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REMOTE STORAGE

Electric Railway Journal

Volume 53

January to June, 1919

McGraw-Hill Company, Inc.
Tenth Avenue at Thirty-sixth Street
New York City

Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the State matters of any particular State. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or State to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or State affairs appear direct under the names of the city or State involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into sixteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index. As an example, if a reader wished to locate an article on power-driven tower wagons he would obviously look in the list under the general subject "vehicles," and of the two keywords that appear under this caption, only "Service and tower wagons" could apply to the article in question. The reader would therefore refer to this keyword under "S" in the body of the index.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other societies are indexed only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair Shop Equipment" and are not indexed alphabetically, because of the wide choice in most cases of the proper keyword.

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Cars (descriptive)
Motor buses
Motor cars, gasoline
One-man cars
Work and wrecking cars

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Controllers
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Gears and pinions
Motors
Trucks
Wheels

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Labor
Wages

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Fare increases
Zone fare system

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Operating records and costs
Public service and regulative commissions

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READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, January 4, 1919 *Number* 1

Journal Raises Subscription Price to Earlier Figure

AFTER resisting for many months the pressure put upon it by the enormously increased prices of everything the ELECTRIC RAILWAY JOURNAL is forced to raise its subscription price, the increase taking effect with the March 1 issue. The increase will be but one-third, so that even at the $4 rate the paper will still be supplied to its readers at a price lower than a number of other magazines in the same class have been forced to charge. Long-time readers of the paper will remember that they paid $4 a year for the STREET RAILWAY JOURNAL up to March 1, 1904, even when it was a monthly. The same causes which have operated to make an increase in fare necessary for the electric railways have been potent in the publishing business. The elements of increased expense in both cases are materials and labor. Take for example the item of paper. White paper of the quality used in the JOURNAL has increased more than 50 per cent in cost in three years; printing costs are a third higher, and engraving expense has gone up 75 per cent. In war time and pre-war time the JOURNAL was sold at a very low price considering the cost of producing it. Its watchword has been "service to the industry," and this included keeping the paper within the reach of all who ought to receive it regularly, but there is a lower limit to the price at which it can be produced. This note of explanation is in no sense an apology for the decision to raise the subscription price. In going back to the former price of $4 the publishers are still furnishing the paper at a price less than before the war in comparison to cost. If the paper is worth while at all, and the overwhelming testimony is that it is so, it is worth any reasonable price. A single idea derived from its columns in the course of a year will more than pay for the year's subscription.

A Definite Program for Immediate Action

After summing up the electric railway situation, in his article in this issue, Philip H. Gadsden says this:

I believe that the financially strong electric railway property groups should get together and support with their money and their executive talent a permanent agency which could do a number of things for the industry as a whole.

It could assist individual railways in solving their local problems by bringing to bear upon these the experience of other railways similarly situated.

It could conduct general publicity campaigns on behalf of the industry generally.

It could demonstrate to public bodies the facts in any particular local situation by furnishing incontrovertible data applicable thereto.

It could do many other things to make itself well worth while.

It is my earnest hope that something of this sort will be done, and done soon and that men of wide experience will show a readiness to give of their time and energy to save the industry from annihilation and permit it to serve the country with first-class transportation.

Electric Railway Statistics Permit Interesting Comparisons

IN THIS ISSUE we publish the statistical tables of rolling stock ordered and track built during the past year. Similar tables have been an important feature of our first issue of each year since 1907. In the analysis of rolling stock, three things stand out above the others. The first is the increase in the number of one-man cars. These cars in 1918 amounted to more than six hundred and constituted 37 per cent of all the cars ordered for city service, exclusive of those for subway and elevated railway use. Nearly all of the one-man cars ordered were of the uniform length of 27 ft. 9½ in. The second noticeable feature is the increase in the number of trailers ordered for interurban operation. This increase was no doubt influenced by the difficulty experienced in obtaining equipment due to war conditions and by the adaptability of train operation to service where large numbers of passengers are loaded and unloaded at single points as at the war industry plants. The third point is the large decrease in the number of home-made cars, due also in part at least to the scarcity of material and labor. As was to be expected, the track statistics show very little new track built. Actually, if the rapid transit extensions in New York City are deducted, it will be found that only four city systems built more than 7 miles of track, and of these four, two were municipal lines. The interurban situation is no better. One publicly owned railway in Canada built 28 miles of track. The aggregate interurban mileage for the United States and the rest of Canada besides this line was only about 90 miles, made up principally of spurs and short extensions, including, of course, those in whose cost the government assisted. More mileage of steam lines was electrified than in 1917, but this was due to the progress made by the Chicago, Milwaukee & St. Paul Railway.

Who Are to Run Our Cars?

ENTERING on a new calendar year we are also at the start of a period of reconstruction—a period which Judge Gary of the United States Steel Corporation predicts will be the most progressive, prosperous and successful in the country's history. This enormous work of reconstruction will undoubtedly demand the activity of every man and woman capable of taking part in the task. It will call for the organization of industry in such a way as to utilize to the full all of the available working forces of the country. There will be no place in the economic structure for any idle person—man or woman—rich or poor—who is physically able to perform useful service.

In this situation the electric railways are confronted with a problem which has frequently been mentioned in these columns and which grows all the more disturbing in view of recent developments. We have in mind the shortage in man-power for the operation of cars and the discouraging outlook for the employment of women substitutes because of certain recent rulings of the War Labor Board. The situation is best illustrated in Cleveland and Detroit, as told in two articles in the Dec. 21 issue of this paper. In the first-named city the company has been forbidden to hire more women conductors and directed to discharge those now in service before March 1. In Detroit the union has notified the company that no more women must be employed and that those now on the cars must be let out in the near future. This dispute is now pending before the War Labor Board.

The attitude of the Amalgamated Association toward women conductors has been hostile from the start, the alleged basis for this opposition being the claim that female employees were being introduced in order to reduce wages and to demoralize the unions. That this contention had no foundation is evident by the ready agreement of the companies to pay full union wages to the women conductors and to allow them to join the organization of the trainmen. In its latest pronouncement on the subject, the Amalgamated Association still contends that the position of conductor is not the place for a woman, although it says that when their employment in this capacity is necessary during the war they should be on the same basis as men as to pay, seniority and working conditions and should become members of the association.

In face of the continued shortage of suitable male employees for platform duty in many cities this attitude of organized labor—apparently sanctioned by the War Labor Board—offers a disheartening outlook for an industry which should be ready to meet the full requirements of the coming period of construction. Women have been employed as conductors on several properties in the United States as well as in foreign countries. We believe that experience has proved them adapted to the work; in fact, since the duties of a conductor have become primarily those of a cashier, as they have on most modern prepayment cars, may we not venture to say that women are better fitted for the place than men? All reports indicate that the average woman conductor is accurate, rapid, honest, courteous and enthusiastic in the performance of her duties. Several companies reported a decreasing list of accidents due to the greater caution of these employees. The public is satisfied in every city where they have been used. In brief, the statements in general indicate that the women conductors have made good. In view of the past year's experience we believe that there is a field for the woman conductor—a field of course with limitations. The employment of these women at the time was a patriotic duty. The companies which rose to the occasion and kept hundreds of extra runs in operation when no suitable men were available should not be discouraged now by any action of the War Labor Board.

The year just closed has been a hard one also for electric railways in having to meet the terms of the War Labor Board in the various awards affecting wages and working conditions. Admitting the justification for a living wage for the workman, the rulings of this board, which advanced the remuneration of street car employees about 50 per cent without providing the means for meeting this added item of expense, proved a real hardship in every instance. Several recent receiverships are a warning of the results of such a policy, and unless conditions in the nature of increased revenue improve shortly the coming year will prove disastrous for many more of the properties concerned. The labor situation, to say the least, offers a gloomy outlook.

The B. R. T. Goes Into Receiver's Hands

THE inevitable has happened and the Brooklyn Rapid Transit Company has gone into the hands of a receiver. This financial collapse will be a source of special regret to electric railway men because the company has made many important contributions to the science of railroading and is recognized everywhere as a leader in economical and scientific operation. Nevertheless, it has been compelled to acknowledge defeat in its tremendous struggle against the odds of continually increasing expenses with a fixed fare.

The list of electric railways which have passed into receivership during 1918 is far larger, measured in number of companies, miles of single track or capitalization, than in any previous year, and other companies will follow soon unless remedial steps are taken. It is significant that in New York State two of the three largest electric railway properties, those in Brooklyn and Buffalo, have confessed insolvency, and the president of the third among the large railway systems, the Interborough Rapid Transit Company, warns its partner in the dual subway agreement, the city of New York, that it too is in danger of being starved into bankruptcy unless remedial measures are begun promptly.

There is but one answer to the New York situation. The present Legislature should promptly grant power to the present public service commissions, or to their successors if new commissions are to be chosen, to permit the companies to charge an adequate fare. The city authorities should co-operate where they have power to do so and have not exercised it.

This is not only the counsel of justice but of expediency. Electric railway service is a public necessity and its cost must be met. The conditions under which these companies suffer are not local but general. Relief, and given quickly, is the best as well as the only fair course possible.

The Prospects for 1919 Surveyed

IS THE débâcle at hand for the electric railway industry in the United States? Is the year 1919 to witness a series of financial disasters in this great class of public utilities? We hope our next annual Statistical Number will not have to record such a story of cataclysm, yet we do not hesitate to predict that the financial record of the coming twelve months will include many an item of bankruptcy for these properties unless prompt and sufficient means are devised for meeting their dire need of additional revenue. We have just discussed the situation in New York City. That in the country at large is not greatly different.

Last August the War Labor Board handed down a batch of awards fixing new wage scales for electric railways whose employees had appealed to this tribunal for the means of meeting the increased cost of living. The new wages were generous but not out of proportion to the rates paid at that time to other labor. The difficulty in the situation, however, was that most of the companies affected had not the resources with which to meet the added expenses. The members of the board appreciated the dilemma in which the companies were placed, but they could do nothing except call attention to the situation and make recommendations for relief by federal or local authorities.

Except in a few instances, the public has not shown a disposition to measure up to the standard of fair dealing which the board set before them. In some cases state utilities commissions or municipal authorities have extended a helping hand to the suffering transportation agencies, but this aid has rarely been sufficient to give adequate relief. In a greater number of cases the authorities have either refused an increase in fares or are withholding action while creditors knock at the doors of the distressed companies. Meanwhile service suffers and these utilities are unable to do their share in the great period of reconstruction which is at hand.

The threatening outlook can be no better pictured than by noting the experience of the Chicago City Railway, which recently passed its dividends for the first time since dividends were initiated in 1870. This is one of the two main properties, and the most prosperous, of those composing the Chicago Surface Lines. The regular quarterly distribution was omitted because the company not only is failing to earn anything for the stock, but is not earning 5 per cent on the city purchase price. President Busby explained that this action was caused by the wage increase ordered by the War Labor Board, the increased cost of supplies and the falling off in gross receipts due to a decrease in traffic. The Surface Lines petition for a 7-cent fare has been pending before the State commission for several weeks and the frequently delayed hearings prompted one of the attorneys to state that another of the component companies faces serious financial troubles if it cannot meet its bond interest on Feb. 1.

The Boston Elevated situation is only less alarming because its failure to produce adequate revenue through earnings is offset by the guarantee of dividends through the State taxing power. This case, however, is an unusual illustration of the effect of fare increases on traffic. Under public trustee operation, with the power to alter fares to meet the cost of service, fares were advanced last August from a 5 to a 7-cent basis. Passenger revenue for the first month increased about 24 per cent. For the second month it showed a gain of 12 per cent, while for the third month—due largely to the effect of the influenza scare—the gain was only 1 per cent instead of the possible 40 per cent under the new rate. On Dec. 1 the fare was raised to 8 cents, but on account of the resulting traffic losses the increase in revenue was so small as to be ridiculous. It has been stated that a 10-cent fare would pay the Boston Elevated bill provided everybody who used the cars last year at 5 cents would be compelled to ride this year and pay 10 cents.

This brings us to the critical question being asked by railroad men all over the country, namely, "What system of fares will enable us to get out of our difficulties?" Some companies have gone from a 5 to a 6-cent basis and instead of the theoretical increase of 20 per cent in revenue, the reports show anywhere from 8 to 14 per cent. Others having tried a 7-cent fare, with the possibility of a 40 per cent gain, report gains from 1 to 24 per cent. A few have been collecting 8 cents, and instead of the theoretical gain of 60 per cent in earnings they show from 9 to 14 per cent. Ten-cent fares have been tried elsewhere, and it is possible that some companies will experiment with rates even higher.

The receiver of the Bay State system stated recently that this constant irritation of the public by little jabs at the problem is responsible for a large part of the railway troubles. He favored a jump to a rate considerably higher so that changes hereafter will be in the direction of lower fares. There are other thoughtful operators who expect to find eventual relief only in a zone system of fares. Still another group are coming to agree with the view recently expressed in the Bay State fare case that "it is wiser to place a part of the burden of the cost of necessary electric railway service directly upon the community as a whole than to suffer increases in fare which do not produce the results that they are designed to produce, and which are seriously disturbing to social and economic conditions."

The concentration of trained minds on this problem is bound to find a solution in time. A solution will be found because electric railways are essential to the national life and someone must pay for their continuance. Further receiverships may be required to awake the public and the authorities to the danger, but it will be unfortunate indeed if such a price has to be paid to attain justice. The subject is receiving much publicity, and the public we think realizes, as never before, that early action is necessary. What that action might be is suggested in the extended article in this week's issue by L. R. Nash of Stone & Webster, who reviews at length the principal service-at-cost franchises in existence or proposed. The Merchants' Association in New York has appointed a committee to report on the subject and similar action will be taken by the United States Chamber of Commerce. We have no doubt that through the work which is being done in and outside the industry the long dormant sense of fairness in the mind of the prejudiced public will be roused and the utilities which have been crowded to the brink of disaster will be saved. We confidently believe that the year 1919 will bring the dawn of an era of understanding and fair dealing.

Cohesive Spirit of Electric Railway Industry Must Be Conserved and Intensified

Results of Activities of Temporary War-Time Organization Will Be Partly Lost Unless Effort Is Made to Capitalize and Stabilize Them—A Number of Very Definite Utility Problems of a National Character Await Solution

BY PHILIP H. GADSDEN
Chairman Readjustment and National Relations Committees,
American Electric Railway Association

THE publication of the annual review issue of the ELECTRIC RAILWAY JOURNAL renders especially timely a retrospective view of the condition of the transportation utility during the past year under war conditions. But such a retrospect is warranted only if it furnishes help for the future. The American Electric Railway Association has appointed a committee on readjustment, the purpose of which is to assist electric railways in tiding over the period on which we are now entering. Before it has finished its work this committee will presumably have definite recommendations to offer with reference to some permanent way of conserving the gains in co-operative spirit which have been made during the war period. Otherwise the sacrifices and concessions made will largely have been in vain. And this matter must be considered not alone in the light of the needs of this one industry, but rather of the needs of public utilities as a whole. An industry representing a capitalization of ten billion dollars, and involving the welfare of hundreds of thousands of stockholders and bondholders and the comfort and convenience of many millions of citizens must speak as one voice for the principles of fair dealing and justice for which the great war has been fought and won.

PHILIP H. GADSDEN

Mr. Gadsden has done notable work for public utilities generally, and for the electric railway in particular, during and before his time of residence at Washington as local representative of the Electric Railway War Board. Mr. Gadsden is president of the Charleston (S. C.) Consolidated Railway & Lighting Company. He was educated in the Charleston schools and at the University of South Carolina, from which he holds the degree LL.D. He practiced at the bar for fifteen years and also served for six years in the State legislature.

RECONSTRUCTION IS IN THE AIR

The emergency conditions of the war are passing, but they have not yet passed and will probably not disappear entirely for many months. Coal prices are dropping, materials prices will follow, labor conditions arising out of the war will be slow of readjustment, the revenue bill is still in controversy and public ownership is open for national discussion. Furthermore, the reconstruction or adjustment programs of many civic and governmental bodies are just beginning to be shaped. As a step in this direction, the Zihlman bill, offered in the House of Representatives on Dec. 12, provides for a "reconstruction commission" of ten members to study post-war conditions, recommend principles of uniform legislation for all states and consider the problems of labor, capital, credit, public utilities and other matters.

But before going into details regarding reconstruction let us note for a moment the present situation which confronts us. The electric railway industry, due to conditions brought about by the war, is practically bankrupt. It has been subjected not only to the general rising costs of materials but also to the particularly burdensome labor awards of the National War Labor Board. Its needs, as brought to the attention of the federal authorities a year ago, have not brought forth remedial action of a general character. As a result, the electric railways, with few exceptions, find themselves at the close of the war with ruined credit and deteriorated equipment, unable to give adequate service, and in many communities, objects of hostile and unreasoning criticism.

The facts and figures presented by the writer at the war emergency and reconstruction congress of the United States Chamber of Commerce as reprinted in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 14, 1918, page 1045, indicate very clearly the problems that must be solved. Whether they shall be solved by the politicians and reformers or by the industry depends upon whether a defensive or an aggressive policy is adopted by the operators of the electric railways. Furthermore, the manner in which the electric railway problem is handled will, in a very large measure, determine how the problems of other public utilities are to be handled as they arise.

THESE ARE THE BOLD FACTS TO BE CONSIDERED

Briefly, then, the rehabilitation of the industry must be undertaken aggressively, with a recognition of the following facts:

1. As an industry, the electric railway industry is practically bankrupt.

2. Its service is essential to the health, progress and development of every community, hence to the nation itself.

3. The present rate structure is economically unsound, and the present basis insufficient to take care of

increased wages and standards, together with the higher scale of material costs likely to continue for many months.

4. The public authorities, whether state public service commissions or municipal bodies, must be made parties to the readjustment on a co-operative rather than an antagonistic basis.

8. Adequate and satisfactory service to the public is the primary end in view.

The war has taught the industry that the local franchise relationship is inelastic and non-responsive to the economic laws upon which all industry must be founded. It has shown that irretrievable loss is in practically all cases made a condition precedent to the granting of rates that will provide an adequate return. Such irretrievable loss means poor service and public dissatisfaction, hence adequate service and public satisfaction must be insured by some form of public responsibility in the revenues necessary for maintaining such service.

Whether the public's financial responsibility can be worked out through a readjustment of present rate structures and service schedules, or whether the funds necessary shall be furnished from the public treasury, is in a sense a collateral question, as long as the importance of electric railway development as essential to the nation's life and progress is regarded as the prime consideration.

SOME DEFINITE PROBLEMS FOR SOLUTION

The problems for the industry to solve may be considered briefly as follows:

1. It must learn how to conduct an educational campaign which will give the public a point of view from which it will be able to deal with the railways on an equitable and therefore fair basis. In this connection data must be widely distributed so that the public will obtain a proper concept of the costs of building, equipping and operating electric roads, and the utilities must virtually be opened through advertising channels for public inspection. Further, the railways must suggest such inferences from present conditions as to stimulate public thought on the railway question, with special emphasis upon the idea of public interest.

2. The problem of public ownership versus service at cost must be attacked.

3. Due consideration must be given to the merits of quasi-public ownership as compared with the service-at-cost plan.

4. Franchise relationships must be studied.

5. The industry must investigate the extension of state commission jurisdiction under proper laws, particularly with relation to responsibility for financial and service conditions.

In connection with the latter requirement it is interesting to note that during the war the National Committee on Public Utility Conditions investigated the rate situation as affecting the electric railways for the first six months of 1918. During that period 236 rate increases were allowed electric railways by state commissions, whereas during the same period only eighteen were allowed by municipal authorities. It was also shown that in twenty-two states electric railway rates are subject to regulation by municipal authorities. A number of important states in which public service commissions exist fall into this group because of the action of the supreme courts of those states in depriving the commissions of jurisdiction over rates fixed by local franchise.

MANY RECONSTRUCTION FORCES ARE AT WORK

The working out of any such program as herein outlined is not to be confined to any one committee but is to be made a part of the general reconstruction program of the nation. Already reconstruction committees have been organized and relationships established between those committees and the readjustment committee of the American Electric Railway Association. Among these reconstruction committees should be mentioned the following:

1. The special war committee of the National Association of Railway and Utilities Commissioners which is to be continued as a reconstruction committee in Washington, D. C. Its program is a study of the entire problem of public regulation of railroads and public utilities. Among the points for consideration mentioned by the president of the association in his address at its recent convention was this: "Perhaps the time has come for our association to consider the advisability of recommending a change in the contract relationship of these utilities." This statement referred especially to electric railways and their embarrassment during the war by the restrictions imposed by local franchises. Continuing the president said: "One of the methods suggested is that state laws or constitutions be so modified as to give all state commissions jurisdiction over rates of utilities, and that an indeterminate permit free from all local limitation as to rates be issued upon the surrender of the existing license or franchise."

In the report of the committee on public utility rates, presented at the convention, it was suggested under "Electric Rates" that an automatic sliding scale might be desirable, based upon fluctuating costs of material and labor where the state commissions have adopted uniform cost accounting for public utilities. Under "Street Railway Rates" the report states "among utilities most seriously affected by war conditions because of increased cost of fuel, material and labor, are the street railways. It is believed that when it is possible to do so, the zone system offers the most practical method whereby increased income may be obtained. Where zones are already established, an increase in number of zones or a shortening of the zones will usually yield the increased revenue desired." Many other important statements are made with reference to the rates of other utilities. These are some of the problems that will be considered by the reconstruction committee.

2. Reconstruction committee of the National Civic Federation. This committee has listed public utilities among the subjects to be studied, and the thoroughness with which the federation makes its investigations is well known to those familiar with its work.

3. Special committee of the Merchants' Association of New York. This committee is to study and report upon the question of governmental ownership and operation of public utilities and industrial undertakings. A note regarding it and giving its membership will be found in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 14, 1918, page 1063.

4. A committee of the United States Chamber of Commerce, provided for in the following resolution

adopted by the recent War Emergency and Reconstruction Congress:

> Public utilities have faced difficult problems, which have been accentuated by conditions arising out of war. The development and efficiency of such a utility as local transportation has immediate importance for every community. It is recommended that the Chamber of Commerce of the United States should appoint a committee to investigate and study the question of local transportation as it relates to the control of rates and service, franchises, taxes, the attraction of capital into the business, and such other questions as the committee may find pertinent. Such a committee should report its recommendations to the board of directors of the national chamber, and the board should deal with them in accordance with the established procedure of the chamber.

5. A special committee of the United States Chamber of Commerce to be made up of the representatives of industry and the chairmen of the war service committees, represented at the recent Reconstruction Congress. It will include the chairmen of the public utility war service committees that have been organized during the war. Thus, the public utility industry will have representation on this special committee in any work that is undertaken.

6. The readjustment committee of the American Electric Railway Association, to which reference has already been made. In addition to these six reconstruction committees and the bill now before Congress providing for the appointment of a federal reconstruction commission, there should be mentioned the various organizations that are likely to be appointed for the readjustment period, growing out of the activities of the War Finance Corporation, the National War Labor Board, the War Labor Policies Board, the Capital Issues Committee, the War Industries Board and the Council of National Defense.

> THE war has taught the industry that the local franchise relationship is inelastic and non-responsive to the economic laws upon which all industry must be founded. It has shown that irretrievable loss is in practically all cases made a condition precedent to the granting of rates that will provide an adequate return. Such irretrievable loss means poor service and public dissatisfaction.

Furthermore, it is probable that a committee on reconstruction finances will be appointed by the Investment Bankers Association of America, to co-operate with the other committees in relation to financial problems confronting the public utility industry.

In addition to the above, conventions of local public utility associations will be called for the consideration of reconstruction problems. Such a step has already been taken by the Illinois Electric Railways Association, which the writer hopes to be able to address on the occasion of the meeting to be held in Chicago on Jan. 17.

While a wide influence can be exerted through the activities of the above organizations, if properly guided and informed by a central committee, much additional work can be done through the various civic bodies and associations in the various states.

RECONSTRUCTION PLANS MUST BE MADE DEFINITE

One of the chief problems now presented to the electric railway industry is to determine promptly upon the fundamental points that should be urged before these various reconstruction committees and other bodies for consideration. The reconstruction committee of the American Electric Railway Association has already considered a few of the points that should be referred to the special committee on electric railway transportation of the United States Chamber of Commerce. The points suggested for reference to that committee are as follows:

1. A study of the various classes of electric railway franchises, the unusual as well as the usual forms, with a digest of the same, indicating the burdens and requirements imposed upon electric railways, including paving requirements, free transfers, free carriage of certain classes of passengers, compulsory extensions into unproductive territory, etc. Some estimate of the total amount expended by the industry annually on account of paving requirements should be included.

2. The various forms of taxation to which electric railways are subjected, including city, county, state, federal, ad valorem, franchise and gross income taxes.

3. A formulation of some plan looking to the standardization of burdens and requirements and a segregation of the industry for purposes of taxation.

3. Service-at-cost plans, as compared with out-and out municipal ownership, indicating the advantages of quasi-public interest service and finances.

5. Comparison of results of state commission regulation with regulation through municipal bodies.

6. Uniform state commission laws or a standard franchise.

So much for a general program on reconstruction. Next, how is even a satisfactory program to be made effective?

A STRONG CENTRAL AGENCY IS NEEDED

Unless some agency which is financially strong can be set up to put the plan into operation the whole matter will be in danger of resolving itself into a mere academic discussion—reports, resolutions, compliments, but nothing more. I believe that the financially strong electric railway property groups should get together and support with their money and their executive talent a permanent agency which can do a number of things for the industry as a whole, among which I need mention only the following:

1. It could assist individual railways in solving their local problems by bringing to bear upon these the experience of other railways similarly situated.

2. It could conduct general publicity campaigns on behalf of the industry generally.

3. It could demonstrate to public bodies the facts in any particular local situation by furnishing incontrovertible data applicable thereto.

This influential central agency could do many other things to make itself well worth while. It is my earnest hope that something of the sort suggested will be done, and done soon and that men of broad practical knowledge and wide experience will show a readiness to give of their time and energy to save the industry from annihilation and permit it to serve the country with first-class transportation.

Transportation Work of the United States Housing Corporation

Under the Supervision of the Transportation Division 300 or More Cars Have Been Purchased and Much Work Undertaken to Facilitate Housing of War Workers

BY GARDNER F. WELLS
Manager Division of Transportation, United States Housing Corporation

AFTER the United States had been at war with the central powers for some months it became apparent to the government officials that they were being seriously hampered in the task of supplying the munitions of war by the lack of housing facilities for workers in the vicinity of war manufacturing plants. The same conditions surrounded the production of merchant ships also, but fortunately the United States Shipping Board was supplied with the funds necessary for solving the housing problem as soon as the circumstances were appreciated and the necessary legislation to enable the funds to be applied to housing and transportation could be passed. No such provision could be made for the workers in munitions plants until Congress should take special action to provide funds for this purpose, together with an organization to dispense these funds effectively. This was done in the spring of 1918 and on May 16, 1918, an act was passed to authorize the President to provide for housing needs. The President signed the bill on June 26 and the work was delegated by him to the Secretary of Labor, who instituted the Bureau of Industrial Housing and Transportation. Of this bureau Otto M. Eidlitz was made director. To facilitate the administration of the work the United States Housing Corporation was incorporated on July 8 with Mr. Eidlitz as president, and funds became available on July 25. As a part of the activities of the corporation a transportation division was organized and the writer was made its manager.

GARDNER F. WELLS

Mr. Wells was associated with Stone & Webster, Boston, for fifteen years until March, 1916, when he took up his present work as head of the corporation bond buying department of Arthur Perry & Company, Boston. After leaving the Massachusetts Institute of Technology he spent ten years with the Thomson-Houston and General Electric Companies in engineering construction and management work, and followed the same general line with Stone & Webster. He was commissioned major in the Army Ordnance Department in 1917, on leave of absence from his firm, but resigned to take up his present work with the Housing Corporation.

WHY THE TRANSPORTATION DIVISION WAS CREATED

This transportation division was organized for the purpose of improving present, and creating new, transportation facilities for war industrial workers, in accordance with the act of Congress already mentioned. Among other things this act anticipated that in certain localities it would be found that transportation would solve the housing problem. This could be brought about by making communities where there were vacant houses in abundance available to employees in congested industrial centers through improved transportation facilities. It was also anticipated that improvements to local transportation systems in communities where intensive war manufacturing was being carried on would materially add to the speeding up of the work.

That transportation supervision might properly be administered, ample provisions were made in the act for equipping, managing, maintaining, purchasing, leasing, constructing, requisitioning or acquiring by condemnation such transportation lines as might be necessary to provide adequate transportation facilities for industrial employees engaged in war work. This act also carried with it the appropriation of certain funds for the beginning of this work. Subsequent acts have further increased the funds available.

Many special requests for assistance have come to this division from railway companies or manufacturers, but a strict interpretation of the act of Congress indicated that the work to be handled by the division was to be considered from the standpoint of war necessity. The work was therefore confined principally to requests coming from the War and Navy Departments.

The transportation division consists of manager, assistant manager, consulting engineer, three investigating engineers, one construction engineer, a division manager at New York City, as well as an office manager and two investigating engineers, one consulting engineer and two assistants at Chicago, a consulting engineer at Philadelphia, one construction engineer at Erie and one division manager and two construction engineers at Hampton Roads, together with the necessary clerical assistants in the several offices.

The principal work of the division has covered: (1) The installation of special steam and electric train service for war workers. (2) The rearrangement of steam and electric railway schedules. (3) The financing of necessary electric railway extensions and additions. (4) Construction or supervision of construction of these extensions or additions.

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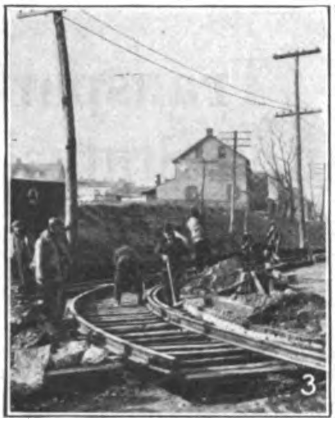
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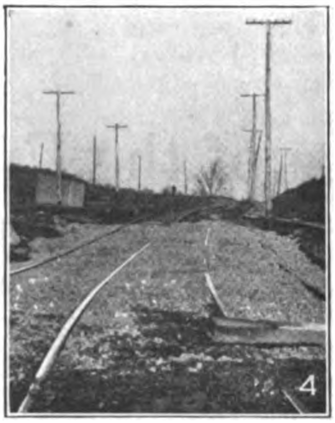
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TRACK CONSTRUCTION WORK AT BETHLEHEM, PA.
Fig. 1—Looking west on Broad Street from Minsi Trail Street. Fig. 2—East leg of wye, Day Avenue. Fig. 3—West leg of wye. Fig. 4—Looking north on Minsi Trail Street, from Market Stoeet to Broad Street.

Through the efforts of the division, twenty-one special steam trains, to provide transportation for war workers, have been installed in various parts of the country. The Railroad Administration has established an especially low tariff for these workers, and in many instances the Housing Corporation has granted still lower rates, absorbing the incidental differentials. By this arrangement a large amount of vacant housing has been made available. At least 8000 people have been cared for in this manner at a cost which will not be more than $275,000 to the division, based on this service being in operation for one year. This is at the rate of approximately $35 per man per year.

The experience of the Housing Corporation shows that the average cost of housing a war worker in a dormitory completely equipped and furnished with cafeteria, etc., is $550, while the cost of housing workers in homes built especially for them is from $3,500 to $5,500 per house, the assumption being that the average number of workers occupying each house will be two. On this basis it will readily be seen that, through transportation improvements, millions of dollars of investment have been saved.

In accordance with recommendations made to the regional directors of the railroads under federal control, and through the co-operation of the United States Railroad Administration itself, war workers have been benefited in many localities by rearrangement of schedules and institution of extra stops on steam railways, and by rearranging schedules on electric railways.

In many instances it was reported by either the War or the Navy Department that electric railway service in connection with war industries was entirely inadequate. In every such case a careful investigation and study of conditions was conducted, recommendations were made and estimates of cost were compiled for necessary improvements.

THE HOUSING CORPORATION PROVIDES THE FUNDS

When it was determined that new and additional transportation facilities were required, plans or recommendations therefor were presented to the companies with the request that measures be taken immediately to acquire or install the necessary extensions, additions or betterments. These recommendations usually involved an expenditure for their accomplishment. In all cases the companies pleaded that they were unable to finance the cost of the work at a reasonable rate of interest. They also objected to making expenditures at the time because of the abnormal costs of labor and material and the fact that the operation of these extensions and additions was unprofitable. It was also held by them that the service was for rush hours only and that these periods were the most costly to operate. In spite of the foregoing, however, they invariably agreed, from patriotic motives, to carry out the Housing Corporation's recommendations, with its assistance and under its supervision.

When it was decided what improvements should be carried out, contracts were entered into with the local

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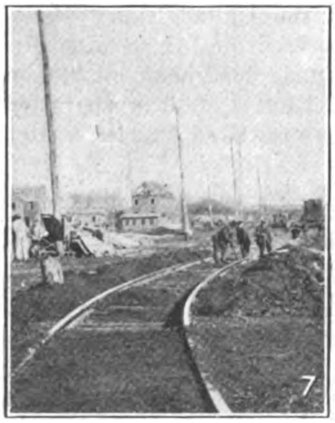
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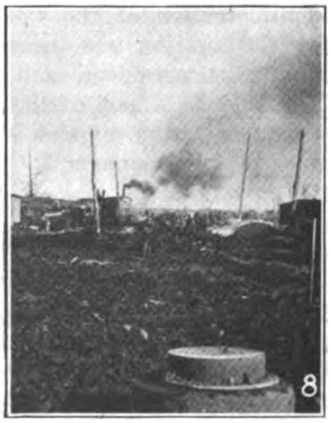
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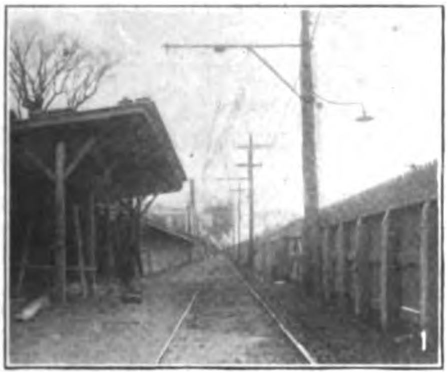
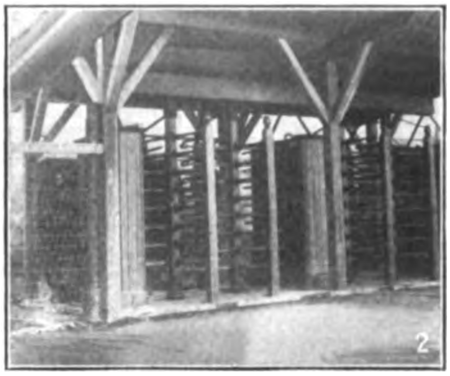
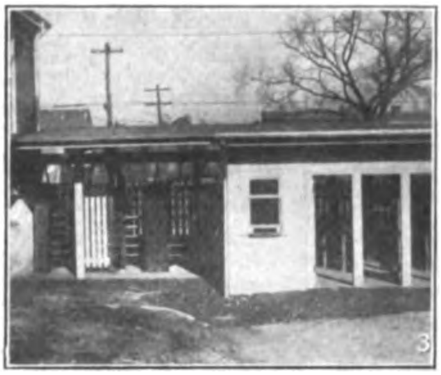
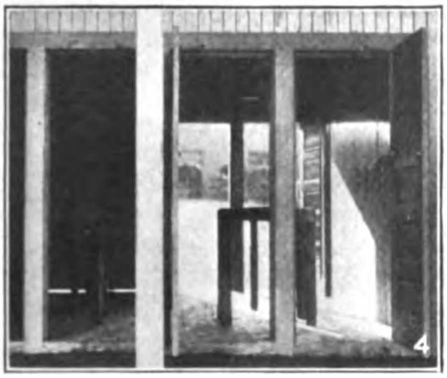
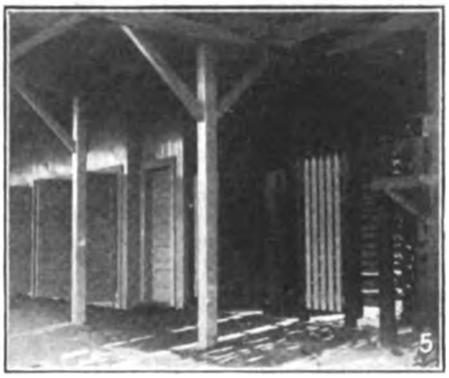
TYPICAL TRACK JOBS AT BETHLEHEM, PA.
Fig. 5—Looking north on Minsi Trail Street from Broad Street. Fig. 6—Looking east on Broad Street from Linden Street. Fig. 7—Looking northeast on Newton Avenue. Fig. 8—Looking northeast on Newton Avenue from Road No. 1.











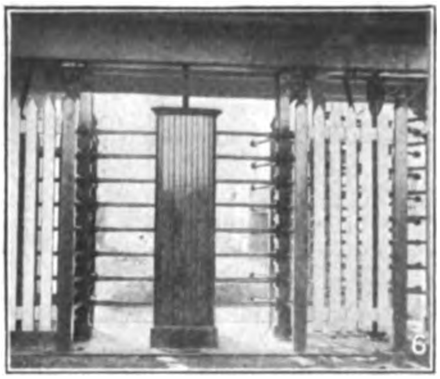


Fig. 1—Prepayment area at Watertown Arsenal.

Fig. 2—Turnstiles at exit.

Fig. 3—General view of entrance-exit structure.

Fig. 4—One of the prepayment entrances.

Fig. 5—Another general view of the entrance-exit arrangement.

Fig. 6—Close-up view of a turnstile.

Fig. 7 — Bridge Street, southwest of Milnor Street, Philadelphia, near Frankford Arsenal.

Views showing construction work at federal arsenals in Boston and Philadelphia done under supervision of the transportation division of the United States Housing Corporation. Figs. 1 to 6, Watertown Arsenal, Boston; Figs. 7 to 12, Frankford Arsenal, Philadelphia.

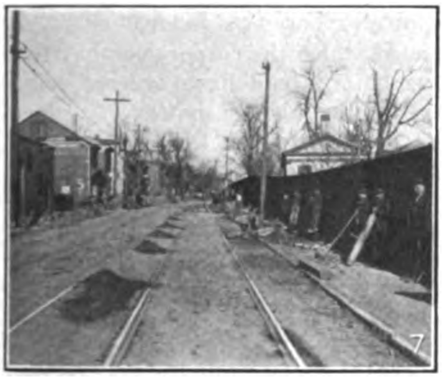
Fig. 8 — Bridge Street north of Frankford Creek—arsenal buildings in background.

Fig. 9—Bridge Street looking northwest from Thompson Street.

Fig. 10 — Bridge Street looking northwest from Milnor Street—arsenal gate at right.

Fig. 11—Pratt Street looking northwest from Richmond Street.

Fig. 12 — Same looking northwest from Salmon Street.



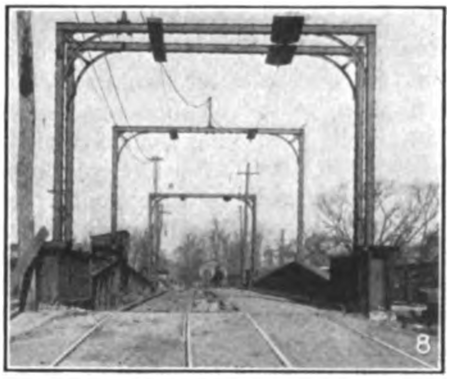


TABLE I—STATUS OF LOANS AND PROPOSED LOANS AS OF DEC. 17, 1918

Locality	Name of Company	Contract Executed for Loan	Loans Recommended in Reports	Allotment Annulled
Bethlehem, Pa.	Lehigh Valley Transit Co.	$650,000		
Bridgeport, Conn.	The Connecticut Co.	1,350,000		
Boston District				$462,000
Boston-Watertown	Boston Elevated Ry.	38,000		
Buffalo, City of Buffalo-Niagara				500,000
Buffalo-Depew	Buffalo & Depew Ry.	74,000		
Charleston, S. C.				300,000
Chicago, Ill.	Chicago City Ry.	235,000		
Dayton, Ohio				500,000
Erie, Pa.				100,000
Gary, Ind.	Gary & Valparaiso Ry.	33,000		
Gary, Ind.	Gary Street Ry.	169,000		
Hammond, Ind.	Hammond, Whiting & East Chicago Ry.	315,000		
Hegewisch, Ill.	Calumet & South Chicago Ry.	150,000		
Hilton, Va. (Newport News, Va.)	Newport News & Hampton Ry. Gas & Electric Co.	*150,000 25,000	G$65,000	
Milton, Pa.	Lewisburg, Milton & Watsontown Passenger Ry.	25,600		
Neville Island, Pa.				2,700,000
Newark District	Jersey Central Traction Co.		67,000	
Newcastle, Del.				100,000
Niles, Ohio				300,000
Norfolk District				1,700,000
Norfolk, Va.	Virginia Ry & Power Co.	300,000		
Pensacola, Fla.				100,000
Philadelphia District				456,000
Philadelphia, Pa.	Philadelphia Rapid Transit Co.	2,284,000		
Rock Island, Ill.	United Light & Ry. Co.	105,000		
Seven Pines, Va.	Richmond - Seven Pines Ry.	*118,147		
Toledo, Ohio				500,000
Tullytown, Pa.				150,000
Washington, D. C.	Washington Ry. & Elec. Co.		125,000	475,000
Washington, D. C.				400,000
TOTALS		$6,021,747	$257,000	$8,743,000

SUMMARY:	
Contracts executed	$6,021,747
Loans recommended	257,000
Allotments annulled	8,743,000
Total	$15,021,747

*Purchase by Housing Corporation.

transportation companies whereby the Housing Corporation financed the undertaking on a 5 per cent interest basis. In most instances the government is to bear the excess war cost, this to be determined in the following manner.

An appraisal of the additions and extensions to the properties is to be made on a date fixed by the Housing Corporation within a period of from one to three years after the declaration of peace, to determine their then cost to reproduce new. The difference between this appraisal and the actual cost of the work is termed the war excess cost, and this difference is to be borne by the government. Where funds have been advanced, the companies have been required to furnish proper security by lien, mortgage or pledging of securities, or guaranty of another and responsible corporation. The amount as determined by the appraisers is in substantially all cases to be returned to the government in five equal annual installments, payment of the first installment being due one year after the date of the appraisal.

In accordance with the above arrangement the government, through the Housing Corporation, has contracted to advance about $6,000,000 to various traction companies. The total appropriations for the transportation division originally amounted to $15,000,000. As soon as the armistice was signed, the amount was cut down to approximately $6,500,000. There may be a further reduction due to the omission of some of the work planned. A general summary of the division's expenditures is as follows:

Executed contracts with electric railways	$6,021,747
Loans with electric railways recommended	257,000
For operating steam trains	137,500
Transportation division administration expenses and overhead (six months)	30,000
Total	$6,446,247

The first loan executed was with the Connecticut Company, on July 31, and the last was with the Philadelphia Rapid Transit Company on Nov. 8, the total period covered, therefore, being about three and one-half months. One road was purchased, the Richmond-Seven Pines Railway, for the sum of $118,147.

FINDING CARS FOR ELECTRIC RAILWAY NEEDS

Naturally the primary need of the electric railways serving war plants was for cars, and the division promptly made arrangements to supply a considerable number, totaling to date more than 300. Most of these were new cars of the local companies' standard types. New double-truck cars to the numbers indicated were purchased for the following: Lehigh Valley Transit Company, fifteen; Connecticut Company, fifty; Gary & Valparaiso Railway and Gary Street Railway, twelve; Hammond, Whiting & East Chicago Railway, ten; Lewisburg, Milton & Watsontown Passenger Railway, three; Newport News & Hampton Railway, Gas & Electric Company, ten; Philadelphia Rapid Transit Company, 110. Twenty one-man cars were also purchased for the Connecticut Company and fifty for the Virginia Railway & Power Company for use at Norfolk. Some second-hand cars (eight motors and four trailers) were supplied to the Buffalo & Depew Railway; three to the Jersey Central Traction Company, and eight old Interborough Rapid Transit Company cars to the Virginia Railway & Power Company. The one-man cars mentioned were of the standard Birney type, and two of the Gary cars were of the double-end Peter Witt type, nearly like the Housing corporation's proposed "standard" car.

The "standard" type, of which the corporation but for the signing of the armistice would have ordered fifty at once, was developed to simplify the matter of ordering double-truck cars and to render the cars salable after the war in case the local companies should prove to have no further use for them. At the request of the Housing Corporation the War Board of the American Electric Railway Association appointed a committee to consider plans for a design of car which would be adapted to the corporation's needs. As a result the committee approved for the purposes outlined two types of double-truck car, as described in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 26, 1918, page 729. Special credit is due to C. O. Birney of Stone & Webster, Boston, Mass., for his work in preparing plans for the consideration of the above-mentioned committee.

TRACK EXTENSIONS WERE ALSO A FEATURE OF THE DIVISION'S ACTIVITIES

In addition to the provision of rolling stock the Housing Corporation financed many track improvements, and in more than one case assisted in increasing power facilities. A notable example of this work is furnished by the Plaza "dumb-bell" loop at Bridgeport, Conn., an improvement to facilitate loading and routing of the cars in that important munitions center. Other extensions and rearrangements in Bridgeport bring the total expense at that point to about $1,333,000. At Boston, Mass., a loop and prepayment station for the Watertown arsenal involved an expenditure of about $40,000.

A very large proposition was a double-track extension of the Chicago (Ill.) City Railway to serve the United States Quartermaster Depot. This extension is a mile in length, is located on Thirty-ninth Street between Ashland and Western Avenues, and cost about $230,000. In the same city $150,000 was spent for nearly 12,000 ft. of single-track equivalent for the Calumet & Chicago Railway to benefit employees of the Pressed Steel Car Company and the Ryan Car Company. One of the largest single jobs was at Philadelphia where, besides the large number of cars supplied, additional substation and feeder capacity was furnished as well as storage tracks, etc., all to accommodate the workers at the League Island Navy Yard. These improvements cost more than $1,000,000. Similar work in the Eddystone district cost nearly $600,000, and more than $500,000 was spent on extensions, a rotary substation, direct-current feeders, a terminal loop, etc., at the Frankford Arsenal. These examples are cited merely to show how diverse has been the task of the transportation division and how wide the territory over which its work has been spread.

In concluding this brief summary of our work I take the opportunity to record the appreciation of the division for the splendid co-operation it has enjoyed from the Navy and War Departments, the United States Railroad Administration, the Emergency Fleet Corporation, and other governmental agencies and to the American Electric Railway Association War Board. Special credit is due to Mr. Eidlitz, president of the corporation, and to J. P. Clark and A. L. Drum, consulting engineers to the division. Mr. Eidlitz has been in the closest possible touch with the Department of Labor, under the auspices of which the corporation has operated. Messrs. Clark and Drum have personally investigated in the field the propositions made by the electric railways and have furnished sound engineering counsel in connection therewith.

The General Electric Company, the Westinghouse Electric & Manufacturing Company, Stone & Webster and other commercial concerns have rendered invaluable aid. E. S. Harkness, of the Standard Oil Company, assisted very materially in connection with transportation matters. On the division staff at Washington the manager has been ably assisted by W. A. Mellen, formerly associated with the Capital Traction Company; H. H. Easterly, associated with Mr. Drum; Cabot Stevens, of Stone & Webster; Edward P. Smith, formerly with Harris, Forbes & Company; G. W. Wells, formerly with Stone & Webster; and H. A. Nicholl, general manager Union Traction Company of Indiana. Mr. Smith's financial advice in connection with the making of loans was greatly appreciated. Mr. Nicholl was in charge of the Hampton Roads district. The division also extends its thanks to its loyal office staff for the way in which it assisted in the work done during the past few months.

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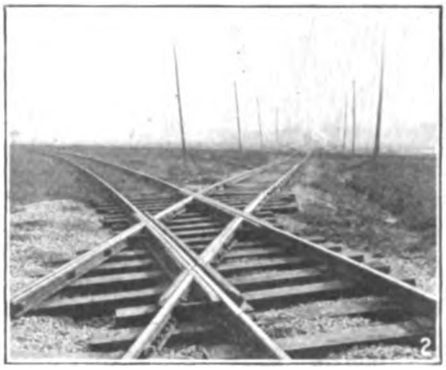
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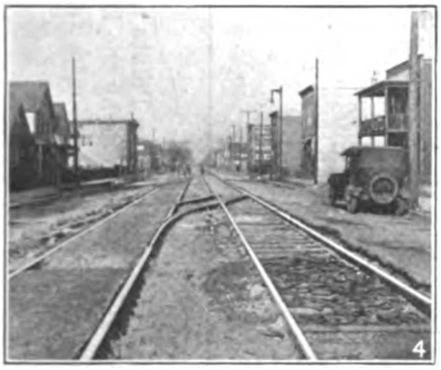
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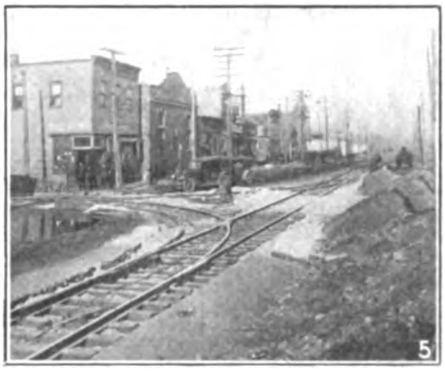
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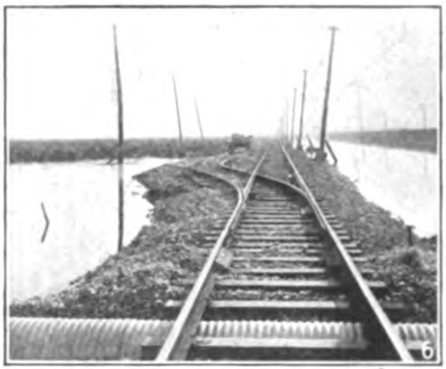
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TRACK CONSTRUCTION IN CHICAGO

Fig. 1—Forsyth Avenue, looking south from Chicago Avenue, showing double-track, the second track having been installed to facilitate movement of cars at a very heavy loading point.

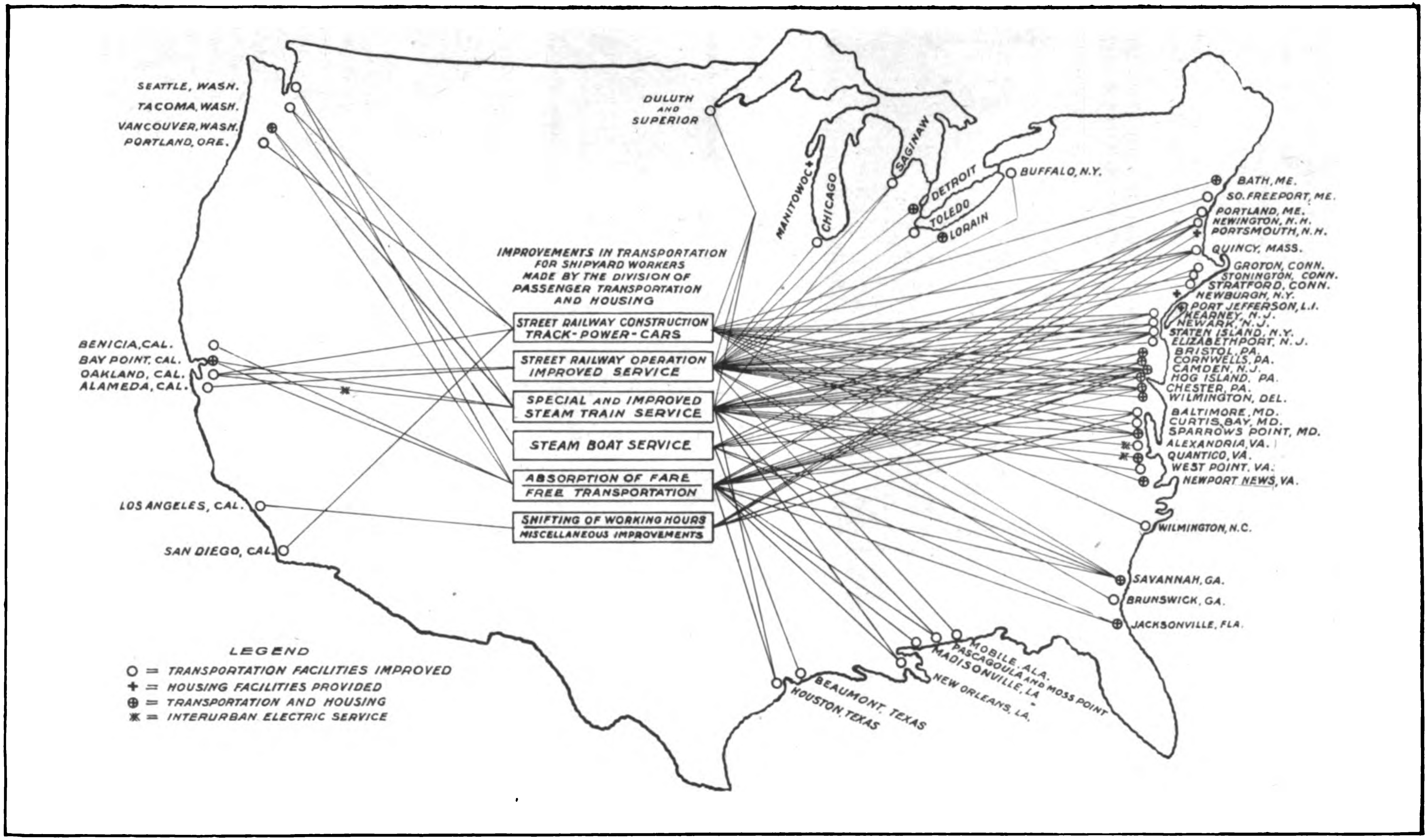
Fig. 2—Hegewisch extension, on Brandon Avenue, looking south from steam railroad crossing. Double-track begins where car is seen.

Fig. 3—Hohman Street, looking south from point near N. Y. C. R. R. track, showing second track installed to complete double-track line to Chicago.

Fig. 4—Hegewisch extension, on Brandon Avenue, looking north from Brainard Avenue (end of line) at Pressed Street Car Works.

Fig. 5—Columbia Avenue, Winton Avenue and Chicago Avenue, looking north from former stub terminal at Standard Steel Works. Near point where connection is made with Gary Street Railway.

Fig. 6—Hegewisch extension, on Brainard Avenue, looking south from about 125th Street and showing construction through marsh.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TACOMA, WASH.
VANCOUVER, WASH.
PORTLAND, ORE.
BENICIA, CAL.
BAY POINT, CAL.
OAKLAND, CAL.
ALAMEDA, CAL.
LOS ANGELES, CAL.
SAN DIEGO, CAL.
DULUTH AND SUPERIOR
MANITOWOC
CHICAGO
SAGINAW
DETROIT
TOLEDO
LORAIN
BUFFALO, N.Y.
BATH, ME.
SO. FREEPORT, ME.
PORTLAND, ME.
NEWINGTON, N.H.
PORTSMOUTH, N.H.
QUINCY, MASS.
GROTON, CONN.
STONINGTON, CONN.
STRATFORD, CONN.
NEWBURGH, N.Y.
PORT JEFFERSON, L.I.
KEARNEY, N.J.
NEWARK, N.J.
STATEN ISLAND, N.Y.
ELIZABETHPORT, N.J.
BRISTOL, PA.
CORNWELLS, PA.
CAMDEN, N.J.
HOG ISLAND, PA.
CHESTER, PA.
WILMINGTON, DEL.
BALTIMORE, MD.
CURTIS BAY, MD.
SPARROWS POINT, MD.
ALEXANDRIA, VA.
QUANTICO, VA.
WEST POINT, VA.
NEWPORT NEWS, VA.
WILMINGTON, N.C.
SAVANNAH, GA.
BRUNSWICK, GA.
JACKSONVILLE, FLA.
MOBILE, ALA.
PASCAGOULA AND MOSS POINT
MADISONVILLE, LA.
NEW ORLEANS, LA.
BEAUMONT, TEXAS
HOUSTON, TEXAS
IMPROVEMENTS IN TRANSPORTATION FOR SHIPYARD WORKERS MADE BY THE DIVISION OF PASSENGER TRANSPORTATION AND HOUSING
STREET RAILWAY CONSTRUCTION TRACK-POWER-CARS
STREET RAILWAY OPERATION IMPROVED SERVICE
SPECIAL AND IMPROVED STEAM TRAIN SERVICE
STEAM BOAT SERVICE
ABSORPTION OF FARE FREE TRANSPORTATION
SHIFTING OF WORKING HOURS MISCELLANEOUS IMPROVEMENTS
LEGEND
○ = TRANSPORTATION FACILITIES IMPROVED
+ = HOUSING FACILITIES PROVIDED
⊕ = TRANSPORTATION AND HOUSING
✱ = INTERURBAN ELECTRIC SERVICE

Map of the United States Showing the Points at Which Improvements for Shipbuilding Workers Have Been Made by the Division of Passenger Transportation and Housing, U. S. Shipping Board, Emergency Fleet Corporation

Electric Railways Help Win the War

How Electric Cars Were Purchased, Electric Roads Extended, Steamboats and Railroad Trains Put in Service and Houses Erected During the War to Stimulate Production at Our Shipyards

BY A. MERRITT TAYLOR
Manager Passenger Transportation and Housing Division, United States Shipping Board Emergency Fleet Corporation

A. MERRITT TAYLOR

Mr. Taylor, previous to his connection with the Emergency Fleet Corporation, was best known for his work as transit commissioner, and later as director of city transit, of Philadelphia, Pa. After serving an apprenticeship as a boy in the machine shops of Wm. Sellers & Company, in Philadelphia, he became interested in investment securities, and in the development of transportation properties. In this field he was very successful and he still retains the presidency of the Philadelphia & Westchester Traction Company, to which he was elected when but twenty-four years of age.

WHEN the United States went to war, enemy submarines were rapidly destroying the world's mercantile marine, and it was at once apparent that the winning of the war was largely dependent upon the building of ships in which to transport our men, munitions and supplies to the European battlefields.

The United States Shipping Board Emergency Fleet Corporation was established by Congress and endowed with the authority and funds to build the ships. Great shipyards were established; others were enlarged. Our problem was to get men to the shipyards to build the ships.

Many of the 203 shipyards on the Atlantic, Pacific, Gulf and Great Lakes were located in districts already congested by other war activities; others were of necessity located in districts which lacked the necessary local labor to build the ships.

In order to abate the labor deficiency in these yards, the United States Shipping Board Emergency Fleet Corporation established the Department of Housing and the Department of Passenger Transportation. It was soon found that the activities of these two departments were so closely related that they could function best as one; consequently, on May 7, 1918, they were merged by the formation of the Division of Passenger Transportation and Housing.

HOW THE DIVISION WAS ORGANIZED

Experienced and able transportation men, engineers, architects, builders and others were called and patriotically entered the service of their country in this division. Many of them made great personal sacrifices which have been fully justified by the results of their efforts under the able leadership of the two assistant managers of the division, Garrett T. Seely, normally assistant general manager of the Chicago Elevated Railroads, who has been in charge of the Transportation Department, and J. Willison Smith, normally vice-president of the Land Title & Trust Company, who has been in charge of the Housing Department; and I have record that a part of the success of our undertaking has been due to the exceptional executive ability and indomitable energy of these two men.

Our other associates, many of them leaders in their professions, possessed of rare executive ability, have each and every one of them contributed in a large way in securing the required results, and I shall always be proud of having been associated with such a splendid coterie of patriotic citizens.

A quick survey developed the present and prospective labor deficiency in each shipyard which was resultant from lack of available housing facilities. All existing housing facilities which were found to be unavailable, owing to lack of proper and necessary transportation facilities, were promptly made available by co-operation between the Fleet Corporation and the transportation companies, in financing the construction of required extensions and by enlarging existing facilities, also by the establishment of additional or new transportation facilities.

A separate appropriation of $20,000,000 was made by Congress for the construction of transportation facilities, and of this amount approximately $12,000,000 was utilized, the greater part of which is adequately secured and will be returned to the United States Treasury with interest at 5 per cent.

Our policy has been to encourage, help and require transportation companies to improve their existing facilities and methods of operation with a minimum capital expenditure, and thus to increase the capacity of their existing facilities to transport the additional traffic with a minimum increase in operating costs and fixed charges; also to bring about co-operation of industrial plants in staggering hours whereby the capacity of transportation lines to serve such plants has been increased twofold over night.

THE WAR WORK DONE

The general results obtained are illustrated by two accompanying charts. One illustrates the progress and results of the activities of the division in locating and relieving transportation deficiencies with relation to the total dead-weight tonnage program of ship production by the Emergency Fleet Corporation in the United States. The other illustrates the locations at which transportation facilities have been improved, the general character of the improvements, and the locations at which housing projects have been established.

The principal enlargements and extensions of transportation facilities consisted of the following:

The purchase of 320 new street cars and thirty-five second-hand street cars was financed for the service of seventeen shipyards.

Street railway extensions were either built or financed for the service of eleven shipyards.

Track changes and loops were financed for sixteen shipyards.

Enlargement of railway power-plant facilities was financed for seventeen shipyards.

Thirty steamboats were placed in service for twenty shipyards.

Sixty special steam railroad trains were placed in service for twenty-six shipyards.

Street railway schedules were improved for forty shipyards.

Working hours were staggered at ten shipyards.

Steam railroad schedules were improved for twelve shipyards.

Over 125,000 shipyard employees are now being transported by the additional transportation facilities thus established.

Through the generous co-operation of electric railway companies, 57,000 additional shipyard workers were being conveyed over their lines to the shipyards on the day when the armistice was signed.

The co-operation which has been accorded the government by the electric railway industry and by all electric railway executives through the Division of Passenger Transportation and Housing of the Fleet Corporation has been, without exception, most patriotic and efficient.

It is with pride and much gratitude that I am able to point out to our industry the important part which it has had in thus expediting ship production and in bringing the war to an early termination.

After exhausting all existing housing facilities which could well be made available by transportation service, many shipyards were still unable to secure the men required to build the ships because there was no place for them to live within access of such yards; therefore, a quick resurvey was made which determined the number of additional men required for the production of ships at such yards and the extent of the delay in ship production in such yards, resultant from inadequate housing facilities.

The number and character of the houses which were then required to abate the deficiency were determined and they were promptly built. They included: 8949 substantial individual houses; 1119 substantial apartments; nineteen dormitories; eight substantial hotels.

The foregoing projects have capacity to house 27,732 shipyard workers or 55,324 individuals, and include necessary stores therefor.

The allotments for these projects aggregate $65,883,845.

Substantially all of the aforesaid buildings are in advanced stages of construction or completed. More than 3800 of them are entirely completed with a capacity to house approximately 12,200 shipyard workers.

Although possessed of plenary powers, the Fleet Corporation in dealing with transportation problems has regarded and protected the rights of transportation companies throughout the great emergency which called for instant action.

Public officials, street railway executives and the public were brought together and shown what was their duty to each other and to their government, and a better understanding has thus been gained of the respective rights of electric railways, of municipalities and of the public, and of their respective duties to one another which should be of lasting benefit to all of them.

A BETTER UNDERSTANDING HAD OF PUBLIC UTILITY CONDITIONS

The public generally has, during the war, come to understand that the financial necessities of electric railways must be met or the traveling public must suffer from inefficient service, also that electric railways are just as essential to the body politic as the circulatory system is to the body human; hence the body politic is not going to permit the electric railways to be paralyzed by misguided public officials or by those who through ulterior motives, lambast vested interests. I predict that the time is at hand when those who persist in these nefarious practices will be branded as public enemies and driven out of public life by an enlightened and incensed public.

The war has taught the American people the value of co-operation and what it accomplishes.

Now is the time for all public utility companies to recognize the necessity of co-operation between them and their customers. When this co-operation is developed through the establishment of mutual confidence, which must be brought about through frankness and a complete understanding of the respective rights, duties and necessities of each, there will be no apprehension or injustice on the part of the public, public officials or the management of electric railways.

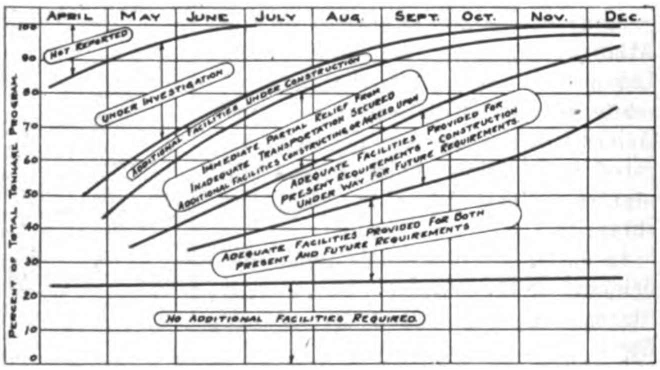


CHART SHOWING PROGRESS OF ACTIVITIES OF DIVISION IN RELIEVING TRANSPORTATION DEFICIENCIES, PLOTTED IN PERCENTAGE OF TOTAL TONNAGE PROGRAM

Twenty years of study and consideration of the problems affecting public utilities, made during various periods in the interest of the United States and municipalities on the one hand and public utility companies on the other hand, and extended investigations made during the war in many localities along our Atlantic and Pacific seaboards and on the shores of the Gulf and Great Lakes, have led me to these happy conclusions.

Among electric railway executives the constructive optimist is to-day the best asset of our industry, and the destructive pessimist is the heaviest burden which it has to carry.

Recent Developments in Service-at-Cost Franchises for Utilities

The Principal Provisions of the Various Service-at-Cost Franchises of Electric Railway Companies Are Described with Great Care and Compared as to Results—The Author Then Draws Conclusions as to the Most Desirable Forms of a Service-at-Cost Franchise

BY L. R. NASH
Stone & Webster, Boston, Mass.

L. R. NASH

Mr. Nash has been connected with Stone & Webster for the past twenty-three years. He entered through the engineering department and has been both a constructing engineer and utility manager, but latterly he has been devoting most of his time to public relations and to appraisal and rate cases and has engaged in work of this kind for more than thirty public utility properties in different parts of the United States and Canada. He has also lectured on his specialties at the Massachusetts Institute of Technology and Harvard University, from both of which he has received degrees.

THE year 1918 witnessed a noteworthy development in railway franchises, in which the fundamental feature is the rendering of service at actual cost. Franchises of this kind are not new in the United States, their use covering a period of more than ten years, but until quite recently their number has been very small and the results of their operation not wholly satisfactory. The new franchises drawn during the past year have attempted to cure the defects which have developed from experience with the earlier models and are of further interest through their reflection of the changes in economic thought applicable to public utilities.

Further attention to this subject has doubtless been stimulated recently by the serious financial difficulties which have befallen the electric railway industry since the civilized world took up its sword in defense of justice and freedom. As a rule the railways have found a 5-cent fare insufficient to cover war-time costs of service and have attempted to secure higher rates. Many of them operated under long-term franchises limiting fares to the established, conventional rate, which presumably held promise of profit when originally adopted. Rapid extensions and improvement of service, transfer privileges and other concessions have kept pace with or outstripped natural increases in business and efficiency to such an extent that the present crisis has been encountered with entirely inadequate reserves.

While many municipalities have unwisely insisted that franchise fare limitations must be strictly observed regardless of consequences, others with breadth of vision have recognized unprecedented conditions and the essential part that transportation plays in our civic and national activities. Some of these latter cities have also taken the precaution to go beyond the bare necessities of a present fare increase and have limited the increase to the period of abnormal conditions. A few of them have gone further and provided that the subsequent reduction shall be proportional to the change in conditions; in other words, they have prepared new franchises embodying the service-at-cost principle.

Within a period of a little more than a year agreements have been reached between municipalities and electric railways with respect to service-at-cost franchises in the following large American cities: Dallas, Tex.; Philadelphia, Pa.; Montreal, Que.; Chicago, Ill., and Cincinnati, Ohio. The service-at-cost principle has been applied by legislative acts to the Boston Elevated Railway and the Bay State system and made available to all other street railways in Massachusetts. Negotiations looking to its adoption have been in progress in other widely scattered communities, notably St. Louis and the Twin Cities. Cities in which similar franchises have been in use for longer periods include the following: Chicago, Ill. (surface lines); Cleveland, Ohio; Des Moines, Iowa; Kansas City, Mo.

Not all these so-called service-at-cost franchises provide, strictly speaking, for the base cost of the service and no more in the prescribed revenue. Some of them embody the sliding scale of rates and return in use by the Boston Consolidated Gas Company and, more extensively, in England, but in a comparatively restricted way. Others provide for a distribution of profits between city and railway. Where the city is required to use its proportion for improvements, extension or ultimate purchase of the railway, service-at-cost still obtains in the long run, although present patrons help to pay the cost of future service. Where the city is not restricted in the use of its proportion of the profits or imposes a special rental or franchise tax, the principle in question is departed from and the prescribed fares cover service-at-cost plus an abnormal part of the city's administrative expenses.

The need of increased fare has not as yet been the primary motive behind the negotiation of most of these franchises, but rather the impending expiration of old grants or the requirements of reorganization, but the example set in Massachusetts, where additional revenue was practically the sole object of the service-at-cost legislation, will doubtless be followed in other communities in the near future.

It is the purpose of this discussion to set forth and compare the distinctive features of the various franchises referred to above, to indicate those features which have found general or recent favor, and to criticise those which are illogical or economically unsound, to the end that an interested reader may assemble such features as appeal to him as the foundation of a model service-at-cost franchise.

Inasmuch as many important features of these various franchises were influenced or controlled by past franchise history and other local conditions, a brief statement of each local situation may throw some light upon the comments on franchise features which follow.

SOME PIONEER SERVICE-AT-COST FRANCHISES DESCRIBED

The Chicago franchises, granted in 1907 in substantially identical general terms to the two principal surface railways serving the city, were renewals of sundry old grants, some of which had already expired, and others were nearing expiration. Extended exploitation of some of these old franchises and alleged exorbitant profits therefrom impelled the city to devise certain safeguards against future similar possibilities. The result, reached after long controversy and exhaustive study, was our first noteworthy franchise of the service-at-cost form. The two principal railways, with subsidiaries, were later combined for operating purposes into a unified surface system.

The acquisition of the Chicago elevated lines by the same ownership and the necessary future association therewith of the comprehensive system of subways projected by the city, led logically to the drafting of a new consolidated franchise covering the existing local transportation facilities and the leasing of the subways to be built and owned by the city. This franchise, which had the indorsement of the business interests of the city, was passed by the City Council in August, 1918, but was rejected at a referendum on Nov. 5, 1918, the opposition being led by certain political and labor elements. The city retained Walter L. Fisher as special counsel in connection with the extended negotiations, he having also served in the drafting of the 1907 franchises. Because the consolidated franchise draft embodies so many features which will doubtless have a place in future franchise negotiations, it has been included in this discussion to the same extent as if it had become effective.

The second franchise of this class, granted in 1909 to the Cleveland Railway in renewal of expired and expiring grants, conforms more nearly to modern service-at-cost standards. It was the outcome of years of bitter struggle, unparalleled in the street railway history of this country, involving receivership, municipal competition, demoralization of service and wreckage of physical property, in which Tom L. Johnson played a dominant part.

In 1914, Kansas City, Mo., granted a new franchise to the Kansas City Railways, organized to succeed the Metropolitan Street Railway then in the hands of receivers. Reorganization and other necessary formalities delayed the putting into effect of this franchise until Feb. 15, 1916, when the Kansas City Railways began operation. A substantial portion of its provisions became effective, however, immediately after its passage on July 7, 1914, and continued in effect throughout the receivership. The primary motive in granting the new franchise was to secure much-needed extensions and improvements which the company was unable to finance under the old franchise, which had only a few more years to run.

The Des Moines (Iowa) City Railway started operations under its new franchise on Jan. 1, 1916. Its old franchises had expired and negotiations looking to renewals had been carried on with the city covering a period of ten years. Progress had been unsatisfactory and receivership followed. Finally the court fixed a period of two years within which the city and company must come to an agreement, failing which the city would be deprived of street car service and the company would be required to remove its property from the streets. The agreement herein referred to was accordingly made. It lacks some of the modern features but still has others of interest.

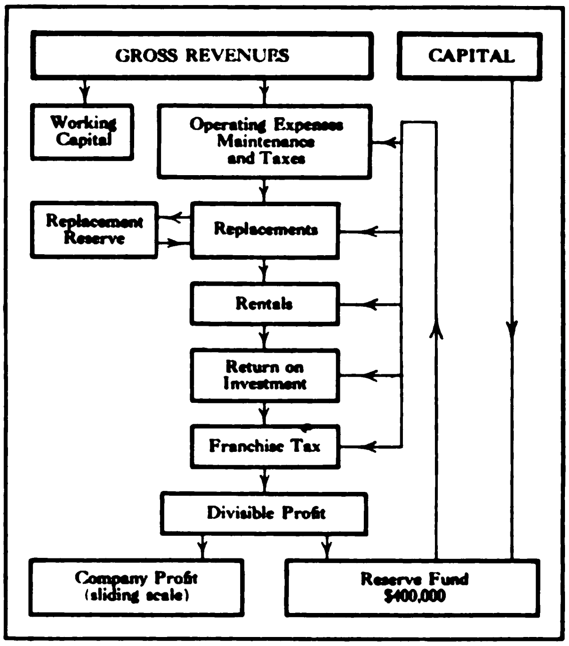
In 1916 Dallas, Tex., passed a new franchise which became effective on Oct. 1 of the following year. It provides for the consolidation of three existing local companies into the Dallas Railways, and the leasing of local lines of another company. It replaced old franchises having only a few years to run under which the logical development of the properties had been retarded.

The new Philadelphia franchise, passed on Jan. 3, 1918, has for its primary object the lease of the city's subway and elevated system by the Rapid Transit Company, and the unified operation of surface and rapid transit lines. It supplements a grant made in 1907 which remains in effect except as modified by the new one. This franchise is now awaiting approval by the Pennsylvania Public Service Commission before becoming effective.

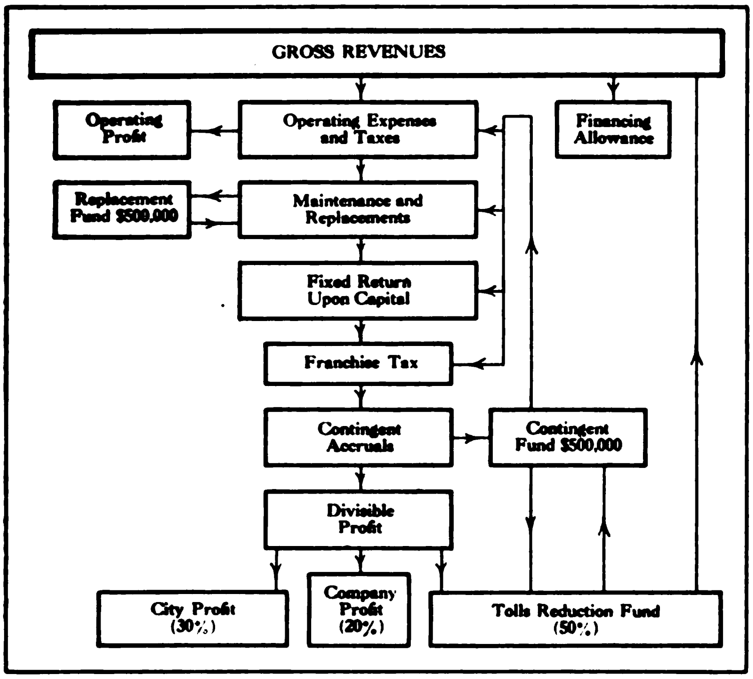
In 1916, the Montreal Tramways found itself in need of additional or extended franchise rights and started negotiations with the city officials for such rights. Opposition developed and finally led to the appointment by the Provincial Government of a commission to investigate the situation and draft a franchise, fair alike to the company and to the communities served. This novel procedure removed the question from the field of local influence and politics, which, in many cases, including one referred to above, have prevented just settlements. The franchise recommended by the commission, with some modification, was approved by the city and accepted by the company on Jan. 28, 1918.

On Aug. 23, 1918, the city of Cincinnati passed an ordinance amending the existing franchise of the Cincinnati Traction Company, granted in 1896 and continuing until 1931, to provide for higher fares and closer regulation. The proceeding was started by a petition from the company asking for permission to increase its fares to compensate in part for war-time increases in cost of labor and materials. The amended franchise, which became effective in September, did not grant an increase immediately but defined the procedure under which it may automatically become effective in the near future.

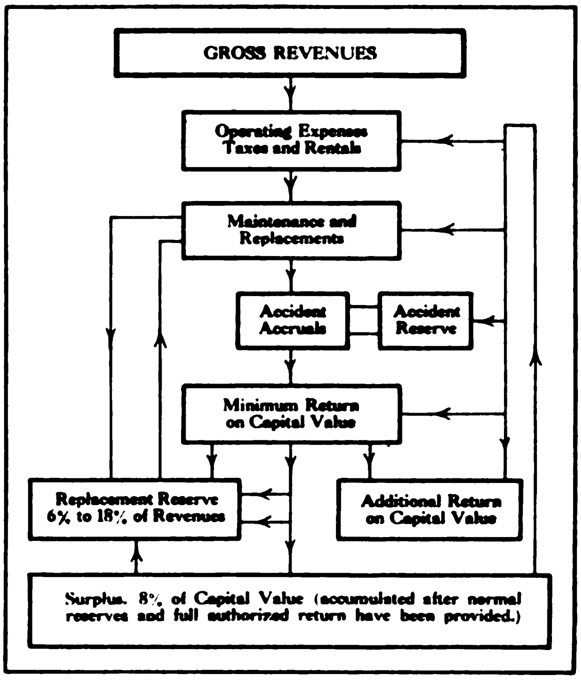
On May 22, 1918, the Massachusetts Legislature enacted a measure providing for public control of the affairs of the Boston Elevated Railway for a period of not less than ten years. The sole object of this act was to effect financial and physical rehabilitation of the system, and to this end a 5-cent fare limitation in the company's charter was removed. As this charter embodied the company's operating rights not only in Boston but in a large tributary area, the amendment of these rights was logically a matter of State legislation. This act was duly accepted and became effective on July 1, 1918, and promises long-needed relief from the burdens of expanding rapid transit facilities which could no longer be carried by a fixed 5-cent fare. The act provides that if the property is returned to private management it shall not thereafter be subject to public regulation which will deprive it of sufficient income to meet the cost of service, as defined in the act. On June 8, 1918, the Massachusetts Legislature passed a similar measure applicable to the Bay State Street Railway, which serves a large proportion of the urban and rural population of eastern Massachusetts. Its purpose was substantially the same as in the case of the Boston Elevated bill, the Bay State system having for some time been in the hands of a receiver. Management of this property has not yet been taken over by trustees because it has so far been impossible to organize and finance the new operating company contemplated by the act to take over the Bay State property.


GROSS REVENUES
CAPITAL
Working Capital
Operating Expenses Maintenance and Taxes
Replacement Reserve
Replacements
Rentals
Return on Investment
Franchise Tax
Divisible Profit
Company Profit (sliding scale)
Reserve Fund $400,000

Cincinnati Traction Company


GROSS REVENUES
Operating Profit
Operating Expenses and Taxes
Financing Allowance
Replacement Fund $500,000
Maintenance and Replacements
Fixed Return Upon Capital
Franchise Tax
Contingent Accruals
Contingent Fund $500,000
Divisible Profit
City Profit (30%)
Company Profit (20%)
Tolls Reduction Fund (50%)

Montreal Tramways Company


GROSS REVENUES
Operating Expenses Taxes and Rentals
Maintenance and Replacements
Accident Accruals
Accident Reserve
Minimum Return on Capital Value
Replacement Reserve 6% to 18% of Revenues
Additional Return on Capital Value
Surplus. 8% of Capital Value (accumulated after normal reserves and full authorized return have been provided.)

Dallas Railways Company

DIAGRAMS SHOWING DISPOSITION OF ITEMS UNDER SERVICE-AT-COST OPERATION

About the same time the Massachusetts Legislature also enacted a general measure under which any other street railway in the State may voluntarily accept a service-at-cost plan of operation under State supervision. This is further referred to herein as the "Massachusetts act." It has so far not been accepted by any of the railways to which it is applicable, primarily on account of the present difficulty of setting up in advance the required reserve fund. The procedure first embodied in these several Massachusetts measures, of transferring the control of public utilities from private management to trustees representing the public, was the result of a desperate need of action, prompt, far-reaching and fearless, which would be accepted by a critical public with far less protest when coming from their own appointees than from private officials, so often assumed to be under control of financial interests. This review of recent agreements might properly include the so-called "dual subway" contracts under which the new subways in New York will be operated. They are omitted because they are not in general effect, and the division of profits provided for therein does not differ essentially from that in effect or contemplated in other cities whose railway franchises are described.

Passing from this historical review, it is now in order to consider more in detail the distinctive features of the various service-at-cost franchises. With so many elements common to all, the logical procedure is adopted of arranging the description and discussion by elements, with a statement of the peculiar features of each appearing in the different franchises. General provisions, applicable to any form of franchise, are omitted unless they assume special significance in the form under discussion.

LIFE OF FRANCHISE

Most of these franchises do not differ from the older forms in the length of their term, which in many cases is limited by state legislation, other than to provide for earlier termination by municipal purchase as elsewhere described. The Chicago consolidated franchise is of the indeterminate form, as are those in Massachusetts, in accordance with the established practice in that State. The Dallas franchise has a fixed initial term of ten years, after which it continues without limit except for purchase provisions.

TABLE I—INITIAL CAPITAL VALUE

In Approximate Figures Per Mile of Single Track of Various Service-at-Cost Electric Railways

Chicago (1907)	$92,000
Cleveland	98,000
Kansas City, Mo.	132,000
Des Moines	54,000
Dallas*	65,000
Montreal	139,000
Cincinnati	138,000

*No power station.

The advantages of unlimited life, in avoiding amortization of investment in excess of adequate provisions for depreciation, and in not discouraging improvements and extensions at any period, are too obvious to need elaboration.

VALUATION

Under one name or another all the franchises herein considered embody an amount used as the basis of return to investors. In most cases the same amount, or another derived from it, is established as the price for municipal purchase. The term "capital value," used in some of the franchises, is adopted herein to designate the rate base. With respect to the initial capital value, the different franchises show a wide range as compared with the actual investment or normal cost of reproduction. The approximate initial amount per mile of track is shown for a number of the service-at-cost cities in an accompanying table.

The Chicago, 1907, surface franchises contain capital values fixed by a commission after a careful appraisal of the properties and determination of their physical condition. The values adopted were the "present value" or cost of reproduction less depreciation. There has been frequent criticism of these values, much of it in connection with the recent franchise campaign, as being too liberal. A careful study of the figures does not furnish support for such criticisms. The physical value allowed for the two principal systems was less than 75 per cent of their combined cost of reproduction. The amounts added to the physical values for franchise values and other intangibles, bringing the compromised total up to $50,000,000, were comparatively small. While a considerable proportion of the reconstruction costs during the initial rehabilitation periods was charged to capital value, there is every reason to give credence to the opinion of the Board of Supervising Engineers, Chicago Traction, that "It is doubtful if a large unified traction company exists in this country to-day which contains a greater percentage of actual physical value in its capitalization."

In the recently rejected consolidated franchise, the capital value was fixed as the current capital value of the surface railways plus a value for the elevated lines determined in a manner similar to that originally followed with the surface lines.

The original Cleveland capital value was the subject of extended controversy and is still freely criticised as unfair to the investors in the property. This value was fixed by Judge Tayler, the arbitrator, at slightly more than $24,000,000. After deducting the outstanding indebtedness, there remained for the stockholders a balance amounting to only 55 per cent of the par value of their holdings. The outstanding stock was surrendered and new certificates were issued for 55 per cent of the original amounts. The 45 per cent of par value thus wiped out amounted to $10,530,000. The full value of all outstanding securities was only slightly in excess of the undepreciated value fixed in the appraisal, which was the basis of Judge Tayler's determination. There was no evidence to show that the property had in the past earned a depreciation reserve or a fair return to investors. Without such evidence there is no economic justification for depreciation of value. No going value element was included.

The Kansas City capital value was determined from an appraisal made in 1912. While the full cost of reproduction was not allowed, the depreciation was more than offset by intangible elements. The very thorough study made in this case of early deficits, franchise values, actual investment, market values and other pertinent elements, is worthy of very careful study in connection with future franchise settlements. Further reference will be made in this article to the intangible elements amounting to about 25 per cent of the full capital value.

The initial capital value included in the Des Moines franchise, $5,000,000, was the result of compromise after the extended negotiations already referred to, and its relation to actual investment is not known. It was only slightly less than the then outstanding capitalization.

The Dallas value was also the result of compromise but was materially below the usual standards. It was about 80 per cent of the actual investment in the properties, which corresponded quite closely with their cost of reproduction. A large going value or development cost was entirely ignored.

No new values were established in the recent amendments to the Philadelphia Rapid Transit franchise. Actual indebtedness and the par value of the $30,000,000 of capital stock approved in the 1907 franchise plus actual expenditures for new facilities form the basis of the return to investors.

The capital value fixed by the provincial commission for the Montreal franchise was in fairly close agreement with the company's capitalization and is believed to be approximately equal to the cost of reproduction of the property.

The recent amendment to the Cincinnati franchise does not definitely name a complete capital value for rate purposes but does establish a base, determined by appraisal, for a municipal price.

The several Massachusetts railway acts considered herein recognize, as far as capital value is concerned, the long-established custom in that State of basing return and purchase price upon actual cash investment, "honestly and prudently made," without deductions for depreciation or other theoretical factors and without specific reference to the form of securities outstanding. This sane policy, adhered to by the Massachusetts commissions in the face of widely different methods advocated in other states with less complete regulatory experience, has materially increased the stability of public utility investments within their jurisdiction.

Starting with the initial capital values as herein described, a continuous record is kept for purposes of return or purchase, or both. The procedure is in most cases similar. Approved additions to property are included at actual cost or with an arbitrary allowance for certain overhead elements such as supervision, financing, etc. Property lost or retired is similarly deducted from capital value, logically and usually by the amount representing its cost or other value previously included in capital value. In the case of Cleveland, this practice is not followed. If worn out or obsolete elements of property are replaced by new elements, the capital value is increased only by the excess cost of the new elements over the estimated cost of the replaced elements new at the time of replacement.

The property included in the initial capital value was entered at an average of 70 per cent of its then cost of reproduction. If it were withdrawn from time to time at this same depreciated value and replaced by new property at full value, the initial 30 per cent depreciation would ultimately disappear. This possibility has been carefully avoided and the initial depreciation, with whatever injustice to stockholders was involved therein, will always remain, although subsequent stockholders are assured a continuous return upon their full investment. This discriminatory feature is not to be found in full in any other of these modern franchises. In the Dallas franchise, which embodies a similarly depreciated value, this Cleveland provision applies after an initial rehabilitation period of two and one-half years within which a large amount of reconstruction was required, including those elements of the property which had experienced maximum depreciation.

The capital value set up in these franchises includes, or has added to it for rate purposes, an allowance for working capital, including cash, supplies, net current assets, etc. In a few cases a distinct fixed sum or a fixed percentage of gross revenues is established, but more commonly the amount included in the original appraisal, on which the capital value was based, is continued unless or until a larger amount is authorized.

A review of the different bases of capital value used in these franchises shows a preponderance in favor of cost of reproduction or actual investment without deduction for accrued depreciation. Actual investment as a basis for rates has so many obvious and logical advantages as to give it increasing favor in regulatory practice. It would probably have much wider use but for the difficulty of determining it from the records of old properties which may have been through many reorganizations or consolidations. Where the difficulties of determining actual investment are insurmountable, the cost of reproduction gives a suitably close agreement with probable investment, and may be used without injustice, particularly if historical prices and conditions are applied. Neither actual investment nor cost of reproduction should be diminished for depreciation unless a careful study of the entire financial history of the property shows that the investors therein have taken such a large average return from the property as clearly to justify the opinion that a part thereof was in effect amortization of investment. If the investors have received no more than a fair return and the property has had reasonable provision for its upkeep, there is no economic justification for a depreciated value.

SUPERVISION

Control of operation, construction and financing by city or state authorities is embodied in all service-at-cost franchises. It is usually in the administrative hands of a local supervisor or board responsible to the municipal governing body. The term "supervisor" is generally used herein to designate one or more persons occupying this office.

A single supervisor is provided in Cleveland, Dallas and Cincinnati, acting in each case as a representative of the City Council with limited personal authority or responsibility.

Boards of two supervisors representing city and railway respectively, with provision for a temporary or premanent third member as arbitrator, are found in Kansas City, Des Moines and Philadelphia. The railway members are presumably regular officials of the companies. A permanent board of three members, appointed for a term of ten years or good behavior by a provincial official, serves in Montreal, with no direct responsibility to the city administration.

In certain cases, particularly Philadelphia and Montreal, appeal from a decision of the supervising board may be taken to the public service commission of the State or Province. In fact, the Montreal board may be called a local agent of the Quebec Public Utilities Commission, which retains general jurisdiction and may intervene as in other localities. The results of this relationship should be of interest and offers a possible compromise solution of the frequent demand for "home rule" in utility regulation.

The Chicago consolidated franchise and the Boston Elevated and Bay State acts embody the new principle of public administration of private property. The Massachusetts trustees, five in number in each case, are appointed for ten-year terms by the Governor and have very broad administrative powers entirely independent of public service commissions and local authorities. The Chicago trustees, nine in number, who are in reality to be directors of a new holding company not for profit, serve for overlapping three-year terms. The original board was selected by agreement but ultimately the appointing power lies in the city of Chicago. It is contemplated that a comparatively small executive committee will have direct charge of administrative affairs of the surface, elevated and subway lines.

The trustee principle is a compromise between regulated private operation and complete municipal ownership. It promotes that confidence with persistently attaches itself to public operations, but avoids the proverbial inefficiency of such operations and the subjection of new bodies of voters to political control. Where confidence already exists in the public utilities or their regulatory commissions, public trustees would serve no necessary purpose. Where it does not exist, temporary public operation such as is provided in the Massachusetts acts, may serve to restore it and permit subsequent satisfactory service under restored private operation.

As far as the usual local supervision is concerned, the success so far attained with a single official would indicate that an independent, larger board is not required except in quite large cities, provided the appointment is free from political influences. It is suggested that the appointment or nomination of such an official might well be made by the state utilities commission. This would tend to insure the needed technical training and promote harmony between city and state in the regulation of the utilities affected. The local supervisor may well serve as an agent of the utilities commission in matters over which it retains jurisdiction, relieving the commission of many local details and allaying opposition to state regulation. A board of trustees as large as that contemplated in the Chicago consolidated franchise is too large for effectiveness unless its active duties and responsibilities are assigned to a comparatively small executive committee.

THE trustee principle is a compromise between regulated private operation and complete municipal ownership. It promotes that confidence which persistently attaches itself to public operations, but avoids the proverbial inefficiency of such operations and the subjection of new bodies of voters to political control. Where confidence already exists in the public utilities or their regulatory commissions, public trustees would serve no necessary purpose. Where it does not exist, temporary public operation such as is provided in the Massachusetts acts, may serve to restore it and permit subsequent satisfactory service under restored private operation.

FRANCHISE TAXES

A special tax upon municipal franchises may be considered as a payment for special, exclusive rights to conduct a profitable business, or as a charge for the location of fixtures upon public property. As far as electric railways are concerned, such taxes have usually taken the form of a fixed fee per year per mile of track, per car operated, or per pole erected upon public streets, or a percentage of gross earnings, or a lump sum to cover one or more of these elements.

In the old days when the street car business was, or was supposed to be, a profitable unregulated undertaking at the conventional 5-cent fare, any amount which municipal authorities could extract from this business lessened the burdens of taxation on other property without offsetting disadvantages other than a possible, minor impairment of service.

In these present days of regulated public service, all tax burdens are included in the cost of the service which the patrons are expected to pay, Regulation has not always accomplished its intended purpose, and charges for service may remain higher or lower than actual cost. This, however, is not true under service-at-cost franchises. Any inequitable taxes imposed upon electric railways under service-at-cost operation transfers to their patrons, through higher fares or poorer service, burdens which the community as a whole should carry. To the extent that the patrons of the railways are not well-to-do or property owners, the injustice to them in such taxation is multiplied.

This fact is recognized in most of the service-at-cost franchises as far as direct taxation is concerned. In two of them, however, a direct franchise tax or "rental" is imposed. In Montreal, the tramways company pays the city a rental of $500,000 per year, or about 6 per cent of its present gross revenue. In Cincinnati, the traction company pays a "tax on gross earnings" or $350,000 per year, or about 8 per cent of revenue.

With respect to indirect burdens which may be considered as a form of taxation, such as street paving, cleaning, sprinkling, etc., most of the service-at-cost franchises do not differ essentially from the older forms. Logically, there is no excuse for continuing such practice. Since the passing of the horse cars, the operation of the street railways has imposed no material additional burdens upon pavements, but they have continued to pay a large proportion of the cost. Hundreds of miles of streets have been paved solely because of the car tracks therein, and the street car revenues have been steadily decreased by the resulting encouragement to vehicular traffic.

Some recognition has been given to this thought in several of the franchises under discussion. In Montreal and Cleveland, the railways do not pay for new paving but do pay their proportion of maintenance. In the new Chicago franchise the usual paving, repaving, cleaning and sprinkling requirements are included, but the cleaning and sprinkling part must be omitted if at any time a deficit has been created and an increase in fare would otherwise be necessary.

A model service-at-cost franchise should entirely omit all such special taxes and street maintenance except any actual repairs or cleaning incident to car operation.

PUBLIC CONTRIBUTIONS

The State of Massachusetts, always a pioneer in public regulation, has gone one step further than the relief from special taxation discussed in the preceding section. It has provided in the Boston Elevated and Bay State acts and a separate act applicable to other street railways, that cities and towns may contribute through taxation toward the operating costs of street railways which serve them. In the case of the Boston Elevated, this relief is intended to be temporary, the advances to be refunded if possible from surplus subsequently accumulated through higher fares or more successful operation. There is, however, no specific obligation in the act to make such refund.

In the case of other railways the contributions may be made permanent, in lieu of higher fares, or to prevent curtailment or abandonment of service otherwise necessary. These contributions are limited to 50 cents per $1,000 of valuation in cities and $1 per $1,000 in towns and are made under terms and conditions approved by the utilities commission. Several communities have taken advantage of this act within the last few weeks to retain service which would otherwise have been discontinued. While this relief is limited to the period of the war and two years after its official termination, it indicates a very definite change in the public attitude toward the electric railway industry. Instead of its being considered a profitable private monopoly to be taxed as far as possible for the support of the state, it is being regarded as a public institution which must be maintained, through taxation if necessary.

The Philadelphia franchise contains an interesting provision having the same effect as aid through taxation. In connection with the rental to the railway of the city's rapid transit system on a percentage-of-cost basis, the city, to avoid or minimize an otherwise necessary fare increase, may withdraw from rental requirements any or all of its transit facilities used by the railway and collect the interest and sinking fund charges thereon through general taxation. This is in addition to the prescribed practice of caring for such charges on new sections of the rapid transit system through general taxation for one year after they begin to operate.

The Bay State act provides that, during the war and for two years thereafter, the railway shall not be required to pay for any paving, or other street or bridge improvements or repairs, abolition of grade crossings, putting wires underground, or other non-esential work. So far as such work continues to be done, direct taxation therefor is increased to relieve the railway.

The policies outlined are in marked contrast to those prevailing in Montreal and Cincinnati, where the cities not only exact a large franchise tax but also take a larger share of the surplus than goes to the railways.

FARE SCHEDULES

The kind of charges that may be made to cover the cost of service are defined in most of the service-at-cost grants but not in all. There is a tendency in recent grants to allow more latitude in this direction to the supervising authority. The first franchise to lay down a specific schedule of fares, from one step of which to another the fares would go up or down with increased or decreased cost, was the Tayler grant in Cleveland. The ten steps in this schedule, starting with a 2-cent fare, did not contemplate that it would ever be necessary to go as high as 5 cents in Cleveland, the highest authorized rate being 4 cents cash, or seven tickets for 25 cents, plus 1 cent for transfers. The steps were intended to vary from each other by about 10 per cent, but changes in routing and transfer requirements upset the symmetry of the schedule so that certain steps became practically useless. It was necessary in 1918, partly on account of war-time costs, to amend this franchise to increase the upper limit of fares by adding five new steps, the one now in effect being 5 cents plus 1 cent for transfers. The maximum new step is 6 cents, nine tickets for 50 cents, 1 cent for transfers.

The Dallas fare schedule is simpler, with a uniform cash fare of 5 cents with free transfers, but with tickets at twenty-two, twenty-four, twenty-eight and thirty-two for $1 respectively in the four specified steps (sold in 25-cent lots where divisible by four).

The Cincinnati schedule includes only three specific steps, 5, 5½ and 6 cents respectively, but provides for as many others, up or down at ½ cent intervals, as may be required.

No other franchises of this class include a specific range of fares, but the Boston and Bay State acts provide that the trustees shall prepare and publish fare schedules with steps above and below that in effect, all such schedules to be subject to revision at the will of the trustees. The Chicago surface, Kansas City and Des Moines grants fix the standard fare at 5 cents. The Kansas City, Mo., fare has recently been increased to 6 cents by order of the Missouri commission. The Chicago consolidated franchise fixes the initial fare at 5 cents (or such other rate as may be in use when it becomes effective) and provides for a transfer charge of not more than 2 cents, between rapid transit and surface lines only, for further increases in costs of service. If this should prove insufficient, an increase in base fare is permissible without limit, although not very clearly so stated in the draft. The Des Moines City Council recently denied a petition for a 6-cent fare, claiming that it had no legal authority to do otherwise. A receivership for the railway promptly followed.

> ACTUAL investment as a basis for rates has so many obvious and logical advantages as to give it increasing favor in regulatory practice. It would probably have much wider use but for the difficulty of determining it from the records of old properties which may have been through many reorganizations or consolidations. Where the difficulties of determining actual investment are insurmountable, the cost of reproduction, using historical prices and conditions, gives a suitably close agreement with probable investment, and it may be used without injustice. Neither actual investment nor cost of reproduction should be diminished for depreciation unless a careful study of the entire financial history of the property shows that the investors therein have taken such a large average return from the property as clearly to justify the opinion that a part thereof was in effect amortization of investment. If the investors have received no more than a fair return and the property has had reasonable provision for its upkeep, there is no economic justification for a depreciated value.

All the above franchises, and also the one in Montreal, provide for uniform fares within the city limits other than for possible charges for transfers. Such limitation is not imposed in Philadelphia, Boston or the Bay State territory. Philadelphia fare changes are restricted only by the supervisory power of the utilities commission. Boston and Bay State fares may be fixed by the trustees without any such supervision. This territorial restriction in Montreal is the only one in this last group of cities bearing upon the character of fare revisions. The extent of the revisions at any one time is, however, restricted in some cases, particularly with respect to reductions. In Philadelphia, a downward revision is not permitted unless two successive years show substantial increases in surplus, and then the estimated annual loss in gross revenue from the reduction must not exceed one-third of the accumulated surplus. Revisions upward must be sufficient to make up losses "within a reasonable time."

The changes contemplated in the general Massachusetts act are exceedingly small per step, each being intended to be not more than 30 per cent of a reserve fund, which in turn is between 6 per cent and 12 per cent of the normal gross revenue. It is not clear how such small changes would be workable.

The Montreal provisions for fare changes are interesting, more from the point of view of extreme refinement than from their practical advantages. For example, fares may be decreased when a fund for their equalization reaches $1,000,000 and must be decreased when it reaches $2,500,000. When a decrease is made, the resulting lower revenues are supplemented by an appropriation from the fund of not more than 25 per cent of the accumulation therein. The estimated annual gross loss in revenue from the reduction must be greater than this percentage appropriation from the fund, but not greater than this percentage plus 37½ per cent of the additions which flowed into the fund during the preceding year from "divisible surplus." This appropriation from the fund to augment current revenues is continued annually until the balance remaining therein is less than the annual appropriation. No similar proceeding is possible in connection with fare increases. They must directly yield enough to make good accumulated losses. It is clear that, by the complicated safeguards surrounding fare reductions in Montreal, they must be kept within safe limits, determined by past profitableness of the business, but it is yet to be demonstrated that suitable care is not assured by the simpler requirements in other franchises.

The two boards of trustees authorized in Massachusetts to administer the Boston Elevated and Bay State systems furnished the only illustrations of unrestricted freedom in the method of raising or lowering fares other than for the directions given in the act. If this arrangement proves successful, it will indicate the desirability of further simplification in this respect in future franchises.

Limited actual experience up to this time does not show any advantage in fare schedules definitely fixed in the franchise. The Cleveland schedule has failed as to both range and relation between steps. There is, however, advantage in having fixed at all times at least one step above and below the one in effect ready for use without delay, and the general principles embodied in the various scheduled steps should be clearly established and published. The supervisor should, however, have authority to change both the schedules and the basis upon which they are designed, possibly after public hearings and approval of the utilities commission. Only by such latitude can conditions like the present be promptly and satisfactorily met. Under normal conditions fare changes should be neither frequent nor violent, indicating the advisability of fairly wide limits in a liberal "barometer" fund.

COST OF SERVICE

This is the central feature of all the franchises under consideration, the one which requires the most careful scrutiny. There is naturally a material difference among these franchises in their definitions of cost. The difference may be quite large in some of the elements, but when all these elements and their definitions are put together, the differences are found largely to offset each other so that the conceptions of total cost are reasonably consistent in most cases.

The significant elements of cost, as set forth in some or all of the various franchises, are stated in the following schedule:

1. Expenses of operation.
2. Maintenance and replacements.
3. Taxes.
4. Rental.
5. Return on capital value.
6. Amortization.
7. Surplus and reserves.

An attempt has been made to state these elements in the order of their importance or priorities. The latter exist even in cumulative form in some cases. A fundamental difference between the various franchises in this group is that some definitely limit or fix the important elements of cost, while others leave the matter very largely to the judgment of the supervisor. Definiteness is found most uniformly in the return to investors, but even here the rate of return is subject to variation in the majority of cases. The method of treating the various cost elements in the several franchises is explained in the following paragraphs:

1. Expenses of Operation

The Cleveland grant is the only one which imposes a strict and definite limit on operating expenses. The amount per car-mile which may be spent is fixed in the original franchise, and it may not be exceeded or changed without action of the City Council. If actual expenses are greater than the allowance, as has commonly been the case, the excess comes out of the company's pocket unless or until it has been validated. If the company runs under its operating allowance at any time, it may not retain the balance as a reserve to offset overruns but must turn it back at the end of the year. The company has habitually kept accounts of both its actual and allowed expenses and has at times accumulated an overrun of hundreds of thousands of dollars before validation, the allowance being very often too low. This arrangement obviously lacks flexibility, and the responsibility for adjustments rests with a large body of city officials not well acquainted with operating requirements and sometimes influenced by political motives. The initial Cleveland allowance for expenses, exclusive of maintenance, was 11½ cents per "ordinance" car-mile. This has been increased from time to time and is now 19½ cents.

The Montreal franchise has a somewhat similar operating expense allowance on a car-mile basis, but it is fixed annually in advance by the supervisor in the light of recent experience and any anticipated changes in operating conditions. If the allowance is exceeded, due to unforeseen developments for which the railway is not responsible, the excess must be approved by the supervisor. Any excess for which the railway cannot give acceptable explanation must be made up from its own resources. A standard of traffic density is determined in connection with the expense allowance for closer definition. There is no obvious reason why this arrangement should not guard fully against extravagance, incompetency or other derelictions which it seeks to prevent.

In Cincinnati the railway must annually, in advance, prepare a detail expense budget and submit it to the supervisor for approval. With any necessary modifications agreed upon or fixed by arbitration, the budget becomes the basis of the year's operations. It may not be exceeded wholly or in any part without approval of the supervisor.

None of the other franchises in this group has any such definite provisions for avoiding excessive expenses. Presumably they all contemplate such close supervision of operations and scrutiny of reports thereof that any improper practices or tendencies would be at once detected and corrected. It would seem reasonable to concur in this majority opinion, at least until such defects develop in the practical workings of the simpler procedure as would justify the added complications and cost of the other.

2. Maintenance and Replacements

A larger number of these franchises have more specific requirements with respect to maintenance and replacements. Here, in contrast with current operating expenses, the intent is to insure adequacy rather than close adjustment to actual current requirements. To that end the maintenance and replacement account is made a continuing one from year to year, any unused appropriations being carried to a reserve.

On account of the difficulty of definitely distinguishing between current maintenance and renewals or replacements and also because of their interrelation, the two have in most cases been combined in franchise provisions relating thereto. The Chicago franchises furnish the only exceptions among those discussed. The consolidated draft follows the example of the 1907 surface grant in requiring a minimum annual expenditure or reserve for maintenance of 6 per cent of the gross revenues, and a corresponding 8 per cent for replacements or 14 per cent minimum total for total upkeep. Either or both percentages may be increased at will by the trustees, but no specific reserve is required as a condition of a fare reduction or otherwise.

The Cleveland franchise includes a combined maintenance and replacement allowance. It is on a car-mile basis, varying in different months of the year and averaging about 4.9 cents. Any amount not currently spent is credited to a reserve, but no accumulation has been possible. On the contrary, the allowance has proved so inadequate that in spite of numerous special appropriations and prorates, a deficit of more than $2,600,000 was recently reported. Clearly, this allowance should have been increased years ago, as was the operating allowance, but allowances when once increased by ordinance are not easily reduced again. In August, 1918, the City Council granted an increase in this allowance to 6 cents for the period of the war and six months thereafter.

The Dallas provisions for repairs and replacements are more complicated but are interesting in that they embody ideas not found in any other franchises. A minimum expenditure for repairs and replacements is fixed at 10 per cent of the gross revenues. For each 1 per cent per annum return paid on the capital value in excess of 5 per cent, this 10 per cent minimum is increased by 3 per cent. With the contemplated normal return on the capital value of 7 per cent, the minimum accruals for repairs and replacements become 16 per cent.

After providing in any month for operating expenses, including a suitable accident reserve, taxes, the normal return on the capital value and the corresponding repair and replacement accrual, any balance remaining of current gross revenue must first be applied to increase the said accrual to 18 per cent for the current month and year, and thereafter to make up as far as possible any prior deficiencies in said accruals under 18 per cent.

These accruals are continued as herein described until the excess over actual expenditures accumulates in a reserve to the "normal" amount, after which they are reduced to such amount as will maintain the normal reserve. The normal amount is 6 per cent of the capital value when the fare schedule then in effect includes six tickets for 25 cents; it is 10 per cent of the capital value when seven tickets are sold for 25 cents, etc. This provision embodies in a systematic way the old practice of setting up reserves for depreciation in proportion to the prosperity of the business.

Prosperity is measured in this case by the rate of return on the capital value (fixed by the rate of fare). Starting with a minimum accrual and return of the percentages above stated, both increase together until an adequate reserve is created, and the reserve is made more liberal with increasing rates of return. This arrangement or its equivalent might well be embodied in other franchises, for it is impossible to tell definitely what constitutes an adequate reserve to provide for obsolescence, inadequacy, catastrophes and other indeterminate factors in addition to the more definite wear and decay. A practice that provides for little beyond the definite factors in hard times and liberally for the indeterminate factors in good times, should meet all reasonable requirements.

It might even be argued with force, particularly in the case of service-at-cost, that no advance provision should be made for certain of the indeterminate factors. When an inefficient property element is replaced by an efficient one, or a heavy wooden car by a light, modern, steel car, the cost of the change may well fall upon those who benefit thereby, the future users of the service. In many cases careful calculations would show that no additional burdens are thereby imposed upon these future users because the added charges and amortization would be offset by increased operating efficiencies. If the full burdens of depreciation were thrown on the users of the old facilities, the users of the new facilities would get improved service at reduced cost.

The Montreal franchise provides for a maintenance and renewal charge in operating expenses on a car mileage basis, fixed in advance for each year by the supervisor, sufficient to keep the property permanently in good condition. The current excess over actual expenditures is added to a fund which must be accumulated to a normal amount of $500,000. When this amount has been reached, subsequent charges for maintenance and renewals will be only sufficient to maintain the normal amount. So much of this fund as is not currently needed is invested in additions to the property or otherwise, and the interest thereon is added to the fund.

None of the other franchises in this group has specific charges or accumulations for these purposes. It is in all cases intended that the supervisors shall see that the properties are adequately maintained at all times. In the case of Cincinnati, the city or company may call upon the State Utilities Commission to prescribe suitable depreciation reserves. The advantages of freedom from rigid provisions for uncertain requirements are obvious. Under service-at-cost franchises, there is no question of diverting needed replacement funds to pay excessive dividends. Returns to investors are definite and there is no possibility of diversion. The problem of reserves for replacements involves theoretically the amount of destruction of capital incident to the unit use of the property. If this is currently overestimated, present patrons pay more and future patrons less than cost.

> ANY inequitable taxes imposed upon electric railways under service-at-cost operation transfer to their patrons, through higher fares or poorer service, burdens which the community as a whole should carry. To the extent that the patrons of the railways are not well-to-do or property owners, the injustice to them in such taxation is multiplied.

Under old forms of franchises with fixed rates of fare, the investor is the one who submits to fluctuations in return in case of bad guesses at depreciation. This is not the case with service-at-cost. If the average car rider were better acquainted with the economics of the situation, he might well ask why he should contribute largely to the accumulation of a fund for replacements which will never be used, the interest on which will permit car riders of some future day to pay less than the then current cost of replacements. A moderate reserve is undoubtedly needed. The specifically fixed reserves mentioned, not exceeding 10 per cent of the capital value, are not excessive. A theoretical reserve, amounting to perhaps four times that limit, which might be set up under some of the other franchises, has no practical justification.

3. Taxes

The tax feature of these franchises needs very little further comment. The actual taxes, subject to little control by either railway or supervisor, are a necessary part of the cost of service. It is proper that the city should not impose any illogical tax burdens or permit other taxing authorities to do so. Cleveland has been notably active in this direction, joining with the railway a few years ago in a suit to bring about reduced State taxation of the railway property.

4. Rentals

The leasing of transit facilities from other utilities or from municipalities is not uncommon. When the leased facilities are comparatively unimportant, the rent is included among the operating expenses. Where the leased property is as extensive as that included under several of the service-at-cost franchises, more critical attention is necessary. The Dallas and Cincinnati franchises authorize the railways to include in the cost of service the actual rental in very substantial amounts paid to other railways for use of tracks and other facilities under prior agreements made between the parties at interest. In Chicago and Philadelphia the leasing of city-owned rapid transit facilities is a very important feature of the recent franchise drafts.

The Philadelphia terms are noteworthy for their liberality. The railway undertakes to reimburse the city for actual interest and sinking fund payments on the city's certified investment in subways, elevated structures and equipment "as and if earned." These rental payments are made from the balance, called "current net revenue," remaining after the gross revenues have provided in full for the following items: (1) operating expenses; (2) taxes; (3) fixed charges on the company's prior obligations; (4) fixed charges and dividends on securities issued pursuant to the new grant for new transit facilities and extensions of the old system; (5) accruals to depreciation reserves for the city's transit facilities, the company's associated transit facilities, and for the balance of the company's system; (6) sundry payments to the city required under the 1907 franchise.

The balance after these six items are taken care of is not all devoted to rental, but is divided between company and city in proportion to respective investments the city's investment being in the leased transit facilities, the company's investment being the capital stock outstanding on its old system, amounting to $30,000,000 (dividends not included in item 3 of prior deductions above). Each party gets not more than 5 per cent on this investment. Out of any balance remaining after this 5 per cent distribution, but not before, the city may be paid any additional amounts needed to meet its full interest and sinking fund charges on its transit facilities. All other disbursements have priority. Furthermore, payments under the first five items of deductions are cumulative and must be paid in full after any period of deficiency, and thereafter the distribution of current net revenue between city and company takes precedence over deferred payments under item 6 and the final rental payments to the city.

Reference has already been made to the option which the city has of withdrawing from certification and rental requirements, any part or all of its transit facilities, so that fares may not be unduly increased thereby. The terms of this Philadelphia lease embody a broad recognition of the principle that a city as a whole may need improved transit facilities which the patrons of the facilities should not pay for in full. The removal of surface railway traffic from the streets is of substantial benefit to many business interests which must still use the streets. Rapid transit definitely enhances suburban real estate values. It is not unfair that some of these interests affected should, temporarily at least, bear a portion of the rapid transit burden. In the case of suburban real estate, an increase in assessed valuation in proportion to the increase in market value, and the application of the resulting increase in taxes or its equivalent to the charges on rapid transit facilities, would materially lessen the increased cost of transit service.

The provisions in the recent Chicago draft, covering the lease of the city's projected subways, do not show the same liberality as found in the Philadelphia lease. The company is required to pay 6 per cent on the new money which the city invests in its subway system, the payment for each section of the system beginning immediately upon its being placed in service. The investment upon which this return is paid naturally does not include the expenditures made from the large fund accumulated from the city's 55 per cent of the net revenues of the surface lines under the 1907 franchises.

The only possible relief from the payment of this rental is through the right granted to the city, within lawful limits, to assess all or any part of the cost of subways upon private property specifically benefited thereby. This may be done only by special ordinance in each case, and the exercise of the right, with its probable attendant litigation, is doubtful. In the case of deficiencies in gross revenue, the only payments having priority over the city rentals are operating expenses and reserves, taxes and fixed charges on prior obligations.

It is apparent that the 6 per cent charged for rental is not cost. It is probably much more than cost, for the usual sinking fund should not be necessary as the lessee undertakes to "maintain, repair and renew" the entire subway system throughout its indeterminate lease. Combined interest and sinking fund charges on the Boston subways are less than 5 per cent, so that Chicago is apparently anticipating a profit from its subway leases.

5. Return on Capital Value

The simplest form in which return on the investment can appear as an element in cost of service is a fixed, straight percentage on capital value. None of the service-at-cost franchises has this simplicity. The nearest approach to it is found in Cleveland and Des Moines, where actual, existing fixed charges are allowed on funded indebtedness and 6 per cent on the remainder of capital value, represented by stock and floating debt. This means a variable average return as the proportions of indebtedness and stock change. In Cleveland, bonds bearing 5 per cent interest have gradually been retired and replaced by 6 per cent stock. The market value of this stock has remained appreciably above par since 1911, when the franchise was amended to increase its security.

Slight modifications of this general plan are found in the Boston, Bay State and Massachusetts acts. Actual fixed charges, either existing or future, are provided for in all these acts and, in addition, fixed rates of return upon stock investments. The Boston act authorizes a $8,000,000 issue of preferred stock paying 7 per cent dividends, and an ultimate return upon present or future common stock of 6 per cent. During the first five years the return on the common is less, being 5 per cent during the first half of that period and 5½ per cent during the remainder of the period. The Bay State and Massachusetts acts provide for 6 per cent uniformly upon capital stock investment.

The Chicago consolidated basis of return is somewhat similar. Fixed charges of 5 per cent are allowed upon prior obligations of the old companies (not to exceed 60 per cent of the total capital value) and 8 per cent is allowed on the balance of the capital value until 1932, with 7 per cent thereafter.

The Philadelphia franchise allows actual fixed charges upon prior obligations, and actual charges and dividend requirements upon all new capital issued under authority of the supervisor. Dividends upon the prior capital of $30,000,000 are to be paid at the rate of 5 per cent if and when the city is paid a similar return upon its investment in new transit facilities. These payments are cumulative.

All the above grants accept the rates of return fixed or to be fixed by investors for secured loans. The grants themselves fix the return upon unsecured investments. The difference in most cases is 1 per cent. Theoretically, there is the same assurance of return for both classes of investment under the service-at-cost plan during the life of the franchise. Under an indeterminate franchise (or a term franchise with obligations of renewal or purchase) with satisfactory terms of purchase, the theoretical difference in security of principal is small. There is, however, in the minds of investors a practical, material difference. It may be worthy of note that in one service-at-cost city, the Mayor not long ago in all seriousness proposed that the guaranteed return of 6 per cent to stockholders be reduced to 4 per cent during the continuance of war prices, so that an increase in fares, then materially less than 5 cents, might be avoided.

> SINCE the passing of the horse cars, the operation of the street railways has imposed no material added burdens upon pavements but they have continued to pay a large proportion of the cost. Hundreds of miles of streets have been paved solely because of the car tracks therein, and the street car revenues have been steadily decreased by the resulting encouragement to vehicular traffic.

There is grave doubt, in view of recent radical changes in investment conditions and the improbability of return to the former more stable conditions, if it is now possible to fix an equitable return upon long-term investments. If the return becomes too low, the investment field is restricted; if too high, the cost of service becomes excessive. This condition is recognized in the most recent franchise draft in this class, that in Cincinnati, in which the actual cost of all new money invested under the franchise is allowed. In this franchise the class of securities, the normal rate of return thereon, their amortization provisions, the price at which they are sold and other pertinent conditions are all subject to the approval of both the local supervisor and the State Utilities Commission. The prevailing return upon prior securities is maintained. In this way, investors, public, company and any other parties concerned are protected.

The sliding scale principle, well known among English utilities but used to only a very limited extent in this country, is embodied in one of the railway franchises included herein. The Dallas grant has a sliding scale of return on the capital value in connection with the fare schedule already stated. When the highest authorized rate of fare is in effect, the return is fixed at 7 per cent. When the next lower rate is adopted, the return becomes 8 per cent. For each of the lower rates included in the schedule an additional one-half of 1 per cent is allowed. This gives a maximum possible return of 9 per cent, but the probability of this rate being earned is quite remote unless there is a very radical change from present conditions.

TABLE II—CHICAGO SURFACE RAILWAYS

Statement of City's Share (55 Per Cent) of Surplus from Operation Under 1907 Franchises

1908	$1,564,618.47
1909	1,386,877.96
1910	1,276,252.65
1911	1,705,550.30
1912	1,870,908.00
1913	2,529,992.26
1914	3,002,453.16
1915	2,558,383.63
1916	1,665,710.34
1917	2,746,988.99
	$20,307,735.76

The sliding scale principle has the advantage under stable conditions that it encourages efficiency of operation. However, with such a radical increase in operating costs as has taken place since the Dallas franchise became effective, a higher fare, logically necessary, involves a lower return to the investor and at a time when money is commanding materially higher rates, the investor therefore being subject to a double injustice. The reverse condition of a higher return with a lower fare resulting from business stagnation is equally open to criticism. The results of this application in Dallas of the sliding scale to a railway situation will be watched with interest, but satisfactory working is not to be expected under present unstable conditions. It will probably also be found that the fare and return steps contained in this franchise are too large for stability. Alternate up and down changes at the prescribed minimum intervals of six months are to be expected if the fares ever get below the maximum rate.

The remaining franchises in this group embody the profit-sharing principle of return. Supplementing a minimum fixed return on the capital value, there is a division of surplus earnings between railway and city. This method was first adopted in the Chicago surface franchises, which allow a return of 5 per cent upon the capital value plus 45 per cent of the surplus. Fifty-five per cent of the surplus goes to the city to be used ultimately for the construction of rapid transit facilities. As shown in Table II, the city's share of the surplus during the ten full years of operation of these franchises ending in 1917 amounted to slightly more than $20,000,000.

The Kansas City arrangement is somewhat similar, but the railway gets a 6 per cent return upon the capital value without any distributable share in the surplus until it has amounted to $6,300,000. Further surplus is divided between railway and city, the railway getting only one-third. The initial $6,300,000 surplus is to be used in amortizing intangible elements in the capital value already referred to through the addition of uncapitalized extensions and betterments up to that aggregate amount. The city may use its share of the subsequent surplus to finance additions to the property with a view to ultimate purchase, to reduce the capital value, to reduce fares, or, by popular vote, for other public purposes. If fares are reduced, the railway's share of the surplus which would otherwise be accumulated must not be impaired, that is, the reduction must be made exclusively from the city's share of the surplus. The city's share in the surplus has so far amounted to only about $100,000.

The Cincinnati grant contains a combination of profit-sharing and sliding-scale principles. It provides for actual fixed charges on prior obligations, a fixed sum return on certain prior capital, and actual fixed charges and dividends upon all new securities issued in accordance with the new franchise. The company also shares in varying proportions in any surplus that may be accumulated. When the rate of fare is 5 cents or less the company's share is 45 per cent; when the fare is 5½ cents, the share is reduced to 30 per cent; when the fare is 6 cents, the share becomes 20 per cent; if the fare goes above 6 cents, the company gets no part of the surplus.

The Montreal grant allows a 6 per cent normal return upon capital value. Upon new capital furnished by investors during the war or within two years after its termination, an additional 1 per cent is allowed, but this supplementary return is wholly withdrawn within five years after the war. The railway also receives a further return to the extent of 20 per cent of the divisible surplus, the balance of the surplus going to the city (30 per cent) and the tolls reduction fund (50 per cent). There is no restriction upon the use of the city or company allotments. The purposes of the tolls reduction fund have already been explained. The company is not permitted to pay dividends on its stock in excess of 10 per cent.

This grant also provides for two supplementary allowances, one of which is unique in franchise history. The first is a fixed annual sum, equivalent to one-half of 1 per cent of the initial capital value ($181,431.47) for the expenses of new financing, including printing and engraving, legal and registration fees, listing, etc. Any unused part of this allowance must be kept intact with interest accretions until the termination of the franchise, when it may be distributed. This item of cost, where specifically provided for, is more commonly a

TABLE III—THE CLEVELAND RAILWAY COMPANY

Operating Expenses Less Maintenance and Total Cost of Service Under Tayler Ordinance, Actual and Allowances, Per Car-Mile

	Operating Expense		Total Cost	
	Actual	Allowance	Actual	Allowance
1910	11.67	11.50	24.28	23.09
1911	12.07	12.50[1]	23.88	23.59
1912	12.19	11.50	23.09	22.57
1913	12.23	12.10[2]	24.72	24.10
1914	12.22	12.10	25.27	24.32
1915	12.56	12.60[1]	25.70	25.49
1916	14.00	13.50[1]	28.16	28.33
1917	15.34	14.50	29.75	29.52
1918		16.00[3] 19.50[4]		

[1] On and after May 1.
[2] On and after March 1.
[3] On and after Feb. 8.
[4] On and after Aug. 4.

charge to capital value. In the Chicago surface franchises a fixed percentage is allowed on the cost of all capital additions for this and other overhead costs. In Philadelphia the actual financing costs are included in capital value.

The unique allowance in the Montreal grant is an "operating allowance," an amount equal to one-eighth of 1 per cent of the current capital value, awarded to the railway annually if the actual operating expenses are within the amount per car-mile fixed by the supervisor as already explained, or do not exceed this amount by more than 2½ per cent, or, if exceeding it by a greater percentage, such greater excess is on account of abnormal conditions not within the control of the railway and certified as such by the supervisor. If the excess is not so certified, the railway receives no operating profit, and any expenses in excess of the allowance plus the margin of 2½ per cent thereof, less the one-eighth of 1 per cent of capital value otherwise allowed as an operating profit, must be made up from the railway's own resources.

The purpose of this operating allowance is distinctly commendable. It sets up each year a specific standard of operating efficiency in the light of conditions then existing, not those which a score of years before were thought might exist. If the standard is met by sustained vigilance, a deserved reward is made. If this vigilance is relaxed and extravagance is permitted, not only is the reward lost but the railway must pay the bill from its own pocket. The possible objections to such an allowance are obvious. The standard operating expense must be fixed with unvarying, scrupulous fairness and honesty, and in the light of sustained, intimate knowledge of operating conditions and requirements. Otherwise, either injustice is done the public, or the railway becomes discouraged in its efforts to maintain maximum efficiency. A tendency might develop to recognize past earnest but unsuccessful attempts of the railway to secure its reward by liberality in fixing a future standard of expense, or on the other hand past indifference on the part of the railway might suggest a relatively low standard. It would be difficult to decide if or when such tendencies were beyond the intent of the franchise in establishing this policy of reward. The whole scheme has needed and attractive possibilities, and its actual workings will be watched with interest.

6. *Amortization*

A large proportion of the mortgages upon electric railway property contain sinking fund or improvement fund provisions under which the outstanding indebtedness thereunder is gradually reduced, or the amount of property subject to a given indebtedness is gradually increased. The annual requirements for such funds, usually from 1 per cent to 2 per cent of the bonds outstanding or certified, are taken from gross income and are a part of the cost of the service rendered. The railways operating under the franchises herein considered are not exempt from this general practice. Several of them have supplementary amortization provisions which show special conceptions of the meaning or distribution of the cost of service.

The earliest of these franchises is that in Kansas City. The initial capital value in this case, as already noted, contained an item of $6,300,000 for intangible elements such as development cost and franchise value. It was decided that these elements should not be a permanent factor in the cost of service. To the extent that they represented the value of the surrendered old franchises, they should be wiped out by 1925, when they would have expired. To the extent that they represented unrecovered early losses, the necessity for amortization is not as clear. There is no unanimity of opinion as to how, if ever, early losses should be made up by regulated public utilities. In competitive business the problem is comparatively simple. The regulated utility may take care of its inevitable early losses in one of three ways: (1) By maintaining abnormally high rates during a definite succeeding more profitable period; (2) by never recovering the losses themselves but indefinitely earning interest thereon; (3) by gradually but not regularly charging off the losses from the profits of supernormal periods, together with a return on the unamortized balance. The first method involves injustice to the patrons of the period involved. The second method is not unjust to any patrons and is economically sound, but meets with a surprising amount of opposition—instinctive, political and otherwise. The third method, confessedly a compromise, is practical if not scientifically correct. The Kansas City franchise adopts this method. The entire surplus income, to the extent of the initial $6,300,000 accumulation, is to be used by the railway for uncapitalized extensions and betterments, thereby gradually substituting tangible in place of intangible property, until the latter is eliminated. The rate of substitution depends upon the profitableness of the business.

TABLE IV—CHARACTERISTICS OF SURPLUS RESERVES, THE FARE "BAROMETERS" IN SERVICE-AT-COST FRANCHISES

	Normal Amount of Reserve		Range of Upper and Lower Limits	
City	Dollars	Per Cent of Capital Value	Dollars Between Limits	Per Cent of Either Limit from Norma
Cleveland	$500,000	.....	$400,000	40
Dallas	575,000[1]	8		50
Montreal	....	......	1,200,000 to 2,700,000	..
Philadelphia	....	......	2,500,000	
Cincinnati	400,000	.....	400,000[3]	62.5 37.5
Boston	1,000,000	.....	600,000	30
Bay State	500,000	....	500,000	50
Massachusetts		6 to 12[4]		30
Chicago (cons.)	2,000,000	......	1,000,000[2]	50[2]

[1] Approximate initial amount.

[2] Below normal only, upward range not specified.

[3] $250,000 above normal; $150,000 below normal; all other specified ranges are divided equally above and below normal.

[4] Per cent of annual revenue.

The city may, if it sees fit, carry this amortization program further by applying its share of the surplus beyond the initial $6,300,000 to further uncapitalized extensions and betterments, or to reductions of capital value, thus decreasing the unit cost of the service. This program was predicated upon a profitable 5-cent fare.

The Philadelphia grant embodies no new amortization features other than a sinking fund on the city's transit facilities, presumably sufficiently large to retire the entire investment within a reasonable term of years. It confirms, however, an unusual amortization feature in the 1907 franchise by which a fund is to be accumulated to retire the entire issue of stock then outstanding at the expiration of that franchise, the city then becoming the owner of the property. There is no provision in the new franchise by which this amortization can be suspended other than temporarily. Clearly such proceeding burdens the present generation of patrons with a part of the cost of serving the succeeding generation.

The Chicago consolidated franchise contains the remaining amortization feature of interest. Five years after the effective date of the ordinance, the company must begin to accumulate such a fund. For the first five years thereafter, accrual is at the rate of one-quarter of 1 per cent of the capital value; for the next five years it is at one-half of 1 per cent; for the next five years it is three-quarters of 1 per cent; and after the end of the initial twenty years the rate of 1 per cent applies. Under the operation of this final fixed 1 per cent there must be no diminution in the amount of annual accrual although the capital value may decrease. This fund may be used for retirement of outstanding obligations or to pay for uncapitalized extensions and betterments, the effect in either case being to reduce the capital per unit of property. If this franchise were to continue in operation for about fifty years with the amortization annuity in scheduled effect, the equivalent of the original capital value would have been wholly retired, a large proportion of the annual cost of subsequent additions to property, financed through the amortization fund, would be uncapitalized, and the cost of service would be appreciably reduced. The then existing situation may be expressed mathematically if certain average assumptions are made. At the end of n years, with an annual increase of r per cent, the capital value would be $(1 + r)^n$ times the initial capital value. If $n = 50$ and $r = 5$ per cent, the capital value at the end of fifty years would be 11.47 times the initial capital value. The portion of capital retired through amortization would be 1.00/11.47 or nearly 9 per cent. If it is further assumed that one-sixth of the subsequent additions to property are financed through the amortization fund and therefore uncapitalized, it appears that between 15 per cent and 20 per cent of the total subsequent capitalization is not subject to regular capital charges. If these charges would otherwise be 40 per cent of the annual revenue, the reduction in revenue thereby becomes 6 per cent to 8 per cent. This reduction is partly but not wholly offset by the objectionable amortization annuity itself. To the extent that it is not offset, the patrons of early years contribute to the cost of the service in later years.

7. *Surplus and Reserves*

The final item in the cost of service, after the initial accumulation of the required surplus and sundry reserves, is negligible in the average year, including only such increases in these accounts as may be required by increased volume of business. In any particular year there may be an addition to the reserves from operating revenues if a deficiency exists, or a withdrawal if current revenues are insufficient to meet current expenses and charges. The methods and limitations of such procedure are more specifically described in a following section.

SUMMARY AND DISCUSSION OF COST ELEMENTS

The different elements of service cost as set forth herein may here be reviewed and useful conclusions drawn from their treatment in the different franchises.

1. A fixed allowance for operating expenses, changeable only by action of a City Council, is not practicable. An annual budget, prepared in the light of expected conditions, is much better as a means of checking actual operations and as a possible basis of reward for operating efficiency.

2. A minimum allowance for maintenance and replacements such as is commonly found is quite important, preferably one accrual for the combination. It should be materially in excess of current requirements unless the property has reached a maturity and stability unusual among street railways. There should be a limit to the accumulation of unused accruals. Although gross revenue is not a scientific basis of accruals and total reserve, it has definite practical advantages, particularly if the percentages of gross revenue are automatically adjusted to the prosperity of the business.

3. Taxes should be limited to the usual assessments upon commercial property. There should be no franchise or gross earning taxes.

4. Rentals of transit facilities should be limited to actual cost to the lessor. If rapid transit facilities are leased from the city, a provision for abatement of rentals when and to the extent that the traffic cannot properly bear the burden is to be commended.

5. The return upon capital should not be wholly fixed because the future normal return cannot be foreseen. Actual interest and amortization should be allowed upon indebtedness. A substantial proportion of preferred stock, bearing a fixed return, may well be authorized. The final equity, represented by common stock, should have a return varying with general business conditions or with efficiency of operation, or both. Without this last incentive to sustained alertness, stagnation will result. None of the franchises here reviewed has an ideal provision for an equitable return to investors. A share in the surplus, added to a fixed return, is commendable but may fail to accomplish its purpose under abnormal business conditions. The same objection applies to the sliding scale of rates and return. Within limits, the operating profit plan is thoroughly good. It might be improved by making it proportional to operating efficiency instead of being fixed. By combinations or amplifications of such methods, there should be assured to the holders of the final equity such an increase in their minimum return as will secure a degree of efficiency and progressiveness approaching that found in unregulated private business. Such incentives would involve no increase in ultimate cost of service. It would, among other things, tend to reduce the base rate of return.

6. There should be no amortization of capital as far as it relates to tangible property. There is no equitable ground for amortization of intangible elements of value representing the usual initial losses, but this may be permissible to a limited extent in times of prosperity when fares are not above normal. No noticeable burdens should be imposed for this purpose.

7. No further comment is necessary regarding surplus except to urge that no excessive accumulations be made from revenue, particularly when large reserves are available for specific purposes. This is particularly true of new franchises which go into effect during the prevalence of war prices.

COMPARISON OF REQUIREMENTS FOR RESERVE FUNDS

All service-at-cost franchises seek to avoid frequent or large changes in fare by the use of sundry reserve accounts. The number and interrelation of these accounts is bewildering, at first sight at least, in some cases. In other cases extreme simplicity is found. The purpose in all cases is the equalization above stated, but the effect in some cases is to increase present burdens for the relief of the future. If present reserves, created from revenue, are unnecessarily large and are invested at low rates of return, the patron, indirectly getting the benefit of such return, becomes an involuntary investor in the railway instead of having an opportunity of finding a more attractive investment elsewhere.

A reserve for depreciation or replacements is required in all these franchises. In some cases, as already stated, maintenance and renewals are not distinguished, both being provided for in the reserve. The Montreal franchise fixes the appropriations to and the normal accumulation in the reserve. The Chicago (surface and consolidated), Cleveland and Kansas City franchises fix the rate of accruals but not the normal accumulation in the reserve. The accumulated reserve in Dallas is limited to a percentage of property value, varying as already stated. The Philadelphia accruals are not fixed other than that the rate for the city's transit facilities shall not exceed one-half of 1 per cent per annum. The method of accrual and amount of the reserve in the case of the remaining franchises are not fixed in advance. Judgment as to adequacy rests with the supervisor except in the case of Cincinnati, where the utilities commission will fix the procedure after an initial period of five years.

> THE terms of this Philadelphia lease embody a broad recognition of the principle that a city as a whole may need improved transit facilities which the patrons of the facilities should not pay for in full. The removal of surface railway traffic from the streets is of substantial benefit to many business interests which must still use the streets. Rapid transit definitely enhances suburban real estate values. It is not unfair that some of these interests affected should, temporarily at least, bear a portion of the rapid transit burden. In the case of suburban real estate, an increase in assessed valuation in proportion to the increase in market value, and the application of the resulting increase in taxes or its equivalent to the charges on rapid transit facilities, would materially lessen the increased cost of transit service.

A reserve for accidents is provided in most cases; it is specifically excluded only in the case of Cleveland where a board of arbitration decided that such a supplement to the so-called "interest fund" was not contemplated in the ordinance. In Dallas the accrual to the reserve is initially fixed at 6 per cent of the gross revenue, with provision for any necessary change. In other cases, rate of accrual and extent of the reserve are left to the judgment of the supervisor.

The Montreal franchise provides for two special funds not found in other grants. The railway must build up from its own resources a guarantee fund of $500,000 from which to pay excess, unauthorized expenses, any penalties imposed by the city, and otherwise to insure the performance of franchise obligations. The fund must be deposited in an approved, accessible place and income from it belongs to the railway. To the extent that the interest upon money borrowed for this fund exceeds the income derived from it, a burden is imposed directly upon the company and indirectly upon its patrons which does not seem warranted by the practical advantages derived therefrom. The city is not without other adequate means of enforcing fulfillment of obligations, and excess expenses might be deducted from the company's share of the divisible surplus or otherwise made up by the company as it might see fit.

This same franchise also sets up a contingent reserve fund of another $500,000, by accruals from gross revenue not exceeding 1 per cent thereof per annum as an equalizing fund, but not having the fare-adjusting functions usually attaching to this fund. This contingent fund may be drawn upon to make good deficiencies in revenue and is restored as soon as sufficient revenues are available. We now come to the fund common to and a salient feature of all the modern franchises of this type, the index or barometer which determines fare changes, variously named interest fund, reserve fund, surplus reserve, emergency fund, etc., and herein called the surplus reserve. In general, this fund has a designated normal value, a lower limit at which fares must be increased and an upper limit at which fares must be reduced. Where specific reserves for replacements, accidents, etc., are set up, it is usually provided that the upper limit of the surplus reserve shall not be reached until all these subsidiary reserves are normal, brought up if necessary by appropriations from the surplus reserve. Unless otherwise stated in the following outline of the special characteristics of the various surplus reserves, the funds therein are capitalized and not accumulated from revenue.

The Cleveland normal reserve is $500,000 with upper and lower limits of $700,000 and $300,000 respectively. There is no direct relation between the surplus reserve and the replacement reserve accumulation. There is now an enormous deficit in the replacement reserve, or would be if all appropriate charges had been made to it rather than to special suspense accounts. If the surplus reserve were used, as it should be, to make up this deficit, the present balance would be reduced by more than $2,000,000, possibly to $3,000,000 less than normal.

The Dallas franchise sets up from revenues a surplus reserve which is normal at 8 per cent of the current capital value. If, when the subsidiary reserves are not less than normal, the surplus reserve accumulates to 50 per cent above normal, fares must be reduced to the next lower step in the schedule. If, after six months' operation under the reduced fare, the subsidiary reserves are normal and the surplus reserve is still 30 per cent or more above normal, another fare reduction must be made. Further decreases may be similarly made until the reserve does not exceed normal by more than 10 per cent. It is, however, stipulated that no fare reductions shall be made until the full return authorized by the franchise shall have been paid cumulatively from the effective date of the grant.

If, under any rate of fare, the surplus reserve falls to 50 per cent of normal, the fare must be raised to the next step. If the reserve does not rise to 80 per cent of normal within six months under the operation of this higher fare, another increase may be made, and further increases may similarly follow until the reserve is not more than 10 per cent below normal. Thereafter no further increases may be made until the reserve has again fallen to 50 per cent of normal.

When the surplus reserve is in excess of normal by more than 10 per cent, and either subsidiary reserve is below normal, the railway must transfer to such reserve such amounts as are necessary to bring them up to normal, or such lesser amounts as will still leave the surplus reserve 10 per cent above normal. The noteworthy thing about this general plan is the relation of the surplus reserve to capital value, by which the reserve automatically increases as the property and business grow. This has a definite advantage over a fixed reserve which gradually grows smaller in proportion to the volume of business.

In the Montreal grant the so-called "tolls reduction fund" created from revenue performs in part the immediate functions of the surplus reserve. The operation of this fund has already been explained, and it will be recalled that its upper limit is between $1,000,000 and $2,500,000 at the discretion of the supervisor. In case of deficiencies in revenue, involving a possible increase in fare, the contingent reserve fund is also a factor. If in any year the deficiencies are such as to reduce the contingent reserve to less than $300,000, the deficiency therein and any in other subsidiary reserves must be made up from the tolls reduction fund. If this fund is thereby exhausted, fares must at once be raised to provide at least the prevailing full cost of service. So long as any balance remains in the tolls reduction fund no fare increase is necessary, for the contingent fund still remains. If the $500,000 normal amount of the contingent fund were made the minimum limit for fare increase purposes of the tolls reduction fund, the complication of the combination of funds might have been avoided.

When the new Philadelphia franchise goes into effect, the surplus accumulated during the prior operation under the 1907 franchise will be set up on the books as an "initial surplus." Any surplus earned under the new grant will be separately accounted for as "new surplus." The combination of these two accounts becomes the surplus reserve. Whenever the new surplus has reached the sum of $2,000,000 and has been increasing in substantial amounts during the two years preceding, and all costs of service have been met cumulatively, the rate of fare shall be reduced after approval of the utilities commission. Whenever, through increased cost or diminished revenue, the new surplus has become exhausted and the initial surplus has been drawn upon to the extent of $500,000, a higher rate of fares shall be effective after approval of the utilities commission. This plan, without definitely fixing a normal surplus reserve, provides a zone of such reserve, with upper and lower limits $2,500,000 apart, within which fares shall be fixed but outside of which they shall change.

The Cincinnati franchise provides for a normal surplus reserve of $400,000, of which $250,000 is to be procured from the sale of securities, the balance of $150,000 to be the entire initial surplus to that extent earned under the new franchise, beyond which amount the surplus is divided as already explained. Whenever after the normal surplus reserve has been created (which implies the full cumulative payment of all elements of service cost) it shall be increased by $250,000 or 62½ per cent, the fares then in effect shall be decreased. If within two months after the reduction the reserve continues to increase, a second decrease may be made. Whenever after the normal surplus reserve has been created the amount in the reserve shall be reduced by $150,000 or 37½ per cent, the fares shall be raised, and if after two months' use of the higher fares the reduction in reserve continues, another increase may then be made, and this process is continued until the reserve is restored. At the beginning of the franchise term, before the normal surplus reserve has been created, the fares may be increased from the initial tentative 5-cent rate if the results of two months' operation show that the revenue is insufficient to cover the cost of the service, and further increases may similarly be made at intervals of two months until the required revenues are obtained.

The Chicago consolidated grant provides for a surplus reserve of $2,000,000. Fares must be increased if this reserve is drawn down to $1,000,000 to make deficits good. The fare increase shall be calculated to restore the reserve to normal by the end of the following fiscal year. After the deficits have been made up fares may be reduced if, in the judgment of the trustees, a new deficit would not thereby be created. Fares may be decreased at other times if the accumulation in the reserve and the surplus receipts are "sufficient to justify it."

The Boston act requires the creation of a surplus reserve of $1,000,000. If at the end of any calendar quarter ending June 30, 1919, or thereafter the reserve is 30 per cent above the initial normal amount, and the revenues for the preceding quarter have exceeded the cost of service, the fares shall be reduced within one month. If at the end of any quarter ending June 30, 1919, or thereafter the surplus reserve shall be below normal by more than 30 per cent, fares shall be increased within one month. If the surplus reserve shall be entirely exhausted on June 30, 1919, or semi-annual dates thereafter, or the balance is insufficient to meet existing deficiencies, the trustees may call upon the treasurer of the Commonwealth for funds to make up all accumulated deficits in accordance with the Massachusetts policy already outlined.

It is to be noted that, although June 30, 1919, is still in the future, two fare increases have already been made on the Boston Elevated system and others are under consideration to take care of large deficits, but no call has yet been made upon the State for aid. It is reported, however, that the trustees will shortly recommend that the State purchase from the company its part of the subway system, and relieve the company of all charges upon the entire publicly-owned rapid transit facilities used by the company.

The Bay State act fixes the amount of the normal surplus reserve at $500,000 and the upper and lower limits, beyond which fares shall be changed under procedure similar to that in the Boston act, at 50 per cent from the normal.

The Massachusetts act fixes the reserve less definitely, in per cent of the capital value, but establishes the upper and lower limits 30 per cent from normal, with procedure in fare increases similar to the other acts already mentioned.

A review of these various reserve programs shows unanimity in favor of accumulations for replacements, and nearly the same agreement in favor of an accident reserve. There is also a fare index fund where varying fares are contemplated. In connection with the upper and lower limits of such funds, fixed to indicate the need of a change in fare, attention is directed to the stipulation in a few cases that fares shall be changed when these limits are reached only if there has been a general upward or downward tendency in surplus revenues for a considerable period of time in the direction confirming the need of the fare change. The two-year tendency period fixed in Philadelphia may be too long, but the application of the principle will tend to prevent needless fluctuations in fares at times of brief especially good or bad business conditions. Other special funds or reserves, found in a few cases, apparently serve no essential purposes and might be eliminated for simplicity by slightly modifying the functions or characteristics of those universally employed.

> THE advantages of unlimited life, in avoiding amortization of investment in excess of adequate provisions for depreciation, and in not discouraging improvements and extensions at any period, are too obvious to need elaboration.

Several diagrams are shown on page 17, illustrating the relation between reserves, current operating revenues and service costs. These diagrams set forth more clearly than descriptive text the direction of flow of available funds from revenue to divisible surplus, the interrelation of revenue, costs and reserves, and existing priorities in disbursements.

PENALTIES

Little needs to be said with respect to the penalties which may be imposed under these franchises for violation of their terms, with the exception of two which have unique provisions. These penalties are in the form of a reduction in return upon capital value not exceeding 1 per cent for any and all offenses. In both the Cleveland and Dallas grants the application of such severe measures is limited to matters submitted to arbitration and to violation of decisions with respect thereto. The board of arbitration determines the amount of the penalty (within the limit fixed) in Cleveland, and its duration, coinciding with the violation of the decision, in both Cleveland and Dallas.

GENERAL PROVISIONS

Most of these franchises do not differ from older forms of grants with respect to the various general terms and conditions usually considered essential in such cases. There should be a noticeable difference in certain matters from the public point of view. Where the public is paying the costs of service, it should be careful that it does not set up extravagant standards or provisions, such as special types of track construction, iron poles exclusively, power plants, carhouses and other extensive buildings upon expensive city real estate, etc. Provisions that cars shall seat not less than forty passengers and be operated by two men are inconsistent with the latest developments for efficient service. On the other hand, an agreement that the city may call upon the railway to clean and water occupied streets at bare cost plus 10 per cent when traffic will not be impeded, is quite consistent with the fundamental intent of these grants.

A wise provision in this or any other form of franchise is that which permits the cancellation of any specific requirement or feature found to be unlawful without disturbing the rest of the grant, provided the matter in question is not an essential one or was not a controlling or material inducement to the making of the agreement. In the matter of extensions of lines and service, aside from certain initial or minimum requirements, a commendable policy is embodied in a number of these grants to the effect that extensions into new territory will not be required when their operation would impair the present of future ability of the railway to earn a reasonable (or specified) return upon its property as a whole. Other than for such restrictions, the cities may order any new facilities that appear to be needed. Ability to finance the necessary expenditures upon reasonable terms is a further limitation found in a few cases.

Arbitration of disputes in the conventional way is permitted in nearly all cases, but there is a noticeable tendency to restrict the scope of arbitration, leaving many matters to the decision of the supervisor, and others, on appeal to the state utilities commission. In Philadelphia, all matters in dispute are referred to the regular supervisory board, having a member representing each side and a neutral member. This plan has an advantage over the ordinary arbitration board in that at least two of the members are intimately acquainted with the matter at issue and are no more biased than the usual party members in arbitration.

MUNICIPAL PURCHASE

The right of the city to purchase the railway property under service-at-cost franchises is included in all such grants so far in effect, although it does not appear to be an essential element in those not of indeterminate form. This right is limited as to time in several cases—Dallas, after ten years; Philadelphia, after July 1, 1927; Montreal, on March 24, 1953, and at five-year intervals thereafter. In the other cases the right may be exercised at any time after reasonable notice, usually fixed at six months.

The price to be paid in nearly all cases is based upon the capital value with sundry allowances and adjustments described below. In Cincinnati, the city reserves the alternative right to proceed under the State law and pay a "just compensation." In Montreal, the purchase price is to be fixed by arbitration, it being stipulated that the capital value shall not be conclusive evidence in such proceeding. There appears to be no logical reason for this last departure from the usual practice. If the initial capital value was fairly determined and additions thereto and deductions therefrom are all properly handled, and if the return to the investors throughout the life of the grant is no more nor no less than fair, involving no return to them of principal (all of which is insured by the terms of the grant) the appraised value should not differ from the then capital value except possibly for an item appearing in another franchise, the value of future rights of participation in divisible profits. With the exceptionally long initial immunity from city purchase fixed in the Montreal franchise, this value should be negligible.

In all cases the property purchased includes funds created for replacements, damages, etc. Adjustments are of course required where these funds have been invested in the property. Where indebtedness is assumed by the purchaser, it must also be deducted from capital value. The disposition of cash and current assets and liabilities is in accordance with usual commercial practice.

A percentage premium is stipulated in several of the purchase provisions. In Cleveland the city must pay 10 per cent in excess of the capital value less any indebtedness assumed. This premium is not paid if purchase occurs after the expiration of the original term. Dallas must pay 5 per cent in excess of the capital value plus an additional 5 per cent upon that part of it representing additions to the property during the preceding ten years. Kansas City may take over its railway without premium payment when its share of surplus income invested in the property amounts to 50 per cent of the capital value. If the property is taken before this 50 per cent has accumulated it must also pay the company "the value of the remainder of its rights to participation" and the cost of redeeming outstanding bonds.

The percentage premiums above stated may be considered as compensation for terminated profits, for retirement of obligations and other liquidation costs, for amortization of financing costs and other intangible assets not included in capital value, etc. Where such purchase allowance does not appear, a compensating substitute is sometimes found in the form of a cumulative payment of any deficits in return from the date the franchise becomes effective to the date of sale. Where the return is an undivided fixed one this does not apply, but the following applications in other cases are noteworthy.

The Philadelphia franchise requires the city to pay, on purchase, any deficiencies in past dividends on either new or old stock. The Cincinnati franchise requires the city to pay all past deficiencies in operating cost and return to investors, together with interest on any money borrowed to finance deficiencies. The Chicago consolidated franchise apparently has the equivalent of this guarantee against final deficiencies, as it clearly states that the various items of service cost, including interest and dividends, shall be cumulative. The Dallas franchise states that any balance remaining in the surplus reserve at the time of purchase by the city may be applied to the payment of the full return authorized for the rates of fare from time to time in effect. Apparently during the first year of operation under this franchise no surplus was accumulated, for the total earned return was materially less than the 5 per cent minimum allowed before the surplus receives any credits.

An alternative purchase provision is contained in the Chicago surface, Cleveland and Dallas franchises under which the city may designate another purchaser than itself. The purpose of this provision is to secure better terms under private operation than the original grant contains. In Cleveland this is accomplished through reduction in the rate of return, the purchaser being required to accept a rate at least one-quarter of 1 per cent lower than the rate in effect. No provision of this kind is embodied in the other grants, so that the advantage of the so-called licensee clause is not apparent except as a club over the holder of the franchise. The purchaser or licensee in Dallas must pay a 5 per cent higher premium than the city on that part of the capital value applicable to property more than ten years old.

The practices above outlined indicate that the right of purchase should be retained by the city, preferably for its own exercise alone, and that the purchase price should be the adjusted capital value, with a percentage bonus if the property may be taken at any time. There are advantages in an initial period of undisturbed private operation, followed by the right to purchase at stated intervals with a gradually decreasing bonus.

The purchase should include the entire property whether or not within the city limits, unless the outside property is of such size and independent patronage that it may be satisfactorily operated as a separate unit. If partial purchase is permitted, a stipulation for severance damages should be made. The provision in some of the franchises, that any deficiencies in return below the authorized standard rate, which may be possible during operations thereunder, shall be fully made up and paid as an addition to the purchase price, should be of universal application.

CONCLUSIONS

Of the twelve ordinances or legislative acts herein considered, providing for service-at-cost, one has been in use for nearly twelve years. Eight have been in effect or submitted for approval within a period of little more than a year. All of the eight provide for automatically variable fares, while three of the four older ones do not. All of the recent eight also provide for some flexibility in return to investors, whereas in two of the older ones such flexibility is largely lacking. In only one of the recent franchises is a newly established capital value noticeably diminished for depreciation, but two of the earlier four values were largely depreciated. Public management, through trustees, is established in three of the recent drafts but in none of the older ones. A return of about 6 per cent is the maximum contemplated in most of the older grants. Seven per cent is authorized on certain issues among the new ones, with 9 per cent as a maximum limit in one case, the average being appreciably higher than in the former cases.

The above fragmentary summary shows definite, progressive tendencies in service-at-cost features, partly based on experience, but largely due to development in economic thought applicable to such problems. The tendencies now in evidence will undoubtedly continue and future franchises of this class will show increasing departure from earlier methods, particularly in the direction of increasing flexibility in the various necessary standards by which service and financial matters are measured.

WHAT CONSTITUTES A LOGICAL FRANCHISE?

It may be appropriate, in closing, to supplement the various scattered comments and criticisms contained herein by a very brief statement of the writer's conception of the logical outcome of the present tendencies in service-at-cost franchises. To that end, the characteristics which the essential features herein discussed may well embody in new drafts in the not distant future are here given in very brief outline.

The accompanying outline is not intended as the foundation for a model franchise. It is merely a statement of facts and tendencies with respect to a few of the many features which modern franchises contain. Those not considered herein have, to a large extent, become standardized. Many of them might safely be omitted in these days of state and municipal supervision. The features herein considered are still far from standardization. The most striking general tendency in that direction is in matter of flexibility. The earliest service-at-cost franchises were far too rigid and unadaptable. The later forms have not yet tested their improvements in this respect, but it is, nevertheless, confidently expected that their success will encourage further advances in the same direction.

Nothing has so far been said about freedom from competition under service-at-cost operation, because it is not a prominent, expressed feature of the franchises discussed. One of them specifically states that it is not an exclusive grant, and the laws of many states prohibit monopolies. On the other hand, an increasing number of states are providing specifically for exclusive public service under indeterminate rights. Service at cost means, fundamentally, adequate, comprehensive transportation with the lowest possible charges consistent with permanence of service, security of investment and regularity of return to investors. Freedom from competition is economically essential to both minimum cost and maximum security under public regulation, and should be provided for in some effective manner in all service-at-cost franchises.

Essential Features of a Modern Franchise

As Outlined by MR. NASH

TERM: Indeterminate.

CAPITAL VALUE: Cash investment, if accurately or approximately determinable, or cost of reproduction without deduction for depreciation.

SUPERVISION: A single supervisor, independent and technically trained, for all except quite large properties; for the latter, a board of three, representing city, company and state, the last named preferably appointed by the utilities commission. Appeal from supervisor or board to state commission on the more important matters. Extend scope of supervision if necessary to avoid public operation.

FRANCHISE TAXES: None should be imposed. Paving and other similar burdens which are equivalent to such taxes should be abolished.

PUBLIC CONTRIBUTIONS: Railways should be permitted to receive community assistance from taxation authorized by state when necessary to maintain essential service. Relief should not be wholly limited to present war period.

FARE SCHEDULES: Franchises should not embody any fixed fare schedules or limits. These should be left to the supervisor, with confirmation by the utilities commission. Schedule steps should be published in advance, and fare changes should be automatic, small and as infrequent as possible through adequate reserve funds.

COST OF SERVICE: The cost elements should include (1) actual operating expenses, if reasonable; (2) an accrual for maintenance and replacements, usually in excess of current requirements, unexpended portions to be accumulated; (3) actual taxes on the usual commercial basis; (4) return on investment made up of actual interest and sinking fund requirements, a minimum assured return upon remaining capital, a part or all of which should also participate in surplus earnings and possibly in special rewards for efficiency.

RESERVES: Should include an adequate but not excessive reserve for depreciation, an accident reserve and a fund or reserve for contingencies and automatic fare regulation. One regulating fund should be sufficient if its limits are carefully defined and applied with suitable reference to current revenue tendencies.

MUNICIPAL PURCHASE: The right of the city, but no other party, to purchase at any time all, but not less than all, the railway property at its then capital value plus a percentage premium if purchase is made early in the franchise life.

The Fuel Administration and the Skip Stop

How the Federal Government and the Electric Railways Co-operated in Several Ways to Save Fuel, with Special Reference to Eliminating Unnecessary Stops

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WHEN the United States Fuel Administration was created the electric railways wished to do all in their power to save fuel and to work in harmony with the new governmental organization. To facilitate this movement the American Electric Railway Association appointed a joint traffic and engineering committee, with J. P. Barnes, general manager Schenectady Railway, as chairman, and L. H. Palmer, assistant to the president United Railways & Electric Company of Baltimore; G. H. Kelsay, superintendent of power Union Traction Company of Indiana; M. B. Lambert, assistant manager railway department Westinghouse Electric & Manufacturing Company, and the writer as members.

J. F. LAYNG

Mr. Layng has divided his active career between the manufacturing and railway operating fields. For a time he was with the Westinghouse Company, beginning with the apprentice course, and served in several engineering departments. For six years he has been engaged in general consulting work for the General Electric Company, the last three years having been devoted to a study of electric railway operating economies. A most important article on this subject written by him appeared in the 1918 statistical issue of this paper. During the last few months Mr. Layng has been doing special work for the Fuel Administration.

The joint committee compiled information for use on posters which were sent out by the Fuel Administration to the railway companies. These posters were as listed below:

Poster No. 1, entitled "Uncle Sam Needs that Extra Shovelful," showing Uncle Sam (silhouetted) at the fireman's elbow. This poster was designed to impel the fireman to save coal. Poster No. 2. An "Uncle Sam" poster, which showed his face with a severe expression. It was addressed to the carhouse men, and listed the several elements which would influence power consumption from a car maintenance standpoint.

Poster No. 3. The "Eagle" poster, the appeal of which was directed to the conductors and motormen. It illustrated the ways in which they could help in the saving of power.

Poster No. 4. A car card designed to be placed in the car advertising racks, containing the statement that the motormen and conductors of the car were members of the United States Fuel Administration.

POSSIBILITIES OF THE SKIP STOP WERE EARLY FORESEEN

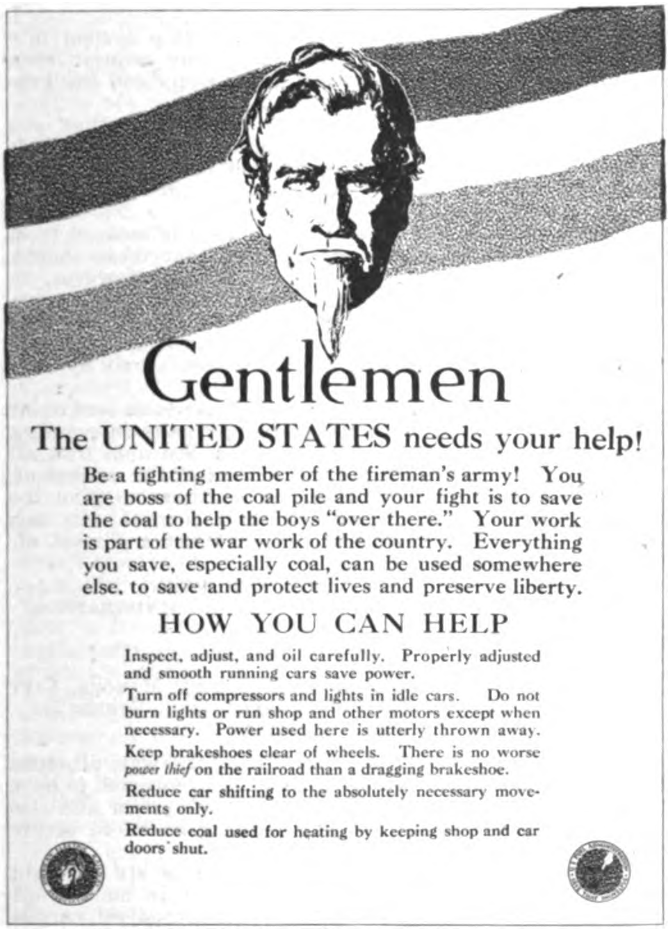
During March, 1918, it was realized that by using the skip-stop system of operation in the large cities of the country great fuel economies could be realized. In order to start the skip-stop campaign properly the Fuel Administration, on recommendation of the War Board of the American Electric Railway Association, recommended it for use in the national capital. John A. Beeler, consulting engineer, carried out the War Board's suggestion, and he proceeded at once to adapt the skip-stop principle to local conditions in Washington. The result has been covered in several articles in the ELECTRIC RAILWAY JOURNAL.

For the purpose of following up the work that was done for the Fuel Administration in Washington an engineer on the Administration's staff was assigned to the duty of requesting the general adoption of the skip-stop system in car operation in the cities of the country, and a part of his duty was to see that proper information for this purpose was supplied.

The promulgation of the system was continued, city by city, up to the latter part of August, by which time practically one-third of the cities in the United States had adopted the skip-stop method of operation. Entire states, such as Massachusetts, Connecticut, New Jersey, Pennsylvania, Texas and Tennessee, adopted the system in all principal cities. The favor with which the plan was received prompted the Fuel Administration to issue a general request that all cities in the United States having populations of 25,000 or more should adopt the skip-stop system. This was done in the belief that annual fuel savings in excess of 1,500,000 tons would thus be secured. This request met with a most gratifying response. Mayors of cities and many others wrote commending the Fuel Administration for taking the initiative in the matter. This result was the more significant when we consider that in the elimination of stops the electric railways are changing the habits of a generation. The result of the campaign has been that car schedules have been "speeded up" and, speaking generally, 10 per cent or more of the time which passengers would otherwise have had to spend on the cars has been saved.

One of the problems confronting the Fuel Administration was properly to present to those who had the guidance of electric railway properties the urgency of the need for installing the skip-stop system. For this purpose a number of bulletins were prepared and copies were sent to all state fuel administrators working under the federal Fuel Administration, to public service commissioners, to mayors, to city councilmen, and to electric railway officials. To secure the co-operation of the American Electric Railway Association War Board, the Fuel Administration appealed to this body, by letter, and asked it to use its influence to insure the proper carrying out of the administration's request. The War Board reproduced this letter in its bulletin No. 29, dated Aug. 29, 1918, which was sent to all electric railways. The substance of the important bulletins issued by the Fuel Administration is reproduced on the following pages.

Entirely aside from the question of power saving, the Fuel Administration used its influence to see that the skip-stop system was installed in the different cities of the country because this principle of operation was known to be economically sound. Saving of time in transportation means a very great deal in connection with community growth. Providing that we have means of rapid transit it is possible for us to live at greater distances from our places of occupation than would otherwise be possible. We can thus raise our children in suburban homes rather than in city flats. Rapid transit economizes the time of the daily car rider and renders available for him a certain extra amount of time which he can spend either at his place of business or at his home. The amount of time which can be saved to the entire body of citizens of the country in this way in the aggregate amounts to a considerable total. The inconvenience to passengers which is occasioned by the relocation of stops is much more than balanced by the saving in time.



The UNITED STATES needs your help!

Be a fighting member of the fireman's army! You are boss of the coal pile and your fight is to save the coal to help the boys "over there." Your work is part of the war work of the country. Everything you save, especially coal, can be used somewhere else, to save and protect lives and preserve liberty.

HOW YOU CAN HELP

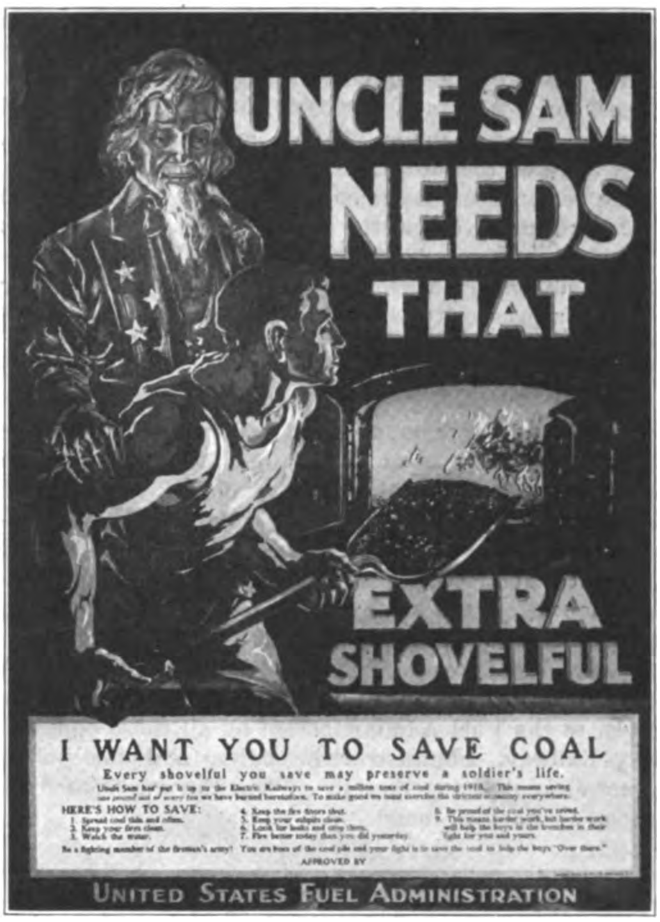
Inspect, adjust, and oil carefully. Properly adjusted and smooth running cars save power.

Turn off compressors and lights in idle cars. Do not burn lights or run shop and other motors except when necessary. Power used here is utterly thrown away.

Keep brakeshoes clear of wheels. There is no worse *power thief* on the railroad than a dragging brakeshoe.

Reduce car shifting to the absolutely necessary movements only.

Reduce coal used for heating by keeping shop and car doors shut.


UNCLE SAM
NEEDS
THAT
EXTRA
SHOVELFUL
I WANT YOU TO SAVE COAL
Every shovelful you save may preserve a soldier's life.
HERE'S HOW TO SAVE:
APPROVED BY
UNITED STATES FUEL ADMINISTRATION

TWO EFFECTIVE "UNCLE SAM" POSTERS DESIGNED TO INDUCE CAREFUL FIRING

Another fact is that when cars can deliver passengers to their destination in less time the population of a city is more evenly distributed. This factor, together with that of the reduction in running time of 10 per cent or more, greatly enhances real estate values in a community. These items are mentioned to illustrate the advantages which can be obtained in electric railway operation through the skip-stop system without additional investment.

AN ILLUSTRATION FROM CHICAGO

Many people prefer the skip-stop system even when there is not a time saving to be made. This is illustrated by service which is given on the South Side lines of the Chicago Elevated Railroads. Over a portion of these lines three tracks are employed, one of which is used during the rush hours exclusively for one-way express traffic. On the other two tracks both local and express trains are operated. The "locals" on these two tracks naturally limit the running time of the express trains, but many passengers transfer from the locals to the express trains to secure a ride free from the continual starting and stopping of the trains.

The total time saved in any community by using the skip-stop system is enormous. For example, let us assume that with the old arrangement eleven stops were made per mile, the stops thus being 480 ft. apart. The greatest increase in any walk possible, as affected by stop locations, is then 240 ft. On this basis the average passenger would walk 120 ft. each at the beginning and end of his ride, a total of 240 ft. Walking at a rate of 5 ft. per second he would require forty-eight seconds to cover this distance.

If we assume that the stops on a whole system, including business, residential and suburban districts, would average seven per mile, or 754 ft. apart, and making our calculations on the same basis, the average walking time, thus revised, would be 75.4 seconds. The net loss in time due to the relocation of stops would be 27.4 seconds. On a transportation system carrying 300,000,000 passengers annually the total extra walking time per year would be about 2,210,000 hours.

Assuming further that the average length of the lines on this system is 9 miles and that the schedule speed of operation is 9 m.h.p., and assuming further that the use of the skip-stop system will reduce the running time by 10 per cent, there will be a time saving per trip of six minutes. Then half of this time, three minutes, would be saved to the average passenger. A total of 300,000,000 passengers would thus enjoy an annual saving of 15,000,000 hours.

Deducting the lost time due to the extra walking, there remains the enormous time saving of 12,790,000 hours which, even at the nominal value of 20 cents per hour, is worth $2,558,000 per year. Time conservation is an important element in the continuance of our country's prosperity, and saving of car riders' time is a part of this conservation.

SKIP-STOP SYSTEM WAS WIDELY ADOPTED

It is interesting to note that approximately 95 per cent of all the cities in the United States which were appealed to in the skip-stop campaign adopted the system. Of these a few will possibly abandon it temporarily, but as the plan is economically sound and greatly promotes community growth the cities which do abandon it will be handicapped in competition with their rivals.

The writer takes this opportunity to acknowledge the enthusiasm and cordiality with which assistance was given to the Fuel Administration by all those appealed to. Railway, administrative bodies, and the public generally pulled together in a "win the war" spirit to assist in saving fuel.

Exhibit I

LETTER TO STATE FUEL ADMINISTRATORS

Skip-stop service, effecting large savings of fuel, has been adopted in many communities. The actual saving in power when skip-stop service is adopted in a city varies from 8 to 16 per cent. Therefore, as a conservation measure during the war, the skip-stop system is of urgent importance.

Moreover, the skip-stop service on our street railway systems means a large saving of the time of the car riders. The same service can be given with less cars or, in other words, more service can be given with the same cars. In these times when all the available man-power is needed for war purposes, anything which we can do to conserve fuel and man-power is a patriotic service.

To put the system into effect, we shall mail, from Washington, bulletin number 2882, addressed to public service commissioners, mayors, city councilmen, city commissioners and street railway officials. The bulletin states the objects which the conservation division of the United States Fuel Administration desires to accomplish and requests that the system be put into operation in every city of 25,000 and over.

From Washington we shall send to the railway companies instructions showing how the skip-stop service should be inaugurated. These directions have been followed in many cities and have been effective. Additional sets of the instructions will be sent on request.

Posters are being printed which can be placed in every railway car used for city and suburban operation. This poster reads:

> *Support the Skip Stop*
>
> It will save 1,500,000 tons of coal per year.
> More coal means more steel.
> More steel means more guns and ammunition.
> More guns and ammunition, a shorter war and fewer casualties.
>
> UNITED STATES FUEL ADMINISTRATION.

The posters will be sent directly from Washington to the street railway companies, who will be notified by letter that the posters are being forwarded.

It is extremely desirable to have the skip-stop service in operation before bad weather begins. If this system is started when weather conditions are good the public will learn the advantages of the system before thinking of the disadvantages which will naturally come with adverse weather conditions.

Many cities have already put the skip-stop system into operation. We are sending copies of our request even to these cities, in order that they may understand the general scope and progress of the work.

Because the situation is urgent, we suggest that you make a personal appeal as Fuel Administrator of the State for the skip-stop system to be started on Sept. 15, 1918. This date has been selected as the proper time to have the system started in all cities of our country.

In some cases, power to operate railways is secured from hydroelectric plants, and it might seem that these should, therefore, not be taken into consideration. However, in practically every instance, it will be found that steam plants are supplementing the hydroelectric supply, and any saving of power that can be made will come from the steam plant supply. In this way, all the power saved by skip stops will mean fuel savings.

The work of Fuel Administrators, committees and their various associates has shown gratifying results in securing the adoption of skip-stop service. It is desirable that all those who have contributed to the success of the movement, follow up the actual operation and continue to give the railway companies the benefit of their counsel. In this way, maximum fuel saving will be obtained and most efficient service rendered.

Yours very truly,
UNITED STATES FUEL ADMINISTRATION.

Exhibit II

LETTER TO PUBLIC SERVICE COMMISSIONERS, MAYORS, CITY COUNCILMEN, CITY COMMISSIONERS AND STREET RAILWAY OFFICIALS

As a fuel conservation measure during the war, all cities having a population of 25,000 and over are requested to have their street railways operate the skip-stop system and also to regulate car heating and car lighting so as to secure the minimum power consumption.

The power required for starting a car is six or eight times as great as that required to keep it in motion. A considerable part of the power for operating street cars is due to the frequent stops which the cars make. A partial list of the states and cities where the skip-stop system has been adopted is indicated below:

- California:
  - Berkeley
  - Alameda
  - Los Angeles
  - San Diego
- Connecticut:
  - All cities
- District of Columbia
- Delaware:
  - Wilmington
- Illinois:
  - Chicago
- Indiana:
  - Indianapolis
  - Evansville
  - Fort Wayne
  - South Bend
- Iowa:
  - Des Moines
- Kentucky:
  - Louisville
- Louisiana:
  - New Orleans
- Massachusetts:
  - All cities
- Maryland:
  - Baltimore
- Michigan:
  - Detroit
  - Grand Rapids
- Minnesota:
  - Minneapolis
  - St. Paul
- Missouri:
  - Kansas City
- New Jersey:
  - All cities
- New York:
  - Brooklyn
  - Rochester
  - Syracuse
  - Schenectady
  - Albany
- Ohio:
  - Cincinnati
  - Columbus
  - Dayton
  - Toledo
- Pennsylvania
  - All cities
- Rhode Island:
  - Providence
  - Woonsocket
  - Newport
- South Carolina:
  - Charleston
- Texas:
  - All cities
- Tennessee:
  - All cities
- Virginia:
  - Norfolk
  - Richmond
  - Portsmouth

Annual savings at the points which we have mentioned total more than 500,000 tons of fuel, all of which can be devoted to war purposes. When all cities in the United States have adopted the skip-stop system, the total annual

THE Motorman *and* Conductor of this car are members of the

U.S. FUEL ADMINISTRATION

and *they* are pledged to save Electricity, which means COAL

WAR BOARD AMERICAN ELECTRIC RAILWAY ASSOCIATION

CAR CARD IDENTIFYING CREW WITH COAL CONSERVATION MOVEMENT

savings will be at least 1,500,000 tons. The skip-stop system not only brings about this saving in fuel at a time when our nation is facing a dangerous fuel shortage, but it also brings about an actual improvement of the service of the street railway companies. The elimination of stops enables the street cars to move their passengers to their destination more rapidly and with more comfort. For instance, in Minneapolis the length of a forty-minute car trip has been reduced to twenty-five minutes. In Washington, a trip that was formerly forty-seven and one-half minutes has been reduced to forty-two minutes.

The skip-stop system does not contemplate putting stops so far apart as to be unduly burdensome. The Fuel Administration has requested that there should not be more than eight stops per mile (average 660 ft. apart) in business districts; six stops per mile (average 880 ft. apart) in residence districts; and four stops per mile (averaging 1320 ft. apart) in open country.

Before starting the skip-stop system it is suggested that a board consisting of five members be selected; two representing the city, two the railway and the fifth a representative of the Fuel Administration. The city members should obtain the views of the police and fire departments regarding dangerous points of traffic, providing they exist. The duty of this board is to select the car stops and see that instructions regarding the stop marking advertising and general policy are carried out that the public may be given the best service with maximum fuel economy.

After the skip-stop system has been started, requests are often made to have stops restored. Great care should be selected in the elimination of stops by the committee and it should be remembered that if stops cut out are restored, we do not have the skip-stop service. The committee selecting stops are requested, therefore, to make their surveys carefully before an announcement of the stops is made.

The United States Fuel Administration desires the adoption of this system by voluntary co-operation of public service commissions, municipal authorities, city commissions and street railways. Since the actual fuel saving is so great in the aggregate, every citizen who is a car user will desire to have a part in this saving and to use his influence to effect the maximum saving.

All mayors and those in authority are urged to have ordinances passed to keep vehicles off car tracks and keep the tracks clear of obstructions. In this way traffic will be accelerated and much time saved for the community. These extra stops waste power.

It is also well to have the railway management and the city authorities make every effort to eliminate all stops on cars going up hill and around curves. Every effort should be made to see that stops at these points are reduced to the absolute minimum as excessive power is required for this operation.

It is desirable to reduce the heating on the street cars. Approximately one-sixth of the operating fuel during the winter months is consumed in heating cars. In this war emergency the Fuel Administration desires that this heating be eliminated, except in very cold weather, and then only sufficient heating be used to take off the chill. In many cases cars have two points of heat, and it is suggested in these cases that the heaters be connected in series. Local municipal authorities and the railway companies are requested to work together on this and reduce the power consumption used for heat to a point that will be reasonable and not endanger public health or cause actual discomfort.

All municipal authorities are urged to do everything they can to reduce the number of stops made by the interurban cars, especially within city limits. In a number of cities ordinances require these large cars, or in some cases, trains, to stop at a number of street intersections. These large cars require three to four times more power to start than do city cars of moderate size.

Yours very truly,
UNITED STATES FUEL ADMINISTRATION.

Exhibit III

LETTER TO ELECTRIC RAILWAY COMPANIES

In order to save fuel, the United States Fuel Administration has advocated the use of the skip-stop system on all electric railways in cities of 25,000 population and over.

To have the public understand the problem and give us their support, we are sending you a number of posters which read:

> *Support the Skip Stop*
>
> It will save 1,500,000 tons of coal per year.
> More coal means more steel.
> More steel means more guns and ammunition.
> More guns and ammunition, a shorter war and fewer casualties.
>
> UNITED STATES FUEL ADMINISTRATION.

We request that you paste these posters in some conspicuous place in all passenger cars operating in city service.

The United States Fuel Administration requests you to give this your personal attention and to see that the skip-stop service is operated so as to give satisfaction to the public. By so doing you will be rendering a patriotic service.

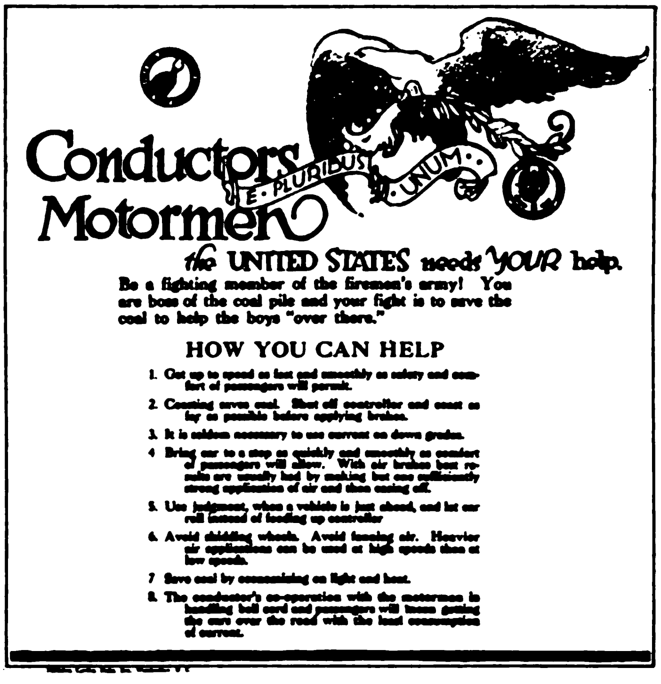
Yours very truly,
UNITED STATES FUEL ADMINISTRATION.

Exhibit IV

SUGGESTIONS TO BE CONSIDERED IN ADOPTING THE SKIP-STOP SYSTEM IN ORDER THAT MAXIMUM FUEL SAVING AND REASONABLE IMPROVEMENT IN SERVICE MAY BE OBTAINED

In adopting the skip-stop system as a fuel-saving measure during the war, there are three fundamental principles which must be observed in order that the proper results may be assured. These are as follows:

A. The system must be applied to the entire city, including the business district as well as the residence district, and not merely to the latter.



Conductors
Motormen

the UNITED STATES needs YOUR help.

Be a fighting member of the firemen's army! You are boss of the coal pile and your fight is to save the coal to help the boys "over there."

HOW YOU CAN HELP

1. Get up to speed as fast and smoothly as safety and comfort of passengers will permit.
2. Coasting saves coal. Shut off controller and coast as far as possible before applying brakes.
3. It is seldom necessary to use current on down grades.
4. Bring car to a stop as quickly and smoothly as comfort of passengers will allow. With air brakes best results are usually had by making but one sufficiently strong application of air and then easing off.
5. Use judgment, when a vehicle is just ahead, and let car roll instead of feeding up controller
6. Avoid skidding wheels. Avoid fanning air. Heavier air applications can be used at high speeds than at low speeds.
7. Save coal by economizing on light and heat.
8. The conductor's co-operation with the motorman in handling bell cord and passengers will mean getting the cars over the road with the least consumption of current.

CAR POSTER TO REMIND CREW OF MEANS AVAILABLE FOR SAVING ENERGY

B. The stopping points must be located so as to serve the people to the best advantage rather than to secure uniform spacing or to follow any arbitrary rule. This may bring some of the stopping points on the near side of the street, some on the far side, and some in the middle of a block. It is better, however, to have such a diversity, with the points properly located, than to have uniformity if convenience of location is sacrificed to secure this result.

C. The number of stopping points must not be too great. There should be not more than eight per mile (averaging 660 ft. apart) in business districts, six per mile (averaging 880 ft. apart) in residence districts and four per mile (averaging 1320 ft. apart) in the open country.

The remarkable improvement in the service which has been effected in Washington by the skip-stop system has been largely due to the proper observance of these principles.

In addition to the above, which may be regarded as fundamental, there are a number of other items which should be carefully considered in each case, but which, on account of local conditions, may or may not apply. These are:

1. If the system is inaugurated gradually instead of all at once, it is preferable to put it into effect first in the congested downtown districts where a number of lines converge and to make it apply to all of the lines in that district. This will effect an immediate improvement in service on all of the lines and will prepare the way for a greater improvement when the system is extended.
2. The stopping points should be plainly marked, preferably by signs bearing the words "Car Stop Entrance" or some similar designation which will be clear to anyone rather than merely by a colored stripe on the pole or other designation which is not self-explanatory.
3. There should be a sign in each car giving a list of the points at which stops are made, where this is practicable, or, where this is not practicable, calling attention to the fact that the car stops only at certain streets and suggesting that passengers find from the conductor the nearest stop to their destination.
4. Where lines diverge, the stopping points should be located so that the stopping of cars of one line will not hold back cars of the other line. A typical instance is where one line continues on a given street while a second line follows the same route for a portion of the distance and then turns into a side street. In such a case, if the cars of the first line stop in both directions beyond the point where the second line turns off and if the cars of the second line stop in both directions on the street which they alone use, the above object will be attained.
5. In many cases a staggered arrangement of stopping points, so that if the cars bound in one direction stop at First Street, Third Street, etc., those bound in the other direction will stop at Fourth Street, Second Street, etc., will distribute the advantages of the system in a more equitable manner among all of the patrons than an arrangement by which the cars stop at a given point in both directions and skip the next former stopping point entirely. There are other cases, however, where this arrangement is not practicable.
6. In connection with the introduction of the skip-stop system the matter of safety stops should be carefully reviewed. There are many points at which cars are now required to come to a standstill where equally safe operation can be obtained merely by having them slow down to a speed of 5 or 6 m.p.h.
7. Where interurban cars enter cities, it is desirable that they should not be required to stop at every city car-stopping point (since such cars require much more power for starting than the city cars) but they should stop not oftener than every quarter mile. This can readily be arranged for by the use of special signs at the interurban car-stopping points.
8. By observing the above policies it is ordinarily possible, when introducing the skip-stop system, to reduce the number of stopping points on city lines by from 30 to 40 per cent. This usually reduces the number of stops actually made by about 25 per cent. Under these circumstances the schedule speed of the cars can, as a rule, be increased by from 10 to 12 per cent (without any increase in the maximum speed) while at the same time the power required (and hence the fuel) is reduced by a corresponding amount.
9. It has been more or less common, in introducing the skip-stop system, to begin with one or two lines and to reduce the stopping points only in the outlying sections, making all stops as usual in the business district. Such an arrangement does not give satisfactory results from the standpoint of either fuel economy or improvement in service. It is in the effort to avoid the introduction of the system on such a basis in any future cases that we are calling especial attention to the above principles which it is necessary to follow in order to secure the desired results.
10. Where single track is operated it is suggested that every other corner be skipped; that is, assuming that the streets are numbered 1st, 2d, 3d, 4th, 5th and 6th, to have the stopping places shown at 1st, 3d and 5th streets. In this way, confusion with reference to the placing of stop signs will be eliminated. This will reduce confusion in knowing where the car stops are located.
11. All stops should be carefully marked. Where it is necessary to start the skip-stop system immediately and regular signs are not ready, in a number of cases temporary signs are used.
12. Previous to starting the skip-stop system the fullest publicity should be given to the established stopping places. This should appear in the daily papers supplemented by notices placed in the cars whenever practicable.

Exhibit V

BULLETIN NO. 29 OF THE AMERICAN ELECTRIC RAILWAY ASSOCIATION WAR BOARD ON SKIP-STOPS

The following letter has been received from the United States Fuel Administration regarding the operation and progress of the skip-stop system:

Washington, D. C., Aug. 29, 1918.

Mr. E. C. Faber, Manager,
American Electric Railway Association War Board,
950 Munsey Building,
Washington, D. C.

Dear Sir:

War's excessive coal demands increasing from day to day, require us to conserve fuel in every possible way. Practically all of the industries of the country are saving fuel. Electric railway skip-stop operation presents one of the largest fields for fuel savings. The Fuel Administration urges that skip-stop service be adopted in the United States in cities having a population of 25,000 or above. The fuel savings effected by this system will be at least 1,500,000 tons annually. We therefore request all electric railways to co-operate fully with the Fuel Administration in its efforts to save coal through the skip-stop system.

We are sending letters to the State Fuel Administrators, who will in turn communicate with the public service commissioners, mayors, city councilmen, and all others who regulate our public utilities, asking them to assist in putting the skip-stop system into effect Sept. 15, 1918.

Posters will be distributed to railway companies with instructions to insert them in prominent places in city cars. The posters contain a patriotic appeal to the public, asking them to support the skip-stop system, and explaining why it is an essential war measure.

Using the skip-stop system generally enables cars to be operated at 10 to 12 per cent higher schedule speed. The power saving varies from 8 to 16 per cent. Inasmuch as the cars operate at the higher schedule speed, it can be seen that the same service can be given with a lesser number of cars; or, providing the service warrants it, more service can be given with the same cars.

The importance of having the full co-operation of railway companies in making the skip-stop system a success in every city cannot be emphasized too strongly. This request from the United States Fuel Administration to the State Fuel Administrators and all public officials concerned, is merely to have the skip-stop system operative during the period of the war. The continuance of this economic method will in all probability depend upon the way the plan is carried out by the individual railway companies.

The railways and public officials are also being requested to eliminate stops on up-grades wherever it is at all practicable. These same officials are also being requested to eliminate all possible stops of interurban cars in cities, towns and villages.

We are addressing this letter to you as the representative of the electric railway industry. We expect the American Electric Railway Association War Board to aid in every way possible in securing the maximum fuel savings that are consistent with proper railway service.

We believe it is the patriotic duty of all railway men and of the individual members of the community to conserve fuel and man power by adopting the skip-stop system.

UNITED STATES FUEL ADMINISTRATION.

Electric Freight Haulage Is an Economic Duty

Such Service Is Invaluable to City and Country—The Field Is Practically Unlimited, and the Service Can Be Developed by Making a Traffic Analysis, Providing the Proper Equipment, "Selling the Product" and Using Farsightedness and Imagination

By A. B. COLE
Westinghouse Electric & Manufacturing Company

UNQUESTIONABLY it is the duty of electric railways to give the public the best possible service. Therefore, it would be well for them to look very carefully into the question of public demands and the profitableness of freight business.

Few lines would flatly say that it is profitable to handle freight. Most of them, however, would consider freight business profitable if they had "proper facilities," belts around cities and towns, freight houses, team tracks and steam road connections. In other words, they do not consider the business to be at present on a profitable basis, but they realize what is required to make it so. This entire view is somewhat pessimistic. Electric railways have a field entirely their own, and they are capable of giving service far superior to that of competitors.

A. B. COLE

Although but nine years out of college, Mr. Cole is well known in the electrical field through his surveys of railway freight conditions, and his recent work for the Electric Railway War Board during the past year. After graduating from Purdue University in 1909, he first acquired practical experience in the Westinghouse shops and engineering and sales departments, later working his way upward through several divisions of the same company's publicity organization. He is now assistant manager of that department, with headquarters at Pittsburgh.

The electric railway has done more than all other transportation agencies to improve social life among both city and country dwellers, but it has met only a part of its possibilities as a conveyor and distributer of natural and manufactured goods. The electric railway, in fact, is in a position to do more to place the produce of the farm at the door of the consumer with greater dispatch and less cost than can be done by any other means of transportation.

This closer co-operation with the farmer has been found profitable by many electric lines in more ways than one. For example, there is the good-will which now means so much to a utility, and the increase in tonnage that is bound to come with better crops and stock from more intensive and efficient operation. Through better transportation from the electric railway, the youth who formerly left the farm forever now hies himself off to the nearest agricultural college to become a modern farmer.

The modern electric railway brings the city to the front door of the farmer. There are thousands of farm dwellers who date the history of their success and prosperity from the day when the electric interurban first reached their territory. In the past it was the case of an early start with a two-horse team and a hard day's ride whenever it was necessary to get into the city for supplies or to the market. The advent of the electric interurban changed all this. The farmer now at any hour of the day finds it possible to board a fast electric train for a trip of a few hours to the city. He can ship his produce into the city every day in the week if desired, instead of holding it for the weekly trip. He is in a position to take advantage of the market for his various commodities. His children are enabled to enjoy the educational and social advantages of the city and at the same time retain their residences on the farm.

The electric railway has also proved of immediate value in bringing the school to the farm by the use of special trains with competent lecturers and demonstrators. The subjects covered are usually dairying, horticulture, hog raising, poultry husbandry and farm management. Exhibits include dairy cows, hogs and other stock which are to prove the points made by the lecturers. The cars furnished by the railway operate on a fixed schedule, advance notice of the "Farm Special" being sent to every farmer in the interested territory, to all newspapers, commercial bodies and station agents. Generally, too, the merchants at towns along the way encourage the farmers to attend these "specials." The experts, who are drawn from the nearest schools, include specialists in everything from silos to eggs.

The producing character of some districts so visited has greatly changed because of profitable advice given and followed. Thus, one district was devoted almost entirely to grain. Through the educational talks, the farmers saw that dairying, hog raising, and fruit raising would be more desirable occupations, because of conditions peculiar to their territory.

In addition to the farm specials, electric railways which sell power have run "Electricity on the Farm" and "Home" specials to demonstrate the use of electrically-operated farm tools and electric lighting. Unfortunately, such practices have not been the rule. On many roads the freight business, like Topsy, "jes growed" with no general policy of development that would bring out the uttermost possibilities of the territory.

The advantages arising from electric railway service, however, do not lie solely with the farmers. The city dweller and the city merchant, for example, both profit by having the farm brought to their front door. The interurban railway brings in farm products fresh every day. They do not grow stale in transit but reach the city markets early the same day that they are shipped.

In general the electric railway is considered an advantage to the community. In many instances where electric railway service has been present the city merchants concede an increase of 10, 20 and 25 per cent in their business over a period of years, and in some cases the business has been of such noteworthy importance that it is only a question of time before the old crossroads stores will go out of business, as the farmers prefer generally to trade in the larger towns. Moreover, the electric service allows the storekeepers in the smaller outlying towns to carry smaller stocks and thus not tie up so much capital.

Specimen comments regarding the value of the electric lines follow: "They build up the towns, but turn trade to the cities"; "They give cheaper freight and more consideration of rights of shippers"; "They benefit all trading centers, large towns from smaller, and small towns from farmers"; and "They gradually, but surely concentrate retail trade in the large cities."

ELECTRIC RAILWAYS ARE AT FAULT FOR UNPATRONIZED SERVICE

The electric railway excels in time of transit and in the handling of merchandise freight. In many instances cultivation by the railway traffic department and proper advertising, backed up by salesmanship, would soon make known the wonderful facilities of the electric railway as a freight carrier.

The problem before the electric railway in marketing its commodity is the same as that of a manufacturer who must break into the world market with a new product. He analyzes his field, and so must the electric railway in development of freight traffic. After proper analysis, the manufacturer launches an advertising campaign, backed by expert merchandising knowledge of the particular fields to be exploited. The electric railway must do likewise.

INTERURBAN LINES NEED AWAKENING

Despite the proved value of electric lines to the farmers and city dwellers alike, such carriers have not made full use of their opportunities for developing freight traffic. A railroad commissioner's view of the situation is summed up as follows:

> Apparently interurban interests have never fully awakened to the possibilities of freight transportation. Their facilities are not commensurate with the opportunity, and the managements do not seem to have enough confidence in the future to provide for possible expansion.
>
> The operation of single-unit trains is really an economic waste, in that it makes the unit cost of transportation a great deal higher than it should be. There is business in sight enough to justify multiple-unit trains in freight transportation on practically every interurban in the country—even though the bulk of the freight be not considered.
>
> If the interurbans were to make a reasonably adequate effort to secure and handle bulk freight, the revenue derivable from freight transportation should be multiplied several times, as compared with present returns.
>
> If the interurban railways do not soon awaken to the situation and provide more adequate facilities, it is among the possibilities that they will lose a great deal of the possible business to the several trunk lines, because of the inadequacy of interurban transportation.
>
> Surveys made by various bodies on account of the freight congestion and the delay of steam railroad movement of l.c.l. freight, show unquestionably that the interurban railways can be of good service to the country. They can relieve to a large extent the congestion of millions of tons of freight and thereby increase the car supply.

In its case the fields to be exploited are, to speak broadly, carload freight, less-than-carload freight, and parcel dispatch. All three of these divisions, of course, are subdivided depending on the kinds of industries touched.

To carry the merchandising parallel further, the manufacturer backs up his advertising campaign with expert salesmanship. In the case of the electric railway, these expert salesmen should be well-paid representatives of the traffic department under a high-grade, well-paid, experienced traffic manager. It is a well-known fact that the sales managers of first-class organizations are often the highest type of man in the personnel. This should be true in the case of a traffic officer, and in order to obtain such talent he must receive a salary commensurate with his ability.

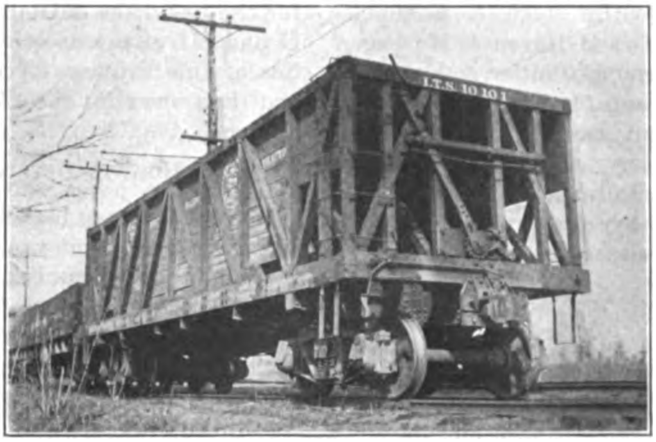
Advertising and salesmanship of the manufacturer must be backed by its service from the main works; otherwise this expensive talent is wasted. The electric railway is in a position to give service superior to that of its competitors, barring none, but unfortunately the electric railway has failed to tell the public of this uncomparable service. Electric railways are to blame for their unpatronized freight service.

ECONOMIC FALLACY OF THE MOTOR TRUCK

Motor-truck and electric railway facilities should be co-ordinated. The motor truck has practiced camouflage, and the electric railway stands by and permits this competitor to take the very cream of its traffic. Short-haul tonnage is now being hauled by motor truck—a traffic which really belongs to the electric railway, for the motor truck is economical over a very short distance comparatively. Yet the public has failed to recognize the true economic value of the electric railway. Why? Because the majority of electric railways when promoted are not backed by the proper imagination and far-sightedness, which in turn would demand the aggressive methods needed to make known to the public the merits of such an incomparable service.

So true is this that many chambers of commerce, boards of trade and other commercial bodies are helping to develop motor-truck haulage, failing to realize that this expensive system of transportation is entirely inadequate to meet the ultimate demands, while cheaper and better facilities—the electric railways—are available.

According to motor-truck promotion literature, the "star of the motor truck is only peeping above the economical horizon." The essential difference between the hauling of large volumes of freight by rail and similar volumes by motor trucks, it is said, is that in the first instance the rights-of-way represent private investments, while in the latter case the rights-of-way are public property. But even on this basis an analysis will prove the economic fallacy of the motor truck for freight haulage, in that with its unrestricted use, there could be nothing less than a maximum of waste in man-power and maintenance—in additional men for up-keep of roads, in increased demand for repair parts and in gasoline needed for other industries. The winter of 1917-18 in many instances demonstrated the value of electric freight haulage. In some localities, where the weather was particularly severe, the electric railway showed its superiority by keeping traffic open and "delivering the goods," when the steam roads and motor trucks were at a standstill. In one instance, the electric line not only took care of the local passenger service when the steam roads were tied up, but it hauled meat, milk, coal and other necessities to the towns within its territory, thereby saving the communities from serious inconvenience if not a real famine. This service will not soon be forgotten by the patrons. If electric roads can deliver the goods under such extreme conditions, it is obvious that they can more than make good under normal conditions.



SPECIAL EQUIPMENT OF ILLINOIS TRACTION SYSTEM

STEAM AND ELECTRIC RATES NOT FAIRLY COMPARABLE

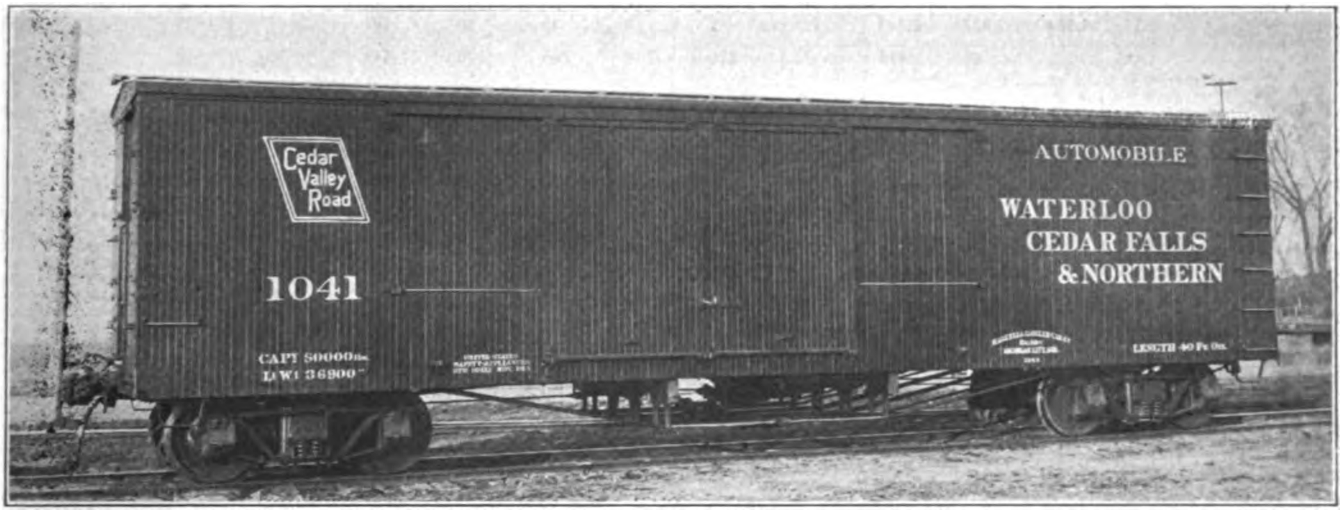
Having realized the folly of their original low rates, many electric railways have asked for, and occasionally secured, increased rates based upon the steam-railroad classifications. As a rule these electric lines have waited for the steam competitors to take the initiative. With regard to the broad principle of rate-making, however, the electric railways have rarely fought for a special classification based upon their superior service.

"Express service at freight rates" is an old slogan that has proved to be the downfall of many an interurban. With proper publicity, the public would pay the higher price that better service deserves. Such factors as early-morning delivery of overnight shipments and accessibility to stations entitles the electric railway to a differential wherever speed is the essence of the contract.

Recent study has clearly disclosed the fact that both public utility commissions and chambers of commerce appreciate these inherent reasons for higher rates. In fact, they have stated that electric service is often worth at least 25 per cent more than steam service to the same destination. From this is would seem that if the railways developed more salesmanship in marketing their superior product of freight transportation, they could build up more business regardless of steam rates.

The field to which electric freight transportation may be offered is practically unlimited, and many lines now are engaged in an extensive business, accepting anything for transit that a steam line would. Noteworthy examples of this practice are the Waterloo, Cedar Rapids & Northern Railway, the Inter-Urban Railway of Des Moines, the Michigan Railway, the Toledo & Western R.R., the Fort Dodge, Des Moines & Southern Railroad and the Youngstown & Ohio River Railroad. There are also some roads which perform special service, such as industrial switching between steam roads and industries, while others handle primarily one principal commodity, such as coal. An example of the former type of road is the Niagara Junction Railway, and of the latter Bellville Electric Railway.

Moreover, there are other roads that are just breaking into the heavy haulage business, such as the Detroit United Railway, the Chicago, North Shore & Milwaukee Railroad and the Chicago, Lake Shore & South Bend Railway. All of the foregoing handle freight with electric locomotives and motor-freight cars. The heavy interurban roads are also found handling a tremendous tonnage, principally of merchandise both l.c.l. and c.l., and here we find solely motor-freight car and trailer operation with practically no steam railroad interchange. Notable examples of this type are the Ohio Electric Railway, the Union Traction Company of Indiana, the Northern Ohio Traction & Light



SPECIAL AUTOMOBILE CAR OF CEDAR VALLEY LINE

Company, the Cleveland, Southwestern & Columbus Railway, the Grand Rapids, Grand Haven & Muskegon Railway, the Pittsburgh, Harmony, Butler & New Castle Railway and the Terre Haute, Indianapolis & Eastern Traction Company. An embryo freight road, about ready to develop its territory, is found in the East St. Louis & Suburban Railway.

The commodities handled by electric lines may be divided into several general classes, as follows:

Products of agriculture
Products of animals
Products of mines
Products of forests
Manufacturers
Merchandise and other commodities
Merchandise not included in the above

The term freight haulage does not necessarily apply to package freight or l.c.l. lots, as almost every interurban electric railway is doing a considerable amount of this business. What many electric lines have not fully developed is the handling of carload freight, which is the mainstay of the steam railroads. An example of what is possible on a 35-mile interurban line is shown from the following statement of commodities handled in one year:

Stone	816 cars	Pipe	21 cars
Coal	240 cars	Horses	20 cars
Hay	226 cars	Bolts	19 cars
Tomatoes	51 cars	Brick	18 cars
Tomato crates	46 cars	Tile	15 cars
Miscellaneous	42 cars	Lumber	11 cars
Wheat	27 cars	Milk	6 cars
Oats	22 cars		

The accompanying tables give further data of this sort. Table I shows the tonnage record by commodities for the Salt Lake & Utah Railroad during 1917. Tables II and III give respectively specimen operating statistics of this railway for the month of February, 1917, and data showing the conditions of operation of this company.

HOW TO DEVELOP FREIGHT SERVICE

The interurban is no longer the proverbial "shoe string railway" that ran somewhere out into the country, but a well organized railway capable of rendering valuable economic service to its territory. While many lines were developed primarily for passenger business, some of these can readily help relieve traffic congestion and improve their load factors by hauling freight. To this end they should:

1. Make a traffic survey.
2. Develop dairy traffic handled by freight-motor cars.
3. Encourage merchandise shipments, handled in less than carloads or carload shipments by locomotives or motor cars and trailers.
4. Relieve steam railroads of local traffic.
5. Develop steam-railroad interchange.
6. Establish sidings and belt-lines, where possible, for industrial development.
7. Cultivate commercial bodies in their territory, and demonstrate the possibilities of electric service.

While freight haulage in its expanded form may call for the use of such special equipment as is shown by the accompanying illustrations of an automobile car on

TABLE I—TONNAGE OF COMMODITIES HANDLED BY SALT LAKE & UTAH RAILROAD DURING 1917

Commodity	January	February	March	April	May	June	July	August	September	October	November	December	Total
Automobiles			37	23	25	23		5	6	6	7	6	138
Beets	1,521	29		348	88					12,078	10,881	7,916	32,861
Brick							63		20			20	103
Building materials									82				82
Canned goods	25		46		27				54	54	205	163	574
Cans					23	25	12	49	63	34			206
Cattle													
Cement			231	181	374	269	224	266	142	178	118		2,003
Coal	490	783	885	504	683	637	664	1,240	4,367	3,371	1,173	4,085	18,882
Coke				56		29		25		24		246	380
Electrical supplies		15			15			15		15		15	75
Explosives													
Fire clay		20		20				30	32				102
Flour				30	37				20	49	25	67	228
Fruit									2,914	591	133		3,638
Grain		87	69	151	315	81	29	20	132	100	160	15	1,159
Hay	12	91	217	227	43			19	121	68	23	220	1,041
Limestone								36			100	283	419
Lumber	362	137	219	459	478	1,152	688	787	556	250	111	289	5,488
Machinery					23	33		80	70	70	6		282
Merchandise	487	589	892	824	825	810	720	948	999	984	654	748	9,480
Miscellaneous	30	100	37	12	124	105	139	41	227	231	99	46	1,191
Ores										20			20
Potatoes		198	98	112					18	613	272	105	1,416
Rail				18	162	414	360	90	18			39	1,101
Salt	75	57	88	47	41			23	45	49	50	31	506
Steel				110	37	24		31	36		21	70	329
Sugar	1,324	2,027	2,442	427	5	53	48	80	141	2,664	935	771	10,917
Sewer pipe	27				7								34
Ties		40	118	71	221	739	766	808	149	30	20		2,962
Tile													
Track material							7		18				25
Vehicles													
Vegetables									282	272	142	215	911
Poles	227	114	50	34	68	40	103	20	40			30	726
Cereal	15			18									33
Corn	37	51											88
Syrup	181	70	72		55				359	612	194	627	2,170
Junk		21	36	138	80	62	42	65	58				502
Iron pipe			188	79		6			38	35		44	390
Wire		37	57	8	35				11				148
Agricultural implements		30	39	115	28	33	22		13				280
Slags				99									99
Beet seed				64			29	15					108
Wagons				28						23		17	68
Iron				80	43	40				16			179
Mill stuff		15	17								21	26	79
Freight cars					162	60	12	12		220			466
Boxes						55	49		36	24	15		179
Spikes						66							66
Horses							14						14
Soda ash							58						58
Silo								279	36				315
Oil								17					17
Shooks								110		29			139
Baskets								80	59				139
Asphalt										316	76		392
Total	4,813	4,511	5,838	4,283	4,024	4,776	4,049	5,179	11,174	23,026	15,441	16,094	103,208

the Waterloo, Cedar Falls & Northern Railway and a coal car of the Illinois Traction System, it requires only simple equipment to begin the handling of local freight. Many a road has started by using one or two freight motor cars, each able to haul three or four trailers. As business grew, one or two freight locomotives were secured. Motive power equipment is available which has such characteristics that operating an "off-peak" freight service would not necessarily require any additional substation, power house or feeder capacity or in anyway interfere with regular traffic. Low-speed field-control locomotive motors can handle heavy drags of freight cars with no greater power demands than those required by a single high-speed large interurban car.

One of the secrets of the rapid and extensive growth of freight business on some electric lines is that they have complete traffic arrangements with steam and electric connecting lines, and a well-organized method of securing business. Invariably, too, it is found that the electric railways which do the heaviest freight business usually have former steam railroad men in charge of this branch. With the nationalization of the steam railroads there should be available for re-employment some steam traffic men who could easily prove invaluable to any electric railway which wants to build up its freight business. Such men not only know how to secure business and move traffic; they are also familiar with the complex practices peculiar to steam railroad interchange of traffic and equipment.

The disease of "localism," or deliberately building non-interchangeable equipment, must be cured if the electric railway wants to do more than a village business. In several instances it has been found that through a mistaken sense of standardization the policy of the mechanical department actually hindered the development of inter-line freight business. For example, because one property was using the same type of coupler on both passenger and freight cars it could not handle M. C. B.-equipped cars in interchange. Some roads discourage interchange because of their unwillingness to have their rolling stock travel on foreign electric lines, being quite devoid apparently of consideration for the meaning and the value of car interchange pooling practice.

These points, although small in themselves, are very important in connection with the development of electric freight on a large scale. It is neglect of points of this kind that causes steam railroads to fail to deliver a car at the designated place on the electric line, despite

TABLE II—SPECIMEN OPERATING STATISTICS OF SALT LAKE & UTAH RAILROAD FOR MONTH OF FEBRUARY, 1917

Freight Statistics

Number of tons of freight carried earning revenue	4,511
Number of tons of freight carried one mile	72,020
Number of tons of freight carried one mile per mile of road	1,081
Average distance haul of one ton	15 9
Average amount received for each ton of freight	$0 96874
Freight revenue per mile of road	$65 61531
Freight revenue per train-mile	$1 25430
Freight revenue per ton per mile	$0 06068
Average number of tons of freight per loaded car-mile	5 1
Average number of freight cars per train-mile	5.1
Average number of loaded cars per train-mile	4.1
Average number of empty cars per train-mile	1.0
Average mileage operated during month	66 6
Average operating cost per ton per mile	$0 06825
Average operating cost per freight train-mile	$1.41090

Miscellaneous Statistics

Revenue from transportation per car-mile	$0 49535
Revenue from transportation per car-hour	$8 40951
Revenue from transportation per train-mile	$0 73323
Revenue from other railway operations per car-mile	$0 00963
Revenue from other railway operations per car-hour	$0 16685
Operating revenues per car-mile	$0 50518
Operating revenues per car-hour	$8 57634
Operating revenues per train-mile	$0 74781
Operating revenues per mile of road	$476 07702
Net operating revenues per car-mile	$0 13012
Net operating revenues per car-hour	$2 20909
Net operating revenues per train-mile	$0 19262
Gross operating expenses per car-mile	$0 38751
Gross operating expenses per car-hour	$6 57877
Gross operating expenses per train-mile	$0 57364
Gross operating expenses per mile of road	$365 19099
Freight, mail and express car mileage	17,795
Freight, mail and express car-hours	1,852
Maintenance of way per mile of track	$73 34
Average maintenance cost per passenger car	$23 99
Average maintenance cost per freight car	$4 16
Average maintenance cost per car of electric motive power	$29 90
Station and terminal expense per passenger-mile	$0 00193
Station and terminal expense per ton-mile	$0 02509
Maintenance not dependent on train movement per mile of road	$67 39
Per cent of freight revenue, loss and damage freight	0 01501

Passenger Statistics

Regular fare passengers carried	52,396
Revenue transfer passengers carried	
Free transfer passengers carried	
Average number of passengers per car-mile	19 2
Average number of passengers per train-mile	22 2
Average number of passenger cars per train-mile	1 2
Revenue passengers carried 1 mile	862.072
Revenue passengers carried one mile per mile of road	12,944
Average distance each passenger carried	16 4
Average fare received from each passenger	$0 39724
Average passenger train revenue per mile of road	$312 52147
Average passenger-mile revenue	$0 02416
Average passenger-mile operating costs	$0 01317
Passenger car mileage	44,968
Passenger car-hours	1,745
Average operating cost per passenger car-mile	$0 25248
Average operating cost per passenger train-mile	$0 29177
Average passenger revenue per car-mile	$0 46286
Average passenger revenue per train-mile	$0 53486

TABLE III—DATA SHOWING OPERATING CONDITIONS OF SALT LAKE & UTAH RAILROAD

Utah-Idaho Sugar Company's Beet Loading Platforms and Tracks:

Granger
Norberg
Lehi
Salem
Harmon
Redwood
Manila
Bello
Riverton
Springville
Fifteenth South
Bluffdale
Keeler

Industries Served Through Connecting Lines:

All industries in: Salt Lake City and Provo, other than are reached directly by the tracks of the Salt Lake & Utah Railroad, are served through reciprocal switching agreements between this road and steam roads.

Routes and Rates:

Through routing and rates are in effect with all lines in connection with the Union Pacific System, thus giving the industries located on our tracks all the benefit of their rates and routing.

Proportion of Intrastate and Interstate Freight Business:

(65 per cent intrastate and 35 per cent interstate)

During the calendar year of 1917, the Salt Lake & Utah Railroad handled 1708 carloads moving on interline rates:

	Carloads
Coal	462
Grain and hay	46
Green fruit	294
Lumber and forest products	231
Potatoes	41
Sugar and syrup	325
Miscellaneous	311

In addition to the carload interline business, more than 2,000,000 pounds of interline package freight was handled.

For the same period, the handling of purely local freight, *i. e.*, freight picked up and laid down along the line, approximated 1,500 carloads of solid carload freight, and 18,000,000 pounds of less than carload freight.

Passenger:

No interline business.

Equipment Owned:

Freight Equipment:

	Tons Capacity
Three electric locomotives	750
Twenty-six box cars	60,000
Twenty all steel side dump gondola cars	100,000
Ten beet cars	80,000
Seven flat cars	60,000
Four refrigerator cars	80,000
Two freight cabooses	

Passenger Equipment:

Two all-steel motor express cars
One all-steel trailer express cars
Eleven all-steel combined express and passenger motor cars
Four all-steel passenger coaches

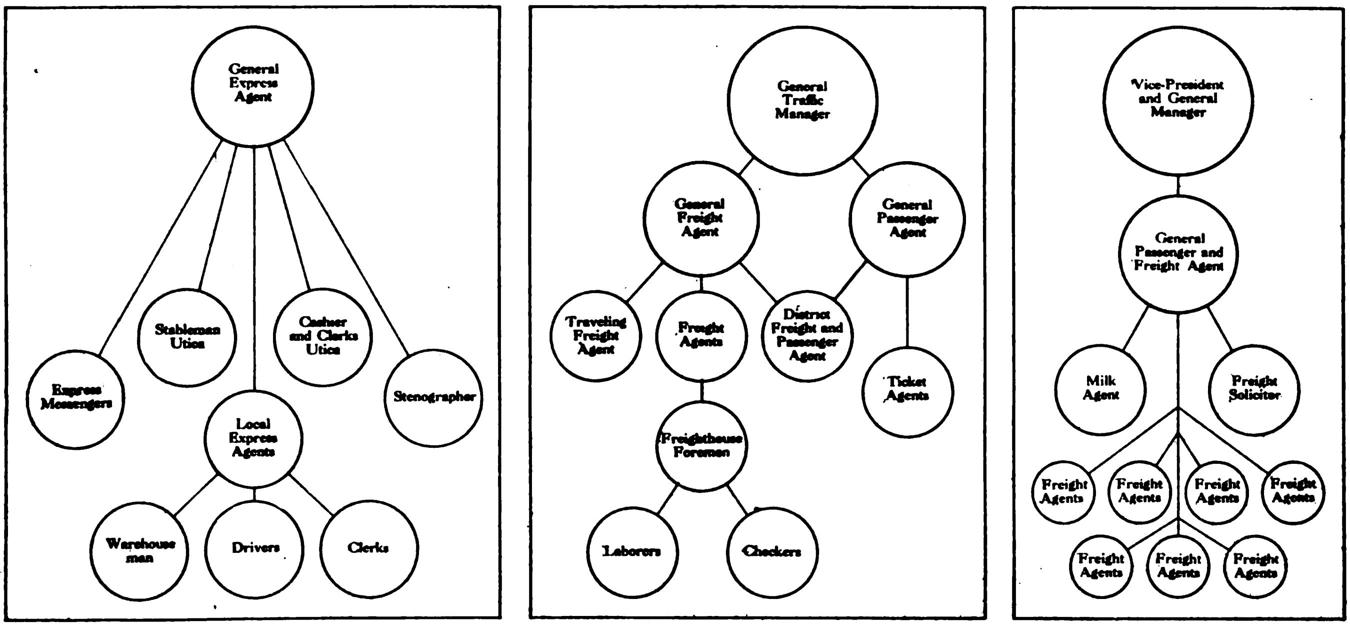
Men employed...... 143

Fuel used........... Hydroelectric power, purchased from the Utah Power & Light Company, and obtained by them from various mountain streams in Utah and Idaho billing instructions and regardless of the inconvenience to the consignee. If electric railways wish to deal with the steam railroads, they must play according to the rules of the game.

CHOOSING THE PROPER FREIGHT ORGANIZATION

The quantity of business and the methods by which it is handled naturally control the size and the character of a freight traffic organization. While steam railroads have a fairly standardized freight department regardless of size, the electric railways of the United States, when viewed from the goods-handling standpoint, are divided into six different classes, as follows:

1. Purely passenger lines.
2. Lines over which an old-line express company operates on a percentage basis (usually 55 per cent of receipts) and offers a wagon collection and delivery service at rates slightly above those fixed by steam roads for straight rail transportation.
3. Lines which have entered into agreements to form a co-operative express package company organized and operated as a separate corporation with wagon collection and delivery service and with rates practically equal to those of the old-line express company. For example, the Electric Package Express Company, Cleveland, Ohio.


General Express Agent
Stableman Utica
Cashier and Clerks Utica
Express Messengers
Stenographer
Local Express Agents
Warehouse man
Drivers
Clerks
General Traffic Manager
General Freight Agent
General Passenger Agent
Traveling Freight Agent
Freight Agents
District Freight and Passenger Agent
Ticket Agents
Freighthouse Foremen
Laborers
Checkers
Vice-President and General Manager
General Passenger and Freight Agent
Milk Agent
Freight Solicitor
Freight Agents
Freight Agents
Freight Agents
Freight Agents
Freight Agents
Freight Agents
Freight Agents

New York State Railways Utica-Syracuse Lines

Detroit United Railway

Aurora, Elgin & Chicago Railroad

ORGANIZATION CHARTS OF FREIGHT-HANDLING ROADS

4. Lines which operate less-than-carload freight business at steam railroad rates with a dispatch service at twice first-class steam rates, as for material within the 100-lb. limit and carried upon passenger cars.
5. Lines which operate a general freight and express business including both carload and less-than-carload shipments, with interchange relations, carrying through rates with steam roads, but exclusive of a through freight business.
6. Lines operating a general freight business on exactly the same basis as steam railroads, and considered practically as electrically operated steam railroads. The Piedmont & Northern Lines, the Fort Dodge, Des Moines & Southern Railroad, the Inter-Urban Railway of Des Moines, the Waterloo, Cedar Falls & Northern Railway and the Toledo & Western Railway are examples. This class includes terminal, belt and switching lines, such as the Niagara Junction Railway, the Bush Terminal Railroad and the Hoboken Shore Road.

In each of the classes where freight or express is involved an entirely separate department with a special type of organization should be created. The accompanying organization charts are illustrative of methods now in use. The Detroit United Railway has heavy interurban l.c.l. freight traffic, while the Waterloo, Cedar Falls & Northern Railway has freight traffic similar to that under steam operation. The Aurora, Elgin & Chicago Railroad has a large amount of dispatch package freight, and the New York State Railways a considerable amount of pick-up and a large amount of parcel freight. The service on these two lines is more or less alike, the main difference lying in the rapid transit of the former.

HINTS FOR ORGANIZATION

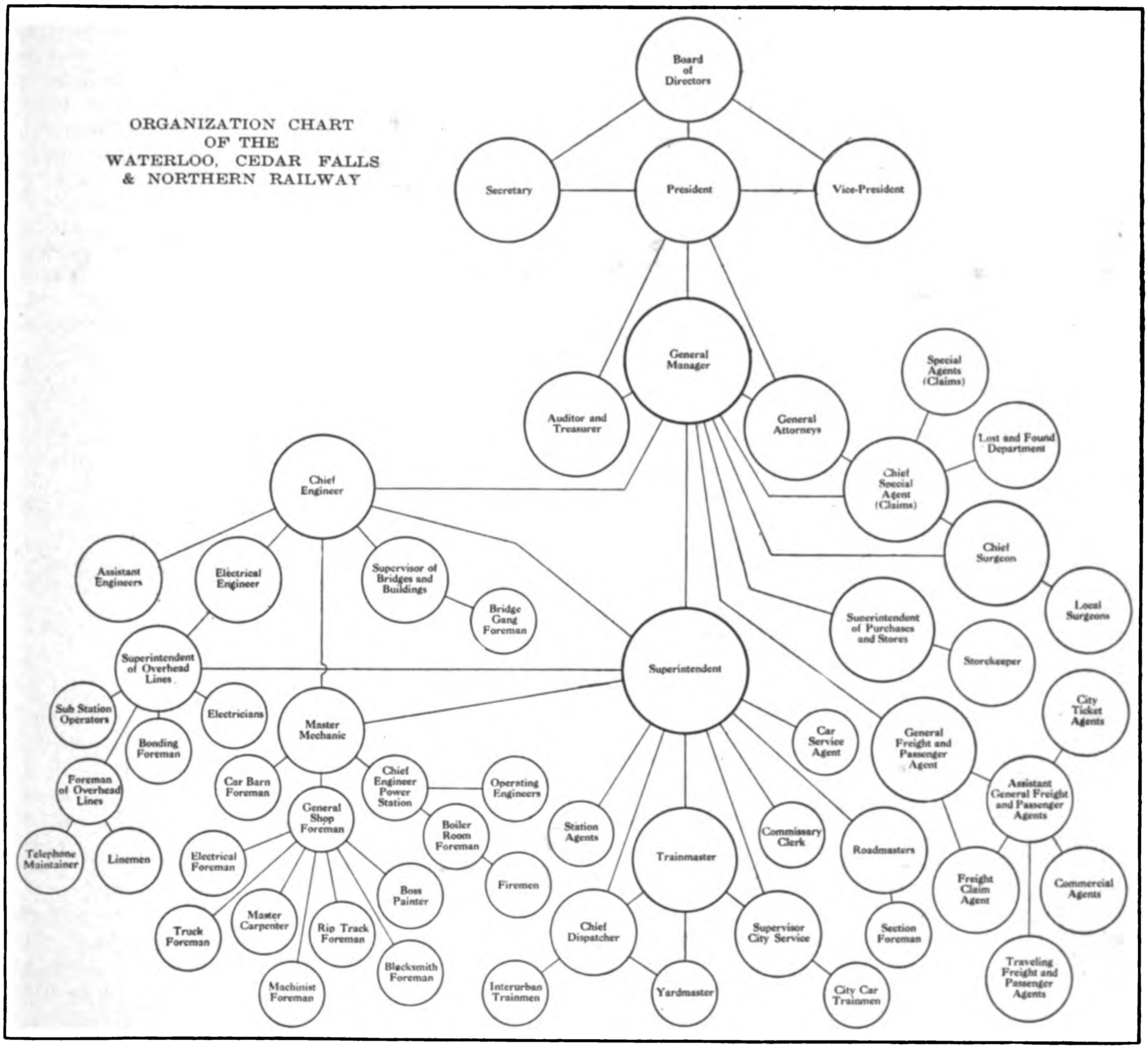
Where a line has been operating a strictly local freight and express, the ideal organization would include a general freight and passenger agent in charge of the securing of business and the general handling of material to and from cars. His duties are such that the freight business need not be separated from passenger business except in routine matters, and the latter may be handled by clerks. This official should be the court of last resort in all traffic matters, including the direction of all division agents, advertising, issuance of tariffs, etc. He should be in close touch with all industrial, commercial and trade organizations. He must also be familiar with such transportation as relates to the handling of regular and special trains. Through his acquaintance with shippers and the methods of billing and handling in transit, he can give excellent counsel to claim investigators, who may work under his supervision or under that of the auditing department.

Enough district freight and passenger agents to cover the territory should be appointed by this general freight and passenger agent. These district agents must cultivate their respective sections to the extent of acquaintanceship with their large shippers and all prospects. In soliciting, agents should carry on an investigation along the following lines:

1. List all city and suburban points which require through freight service.

2. Determine the amount of outbound and inbound business to and from the heavy shipping points.

3. Prepare maps—one on a large scale to show each community; another on a smaller scale to show the surrounding country, and also one of company properties that may possibly be used for freight stations, including lots acquired.


ORGANIZATION CHART OF THE WATERLOO, CEDAR FALLS & NORTHERN RAILWAY
Board of Directors
Secretary
President
Vice-President
General Manager
Auditor and Treasurer
General Attorneys
Special Agents (Claims)
Lost and Found Department
Chief Special Agent (Claims)
Chief Surgeon
Local Surgeons
Chief Engineer
Assistant Engineers
Electrical Engineer
Supervisor of Bridges and Buildings
Bridge Gang Foreman
Superintendent of Overhead Lines
Sub Station Operators
Bonding Foreman
Electricians
Foreman of Overhead Lines
Telephone Maintainer
Linemen
Master Mechanic
Car Barn Foreman
General Shop Foreman
Chief Engineer Power Station
Operating Engineers
Boiler Room Foreman
Firemen
Electrical Foreman
Truck Foreman
Master Carpenter
Machinist Foreman
Rip Track Foreman
Blacksmith Foreman
Boss Painter
Superintendent
Superintendent of Purchases and Stores
Storekeeper
Car Service Agent
General Freight and Passenger Agent
City Ticket Agents
Assistant General Freight and Passenger Agents
Freight Claim Agent
Commercial Agents
Traveling Freight and Passenger Agents
Station Agents
Trainmaster
Commissary Clerk
Roadmasters
Section Foreman
Chief Dispatcher
Interurban Trainmen
Yardmaster
Supervisor City Service
City Car Trainmen

4. Show on the maps the distance of the commercial center or the center of the city from all proposed freight stations, and note the corresponding distance of steam stations. Map also all prominent houses, bakeries, markets, packing houses, factories, quarries, sand pits, dairies, truck gardens, large farms, mines, grain elevators and other sources of traffic—these items may be catalogued on the maps by number or symbol and indexed later by a clerk in the office of the general traffic agent. Learn and record the special requirements of each shipper.

5. In farm and orchard sections, learn in advance what the car requirements of each producer will be at the stated crop time. Such data of forehandedness should be indexed.

6. On completing these surveys, record and map the expected tonnages to predetermine the economical equipment required in beginning freight service.

The district agent should act in an advisory capacity to the local or way station agent, who usually knows his public's whims and fancies. All matters regarding the handling and the delivery of freight through the warehouse and way station should come through the local agent under the district agent's supervision. The fact that several station agents are under the jurisdiction of one district agent permits comparison of respective efficiencies and is a general stimulus to improvement in getting and handling freight traffic.

At larger freight stations the personnel, in addition to the local agent and regular clerical help, usually includes day and night foremen who supervise the checkers, receiving clerks and truckers. These foremen report directly to the local agent. The job of warehouse foreman is not easy, and it is highly necessary that a man appointed to this position should have the tact to handle subordinates and teamsters.

The treatment of the teamster is particularly important, for he is the shipper's representative and often embodies the only contact that the railway may have with the customer for months. Therefore, facilities should be provided to enable the teamsters to deliver goods and secure receipts without delay. Much can be accomplished in securing their good will by properly paved driveways and adequate weather awnings or canopies.

It is also highly important that great care should be given to the movement of freight through the warehouse. Inferior men paid less than the steam railroad scale cause a large number of "overs" and "shorts" and also damage merchandise. The cost of better-paid men will more than offset the cost of dissatisfied customers and freight claims that often exceed the actual gross freight revenue. Claims may be kept down also by using an experienced man or stevedore to stow shipments into the cars. Where business is not too great, the local agent should supervise the loading of freight, thereby assuming personal responsibility for its condition and loading.

Usually the local or way-station agent reports to all the proper departments regarding matters under his supervision. His ability should be equal to or better than that of the steam agent in the same community. Where it would not be profitable to keep a salaried agent, a store-keeper whose place is near the station often will act as agent, his compensation being based on the quantity of business handled.

Current practice on many electric lines is to combine the job of agent with that of substation attendant. This is satisfactory only when the business through the station is small and non-competitive. Such an agent's first duty is that of substation attendant, and he should not be expected to solicit business, collect bills and make adjustments outside the station unless he has an assistant. With the advent of the automatic substation, this difficulty may eventually be eliminated.

At points where there is not enough business to warrant a station, many roads have some local teamster act as the local agent, meet all trains and make collections and deliveries of freight. This teamster-agent acts as a way-station agent except that he has nothing to do with the sale of tickets to passengers. As this service does not require all of his time, he is able to do general teaming.

After the traffic begins to develop it is usually found that the simple traffic organization outlined above cannot handle all the work. It must be enlarged and specialized. Generally the dairy business is the first to demand this attention. A dairy agent can go a long way toward increasing this traffic, not only by looking after the details but also by inducing the farmers to organize co-operative milk depots and by arranging for lectures by experts from local educational institutions on increased efficiency in dairy output. After this division has been established, use may be found for an industrial agent to organize farmers into elevator companies, interest manufacturers to locate their plants along the line, arrange for sidings to nearby plants, etc.

It may also be found necessary to employ an agent for soliciting freight. This agent may cover not only his own property but also that of competitive steam lines. He is especially valuable when able to secure the personal acquaintance of large shippers, even if he does not increase the local l.c.l. business. This can be better fostered by the local agent and his assistant, whose intimacy with the community leads them to be favored.

More business also leads to enlargement of the department for investigating and settling freight claims. The usual head of this department is a freight claim agent who reports directly to the general manager, since the results of his investigations often require that employees of other departments be disciplined. Enough claim investigators should be employed to permit expeditious handling of claims through personal investigation and correspondence. The shortest way to stop a claim is for the local and way-station agents to report all freight matters directly to the claim agent, with a copy to the traffic manager or other head of the traffic department.

A SPECIMEN GROWTH FROM SMALL BEGINNINGS

In developing any freight business, it seems logical to cultivate the local business first and then look for other territory to be served. A specific case of growth from small beginnings is the Waterloo, Cedar Falls & Northern Railway. This road was chartered originally in 1895, under the name of the Waterloo & Cedar Falls Rapid Transit Company. It adopted the present name in 1904, having in the meantime built up an extensive steam-road extension, of which one line of 33 miles was opened in 1903. In 1904 the company leased a 22-mile branch of the Chicago Great Western Railroad (steam) between Waverly and Sumner, Iowa.

In 1910, however, operation of the Chicago Great Western branch was discontinued, a line being built from Denver Junction to Waverly. In 1912 the company started a line from Waterloo to Cedar Rapids, completed it in September, 1914, and placed it in operation as a 1300-volt d.c. railway in March, 1915.

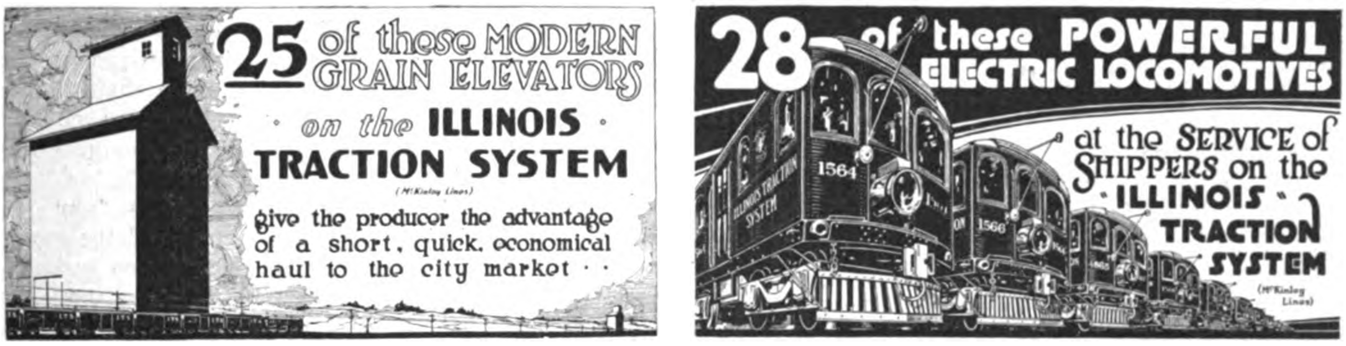
A few years ago this system had a very inadequate freight terminal in the city of Waterloo. It had traffic connection with but one steam line, which it reached only through the city streets. Freight cars could be handled only at night, and property owners protested. The management, realizing that good freight terminals were necessary to develop a large carload business, proceeded to build an outer belt line. This extends around the factory district of Waterloo and ties together all steam lines entering Waterloo. In connection with this belt line, trap-car service is operated to supplement the terminal freight operation in East Waterloo. The East Waterloo terminal is only five or six blocks from the principal business district of Waterloo.

At the terminal on the Denver Division, 17 miles north, connection is made with the Chicago Great Western Railroad to secure a shorter route to points north and west. A traffic agreement was entered into whereby freight directed to or coming from points north or west of Waterloo is turned over from the steam road to the electric line for handling. This agreement opened up a great territory for the jobbers and merchants of

Waterloo and enabled both the steam and electric lines to develop business in the new territory. It also helped the steam line to win competitive business which it had not been able to secure before on account of its inability to meet the time schedule of other steam lines.

REAL FREIGHT SALESMANSHIP

One of the small country towns on the Waterloo, Cedar Falls & Northern line was visited by a traffic officer. Through conversation with a bank cashier he learned that the bank was in correspondence with four or five farmers in Illinois with reference to securing farms at some point in Iowa. Following up this slight clue, the officer went to Illinois to see the farmers, expecting, if successful, to secure the haulage of six or seven carloads of household goods and farm implements. The farmers, impressed by such intelligent inquiry, became interested to the extent that they bought farms located at different points along the electric line. All these farmers were progressive men. One of the first things they did on occupying their new farms was to begin tiling them for drainage. The older farmers in this vicinity were so impressed that several hundred more cars of drain tile are shipped annually to this territory than in former years.


25 of these MODERN GRAIN ELEVATORS
on the ILLINOIS TRACTION SYSTEM
(McKinley Lines)
give the producer the advantage of a short, quick, economical haul to the city market
28 of these POWERFUL ELECTRIC LOCOMOTIVES
at the SERVICE of SHIPPERS on the ILLINOIS TRACTION SYSTEM
(McKinley Lines)
1564
1566

BUILDING FREIGHT TRAFFIC WITH CAR CARDS ON THE I. T. S.

This line was further developed by keeping in touch with building contractors and men handling materials for new construction. By watching the award of contracts and following them up, it has been possible to secure the routing over the electric line of large quantities of brick, cement, plaster, hollow block, stone, sand, etc., purchased at points in the tributary territory.

In developing l.c.l. shipments, or package freight, a careful investigation was made of the shipments of milk and express parcels. When the Cedar Valley road placed in operation several years ago the line between Waterloo and Cedar Falls, and package freight was first handled, it was necessary to meet the competition of a dray line in order to get the business. The two towns were only 8 miles apart, but the slow dray service was well developed. A motor express car service of two round trips per day was installed. This service was well advertised. By degrees the dray competition was eliminated, so that now practically all the package freight between the two cities is handled by the interurban motor freight express cars at a great saving in time. This service is also handled in connection with the Chicago Great Western Railroad, shipments from Chicago into Cedar Falls aggregating a considerable amount daily.

In the factory district the electric line handles industrial shipments to and from the various points and from farms along the line, including milk shipments for city dairies. The milk, which is picked up at country road crossings by the passenger cars, is handled by the duplicate ticket arrangement, each milk can bearing a ticket of the required denomination. Milk tickets are on regular sale at any of the company's stations. At various country crossings several co-operative creameries deliver to the road their butter shipments for Chicago and New York. This traffic, which is handled in refrigerator cars, averages one or more cars a week throughout the year.

To speak strictly, the express business is handled by the American Express Company, which looks after the development of this line. Therefore the responsibility for handling express does not fall upon the railway.

The traffic department of the Waterloo, Cedar Falls & Northern Railway is headed by a general freight and passenger agent, who is in complete charge of all traffic. Under him are two assistant general freight and passenger agents at two important terminals, and a traveling freight agent who makes his headquarters at the largest terminal city. The assistant general freight and passenger agent at the headquarters of the railway is in charge of assigned special duties, while the other assistant has charge of the solicitation of traffic. The traveling freight agent makes all competitive towns on the system, and a general agent in a small city on one of the branches has charge of all local traffic solicitation there. Then come the usual way-station agents.

To secure business to and from any point in the United States the general freight and passenger agent spends about one-half of his time in visiting the various trunk-line points throughout the country. His work is followed up by special agents across the United States. These call upon those large manufacturers who prohibit trunk line solicitations but who may be prevailed upon to route via electric lines. Agents and representatives of foreign lines with whom the electric line has business are also visited. These remarks apply before government control went into effect.

Records compiled from information secured by the traffic department are used to keep track of both the volume and the origin of business. These records are kept according to firms, towns, comparison reports and information secured by personal contact with brokers.

In addition to the use of facilities like grain elevators and stockyards, several other excellent means new to freight business are pursued to increase traffic. Thus, competitive points are visited by the traveling freight agent to induce elevator men to ship their grain over the electric line. Milling-in-transit arrangements permit grain coming from points on the electric line, its trunk-line connections or other points in Iowa and surrounding states, to be milled in transit and then shipped to destination as a completed product. For instance, a carload of corn routed to Chicago via the electric line is set out at Cedar Rapids, milled into starch and then forwarded to destination on the original billing. Thus the electric line can offer every advantage of the steam railroad in addition to its superior speed.

Reciprocal switching arrangements between the electric line and all trunk lines making connections in cities served by the former enable business industries located on other roads to be handled as if they originated on the electric line itself. By this arrangement all classes of business can be solicited regardless of location. For example, a complete train of automobiles routed from a connecting steam railroad was shipped from Flint, Mich., to Waterloo, Iowa, via the electric line.

Very often the projectors of an electric railway will find in examining territory that little more than a few stagnant villages and some discouraged farmers exist, but a closer study of the country itself will often disclose an enormous number of verdant forests, undeveloped quarries, sand-pits, ice-producing lakes and promising fruit and dairy-lands. It is not enough for the railway men to consider furnishing merely the means of transportation for these products. It is just as important that they assist considerably in encouraging the investment of capital in order to exploit these resources so that a profitable outlet may be found for each product and dormant communities may be aroused to the new possibilities that stand before them.

FREIGHT SERVICE MUST BE ADVERTISED

While it has always been the custom of railroads, both steam and electric to advertise their passenger business elaborately, in many instances electric lines have failed to foster their freight business, by means of advertising and constructive publicity.

It is not sufficient to advertise on the time table that a company has fast freight service. It is important that other mediums be used. First of all a small double-column newspaper "ad" about 2 in. deep, run every day, is one form of keeping the service before the public.

Another good form is the use of car cards. A notable example is the case of the Illinois Traction System, which advertises its facilities, not only motive power, but also grain elevators. Two of this company's cards are reproduced on page 47.

In connection with advertising motive power, it is always well to bear one thought in mind. This is, that it is highly necessary for confidence to be established in the minds of the shipping public. This is possible through telling them about the service and then, in turn, about the facilities that make this service possible, showing them that the company has the proper rolling stock to insure prompt and reliable transit.

Blotters are also an effective means of advertising freight service. The company publication, which is generally placed in the car rack, is an excellent medium to keep this service constantly in the minds of the public.

Another effective medium is bill-board advertising. A few bill-boards placed at strategic points along the line may be of considerable service, as generally an attractively painted billboard is hard for a passerby—be he riding or walking—to get away from. A number of electric lines have resorted to this type of advertising for passenger service. Why not consider using such for freight service, which is much more profitable?

The Union Traction Company of Indiana, through a monthly publication known as the *Union Indiana Traction System Magazine*, distributes articles on truck farming and other subjects of interest to its communities. This magazine has proved to be of considerable force in fostering friendly feeling.

THIS IS THE SITUATION

In conclusion, the outstanding points of the electric railway freight situation are these:

1. Electric railway freight haulage is economically one of the most important factors in many of the rapidly growing communities of the country, especially in the Middle West. The field for hauling electric railway freight has not been thoroughly developed, because operators of electric railway properties have not gone into this phase of railroading in an analytical way.

2. A study of operating statistics will show that electric railways have handled freight as a side issue. Very few electric railway properties throughout the country show a freight business of more than 15 per cent of their gross revenue and many not 5 per cent. In the case of steam railroads the freight business has always been the backbone of gross receipts.

3. The "jitney" took millions of dollars from the electric railway before it was regulated, and the motor truck will take many more if electric railway managements do not wake up to the fact that they have an economic duty to perform for the communities served. This duty must be fulfilled by developing to the utmost the commercial and social side of the public by giving adequate freight service and last, but not least, first-class passenger service.

4. To develop freight business properly, it is necessary not only to analyze the field to be served, but also to employ proper facilities in the way of: A well-organized traffic bureau; station facilities according to the character of business to be handled; proper motive-power and rolling-stock equipment; a large number of trailer freight cars and last an unlimited and unrestricted imagination.

Denver Union Station Loop Improvements

Since the article on the layout of the Union Station loop in Denver, published in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 28, 1918, was prepared, information regarding several improvements at this point has been received. It has been agreed by the city and the Union Station interests, on the one hand, and the Denver Tramway on the other, that a covered runway will be built from the viaduct stairs to the point where the route to car is shown in the panoramic picture on page 1032 of that issue. A telephone booth, an inspector's station and a sand box will be placed at this point, and a large concrete platform will be put in. This will be another stopping point for cars going around the loop, as well as a transfer point to and from all north-side, east-side, and south-side lines that come together at the viaduct.

New Electric Rolling Stock for 1918

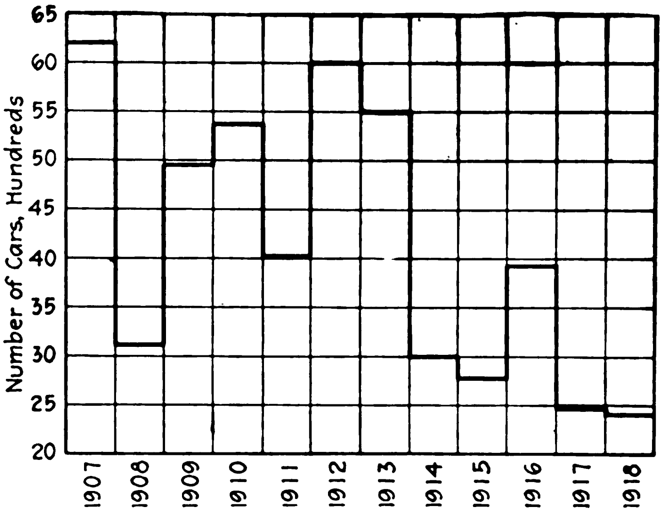
The Number of New Cars Ordered, Together with Those Built in Shops of Various Railways, Is Approximately the Same as in 1917, but the Number of Companies Ordering Cars Decreased Considerably—The Increasing Demand for One-Man Cars Is Shown by the Large Number of This type Ordered as Compared with Previous Years

IN THE TABLES given herewith is this journal's annual compilation of the statistics for new rolling stock ordered by electric railways or built in their shops during the past year. While the total number of new cars placed in service is less than for any previous year recorded, the closeness of the 1918 total to the number for the year 1917 is especially encouraging, and comes somewhat as a surprise as it was the general opinion of most officials that very few cars had been ordered during 1918.

This compilation of figures received from the various electric railways in the United States and Canada represents the railways having about 97 per cent of all the electric cars operated. The total number of new cars so reported for this year is 2419 and is but thirty-six cars less than the number so reported for the year 1917. The number of companies which reported new equipment is 140 as compared with 182 for the year 1917.

Table I gives a comparison in condensed form of rolling stock purchased since 1907. The cars are classified according to the service in which they are used as city, interurban and miscellaneous. In this summary cars for operation on subway and elevated lines have been classed as in city service, and those for interurban or a combination of both interurban and city service have been placed in the interurban column. Electric locomotives, freight and express cars, snowplows and sweepers, and work cars for line and track, have been placed in the miscellaneous column. The numbers of interurban and miscellaneous cars purchased during 1918 has increased slightly over the figures given for the year 1917, and the number of city cars has decreased slightly.

Some of the special features that have been brought out by the canvass are given in Table II, and for comparison the results for 1916 and 1917 have been included. The most notable of these is the increase in the number of one-man cars purchased. There were 644 purchased during the past year as compared with 187 and 280 for 1916 and 1917 respectively. Cars of all kinds built in railway shops total but eighty-nine, which is a large decrease over previous years. The number of interurban trailers increased from twenty-seven for 1917 to fifty-five for the past year. Trailers which may be considered for city service numbered but 130. This included fifty for train operation on the Boston Elevated System. The difference from former years is affected by previous orders for subway trailers purchased by the Interborough Rapid Transit Company, this latter company having purchased no cars during 1918. The number of locomotives ordered was forty-four, which is a decrease of five from the previous year.



CARS ORDERED PER YEAR SINCE 1907

TABLE I—NEW ROLLING STOCK ORDERED SINCE 1907

Year	City Cars	Interurban Cars	Freight and Miscellaneous Cars	Total
1907	3,483	1,327	1,406	6,216
1908	2,208	727	176	3,111
1909	2,537	1,245	1,175	4,957
1910	3,571	990	820	5,381
1911	2,884	626	605	4,015
1912	4,531	783	687	6,001
1913	3,820	547	1,147	5,514
1914	2,147	384	479	3,010
1915	2,072	336	374	2,782
1916	3,046	374	522	3,942
1917	1,998	185	272	2,455
1918	1,842	255	322	2,419

The largest orders of passenger cars for an individual company reported were for 280 cars for use on the lines of the Philadelphia Rapid Transit Company, part of which were ordered by the United States Emergency Fleet Corporation for service to shipyards and part by the United States Housing Corporation, particularly for service to the League Island Navy Yard and the Frankford Arsenal, and an order for 200 motor cars and fifty trailers placed by the Boston Elevated Railroad. The United States Housing Corporation reported a total of 280 passenger cars which it had ordered for various railway properties. In the accompanying list the various railways reporting new equipment have been arranged alphabetically. Space limitations have

TABLE II—SPECIAL COMPARISONS OF NEW ROLLING STOCK

	1918	1917	1916
Number of railways reporting new equipment	140	182	250
Total number of cars ordered	2,419	2,455	3,942
Number of one-man cars ordered	644	280	187
Number of two-men and trail cars ordered for city service	*1,198	1,718	2,859
Number of locomotives purchased	44	49	31
Number of cars built in railway companies' shops	89	281	445
Number of interurban trailers purchased	55	27	71
Number of city trailers purchased	130	402	128

* Includes 100 motor cars for subway and elevated use.

made it necesssary to condense the data as much as possible. All cars are specified as either passenger or miscellaneous, and locomotives are entered separately. The classification of cars for city or interurban service has been made here in the same manner as previously explained. No attempt has been made to give details of construction other than over-all length. The majority of passenger cars are of either semi-steel or all-steel construction.

Although reports from all companies were not received in time for compilation and while studies of this magnitude which must close on a definite date which necessarily precludes the possibility of a 100 per cent report from the industry, still the figures present very complete and accurate data. Through the courtesy and co-operation of the various car builders, equipment manufacturers and government organizations which have been interested in electric railways as a war measure, complete lists have been obtained so that it has been possible to check the companies' figures from several different sources. This courtesy and co-operation in supplying statistics is fully appreciated.

New Electric Rolling Stock Ordered in 1918

Railway	Number	Type	Overall Length	City or Interurban	Motor or Trailer	One or Two Man
Allis-Chalmers Co	1	Sn.Pl.	28′ 0″	......	Mot.	.....
Auburn & Syracuse Elec. R.R.	1	Loco.	....	50 ton	.....	.....
Augusta, Aiken Ry. & Elec. Corp.	14	Psgr.	....	City	Mot.	Two
Bamberger Electric R.R.	3	Psgr.	63′ 0″	Int.	Mot.	Two
	1	Psgr.	56′ 0″	Int.	Mot.	Two
	3	Psgr.	63′ 0″	Int.	Trail	.....
Bangor Ry. & Elec. Co	23	Psgr.	27′ 9½″	City	Mot.	One
Boston Elevated Ry	200	Psgr.	48′ 9½″	City	Mot.	Two
	50	Psgr.	48′ 2½″	City	Trail	.....
	6	Swpr.	39′ 0″	City	Mot.	.....
Brockton & Plymouth St. Ry	2	Psgr.	27′ 9½″	City	Mot.	One
Brooklyn Rapid Transit Co	50	Psgr.	45′ 6″	City	Trail	.....
Buffalo, Lockport & Rochester Ry	1	Swpr.	28′ 0″	Int.	Mot.	.....
Buffalo & Lake Erie Traction Co.	10	Psgr.	50′ 0″	Int.	Trail	.....
	12	Psgr.	50′ 0″	Int.	Mot.	Two
	3	Exp.	50′ 0″	Int.	Mot.	.....
Capital Traction Co	20	Psgr.	43′ 11½″	City	Mot.	Two
Charleston Consolidated Ry. & Ltg. Co.	6	Psgr.	41′ 0″	City	Mot.	Two
	10	Psgr.	41′ 0″	City	Trail	.....
	10	Psgr.	27′ 9½″	City	Mot.	One
Charleston Interurban R.R.	2	Psgr.	47′ 3″	Int.	Mot.	Two
	2	Psgr.	40′ 6″	Int.	Mot.	Two
	2	Psgr.	40′ 6″	Int.	Trail	....
Chester & Eddystone St. Ry	22	Psgr.	45′ 4″	Int.	Mot.	Two
Chicago, Lake Shore & South Bend Ry	1	Psgr.	43′ 0″	Int.	Mot.	Two
Chicago, Milwaukee & St. Paul Ry	5	Loco.	76′ 0″	Int.	Mot.	.....
	2	Loco.	41′ 6″	Int.	Mot.	.....
	10	Loco.	90′ 6″	Int.	Mot.	.....
Chicago, North Shore & Milwaukee R.R.	1	Loco.	37′ 4″	50 ton	Mot.	.....
Chicago & West. Towns Ry	2	Psgr.	40′ 0″	City	Mot.	Two
Cincinnati & Columbus Traction Co	1	Frt.	50′ 0″	Int.	Mot.	.....
Cleveland, Alliance & Mahoning Valley R.R	1	Psgr.	55′ 0″	Int.	Mot.	Two
Colorado Springs & Int. Ry	24	Psgr.	27′ 9½″	City	Mot.	One
Columbia Ry. Gas & Elec. Co.	3	Psgr.	50′ 0″	City	Mot.	Two
	8	Psgr.	45′ 0″	City	Mot.	Two
Columbus R.R. of Georgia	8	Psgr.	27′ 9½″	City	Mot.	One
Columbus Ry. Pr. & Lt. Co	9	Psgr.	48′ 0½″	City	Mot.	Two
Concord, Maynard & Hudson St. Ry	4	Psgr.	43′ 0″	Int.	Mot.	Two
	1	Psgr.	27′ 9½″	City	Mot.	One
Connecticut Co	20	Psgr.	27′ 9½″	City	Mot.	One
	50	Psgr.	43′ 10″	City	Mot.	Two
	4	Misc.	38′ 0″	City	Trail	.....
	1	Misc.	45′ 0″	City	Mot.	.....
Cumberland County Pwr. & Lt. Co	8	Psgr.	44′ 0″	City & Int.	Trail	.....
Denver Tramway	1	Sand	33′ 2½″	......	Mot.	.....
Detroit United Ry	1	Psgr.	46′ 10″	City	Mot.	Two
	2	Sn.Pl.	23′ 2″	City	Mot.	.....
Douglas Traction & Lt. Co.	1	Psgr.	27′ 9½″	City	Mot.	One
Eastern Texas Elec. Co	5	Psgr.	27′ 9½″	City	Mot.	One
East St. Louis Ry	2	Psgr.	27′ 9½″	City	Mot.	One
Easton Transit Co	1	Sn.Pl.	40′ 0″	Int.	Mot.	.....
El Paso Elec. Ry	20	Psgr.	27′ 9½″	City	Mot.	One
Empire State R. R. Corp	1	Sn.Pl.	....	Int.	Mot.	.....
Fort Dodge, Des Moines & Southern R.R	1	Psgr.	29′ 3¾″	City	Mot.	One
	1	Psgr.	45′ 0″	Int.	Mot.	Two
Fort Wayne & N. Indiana Traction Co	25	Psgr.	30′ 7″	City	Mot.	One
	1	Sn.Pl.	22′ 0″	City	Mot.	.....
Galveston Elec. Co	5	Psgr.	27′ 9½″	City	Mot.	One
Gary Street Ry	10	Psgr.	48′ 0″	Int.	Mot.	Two
	4	Psgr.	50′ 0″	Int.	Trail	.....
	10	Psgr.	27′ 9½″	City	Mot.	One
Gary & Valparaiso Ry	2	Psgr.	54′ 7½″	Int.	Mot.	Two
Glendale & Montrose Ry	3	Psgr.	27′ 9½″	City	Mot.	One
Grafton & Upton R.R	2	Loco.	26′ 0″	......	.....	.....
Grays Harbor Ry. & Lt. Co	6	Psgr.	27′ 9½″	City	Mot.	One
Hammond, Whiting & East Chicago Ry	10	Psgr.	48′ 0″	City	Mot.	Two
Harrisburg Rys	5	Psgr.	43′ 10″	Int.	Mot.	Two
Hot Springs Street Ry	7	Psgr.	27′ 9½″	City	Mot.	One
Houston Elec. Co	8	Psgr.	27′ 9½″	City	Mot.	One
Hull Electric Co	1	Swpr.	46′ 0″	......	Mot.	.....
Hydro-Elec. Power Commission	12	Locos.	36′ 0″	50 tons	.....	.....
	1	Sn.Pl.	....	......	.....	.....
	2	Work Cars	....	......	.....	.....
	200	Dump Cars—20 cu.yd.	....	......	.....	.....
Illinois Traction System	6	Loco.	32′ 0″	Int.	Mot.	.....
Indianapolis & Louisville Traction Ry	1	Misc.	72′ 0″	Int.	Trail	.....
Inland Steel Co	1	Swpr.	28′ 0″	City	Mot.	.....
International Ry	30	Psgr.	50′ 0″	Int.	Mot.	Two
Inter-Urban Ry	1	Loco.	60 ton	Int.	.....	.....
Iowa Ry. & Lt. Co	1	Psgr.	58′ 0″	Int.	Mot.	Two
Kansas City Rys	25	Psgr.	27′ 9½″	City	Mot.	One
Laconia Street Ry	2	Psgr.	27′ 9½″	City	Mot.	One
Lehigh Valley Transit Co	15	Psgr.	47′ 0″	City	Mot.	Two
	2	Sn.Pl.	40′ 0″	Int.	Mot.	.....
Lewisburg, Milton & Watsontown Psgr. Ry	3	Psgr.	32′ 4″	City & Int.	Mot.	Two
Lewiston, Augusta & Waterville St. Ry	6	Psgr.	45′ 6″	Int.	Mot.	Two
	1	Sn.Pl.	41′ 4″	Int.	Mot.	.....
Louisville & S. Indiana Trac. Co.	10	Psgr.	27′ 9½″	City	Mot.	One
	1	Swpr.	28′ 0″	City	Mot.	.....
Madison Rys	5	Psgr.	....	City	Mot.	Two
Mahoning & Shenango Ry. & Lt. Co	1	Psgr.	45′ 0″	City	Mot.	Two
Manhattan Bridge 3-cent Line	2	Psgr.	42′ 0″	City	Mot.	Two
Manila Elec. R.R. & Light Corp.	15	Psgr.	39′ 4″	City	Mot.	Two
Mansfield Public Service & Utility Co	7	Psgr.	27′ 9½″	City	Mot.	One
	1	Swpr.	....	City	Mot.	.....
Middlesex & Boston St. Ry	6	Psgr.	27′ 9½″	City	Mot.	One
Mobile Lt. & R.R	3	Psgr.	47′ 5″	Int.	Mot.	Two
	6	Psgr.	45′ 0″	Int.	Trail	.....
	3	Psgr.	45′ 0″	Int.	Mot.	Two
Monongahela Valley Trac. Co.	6	Psgr.	40′ 6″	City	Mot.	Two
	4	Psgr.	48′ 0″	Int.	Mot.	Two
	2	Exp.	45′ 0″	Int.	Mot.	.....
	1	Loco.	45 ton	Int.	Mot.	.....
Newport News & Hampton Ry., Gas & Elec. Co.	28	Psgr.	46′ 0″	City	Mot.	Two
Newport & Providence Ry	1	Psgr.	27′ 9½″	City	Mot.	One
New York Municipal Ry	100	Subw'y	67′ 0″	City	Mot.	Train Opr.
Nipissing Central Ry	2	Psgr.	52′ 0″	Int.	Mot.	Two
	1	Sn.Pl.	40′ 0″	Int.	Mot.	.....
North Coast Pr. Co	3	Psgr.	27′ 9½″	City	Mot.	One
Northern Elec. Ry	1	Loco.	37′ 4″	60 ton	Mot.	.....
Northern Texas Trac. Co	10	Psgr.	27′ 9½″	City	Mot.	One
Oklahoma Ry	10	Psgr.	32′ 0″	City	Mot.	Two
	1	Loco.	36′ 0″	40 tons	.....	.....
Oklahoma Union Ry	2	Psgr.	48′ 0″	Int.	Mot.	Two
Pacific Electric Ry	35	Psgr.	27′ 9½″	City	Mot.	One
Pan Handle Trac. Co	9	Psgr.	57′ 10″	Int.	Mot.	Two
Peekskill Lighting & R.R. Co.	4	Psgr.	27′ 9½″	City	Mot.	One
Peninsular Ry	5	Psgr.	27′ 9½″	City	Mot.	One
Petersburg-Hopewell & City Point Ry	8	Psgr.	47′ 0″	Int.	Mot.	Two
Philadelphia Rapid Transit Co.	240	Psgr.	45′ 6″	City	Mot.	Two
	15	Psgr.	47′ 8″	City	Mot.	Two
	25	Psgr.	27′ 9½″	City	Mot.	One
Philadelphia Rys	15	Psgr.	47′ 8″	City	Mot.	Two
Philadelphia & West Chester Trac. Co	1	Frt.	50′ 0″	City	Mot.	.....
Pittsburg County Ry	6	Psgr.	27′ 9½″	City	Mot.	One
Pittsburg, Mars & Butler Ry	2	Psgr.	27′ 9½″	City	Mot.	One
Pittsburg Rys	6	Swpr.	28′ 0″	City	Mot.	.....
Port Arthur Trac. Co	4	Psgr.	27′ 9½″	City	Mot.	One
Portland Ry. Lt. & Pr. Co	25	Psgr.	27′ 9½″	City	Mot.	One
Public Service Ry. (N. J.)	25	Psgr.	50′ 10″	City	Mot.	Two
	33	Psgr.	48′ 4½″	City	Mot.	Two
Puget Sound Trac., Lt. & Pr. Co.	15	Psgr.	27′ 9½″	City	Mot.	One
Reading Transit & Lt. Co.	2	Psgr.	30′ 0″	City	Mot.	Two
	1	Line	32′ 0″	City	Mot.	.....
	1	Work	45′ 0″	City	Mot.	.....
	1	Swpr.	28′ 0″	City	Mot.	.....
Richmond Lt. & R.R	24	Psgr.	36′ 6″	City	Mot.	Two
Rochester, Syracuse R.R., Inc.	1	Swpr.	....	Int.	Mot.	.....
Sacramento, Northern R.R.	1	Loco.	....	50 ton	.....	.....
San Francisco-Oakland Terminal Rys	10	Psgr.	....	City	Trail	.....

Railway	Number	Type	Overall Length	City or Interurban	Motor or Trailer	One or Two Man
Saginaw Bay City Ry	7	Psgr.	42' 0"	City	Mot.	Two
	14	Psgr.	27' 9½"	City	Mot.	One
	1	Swpr.	40' 0"	City	Mot.	Two
	1	Sn.Pl.	45' 6"	City & Int.	Mot.	Two
	1	Line car	30' 0"	City	Mot.	Two
Sand Springs Ry	2	Psgr.	60' 0"	Int.	Mot.	Two
Scioto Valley Trac. Co	4	Psgr.	60' 0"	Int.	Mot.	Two
	1	Frt.	50' 0"	Int.	Mot.	.....
	6	Frt.	42' 0"	Int.	Trail	.....
Seattle Municipal Ry	12	Psgr.	27' 9½"	City	Mot.	One
	25	Psgr.	43' 2½"	City	Mot.	Two
Sheffield Co	9	Psgr.	44' 0"	City	Trail	.....
Shore Line Elec. Ry	2	Psgr.	45' 8½"	Int.	Mot.	Two
Southern New York Pr. & Ry. Corp	4	Box for mail service			.....	.....
Southern Public Utilities Co	4	Psgr.	38' 2"	City	Mot.	Two
Southwest Missouri R.R	7	Psgr.	44' 0"	Int.	Mot.	Two
Springfield Trac. Co	12	Psgr.	27' 9½"	City	Mot.	One
Stark Elec. R.R	2	Psgr.	55' 0"	Int.	Mot.	Two
St. Cloud Public Service Co	4	Psgr.	34' 0"	City	Mot.	One
Steubenville, East Liverpool & Beaver Valley Tr. Co	1	Swpr.	28' 0"	City	Mot.	.....
St. Joseph Ry. Lt., Ht. & Pr. Co.	12	Psgr.	27' 9½"	City	Mot.	One
Stockton Electric R.R	5	Psgr.	27' 9½"	City	Mot.	One
Tacoma Municipal Ry	20	Psgr.	43' 0"	City	Mot.	Two
Tacoma Ry. & Pr. Co	29	Psgr.	27' 9½"	City	Mot.	One
Tampa Elec. Co	24	Psgr.	27' 9½"	City	Mot.	One
Terre Haute, Indianapolis & Eastern Trac. Co	5	Frt.	40' 0"	Int.	Trail	.....
Terre Haute Trac. & Lt. Co	30	Psgr.	27' 9½"	City	Mot.	One
Texas Elec. Ry	6	Psgr.	27' 9½"	City	Mot.	One
Tontrup, Geo. H. (St. Louis)*	50	Psgr.	27' 9½"	City	Mot.	One
Trenton & Mercer County Trac. Corp	20	Psgr.	27' 9½"	City	Mot.	One
	1	Psgr.	43' 5"	City	Mot.	Two
Tuscaloosa Ry. & Utilities Co	1	Psgr.	49' 0"	City	Trail	.....
Union Ry	1	Sn.Pl.	.....	.....	.....	.....
Union Street Ry	6	Psgr.	44' 0"	City	Mot.	Two
United Rys. & Elec. Co	50	Psgr.	44' 8"	City	Mot.	Two
Utah-Idaho Central R.R	5	Psgr.	27' 9½"	City	Mot.	One
Vicksburg Lt. & Trac. Co	4	Psgr.	27' 9½"	City	Mot.	One
Virginia Ry. & Pr. Co	50	Psgr.	27' 9½"	City	Mot.	One
Washington, Baltimore & Annapolis E. R.R	5	Psgr.	57' 0"	Int.	Mot.	Two
Washington Ry. & Elec. Co	50	Psgr.	43' 11½"	Int.	Mot.	Two
Washington-Virginia Ry	22	Psgr.	48' 0"	Int.	Mot.	Two
	20	Psgr.	48' 0"	Int.	Trail	.....
	5	Psgr.	45' 0"	Int.	Mot.	Two
Waterville, Fairfield & Oakland Ry	2	Psgr.	43' 6"	City	Mot.	Two
Webster, Monessen, Belle Vernon & Fayette City St. Ry	3	Psgr.	32' 0"	City	Mot.	Two
Western New York & Penn. Trac. Co	2	Psgr.	47' 0"	Int.	Mot.	Two
West Penn. Rys	4	Psgr.	57' 10"	Int.	Mot.	Two
	4	Swpr.	28' 0"	Int.	Mot.	.....
Western Washington Pr. Co	10	Psgr.	48' 0"	Int.	Mot.	Two
Wheeling Trac. Co	29	Psgr.	50' 0"	City	Mot.	Two
Winnipeg Elec. Ry	10	Psgr.	45' 8½"	City	Mot.	Two
	1	Swpr.	37' 8"	City	Mot.	.....

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* Included to have table represent all known orders.

An Engineering Magazine to Be Published in Spanish

REALIZING the value of the international exchange of ideas on things engineering, the McGraw-Hill Company on March 1 will begin publication of a magazine dedicated to that purpose. While eventually it is expected to appear in editions in several languages, the original issue will be in Spanish, under the name *La Ingenieria Internacional*, aimed to serve Latin-America and Spain.

The purpose of the new magazine, which has been under consideration for some years, is to afford a medium for presentation of those developments in American engineering which may be of value to engineers, contractors and manufacturers in other lands. At the same time, following the practice of the present McGraw-Hill publications, a far-flung editorial organization will be developed, so that there will be drawn into the paper the best of engineering practice in Latin America, Spain and other Spanish-speaking countries. Aside from this function, the new magazine will be an important developer of international good-will, and at the same time a medium by which American manufacturers engaging in export trades can carry their message to prospective buyers in foreign lands.

It may be a cause for surprise that the McGraw-Hill Company, whose specialized papers circulate so widely overseas, should establish a magazine to serve the foreign field. The reason, however, is not hard to find. The present highly-specialized papers appeal primarily to those who are situated where engineering enterprise has made such progress that there is room for the specialist and need for the last refinement in equipment and design.

But everywhere the world over are territories newly developing, where the engineer, the contractor and the manufacturer must undertake not one but many lines. It is to serve the general practitioner so situated that the new magazine, and its later companions in other languages, will be started. The specialized papers in English will still hold their place as the recorders of the best in the advanced practice of engineering in America and abroad.

1917 Census of Street and Electric Railways Due Soon

S. L. ROGERS, Director of the Census, in his annual report to the Secretary of Commerce, made public in Washington the past week, announces that his bureau will soon be able to present to the public the result of the census of electrical industries which was taken during 1917. The census, which was begun in April, will present information as to the number of establishments engaged in electrical industry, character of ownership, traffic, equipment, expenses, employees, salaries and wages, finances, etc. The compilation of this information is now under way. An abstract of the 1912 census report was printed in the issues of the ELECTRIC RAILWAY JOURNAL for Jan. 9 and 16, 1915, pages 96 and 130.

In his annual report Director Rogers says:

> This census, which, under the act creating the permanent Census Bureau, has been taken quinquennially since 1902, covers central electric light and power stations, street and electric railways, telephones and telegraphs, and municipal electric fire alarm and police patrol signaling systems. The current inquiry is being made as of Dec. 31, 1917.
>
> By reference to the various records available, supplemented by correspondence with some 14,000 postmasters throughout the country, with state telephone associations, and with public service commissions, a card index of establishments engaged in electrical industries was prepared. In formulating the schedules used, criticisms and suggestions were requested and obtained from the Interstate Commerce Commission, the American Telephone & Telegraph Company, the independent telephone companies, the American Electric Railway Association, the American Railway Accountants' Association, and the National Electric Light Association, and a number of conferences were held with representatives of these organizations. All the organizations named have given their hearty co-operation and have rendered valuable assistance to the bureau in the revision of the schedules and the preparation of the reports.

New Track Constructed and Track Rebuilt During 1918

Reports Received from the Various Electric Railways in the United States and Canada Show a New Electric Mileage of 346 Constructed During the Past Year and 275 Miles of Steam Lines Electrified—The Amount of Track Reconstruction Was Very Small

THE single track mileage for new lines built or electrified during the year 1918 together with the mileage of track rebuilt by electric railways in the United States and Canada is given in the accompanying tabulation. The data for this record have been received from electric railways comprising about 97 per cent of the total mileage under electric operation and are quite complete in view of the difficulties involved in conducting a canvass of such large proportions.

In order to facilitate comparison with similar data for previous years the following table has been prepared from the statistical tables published by the ELECTRIC RAILWAY JOURNAL for the years since 1907. In this the amount of electrified steam mileage has been separated from the new electric mileage.

The total new electric railway track mileage exclusive of the electrified steam lines for the year amounting to 314 is but 63 miles less than that reported during 1917. When the difficulties that most roads have experienced in obtaining new rails and special work is considered this record is very gratifying. However most of this is made of spurs and short extensions and few additions of any considerable extent were carried out due to the extreme conditions. Of the 314 miles of new electric railway track built, 80.85 miles was for the various additions to new rapid transit lines in New York City. In addition to this there was 185.56 miles of new track built for city service and 97.4 miles constructed for interurban operation. Although a comparison of the new electrified mileage placed in operation in the last two years shows a decrease from the figures of 1916 still the year 1918 more nearly approached these figures. Both the 1916 and the 1918 electrified mileages were augmented by the extensions of the Chicago, Milwaukee & St. Paul electrification which amounted to 225 miles in 1916 and 211 miles in 1918. Outside of this the greatest amount of electrified mileage reported for this year was 51.15 miles of main and branch line track together with sidings and yards electrified by the Norfolk & Western Railway.

In the general compilation of the statistics received the usual plan of grouping the roads by states has been followed. New York heads the list of states with a total of 87.93 miles of new track and 25.59 miles of track rebuilt. This, of course, excludes the states of Montana and West Virginia, in which large amounts of steamroad electrification were included. Following this comes California with 28.94 miles and Washington with 24.65 miles of new track constructed, the greater part of which was for city service.

COMPARISON OF NEW TRACK BUILT—BY YEARS

Year	New Electric Railway Track Built	Electrified Steam Line	Total New Electric Mileage
1907	......	....	1,880.0
1908	1,174.5	84.0	1,258.5
1909	774.7	112.4	887.1
1910	1,204.8	192.4	1,397.2
1911	1,105.0	86.5	1,191.5
1912	869.4	80.8	950.2
1913	974.9	119.0	1,093.9
1914	716.5	229.0	946.4
1915	596.0	448.2	1,044.2
1916	356.3	388.0	744.3
1917	376.7	66.0	442.7
1918	313.82	275.7	589.53

In Canada the Niagara Construction Railway built 28 miles of interurban track between Stamford, St. David's and Queenstown, Ontario. This was the greatest amount reported.

The total rebuilt mileage for the year was 155.43 as compared with 375.4 miles for the year 1917 or less than half as much. Most of this was in short stretches, there being but seven companies which rebuilt more than 5 miles and the largest amount reported was but 9 miles.

	New Track, Miles	Rebuilt Mileage
ALABAMA		
Mobile & Pensacola Ry. & Navigation Co.	0.00	2.00
Peoples Raiload	1.50	0.00
	1.50	2.00
ARKANSAS		
Intercity Terminal Ry.	0.00	1.10
	0.00	1.10
CALIFORNIA		
Municipal Railway of San Francisco	9.72	0.00
Pacific Electric Railway	15.04	0.00
Pacific Gas & Electric Co.	0.04	0.00
Petaluma & Santa Rosa Ry.	0.16	0.00
San Diego Electric Ry.	1.31	2.00
United Railroads of San Francisco	2.67	2.50
	28.94	4.50
COLORADO		
Arkansas Valley Ry., Lt. & Pr. Co.	0.00	2.25
Denver Tramway	0.24	0.63
	0.24	2.88
CONNECTICUT		
Connecticut Co.	1.57	1.15
The Shore Line Electric Ry.	0.00	1.10
	1.57	2.25
DISTRICT OF COLUMBIA		
Capital Traction Co.	1.02	0.59
Washington & Maryland Ry.	0.93	0.00
	1.95	0.59
FLORIDA		
Jacksonville Traction Co.	6.41	0.00
	6.41	0.00
GEORGIA		
Columbus R. R.	0.50	0.00
Savannah Electric Co.	4.98	0.00
	5.48	0.00
IDAHO		
Caldwell Traction Co.	12.00	0.00
	12.00	0.00

	New Track, Miles	Rebuilt Mileage
ILLINOIS		
Chicago Surface Lines	7.00	8.50
Chicago & Interurban Traction Co	0.00	0.30
Chicago & Oak Park Elevated R. R.	0.00	2.37
Chicago, North Shore & Milwaukee R. R.	2.30	0.00
Evanston Ry	0.00	1.00
Hammond, Whiting & East Chicago Ry	0.85	0.23
Metropolitan West Side Elevated Ry	0.00	0.34
Northwestern Elevated R. R.	0.00	1.52
	10.15	14.26
INDIANA		
Chicago, South Bend & Northern Indiana Ry	5.00	0.00
Fort Wayne & Northern Indiana Traction Co	0.79	1.30
Terre Haute, Indianapolis & Eastern Traction Co.	0.00	0.50
Union Traction Co. of Indiana	0.00	0.77
Vincennes Traction Co	0.60	0.40
	6.39	2.97
IOWA		
Moline, Rock Island & Eastern Traction Co	0.70	0.00
Ottumwa Ry. & Light Co	0.00	0.27
Tri-City Ry.	1.72	0.82
	2.42	1.09
KANSAS		
Kansas City, Lawrence & Topeka R. R.	0.00	0.06
Manhattan City & Interurban Ry	0.10	0.00
	0.10	0.06
LOUISIANA		
New Orleans Ry. & Lt. Co	1.67	1.07
	1.67	1.07
MAINE		
Bangor Ry. & Electric Co	0.00	0.27
Lewiston, Augusta & Waterville Street Ry	1.84	0.44
Portland R. R.	0.29	0.62
Waterville, Fairfield & Oakland Ry	0.00	0.25
	2.13	1.58
MARYLAND		
United Rys. & Electric Co	4.75	9.15
	4.75	9.15
MASSACHUSETTS		
Blue Hill Street Ry	0.00	1.50
Boston Elevated Ry	3.64	9.00
Holyoke Street Ry	0.00	1.00
Middlesex & Boston Street Ry	0.00	0.35
Springfield Street Ry	0.00	1.00
Union Street Ry	0.11	1.56
Worcester Consolidated Street Ry	0.98	1.50
	4.73	15.91
MICHIGAN		
Detroit, Jackson & Chicago Ry	0.00	0.12
Detroit United Ry	11.18	1.88
Escanaba Traction Co	0.00	0.80
	11.18	2.80
MISSOURI		
Kansas City Rys	1.61	4.42
Missouri Electric R. R.	0.21	0.00
Southwest Missouri R. R.	15.00	0.00
St. Louis & Jennings Ry	0.00	1.25
United Rys. Co. of St. Louis	4.01	10.41
Vicksburg Lt. & Traction Co	0.00	5.00
	20.83	21.08
MONTANA		
Anaconda Copper Mining Co	1.0	0.00
Chicago, Milwaukee & St. Paul Ry	211.0	0.00
	212.0	0.00
NEBRASKA		
Omaha & Council Bluffs Street Ry	0.00	1.00
	0.00	1.00
NEW JERSEY		
Millville Traction Co	0.00	0.50
Public Service Ry.	3.04	0.00
	3.04	0.50
NEW MEXICO		
Las Vegas Transit Co	0.00	1.06
	0.00	1.06
NEW YORK		
Auburn & Syracuse Electric R. R.	0.23	0.00
Brooklyn Rapid Transit System (Surface)	0.00	6.90
Buffalo & Depew Ry	0.50	3.00
Buffalo & Lake Erie Traction Co	3.80	0.76
Bush Terminal R. R.	0.06	0.00
Hornell Traction Co	0.00	0.10
Interborough Rapid Transit Co	55.60	0.00
International Ry	0.00	1.36
New York Central R. R.	1.56	0.00
New York Municipal Ry. Corp	25.25	0.00
New York Rys	0.00	1.04
New York State Rys. (Syracuse-Utica Line)	0.09	1.93
Niagara Junction Ry	0.58	0.00
Southern New York Pwr. & Ry. Corp	0.00	3.00
Third Ave. Ry	0.26	7.50
	87.93	25.59
NORTH CAROLINA		
Durham Traction Co	0.00	0.75
Tidewater Pwr. Co	4.00	0.00
	4.00	0.75
NORTH DAKOTA		
Northern States Power Co	0.00	0.33
	0.00	0.33
OHIO		
City Ry., Dayton	0.00	0.87
Columbus, Delaware & Marion Electric Co	0.00	1.50
Mahoning & Shenango Ry. & Lt. Co	4.90	0.00
Northern Ohio Traction & Lt. Co	2.96	0.04
The Oakwood Street Ry	0.57	0.00
Ohio River Electric Ry. & Pwr. Co	0.00	1.00
Richland Public Service Co	0.00	0.17
Springfield Terminal Ry. & Pwr. Co	0.10	0.00
	8.53	3.58
OKLAHOMA		
Enid City Ry	0.00	0.30
Oklahoma Union Ry	10.00	0.00
Sand Springs Ry	3.00	3.00
	13.00	3.30
OREGON		
Pacific Pwr. & Lt. Co	0.05	0.00
Portland Ry., Lt. & Pwr. Co	0.16	0.54
	0.21	0.54
PENNSYLVANIA		
Conestoga Traction Co	0.23	0.00
Harrisburg Rys.	0.00	0.45
Lewisburg, Milton & Watsontown Psgr. Ry	0.31	0.00
Penn Central Ry	3.50	0.00
Philadelphia Rys.	4.75	8.00
Pottstown & Phoenixville Ry	0.00	3.00
Reading Transit & Lt. Co	0.00	2.25
Woodlawn & Southern Street Ry	0.18	0.00
	8.97	13.70
RHODE ISLAND		
The Rhode Island Co	0.00	3.10
	0.00	3.10
SOUTH DAKOTA		
Sioux Falls Traction System	0.00	0.70
	0.00	0.70
TEXAS		
Dallas Ry.	3.43	2.71
Eastern Texas Electric Co	0.00	0.10
El Paso Electric Ry	0.00	0.75
	3.43	3.56
VIRGINIA		
Newport News & Hampton Ry., Gas & Elec. Co.	4.04	0.20
	4.04	0.20
WASHINGTON		
Seattle Municipal Street Ry	23.00	0.00
Tacoma Municipal Ry	1.65	0.00
	24.65	0.00
WEST VIRGINIA		
Charleston Interurban R. R.	1.90	6.30
Lewisburg & Ronceverte Electric Ry	0.70	0.00
Monongahela Valley Traction Co	4.00	0.18
Norfolk & Western Ry	51.15	0.00
	57.75	6.48
WISCONSIN		
Madison Rys.	0.21	0.00
Wisconsin Ry., Lt. & Pwr. Co	0.00	1.00
	0.21	1.00
MANITOBA		
Suburban Rapid Transit Co	0.25	0.00
Winnipeg Electric Ry	1.76	0.00
	2.01	0.00
ONTARIO		
Grand River Ry	2.00	0.00
Guelph Radial Ry.	0.00	0.50
Niagara Construction Ry.	28.00	0.00
Port Arthur Civic Ry	0.00	0.92
Sandwich, Windsor & Amherstburg Ry	3.00	0.00
Toronto Civic Ry	1.99	0.00
	34.99	1.42
QUEBEC		
Hull Electric Ry	1.33	1.33
Levis County Ry.	0.00	4.00
Shawinigan Falls Terminal Ry	1.00	0.00
	2.33	5.33
Total for all companies	589.53	155.43

Data on Automatic Substations

THE automatic control of substation equipment, and to a less extent that of power plant equipment, is a development of but a few years. So far but one manufacturer has gone into this field extensively, but one other has already entered it and others may be expected to do so in time. War conditions have hampered progress but the installations and the apparatus ordered, as listed in the accompanying table, make a creditable showing. Interest in the "automatic" is so great now that the year 1919 should bring a substantial increase in its application.

It has seemed wise to include the automatic control equipment for electric generators in this first table. Another year may make a separate list of this desirable. Included in the table also is an automatic synchronous condenser control used for correcting power factor on the lines of the Interstate Light & Power Company. This is another field automatic control which illustrates the flexibility and adaptability of the fundamental scheme.

The forerunner of the automatic substation, the remote-control substation installed by the Detroit Edison Company in 1913, is not included in the table as being outside of its scope. This substation should not be overlooked, however, as the Detroit Edison is now operating five of these 500-kw. remote-controlled lighting converter substations on its 4600-volt, 60-cycle supply lines. The last one was put into commission in 1918. The pioneer true "automatic" was that started in July, 1915, on the line of the Elgin & Belvidere Electric Company, as shown in the second line of the table.

Details of the novel features of practicably all of this equipment listed in the table have been given in recent issues of the ELECTRIC RAILWAY JOURNAL. In an early issue Charles H. Jones will take up the substation of the Chicago, North Shore & Milwaukee Railroad, and other articles will supplement those already printed.

Coal-Saving Bonus in London

The London County Council is distributing a coal-saving bonus among motormen and conductors on its tramways. During the past quarter the saving was more than $16,000, one-half of which has been distributed. This is slightly under 5 per cent of the value of the total consumption, and it is expected that even better results will be secured as the possibility of saving becomes more clearly understood by the men.

AUTOMATIC SUBSTATIONS INSTALLED BY, OR ON ORDER FROM, THE GENERAL ELECTRIC COMPANY

Company	No. of Stations	No. of Contr. Eqpt.	Kilowatt Rating	Type of Machine	Trolley Voltage	Power Supply Voltage	Frequency, Cycles per Second	Remarks	Placed in Operation
New South Wales Government Railways	1	1	450	Synchronous converter	600	6,600	25	Remote control	February, 1916
Elgin & Belvidere Electric Co	3	3	300	Synchronous converter	600	26,400	25		July, September October, 1915
Potomac Electric Company	1	1	500	Synchronous converter	600	12,500	25		June, 1916
Milwaukee Electric Railway & Light Company	1	1	2-300	Synchronous converter	1200	13,200	25	Two machins operating in series	May, 1917
Interstate Light & Power Co., Hazel Green, Ill.	1	1	3000	Synchronous converter	600	2,300	60		February, 1917
Des Moines City Railway	1	1	500	Synchronous converter	600	2,250/4,500	25		October, 1916
Des Moines City Railway	1	1	500	Synchronous converter	600	4,500/22,500	25	Portable substation	September, 1916
Inter Urban Railway, Des Moines, Iowa	2	2	300	Synchronous converter	600	22,500	25		December, 1916 February, 1917
Inter Urban Railway, Des Moines, Iowa	1	1	500	Synchronous converter	600	22,500	25		November, 1917
Grand Rapids, Grand Haven & Muskegon Railway	1	1	500	Synchronous converter	600	17,500	30		April, 1917
Adirondack Electric Power Corporation	1	1	300	Synchronous converter	600	17,300	40		
Rhode Island Company	1	2	300	Synchronous converter	600	13,200/11,200	25	Operate in Paralul	May, 1918
Rhode Island Company	1	1	300	Synchronous converter	600	11,000/22,000	60		February, 1918
Chicago & Interurban Traction Company	1	1	500	Synchronous converter	600	33,000	25		August, 1917
Columbus Railway, Power & Light Company	1	1	500	Synchronous converter	600	13,200/22,800	60	Remote control	March, 1918
Boston & Maine Railroad	1	1	112	Water wheel generator	500			Direct feed	July, 1917
Des Moines City Railway	2	2	500	Synchronous converter	600	2,200/4,400	25		November, 1917 January, 1918
Butte Electric Railway	1	1	500	Synchronous converter	600	3,800	60		January, 1918
Aurora, Elgin & Chicago Railroad	1	1	500	Synchronous converter	600	26,400	25		August, 1918
Chicago & Interurban Traction Company	1	1	300	Synchronous converter	600	33,000	25	Portable	
Iowa Railway & Light Company	1	1	500	Synchronous converter	600	16,500/33,000	60		April, 1918
Kansas City Railway	1	1	500	Synchronous converter	600	6,600/13,200	25	Portable	June, 1918
Chicago, North Shore & Milwaukee Railroad	1	1	500	Synchronous converter	600	33,000	25		April, 1918
Des Moines City Railway	2	2	500	Synchronous converter	600	2,250/4,500	25		April, 1918 May, 1918
Chicago, North Shore & Milwaukee Railroad	1	1	500	Synchronous converter	600	33,000	25		December, 1917
New York State Railways	1	1	300	Synchronous converter	600	60,000	40		
Northern Ohio Traction & Light Company	2	2	500	Synchronous converter	600	22,000	60		
Kansas City Railways	1	1	1000	Synchronous converter	600	6,600	25		
Transit Supply Company	1	1	1500	Synchronous converter	600	12,500	35		
New York State Railways	1	1	250	Synchronous converter	600	11,000	25		
Chicago, North Shore & Milwaukee Railroad	1	1	500	Synchronous converter	600	33,000	25		November, 1918
Chicago, North Shore & Milwaukee Railroad	1	1	1000	Synchronous converter	600	13,200/33,000	25		
Omaha & Council Bluffs Street Railway	1	1	1000	Synchronous converter	600	13,200	25		
Chicago & Joliet Electric Railway	1	1	300	Synchronous converter	600	13,200	60		
Salt Lake, Garfield & Western Railway	2	2	600	Motor generator set	1500	44,000	60	One—remote control	
Oklahoma Union Railway	1	1	300	Synchronous converter	600	6,600	60		
Conestoga Traction Company	1	1	500	Synchronous converter	600	11,000	25		
New South Wales Government Railways	1	1	200	Synchronous converter	600	6,600	25	Remote control	
Duluth Street Railway	1	1	500	Synchronous converter	600	13,200	25		
Des Moines City Railway	1	1	500	Synchronous converter	600	2,250/4,500	25		
Cincinnati, Lawrenceburg & Aurora Electric Street Railway	2	2	200	Synchronous converter	600	33,000	60		
Duluth Street Railway	1	1	1000	Synchronous converter	600	13,200	25		
Pacific Electric Railway	1	1	1000	Synchronous converter	600	15,000	50		
Pacific Electric Railway	1	1	1000	Motor generator set	600	15,000	50		
Wisconsin Light, Heat & Power Company	1	1	300	Motor generator set	600	66,000	60		
Inter Urban Railway, Des Moines, Iowa	1	1	500	Synchronous converter	600	22,500	25		
Inter Urban Railway, Des Moines, Iowa	1	1	300	Synchronous converter	600	22,500	25		
Chicago, North Shore & Milwaukee Railroad	1	1	500	Synchronous converter	600	13,200/23,000	25		
Sacramento Northern Railway	1	1	300	Synchronous converter	600	2,300	60		

The Worst Year the Industry Has Experienced

Mileage Placed in Receivership in 1918 Is Three and a Half Times the Average for the Last Ten Years—Nearly 500 Miles and $16,525,000 of Capitalization Involved in Dismantlement or Suspension of Service

A HARD YEAR for electric railways—such must be the conclusion reached after a review of the receiverships, foreclosure sales and abandonments in the industry during 1918. The high cost of operation, owing to the increased prices of labor and materials, and the difficulty of securing compensatory revenues left many a company in a crippled condition. Of course the financial difficulties of some companies were the result of accumulated burdens of regulation, of unrestricted competition, of over-capitalization or of organization weaknesses, but the chances of such companies being able to effect satisfactory reorganizations so as to insure the continuance of service were greatly reduced during the last year on account of the decreased net earning power of the industry.

The year 1918 has resulted in more than the usual number of companies being operated or sold under court orders for the protection of investors or creditors. This fact, however, does not indicate the most significant phase of the situation. The big point in the year's record is that so many properties have grown weary from hope long deferred and have preferred dismantlement at present-day scrap prices rather than prolonged existence as losing ventures. Almost three score companies have suspended service in whole or in part, and in most cases they have dismantled or have secured permission to dismantle their lines. Sometimes the owners have voluntarily scrapped the properties; and sometimes, in the case of forced sales, the junk dealer has been the only bidder.

The total wrecks of the year, it will be noticed, were in the main small properties, and without a doubt some had probably been founded upon hopes rather than upon a sound knowledge of utility operation and community needs and thus had at best a restricted future. Yet all the abandoned companies had managed to live through other lean years, and their final collapse in 1918 is only cumulative evidence of the grievous burdens that today are bearing down upon every company, be it small or large.

These burdens, of course, have made themselves felt in different ways and in varying degrees for individual cases. The accompanying compilations are designed to cover all companies from those for which court aid was sought in 1918 to those whose car wheels then turned for the last time. These do not show to the full, however, the damage of 1918 to the industry, for many other companies are near the danger line as far as earning power, credit and adequate service are concerned. Many dividends have been cut or omitted; many interest payments have been allowed by bondholders to run at default in the hope of friendly readjustments, and many companies have announced that curtailment or suspension of service will be inevitable unless relief is granted. No effort has been made to tabulate such instances, but the fact that they exist is mentioned to make more emphatic the statement that the financial condition of all electric railways not included in the compilations can by no stretch of the imagination properly be considered as sound.

To take up the compilations in turn, consider first the receiverships. The accompanying record for the last ten years shows clearly the extent to which the number, the mileage and the capitalization of companies placed in receivers' hands in 1918 far exceeded those of 1915, the record year theretofore. The 1918 mileage was about three and a half times the average for the preceding nine years. The receivership of the Brooklyn Rapid Transit Company on the last day of 1918 naturally runs the totals for this year to a high figure, but even without this company the 1918 figures are in the main larger than in any preceding year. The mileage placed under receivership during 1918 represents more than 4 per cent of the total mileage of the country.

RECORD OF ELECTRIC RAILWAY RECEIVERSHIPS

	Number of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1909	22	558.00	$29,962,200	$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1,152.10	40,298,050	39,372,375
1916	15	359,26	14,476,600	10,849,200
1917	21	1,177.32	33,918,725	33,778,400
1918	29	2,107.61	92,130,388	163,257,102

It should be added that the receivership figures for 1917 have been adjusted to include the following cases, information about which was received too late for use in connection with last year's compilation: Abilene (Tex.) Street Railway—4.75 miles, $25,000 of stock and $30,000 of funded debt; Morgantown & Wheeling (W. Va.) Railway—27 miles, $345,800 of stock and $354,000 of funded debt; and Lewisburg (W. Va.) & Ronceverte Electric Railway—6.2 miles and $50,000 of stock.

Table I presents the details of electric railway receiverships in the last calendar year. An effort was made in every case to secure figures from the most up-to-date and authoritative source, and to obtain the correct data in case of disagreement among financial reports, a not infrequent occurrence. The railways thrown into receivers' hands in 1918 were in the majority of cases small in mileage. In each of nine receiverships, however, 48 miles or more of single track were involved, and in each of the two leading cases, Pittsburgh and Brooklyn, more than 600 miles.

Most of the receiverships were caused by a default in interest due to the generally disappearing margin between revenues and expenses, or to operation in territory of a poor character or to inherent defects in organization, or to a combination of these conditions, but in certain instances special reasons existed. For example, the Brooklyn Rapid Transit Company was confronted with large capital requirements for new construction, the possibility of heavy damages because of a recent severe accident, delay in the opening of vitally necessary sections of the new city rapid transit lines and opposition on the part of city officials to relief through a higher fare. The receivership in Des Moines was precipitated by a construction company after the company had for three months unsuccessfully tried to secure a higher fare. The Southern Traction Company, Inc., Bowling Green, Ky., was placed in receivership by the city, after service had been suspended, in order to prevent dismantlement if possible. Automobile competition brought the receivership of the Rockland, South Thomaston & St. George (Me.) Railway, and municipal restrictions that of the Fort Scott (Kan.) Gas & Electric Company, while the effort of the receiver of the Buffalo & Lake Erie Traction Company to abandon the lease of the Buffalo & Lackawanna Traction Company caused the latter company to be placed in the hands of a receiver.

RECORD OF ELECTRIC RAILWAY FORECLOSURE SALES

	Number of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1909	21	488.00	$22,265,700	$21,174,000
1910	22	724.36	19,106,613	26,374,065
1911	25	660.72	91,354,800	115,092,750
1912	18	267.18	14,197,300	10,685,250
1913	17	302.28	15,243,700	19,094,500
1914	11	181.26	26,239,700	44,094,241
1915	19	308.31	30,508,817	16,759,997
1916	19	430.14	13,895,400	22,702,300
1917	26	745.19	27,281,900	27,313,045
1918	23	524.22	37,740,325	20,149,384

A 1918 receivership not included in the list is that of the Washington Electric Railway, Chehalis, Wash. The reason for the omission is that this company in 1916 disposed of its 19-mile line to the Cowlitz, Chehalis & Cascade Railway, which is now operating the line, and the receivership of the predecessor company is simply for the purpose of making a final settlement of its corporate affairs.

The foreclosure sales in 1918, as shown by the accompanying record for the past decade, were of more than average importance. Although the number of companies and the mileage involved were less than in 1917 (which year is adjusted to include the belated return of the South Fork-Portage Railway with 7.5 miles, $150,000 of stock and $230,000 of bonds), the capitalization in 1918 was greater. Moreover, the 1918 figures generally exceeded those for the other years before 1917 with the exception of 1910 and 1911. Two factors have undoubtedly tended during 1918 to keep the foreclosure sales from numbering even more than they did—first, the fact that financial conditions rendered difficult of accomplishment the readjustments that usually accompany the foreclosure sales of large properties and thus made advisable the continuation of some receiverships until more settled times; and second, the fact that more than a few companies deemed their situation so hopeless that they voluntarily went out of business without going through receivership and forced sale.

The detailed foreclosure sales are shown in Table II, in the preparation of which all the various forms of reorganization, readjustment and change in ownership without formal foreclosure sales were passed over. The

TABLE I—ELECTRIC RAILWAY RECEIVERSHIPS IN 1918.

	Miles	Outstanding Stock	Outstanding Funded Debt
Binghamton (N. Y.) Ry	49.74	$978,995	$2,390,000
Brooklyn (N. Y.) Rapid Transit Co	754.82	75,571,368	119,588,927
Buffalo & Depew Ry., Buffalo, N. Y	13.59	305,000	350,000
Buffalo & Lackawanna Traction Co., Erie, Pa. (a)	8.80	100,000	1,000,000
Claremont (N. H.) Railway & Lighting Co	8.60	160,000	150,000
Columbus, Magnetic Springs & Northern Ry., Richwood, Ohio (b)	18.50	230,000	250,000
Consolidated Street Ry., Strong City, Kan	2.00	10,000	None
Cumberland Ry., Carlisle, Pa	12.40	350,000	404,700
Denver & Interurban R.R., Denver, Colo	51.94	101,500	1,079,000
Des Moines (Ia.) City Ry	85.00	1,305,000	5,995,000
Evansville (Ind.) Rys	61.50	1,519,400	2,129,000
Fort Scott (Kan.) Gas & Electric Co. (c)	7.00	116,700	97,000
Hartford & Springfield Street Ry., Warehouse Point, Conn	48.00	785,000	961,000
Iola (Kan.) Electric R.R	10.50	150,000	150,000
Lewiston, Augusta & Waterville Street Ry., Lewiston, Me	165.65	3,000,000	3,659,000
Memphis & Rugby (Tenn.) Ry	2.50	....	80,000
Paducah (Ky.) Traction Co	19.34	350,000	1,023,000
Penn Yan (N. Y.) & Lake Shore Ry	10.00	94,000	100,000
Pittsburgh (Pa.) Rys	605.25	5,000,000	18,534,000
Plymouth & Sandwich (Mass.) Street Ry	17.43	151,800	None
Rockland, South Thomaston & St. George Ry., Rockland, Me	5.71	122,400	37,575
St. Joseph Valley Traction Co., Elkhart, Ind	9.00	110,200	240,000
St. Paul (Minn.) Southern Electric Ry.	17.54	658,225	364,400
St. Petersburg (Fla.) & Gulf Ry	26.11	300,000	250,000
Scranton (Pa.) & Binghamton R.R	50.00	250,000	4,100,000
Southwestern Interurban Ry., Winfield, Kan	25.00	150,000	50,000
Southern Oregon Traction Co., Medford, Ore	8.19	150,000	150,000
Southern Traction Co., Inc., Bowling Green, Ky. (d)	4.50	10,000	24,500
Springfield (Vt.) Electric Ry	9.00	100,800	100,000
	2,107.61	$92,130,388	$163,257,102

(a) Receivership resulted from petition of receiver of Buffalo & Lake Erie Traction Co. to abandon its lease of the Lackawanna line.

(b) Sale has been set for Jan. 15, 1919. See "Suspensions" in Table of Abandonments.

(c) Railway investment represents approximately one-third of company capitalization.

(d) This company suspended service in 1917, but the city has caused a resumption of service under a receiver.

TABLE II—ELECTRIC RAILWAY FORECLOSURE SALES IN 1918

	Miles	Outstanding Stock	Outstanding Funded Debt
Adirondack Lakes (N.Y.) Traction Co.	5.00	$60,000	$94,000
Central Crosstown R.R., New York, N. Y. (a)	6.32	1,250,000	3,570,809
Cincinnati, Milford & Loveland (Ohio) Traction Co	37.00	1,649,425	441,000
Claremont (N. H.) Ry. & Lighting Co.	8.60	160,000	150,000
Consolidated Street Ry., Strong City, Kan	2.00	10,000	None
Eastern New York R.R., Ballston Spa, N. Y	15.00	275,000	150,000
Freeport (N. Y.) R.R	2.92	20,000	50,000
Lewisburg & Ronceverte Electric Ry., Lewisburg, W. Va	6.20	50,000	None
Memphis & Rugby (Tenn.) Ry	2.50	....	80,000
Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Co., (b)	42.00	6,248,250	750,000
Northern Cambria Street Ry., Patton, Pa	13.00	431,750	395,000
Northern Electric Ry., Chico, Cal	217.65	25,000,000	12,137,000
Orleans-Kenner Electric Ry., New Orleans, La	11.60	250,000	250,000
Petaluma & Santa Rosa (Cal.) Ry	43.41	994,100	872,000
Rockland, South Thomaston & St. George Ry., Rockland, Me	5.71	122,400	37,575
St. Joseph Valley Traction Co., Elkhart, Ind	9.00	110,200	240,000
St. Louis, Lakewood & Grant Park (Mo.) Ry. (c)	4.00	300,000	85,000
San Angelo (Tex.) Power & Street Ry. Co. (d)	1.00	25,000	None
Selma (Okla.) Street & Suburban Ry.	8.00	125,000	125,000
Southwestern Interurban Ry., Winfield, Kan	25.00	150,000	50,000
Ware & Brookfield (Mass.) Street Ry.	11.71	100,000	135,000
Woodstock & Sycamore Traction Co., Genoa, Ill	26.50	292,600	485,000
Worcester & Warren Street Ry., Brookfield, Mass	20.10	116,600	52,000
	524.22	$37,740,325	$20,149,384

(a) The sale covered the lease of the Christopher & Tenth Street Railroad, which is included.

(b) A 14-mile section of this road was sold to bondholders in 1917 and included in the 1917 Table of Foreclosure Sales. The other part was sold in 1918 to an organization of citizens along the line. They then bought in the 14-mile section, and the whole property is now in the hands of a reorganized company, the Minneapolis, Northfield & Southern Railway.

(c) Not in operation since flood of 1915.

(d) This company abandoned service in 1916 and disposed of most of its 4-mile property. The remainder came into possession of the city under an agreed judgment of the district court and was sold in 1918 to the San Angelo Water, Light & Power Company. This company has relaid some track in connection with street paving but has not yet operated its 1 to 1½ mile line.

items in the table generally speak for themselves, but a few special points merit comment. The Northern Electric Railway sale was the culmination of a reorganization pending since 1914. The part of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company not sold in 1917 was sold this year and, as explained in detail in the note in the table, has been reunited in a new company with the other section. The Claremont (N. H.) Railway & Lighting Company was purchased by local manufacturers to save the line. The majority of the properties foreclosed in 1918 are still operating in some reorganized or new form, but nine out of the total of twenty-three either went on to the junk dealer or seem headed in that direction.

These wrecked companies, together with those whose abandonment in 1918 was a voluntary act or the aftermath of receivership and sale in prior years, are shown in Table III. An effort was made to segregate abandoned companies into two classes, the first, or "Dismantlements," including properties actually scrapped in whole

TABLE III—ELECTRIC RAILWAY ABANDONMENTS IN 1918

1. Dismantlements	Miles	Outstanding Stock	Outstanding Funded Debt
Adirondack Lakes (N.Y.) Traction Co.	5.00	$60,000	$94,000
Billings (Mont.) Traction Co. (a)	6.00	100,000	None
Bluffton (Ind.), Geneva & Celina Traction Co	19.00	675,000	None
Bristol (Tenn.) Traction Co. (a a)	15.30	143,800	192,500
Carolina Traction Co., Rock Hill, S. C. (b)	3.00	....	....
Clarkesville (Ga.) R.R.	1.25	....	....
Central of Florida Ry., Daytona, Fla.	5.00	130,000	100,000
Consolidated Street Ry., Strong City, Kan	2.00	10,000	None
Covington & Oxford (Ga.) Street Ry.	6.00	13,600	None
Dayton, Springfield & Xenia Southern Ry., Dayton, Ohio (c)	12.00	159,425	150,100
Denton (Tex.) Traction Co.	4.50	....	....
Gettysburg (Pa.) Ry.	6.50	50,000	47,000
Interurban Ry. & Terminal Co. Cincinnati, Ohio (d)	23.00	946,750	446,325
Lake Erie, Bowling Green & Napoleon Ry., Bowling Green, Ohio (e)	12.50	346,000	218,600
London & Lake Erie Ry. & Transportation Co., London, Ont	28.00	2,000,000	840,000
Martha's Vineyard (Mass.) Street Ry.	1.10	8,000	None
Memphis & Rugby (Tenn.) Ry.	2.50	....	80,000
Middletown (Ohio) Street Ry.	1.00	....	....
Montecito R.R., Los Angeles, Cal.	1.46	20,000	None
New Jersey Rapid Transit Co., Sea Isle City, N. J.	8.00	200,000	120,000
Northwestern Traction Co., Brasil, North Dakota	5.00	....	....
Norwood, Canton & Sharon Street Ry., Foxboro, Mass. (Norwood Division) (f)	2.50	12,500	11,500
Oak Bluffs (Mass.) Street Ry.	6.47	60,000	None
Oklahoma Union Ry., Sapulpa, Oklahoma (g)	1.50	24,000	....
Richmond (Va.) & Rappahannock River Ry. (h)	16.30	321,000	314,580
Rockland, South Thomaston & St. George Ry., Rockland, Me.	5.71	122.400	37,575
Rutland Ry., Light & Power Co., Rutland, Vt.	†2.50	120,000	75,000
St. Joseph Valley Traction Co., Elkhart, Ind. (i)	7.50	110,200	240,000
St. Louis, Lakewood & Grant Park Ry. (j)	4.00	300,000	85,000
St. Simons R.R., Brunswick, Ga.	1.70	12,000	18,000
Sand Point (Ida.) & Interurban Ry., Ltd.	6.00	312,100	None
Sioux City, Crystal Lake & Homer Elec. Ry., Dakota City, Neb.	4.00	50,000	10,300
San Jose (Fla.) Traction Co., Jacksonville, Fla	3.00	*50,000	None
Taunton & Pawtucket Street Ry., Taunton, Mass., (k)	14.00	100,000	200,000
Topeka (Kan.) Ry.	†1.50	45,000	39,600
Twin Falls (Ida.) R.R.	12.00	*500,000	250,000
Uvalde & Leona Valley (Tex.) Interurban Ry.	8.00	32,000	*26,000
Ware & Brookfield (Mass.) Street Ry.	11.71	100,000	135,000
Woodstock & Sycamore Traction Co., Genoa, Ill	26.50	292,600	485,000
Worcester & Warren Street Ry., Brookfield, Mass	20.10	116,600	52,000
Yazoo (Miss.) Municipal Street Ry.	4.00	....	50,000
Total dismantlements	327.10	$7,542,975	$4,318,080
2. Suspensions			
Bay State (Mass.) Street Ry. (l)	†30.40	$834,000	$827,700
Berkshire (Mass.) Street Ry. (m)	†5.05	69,215	69,215
Bristol & Norfolk Street Ry., Randolph, Mass. (m m)	6.44	100,000	70,000
Columbus, Magnetic Springs & Northern Ry., Richwood, Ohio (n)	18.50	230,000	250,000
Conway (Mass.) Electric Street Ry.	6.60	100,000	100,000
Fernandina (Fla.) Municipal Ry.	2.00	....	None
Fort Scott (Kan.) Gas & Electric Co. (o)	7.00	116,700	97,000
Fryeburg (Me.) Horse R.R. (p)	3.00	5,175	None
Hamilton (Ont.) Radial Elec. Ry. (pp)	29.10	111,150	160,000
Laconia (N. H.) Street Ry. (q)	†1.30	20,580	19,250
Lebanon & Franklin Traction Co., Dayton, Ohio	10.80	80,000	135,000
Madison Light & Ry. Co., Madison, Ind. (r)	3.50	150,000	146,000
Mt. Vernon (Ohio) Ry. (s)	9.00	10,000	40,000
Norwood, Canton & Sharon Street Ry., Foxboro, Mass. (Sharon Div.) (t)	4.00	20,000	18,500
Ocean City (N. J.) Electric R. R. (t t)	10.00	100,000	75,000
Oxford Electric Co., Norway, Me. (u)	2.13	80,000	175,000
Parkersburg (W. Va.) & Ohio Electric Ry., (v)	5.00	150,000	150,000
Plymouth & Sandwich (Mass.) Street Ry., (w)	17.43	151.800	None
Total suspensions	171.25	$2,328,620	$2,332,665
Grand total	498.35	$9,871,595	$6,650,745

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* Authorised amount; outstanding amount not ascertainable.

† This represents only a small fractional abandonment; in other words, almost all of the old mileage of this company is still in operation.

(a) Partially dismantled in 1917; heirs of chief stockholder refuse to operate losing line, and the property remaining is for sale.

(a a) This company suspended service in 1917. Early in 1918 an effort was made to operate the outlying 10-mile Holston Valley division, but now this and the city lines have both been dismantled.

(b) The company's three storage battery cars have been sold, but the tracks and charging plant have not yet been removed.

(c) The branch line from Beavertown to Spring Valley has been torn up. The company's remaining trackage, 27.97 miles, is being operated.

(d) Dismantled section represents Bethel division only. The company still operates 62 miles.

(e) The company was sold in 1916, with the option to junk. The 12-mile section between Bowling Green and Pemberville was sold to and is being operated by the Toledo, Fostoria & Findlay Railway. Dismantlement was begun on the remaining part, but the final authorisation for junking was not received from the Ohio Supreme Court until 1918.

(f) See same company in "Suspensions" below. Service on the whole 6.5 mile line was suspended in March, and in this month the company was sold, not at public auction, to a New Jersey syndicate represented by a Mr. Tarr of Boston. The 2.5 mile Norwood division has been junked, but the 4-mile Sharon division lies untouched at the moment.

(g) Abandoned under commission order because controlled Sapulpa Electric Interurban Railway served same territory for slightly greater distance.

(h) A 9.10 mile section of this 25.40 mile property, which went into receivership in 1917, was sold under court decree in 1917 to the Richmond & Seven Pines Railway. The remainder is now abandoned as the result of the voluntary dissolution of the Richmond & Rappahannock Railway.

(i) See this company in Table of Receiverships and Table of Foreclosure Sales. The whole line was sold to a junking company, but W. H. Foster, mayor of Elkhart, purchased a 1½ mile section in that city and is now operating it.

(j) Not in operation since flood of 1915.

(k) This company's 17.5 mile line was all sold in 1917 under the unsatisfied mortgage of the predecessor company, the Bristol County Street Railway, and all has now been abandoned except a 3.5 mile section purchased by the city of Attleboro for $18,000 to form the "A. B. C. Railway."

(l) In March the court authorized the discontinuance of 125 mi. of unprofitable lines, but up to the latest report furnished only 30.4 of unsafe track had actually been closed down. A petition, however, for the discontinuance of 288.2 miles at least during the winter months because of failure to earn operating expenses is now pending.

(m) Operation temporarily suspended on line from Lanesboro to Cheshire. Capitalization represented is arbitrarily halved between stock and bonds. Line from East Lee to Huntington, 23.84 miles, is not included as the express service is still in operation, although all passenger service has been discontinued.

(m m) The securities of this company were purchased at a private sale by junk dealers. Service was suspended on Dec. 2, and it is the intention to foreclose soon.

(n) Service suspended on Dec. 31, 1918; sale set for Jan. 15, 1919.

(o) Railway investment represents approximately one-third of company capitalization.

(p) Railway has gone out of business as far as operation is concerned but still holds its organization and charter for electric line.

(p p) Complete suspension followed failure to secure higher fare. It is reported that proceedings are being taken to declare the company insolvent and that dismantlement will probably result in this event.

(q) An effort is being made to save the remainder of this 8.87-mile line through reorganization of service and finances.

(r) The intention to discontinue service was announced last August, and according to advice late in December formal permission was about to be granted.

(s) This line was sold for junk in 1917 and included in the Table of Abandonments of that year. The dismantling, however, was stopped late in 1918 by an injunction from the Ohio Supreme Court.

(t) See same company in "Dismantlements" above. The company last March was notified not to resume operation until re-inspected by the Massachusetts Public Service Commission, for the roadbed was said to be in a dangerous condition.

(t t) Company suspended service in October, 1918, and says that it will not operate again. Committee of local business men is trying to interest capital for purchase of the property.

(u) It is expected that this suspension will result finally in dismantlement and sale.

(v) Sale is awaiting decision by federal courts; receiver, who has been in power since 1911, states that line will be dismantled.

(w) Property is awaiting decision of Massachusetts Supreme Court relative to writ of mandamus to compel town of Plymouth to keep its promise to pay the road $50,000 toward the construction of 11.5 mile extension (total cost, $250,000) from Fresh Pond to Sagamore completed in 1916. Town voted to contribute this sum, but selectmen refused to obey vote, and service was suspended pending settlement of matter in the courts.

or in part, in the process of being so scrapped or with the necessary legal sanction for such treatment, as well as certain small companies which are known to be out of business and of which nothing can be learned to give hope of a reopening. The second class, or "Suspensions," includes those companies whose service has been in whole or in part discontinued either temporarily or permanently, but which in the latter event have not received the necessary permission for dismantlement.

In 1918 the number of companies involved in dismantlements and suspensions was about three times as large as in 1917, and the mileage and the capitalization concerned were about two-and-a-half times as great. The following record of the last two years tells a plain story of increased burdens:

		Number of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1917	Dismantlements...	13	126.97	$2,048,900	$2,006,450
	Suspensions.......	7	80.51	1,173,300	1,542,000
	Total...........	20	207.48	$3,222,200	$3,548,450
1918	Dismantlements...	41	327.10	$7,542,975	$4,318,080
	Suspensions.......	18	171.25	2,328,620	2,332,665
	Total...........	59	498.35	$9,871,595	$6,650,745

It will be observed that Table III includes a few operating companies which—the Bay State Street Railway is the leading example—abandoned a small part of their lines in 1918 and even in some cases scrapped this part of their properties. The list of cases of this sort is not intended to be complete, for no canvass has been made of all operating companies to ascertain to the last inch how much track has been torn up or allowed to become a streak of rust. The cases cited are those which have attained prominence before commissions, courts or city authorities, and they are included merely to indicate the necessity which companies feel of curtailing unprofitable service. The capitalization in these cases is prorated on a mileage basis.

Regarding the seven companies reported in last year's list of suspensions, it may be said that three have since been dismantled, the Bristol (Tenn.) Traction Company, the Bluffton, Geneva & Celina Traction Company and the Taunton & Pawtucket Street Railway. The Richmond & Chesapeake Bay Railway has not resumed service, but at a recent sale all bids were refused because no one would state an intention to operate the line. The Fort Smith-Oklahoma Light & Traction Company is likewise still existent but inoperative, and there is said to be no indication of a resumption of service in the near future. As before stated, the Southern Traction Company, Inc., Bowling Green, Ky., is being operated by a receiver. The Amarillo (Tex.) Street Railway has not yet resumed operation.

The special circumstances attaching to individual cases of dismantlement or suspension in the 1918 table are believed to be sufficiently explained in the notes, but a few references to companies not included in the table will be used to complete the story as follows:

The 1917 purchasers of the Southwestern Traction Company, Temple, Tex., have been desirous of dismantling the property, but suspension of operation has been prevented by an injunction secured by citizens, city councils and county officials in the company's territory.

The Gary & Interurban Railroad, Gary, Ind., sold in 1917, was succeeded by the Gary Street Railway as far as the original Gary & Interurban and the controlled East Chicago Street Railway lines were concerned. A third constituent part of the old system, the Goshen, South Bend & Chicago Railway, was included in the 1917 Table of Abandonments; and the remaining sections, the Gary Connecting Railways and the Valparaiso & Northern Railway, seemed destined also to meet an early end. The Gary & Valparaiso Railroad, however, was incorporated to operate these last two lines pending an appeal to restrain dismantlement, and during 1918 this company has been aided by the government in its rehabilitation work, as described elsewhere in this issue.

The Dunkirk (N. Y.) Street Railway, after repeated efforts, has at last secured permission from the Public Service Commission for the Second District of New York to abandon parts of its system, with an "if" attached. The commission's order is not to become effective until certain security is given to the city for taxes and until the receiver of the holding company, the Buffalo & Lake Erie Traction Company, obtains authorization from the Supreme Court for the abandonment.

The California Railroad Commission has just granted the owners of the Fresno Interurban Railway the right to suspend passenger service on its line in the city of Fresno. Like the Berkshire Street Railway line noted in Table III, however, the Fresno company is not included in the list of suspensions because some class of service is still maintained, this being freight service to the end of its 15-mile line.

In New York State numerous petitions have been presented to the Second District Commission for approval of declarations to abandon parts of lines. The Fishkill Electric Railway, the New York, Westchester & Connecticut Traction Company, the Yonkers Railroad and the Westchester Electric Railroad have all taken this step, but the applications are still pending. The three companies last named are controlled by the Third Avenue Railway, New York, N. Y.

Other petitions for the abandonment of certain portions of the property are pending before the courts or the commissioners in the cases of the Danbury & Bethel (Conn.) Street Railway; the Washington Water Power Company, Spokane, Wash.; the Los Angeles (Cal.) Railway; the Kansas Electric Utilities Company (Parsons Division), and the Exeter, Hampton & Amesbury Street Railway, Exeter, N. H. In addition the Indiana Utilities Company has a case pending before the State commission for the abandonment of the Angola-Lake James railway property, and the Los Angeles & San Diego Beach Railway one before the California Railroad Commission for complete discontinuance of service and dismantlement.

The twelfth year of operation of the tramways in Penang, Straits Settlement, was somewhat uneventful, the usual services being maintained without accident or serious interruption. The revenue totaled $87,275 (gold), and the gross profit was 10 per cent. The number of passengers carried showed a satisfactory increase, but enhanced prices had to be paid for all materials, and no work of a capital nature was carried on owing to the impossibility of obtaining materials. An electric locomotive to deal with freight haulage was ordered from America.

Electric Railway Statistics

Figures Are Given by States of the Miles of Track and Numbers of Cars Owned

THE accompanying table gives statistics of the miles of track and cars of the electric railway companies in the United States, made up from the August, 1918, "Electric Railway Directory" of the McGraw-Hill Company. The dates of the reports in this directory average about June, 1918, so that the table may be considered to represent the statistics of the industry at about that time.

A comparison of the totals given in this table with those in a somewhat similar table, published in the issue of Jan. 5, 1918, will show that for all states a total of 991 companies instead of 1,029, a decrease during the year of 38. The miles of track this year total 48,484 as compared with 48,175 in June, 1917, an increase during the year of 209, and the motor passenger cars this year total 80,270 as compared with 81,393, last year, a decrease of 1,123. The total number of cars, according to the table, increased from 102,359 to 102,379, or a total of 20. The decrease in the number of companies is due in part to the abandonment of operation of electric lines by companies which had not found the service financially profitable, and in a number of cases to the abandonment of gasoline motor lines. There were a few consolidations and also several cases of the splitting up of former consolidated properties by action of the court or for some other reason. Some of these cases of segregation have brought changes in the mileage credited to the different states, because, under the plan followed, the miles of track and number of cars belonging to each company are credited to the state in which the greater part of the mileage lies. Nominally there has been an increase of 200 miles, but this increase is not significant, in the opinion of the compilers, as it is less than one-half of 1 per cent, and owing to the unavoidable limitations in the method of compiling the statistics, accuracy within that figure is not claimed. The same statement applies to the figures on cars. This is one reason why an attempt should not be made to establish a very close comparison between the figures in this table and in those elsewhere in this issue on track built and abandoned and cars purchased during the year. Another reason of course is the difference in period, the other tables being for the calendar year while these are approximately for the year ended in June. The figures do not differ greatly, however, indicating that all are approximately correct.

A few other words of explanation are necessary. The electrified mileage of steam railroads is included, but as this is reported to the Directory usually as route mileage, that figure is continued in the table, although the mileage of the city and interurban companies is figured as single track as usual. Under "Cars" the statistics include for electrified steam railroads only the electric locomotives and the motor passenger cars. Gasoline motor cars are classified under the head of "motor passenger cars."

Many companies seem to use the expressions "express cars," "freight cars," and "service cars" as interchangeable terms. The table shows the way in which cars of these types are reported by the different companies, but what is known as a service car on one road may be called a freight car or an express car by another road. In a few cases where a company owns a large number of freight cars compared with the number of passenger cars owned, the total number of such freight cars has been intentionally omitted from the table. The most notable instances of this are the Chicago Tunnel Company with 3000 "other" cars, the Fort Dodge, Des Moines & Southern Railway with 2,300 "other" cars and the East St. Louis & Belleville Electric Railway with 510 "coal" cars. In fact, "other cars" as reported by a company may mean almost anything other than motor cars.

Every effort was made to prevent duplication of mileage and cars when reported by a holding company and again by an operating company, but there may be certain cases of this in the table.

TABLE SHOWING STATISTICS OF ELECTRIC RAILWAY COMPANIES IN THE UNITED STATES

	No. of Cars	Miles of Track	Motor Passenger Cars	Trail Passenger Cars	Electric Locomotives	Express or Freight Motor Car	Freight Cars	Service or Other Cars	Horse or Cable Cars
New England States:									
Connecticut...	7	1,608	1,922	3	104	300	.....	123	....
Maine	16	535	511	8	11	85	30	151	....
Massachusetts.	39	3,227	7,873	354	9	29	33	1,076	....
New Hampshire	14	248	285	.....	2	6	.....	41	2
Rhode Island..	3	428	1,030	25	...	...	.....	246	....
Vermont......	10	128	131	.....	...	1	12	14	..
Total.......	89	6,174	11,752	390	126	421	75	1,651	2
Eastern States:									
Delaware......	2	153	309	.....	...	...	.....	81	....
District of Columbia......	8	425	1,066	.....	...	...	.....	438	....
Maryland.....	12	685	2,114	54	13	19	70	92	....
New Jersey....	29	1,595	3,285	3	2	19	4	77	....
New York.....	105	5,633	16,989	1,228	151	65	35	2,116	2
Pennsylvania..	122	4,746	8,154	23	3	24	86	1,365	4
Virginia.......	13	581	891	63	..	14	....	117	....
West Virginia..	21	652	574	.....	12	20	5	53	....
Total.......	312	14,470	33,382	1,371	181	161	200	4,339	6
Central States:									
Illinois........	70	3,757	5,999	701	52	9	1,125	517	....
Indiana.......	41	2,463	1,730	28	39	85	.....	455	....
Iowa..........	24	885	967	13	16	3	.....	354	....
Kentucky.....	10	464	1,005	14	..	12	.....	70	....
Michigan......	26	1,736	2,384	57	16	80	.....	598	....
Minnesota.....	14	737	1,320	4	7	1	.....	171	....
Missouri	22	1,137	2,512	144	1	...	.....	285	....
Ohio	72	4,254	5,501	89	14	59	24	1,285	....
Wisconsin.....	18	763	913	117	2	67	.....	79	....
Total.......	297	16,196	22,331	1,167	147	316	1,149	3,814	....
Southern States:									
Alabama......	15	365	411	28	...	...	....	248	....
Arkansas......	10	122	242	....	...	...	....	44	....
Florida........	9	191	289	13	...	1	....	41	....
Georgia.......	16	499	679	19	...	26	....	58	2
Louisiana	11	330	687	....	...	3	....	135	....
Mississippi....	11	120	150	2	...	...	....	24	....
North Carolina	12	285	314	....	16	1	8	195	....
South Carolina.	5	129	188	25	...	...	....	....	....
Tennessee.....	14	482	799	57	1	13	3	74	...
Total.......	103	2,523	3,759	144	17	44	11	819	2
Western States:									
Arizona.......	4	54	44	1	...	...	....	1	....
California.....	38	3,313	3,733	84	66	9	467	1,531	119
Colorado......	13	494	415	149	6	57	....	206	2
Idaho	5	185	61	2	3	...	....	22	....
Kansas	17	546	411	14	..	...	12	157	3
Montana......	9	663	134	20	42	32	....	17	....
Nebraska......	6	253	578	10	1	...	....	65	....
Nevada	2	11	12	....	...	...	....	...	....
New Mexico...	2	11	16	....	...	...	....	...	....
North Dakota..	4	27	58	....	...	...	....	8	....
Oklahoma.....	16	312	301	....	...	...	....	73	....
Oregon	10	682	721	85	22	26	449	206	....
South Dakota..	3	25	30	4	...	1	....	8	....
Texas.........	34	1,001	1,221	134	.	31	....	162	....
Utah	5	453	269	. .	7	2	....	251	....
Washington....	20	1,069	1,027	28	27	7	442	483	48
Wyoming......	2	22	15	10	. .	...		4	. .
Total.......	190	9,121	9,046	541	174	165	1,310	3,194	172
Total of all States.....	991	48,484	80,270	3,613	645	1,107	2,745	13,817	182

Railway Conditions are Encouraging

War Has Proved Need of Public for Dependable Service—Some Sort of Service-at-Cost Plan of Operation Favored

By CLARENCE RENSHAW
General Engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

THE beginning of the new year on a peace basis finds the electric railways with much to be thankful for. While in many cases their revenues are shamefully inadequate, their physical property run down and their working forces depleted by the severe strains they have been through, there is every reason to believe that the bottom has at last been reached, and that the future will bring improvement.

The war has brought many hardships to the industry, but it has also destroyed several handicapping prejudices which had seemed so deep-rooted as to be almost impregnable, and in their place it has established some valuable precedents. Its effects, therefore, have not been entirely without compensation.

Among the most important of the ideas which have been relegated to the past is the mysterious idealization of the nickel as the necessarily logical unit of car fare and the strong conviction that only a single unit should be charged within the boundaries of a given municipality, no matter how great the mileage. The necessity for stopping the cars at every street corner, also, regardless of the fact that in many cases these corners are only five or six car lengths apart, has likewise been removed and a rational basis generally recognized for the location of stopping points.

IMPORTANT PRECEDENTS ESTABLISHED

In the matter of precedents the national recognition which has been given to the necessities of the electric railways and to the value of their services is an important item. It is stated on reliable authority that of the 158 cities having a population of 40,000 or more, increased rates in one form or another have been granted in ninety, or nearly 60 per cent, and that they are pending in fifty-one others. In many instances, it is true, the granting to the railway companies of the increased rates for which they asked has not proved a solution of their financial problems. However, the recognition of the fact that rates must be adjusted to meet costs, which these increases have shown, is extremely encouraging, especially in view of the idea previously prevalent that fares could be changed in the downward direction only.

The most convincing testimonial, perhaps, as to the value of local transportation has been the loaning to electric railways in various parts of the country, by at least two different departments of the national government, of money at reasonable interest where such financing was necessary to secure service for important industries. Another encouraging recognition of the same sort was the practice adopted by manufacturers in many cases of loaning men from their own forces to the railway companies for operating cars during the rush hours. The difference between the amounts paid these men by their employers and those refunded by the railway companies, often amounting to nearly $5 a day per car, was cheerfully assumed under the circumstances as a legitimate charge for readiness to serve. These practices, moreover, are not merely recognitions of service. They are precedents which will be carefully borne in mind on account of their possible bearing on the ultimate solution of the transportation problem.

With such a background, there is every reason why the electric railways should attack their problems in a spirit of optimism. Never before has the idea of justice and fairness been so noticeable among the people and their representatives as now at the conclusion of a war entered for the sake of these principles. Never before has the management of the railways been controlled by such broad-minded and skillful executives, and never before have the manufacturers of equipment been so adequately prepared to supply the physical needs of the industry. What the results will be it would, of course, be rash to predict. Certain tendencies, however, can be recognized with a fair degree of certainty.

TENDENCY IS TOWARD SERVICE AT FAIR RATES

The general trend in public relations will apparently be away from the municipal franchise with its ironclad provisions and toward state control by the more flexible commission form. In those cases where previous relations have been severely strained, the tendency will be to adopt some form of service at cost with more or less fixed guarantees of capital return. Where conditions have been better, however, and proper technical skill is utilized, it will most likely be feasible to devise means for profitable operation under present forms of control.

To operate successfully under the latter alternative, commercial methods must be more generally adopted. Service of the proper kind, not too much nor too little, but rightly gaged to the needs of the community, must not only be given but must be widely advertised. Reliable, rather than cheap equipment, must be employed with train operation, one-man cars and other modern devices where necessary. Obviously, this will mean highly-trained men in both traffic and mechanical departments. Rates properly proportioned to encourage maximum use of the transportation for sale will likewise be an essential element. Restrictive legislation will not handicap any railway which operates on this basis, for, presenting the case in its bearing on service to the people rather than its effect on the company, it will be able to secure any enactment for which it asks.

On either basis the electric railways in the future will undoubtedly be run for the benefit of the community, and this being properly made known with suitable publicity of all matters of management, the people will be entirely willing to pay the necessary price.

The importance of studying the employees outside of working hours was emphasized in some remarks recently made by Edward Marshall before the station operating committee of the Ohio Electric Light Association. He said, "Do you think most of us give our help the proper consideration and attention? Should we not have in each plant some one whose duty it is to investigate each employee's home life and the conditions under which he labors? Should we not know whether our employees are living economically? We all know that a man in debt is not a good employee. Some system of education and relief for such should be provided."

Renewing "K" Controller Shafts and Handles

The Position of Controller Contacts Should Be Located Accurately from the Machined Portion of the Shaft

By R. S. Beers
General Electric Company, Schenectady, N. Y.

THE handles of most "K" controllers are made removable, which requires that the hole in the handle be slightly larger than the shaft. The continual use of the operating handle increases this difference in size, until in extreme cases the fit may become so loose that the controller cannot be turned fully "on" or "off." Usually, rebushing the handle will be found sufficient to correct the trouble.

But in other cases where the shaft is badly worn it may be brought back to its original dimensions by cutting off the worn end and drilling a hole to receive a new shaft end as indicated by Fig. 1. The part that goes in the hole of the old shaft should be turned to a drive fit.

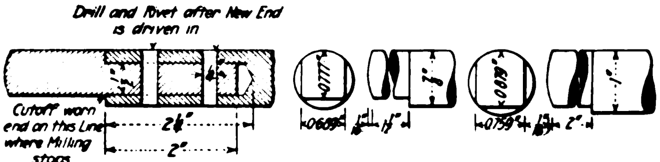

Drill and Rivet after New End is driven in
Cutoff worn end on this Line where Milling stops
2⅛"
2"
.0609"
1⅝"
.0759"
2"

FIG. 1 FIG. 2 FIG. 3

METHOD FOR RENEWING "K" CONTROLLERS AND HANDLES

Fig. 1—Method of renewing handle fit on controller shaft. Fig. 2—Handle end of shaft for K-10, K-11, K-12, K-27 and K-63 controllers. Fig. 3—Handle end of shaft for K-6, K-28, K-29, K-36, K-36, K-40, K-51 and K-66 controllers

A simple plan for locating the new shaft end is to put the cylinder in a controller frame, with the pawl in the "off-position" notch of the star wheel. Then the new shaft end is put into a new handle, the handle is set in the "off position" as indicated by the "off-position" stop on the cap plate and the new shaft end is driven into place. After it is driven in, the shaft is removed and drilled and the new end is pinned to the old shaft. This method of repairing removes the oil-way to the upper bearing but a substitute oil-way can be made by drilling a small hole through the water cap.

A second and much more difficult method of repair is to build up the shaft end with a welding outfit. This has the advantage of maintaining the original strength of the shaft as well as the oil-way to the upper bearing. It has the disadvantage, however, of requiring that, while the weld is being made, the shaft be kept cool where the insulation begins. In addition it is necessary, on the repaired cylinder, to machine the end for the handle in a milling machine having an index head, or else an angle plate and surface gage must be used. Care must be taken to insure that the flat surface for the handle will be correctly located.

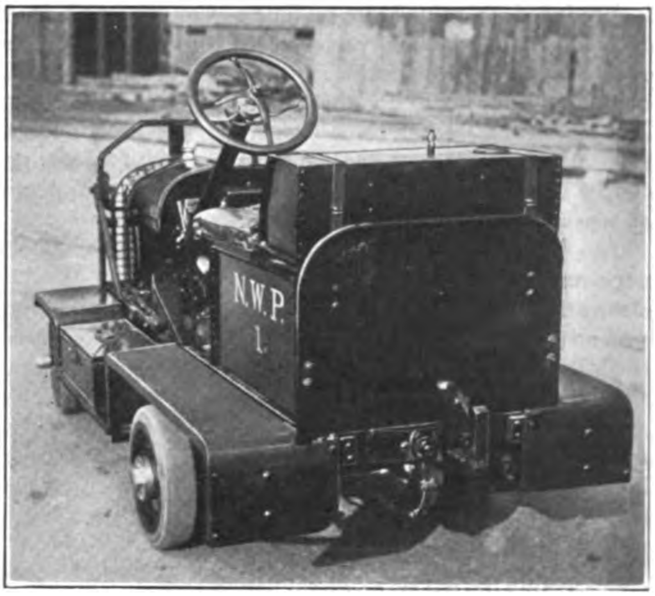
In the manufacture of controller cylinders the milled end for the handle-fit is located by measuring from one of the flat sides of the hexagon or, in the case of the round-shaft type, from the keyway. All other angular distances such as those to segment screw holes and star-wheel notches are located from this milled end. Where a new end for the handle is to be made the operation should be reversed, in the following manner: Take a new cylinder and determine the angular distance from a segment screw hole to one of the milled surfaces and use the distance for locating this surface on a repaired cylinder. Fig. 2 gives the dimensions of the handle end of the main cylinder shaft for the K-10, K-11, K-12, K-27 and K-63 controllers. Fig. 3 gives similar dimensions for the K-6, K-28, K-29, K-35, K-36, K-40, K-51 and K-66 controllers.

Recently several handles have been put on the market that are provided with an adjustment to take up the wear on old controller shafts. At the present time the manufacturers of "K" controllers furnish such a handle with their standard equipments. This particular one is known as a "wedge-lock handle," because the wear is taken up by a wedge forced into place by a spring.

Tractor Made from Rebuilt Ford Expedites Terminal Work

FOR use at the Sausalito terminal of the Northwestern Pacific Railroad in California, Model T. Ford automobiles have been rebuilt into tractors for conveying mail, baggage and express trucks from boats to trains and vice versa. The tractors have now been in operation for about a year and are said to have reduced the time as well as the man power required for the transfer between rail and water. Their operation is reported to be very economical.

The tractors have a tread narrower than the automobile standard, the new axles being made of the same length as those on the baggage trucks. The original rear axles were cut down so as not to project. The new rear axle is set ahead of the original and is driven by chain and sprocket on each end, thus permitting the use of the differential just as arranged for the standard car. The diameter of the front wheels is 14 in. and of the rear wheels 12 in., solid rubber tires being provided throughout. A large water tank was built in under the seat so that the total weight of the machine could be brought up to 1900 lb. This was considered necessary as at low tide considerable traction is required in draw-



TRACTOR FOR BAGGAGE, MAIL AND EXPRESS TRUCKS ing a string of loaded trucks up the inclined apron from the boat. The fuel tank was set on top of the water tank, arranged as a back rest for the operator.

The speedy transfer from boat to train is important at this point because it is the custom for the mail and express to be taken from the front end of the boat before the passengers are permitted to land. This makes possible transfer from the trucks into the trains while the passenger coaches are filling up, and thus trains can pull out quicker than if the trucks were not taken from the boat until the passengers were ashore. Making the passengers wait, however, did not gain popularity for the system, particularly when the baggage trucks had to be pulled up an incline, one at a time, in front of the waiting throng. Since the advent of the tractors the passengers are released much quicker as a tractor backs onto the boat immediately the apron is lowered and all of the trucks are coupled on and taken off in a single trip. The tractors are provided with a very convenient coupling device, as shown in the accompanying view, which automatically locks over the baggage truck handle when the latter is hastily thrust into place. The tractors were built in the shops of the Northwestern Pacific Railroad under the direction of J. K. Brassil, superintendent.

Some Facts About Monel Metal

IN A RECENT issue, London *Engineering* gives some valuable data regarding monel metal, for which many uses are now being found. Readers of the ELECTRIC RAILWAY JOURNAL will remember that one of the earliest electric railway uses was in the resistance strips connecting the armature windings and commutator bars in the single-phase railway motor. According to the *Engineering* article, the ore from which the metal is produced is mined at Sudbury, Canada, and it is called a "natural alloy" in that the proportions of the constituents are about the same in the refined alloy as in the original ore. Roughly, the composition is as follows: Nickel, 66 per cent, copper 29 per cent, manganese and iron, 3½ per cent, silicon from 0.1 to 1½ per cent. Traces of phosphorus, sulphur and aluminum are also present.

The tensile strength of the metal is about 80,000 lb. per square inch and the yield point about 40,000 lb. The strength of the metal is largely "natural" and does not depend much upon the physical treatment. The structure is a solid solution, and the rolled metal shows sharply defined crystal grains, usually twined. The cast material shows only the cord arrangements found in such alloys as German silver. The metal has been largely used on account of the strength which it possesses at high temperature.

According to a report presented to the Dover (England) Tramways Committee recently by Dick, Kerr & Company, the corporation tramways in that city are in bad shape. As a result of failure to provide proper allowance for maintenance the corporation is faced with the alternative of spending a considerable sum of money at a time when materials are very expensive or selling the whole equipment as scrap. In commenting on this situation the *Electrician* notes that the tramways have literally been starved as regards upkeep.

Chipping and Sand Blasting of Glass at Omaha

Cost of Chipping Is Reduced 85 Per cent—Sand Blasting Equipment Made In Shop

THE Omaha & Council Bluffs Street Railway, Omaha, Neb., uses chipped glass quite extensively in the various windows of some of its rolling stock. Like any other glass this is subject to constant breakage, and to replace at the market price would make quite an item of expense, as chipped glass costs about 40 cents per square foot.

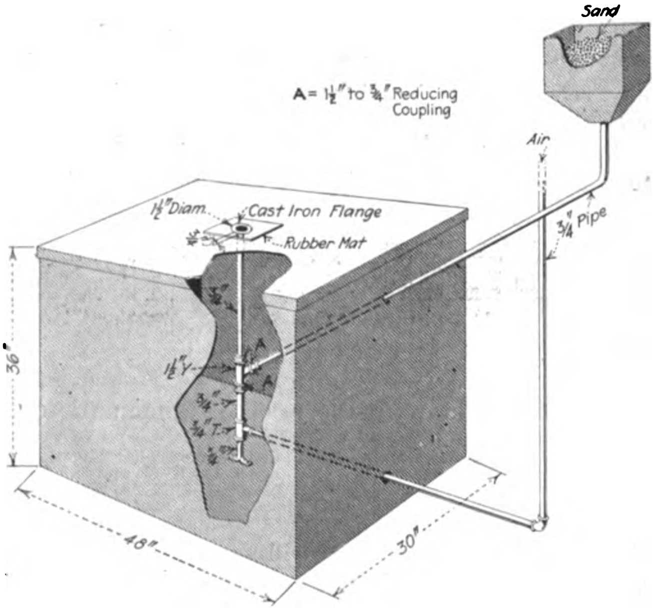


FIG. 1—SAND BLASTING EQUIPMENT MADE IN OMAHA SHOPS

As a matter of economy the company does all of its own glass chipping. The glass is cut entirely from scrap material, and the work is done during the winter months when there are not enough cars in the shop to keep the men busy. A piece of heavy brown paper is pasted around the edge to give a clear edge, and then the glass is covered with a coating of carpenters' glue. When the glue dries the glass chips off with it. This offers a salvage for all scrap glass, and costs about 6 cents a square foot for labor.

Instead of painting signs and instructions on the

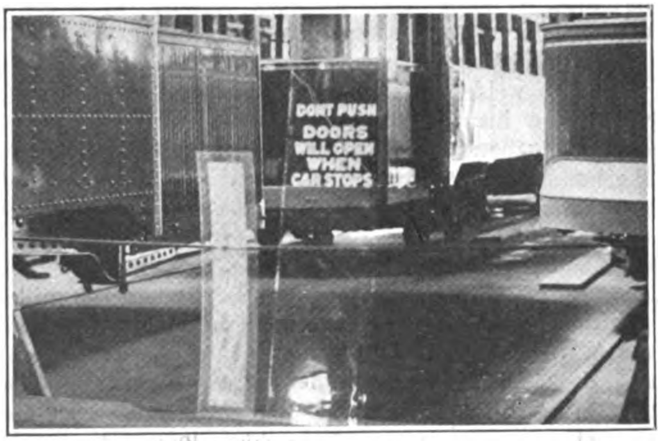


FIG. 2—SAMPLES OF GLASS SAND BLASTING AND CHIPPING DONE AT OMAHA

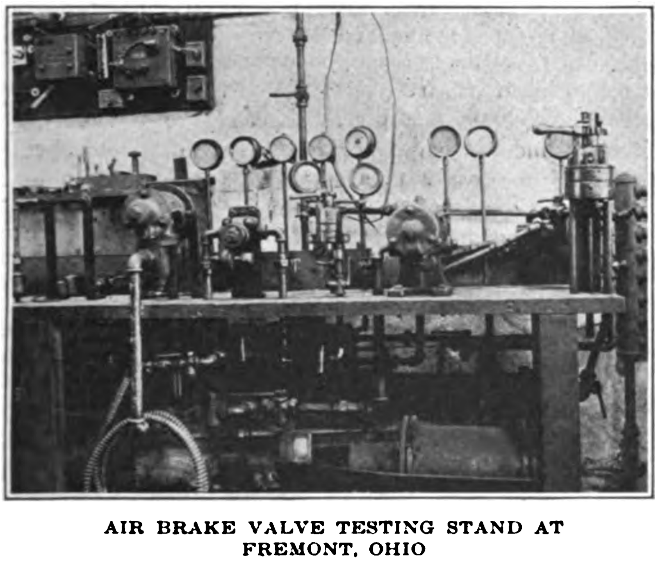
glass car doors and bulkhead windows, to be washed off in cleaning, the Omaha company sand blasts the words into the glass. Many fancy borders are also put on in this way. The lettering is put on by pasting heavy brown paper over the glass, using a templet and pounce bag, and cutting the letters out with a sharp knife. The glass is then ready for the sand blast.

The sand blaster shown in the accompanying sketch, Fig. 1, is a simple piece of equipment made in the railway shops at very slight expense. Sand feeds by gravity from a galvanized iron-box through a ¾-in. pipe into a 1½-in. V. Air entering through a ¾-in. pipe passes through a ¾-in. T to the 1½-in. Y, and forces the sand up through a ¾-in. nozzle pipe. A piece of ¾-in. pipe with the end sealed is screwed into the lower end of the T, and the pipe is split, forming a standard, which is screwed inside the bottom of a box 30 in. x 48 x 3 ft. high. The end of the ¾-in. nozzle pipe is ¾ in. below the lid of the box, and directly over the pipe is a hole 1½ in. in diameter. A square piece of rubber matting on the top of the lid serves as a cushion for the glass, and the edge of the hole is lined with a cast-iron flange.

The Omaha company not only does all of its own work, but also handles some commercial work for outside interests. A sample of both the sand blasting and the chipping is shown in Fig. 2.

Compact Testing Stand for Air-Brake Valves

RAILWAY companies using air brakes, particularly automatic air brakes, find it necessary to provide means for testing triple valves, feed valves, operating valves, etc., and various kinds of testing stands are in use. A compact stand, shown in the accompanying photograph, is used in the Fremont, Ohio, shops of the Lake Shore Electric Railway.



AIR BRAKE VALVE TESTING STAND AT FREMONT, OHIO

In this arrangement the air-brake cylinder and reservoir, with piping, are mounted under the table and the valves are placed at a height convenient for inspection and adjustment above it. Gages are tapped in at points necessary to show the condition of all parts of the equipment when the brake application is made.

LETTER TO THE EDITORS

The "Latest" in Arc Welding

ARC WELDING MACHINE COMPANY, INC.
NEW YORK, N. Y., DEC. 27, 1918.

To the Editors:

We have read your resumé of the report of subcommittee A on welding of the Association of Railway Electrical Engineers. This report undoubtedly represents standard practice of to-day. However, it does not by any means represent the LATEST practice, as the title of your abstract seems to indicate.

Several new developments in arc-welding equipment have been put on the market in the last few years, that are not even mentioned in this report, probably, because they have not come into any extensive use, although one of them has been used extensively in railway jobs.

I refer to the alternating-current welding transformer, the 35-volt generator with automatically regulated resistance in series with the arc, and the constant-current closed-circuit system. All of these systems eliminate the major portion of the power loss, which is the chief objection to the constant-potential system. Two of these systems provide automatic control of the current, and one of them gives voltage limitation. Therefore, no article under the head of "latest practice" would be complete, without including a description of these three systems.

O. A. KENYON, Chief Engineer.

Campaign for Public Works Construction

A GREAT building campaign, involving the construction of highways, public works of other character, homes and public utilities, is about to be undertaken by the government, largely for the purpose of making certain that employment will be found for demobilized soldiers. An organization to conduct the campaign is now being created in Washington, with headquarters at 16 Jackson Place, under the general supervision of Secretary Wilson of the Department of Labor, with the co-operation of the American Federation of Labor and other labor interests. The following slogan for the campaign has been adopted: "Build now for greater and better America. A billion for roads; two billions for public works; three billions for a million new American homes. What are you doing to help this campaign?"

The Department of Labor is sending the following message to wage earners throughout the country: "Use your influence with your city fathers, your selectmen and other town officers to start at once municipal and town improvement." Cities and towns are being urged to build school houses, engine houses, roads, canals and other improvements. To those who believe that the cost of building will be less in a few years from now than it is now, the Department of Labor is replying that "probably 95 per cent of the cost of a residence ultimately goes to labor whenever a home is built, so that the cost is almost immaterial to wage earners as a class." Secretary Baker of the War Department is also co-operating in the campaign, and has asked all the Governors of the States, to urge in their inaugural messages the immediate resumption of building of every character.

Recent Happenings in Great Britain

Reform from Within Speedily Carried Out Is the Plan for Settling Problems Fancied and Real

(From Our Regular Correspondent)

At the time of writing, Great Britain and Ireland face a general election (the first that has taken place for eight years). The Coalition party which will doubtless be returned to power has put forward a program of reform and reconstruction ambitious and far-reaching beyond all precedent. It is a British manifestation by way of ordered development of that new heaven and new earth idea which is a product of a great war and which in some other European countries is producing revolution and in some cases anarchy. There is a widespread feeling that if we are to escape revolution, drastic social and economic changes must be speedily brought about through the agency of the existing government institutions. The bulk of promised benefits is apparently to go to the working classes. All other people are called on to labor, not for their own advantage so much as for that of manual workers.

RAILWAY TRANSFORMATION PROMISED

Transportation is among the subjects in regard to which a transformation is promised. In the tremendous program which the leaders of the coalition have put forward, the subject of development of railways, tramways, road automobile transport and canals is given a prominent place. It has at length been borne in on British statesmen—albeit they admit the fact only tacitly—that the development of means of transport in this country has for years been smothered by legislative and municipal action. This is especially true as regards street tramways and interurban light railways. Expert committees appointed by the government have recently reported on the subject in unmistakable terms.

In the manifesto to the electors of the United Kingdom issued by the Coalition leaders, Lloyd George and Bonar Law, the following passage occurs:

HELP THE AGRICULTURIST

"A systematic improvement in the transport facilities of the agricultural areas must form an essential part of every scheme for the development of the resources of the soil, and the governments are preparing plans with a view to increasing these facilities on a large scale."

And again:

"By the development and control in the best interests of state, and the economical production of power and light of the railways and the means of communication . . . output will be increased, new markets opened out and great economies effected in industrial production."

Lloyd George, who, as the highly successful Prime Minister associated with the winning of the war, speaks with authority in this country, was a little more explicit in an address with which he opened the election campaign. As a collateral subject he spoke of the necessity for the development of a great electric power supply scheme for all purposes, but he insisted on the necessity for improved transportation for the revival of dead rural life and for the development of housing schemes in suburban and rural areas. "You must," he said, "have good services of tramways, light railways, lorries and whatever enables people and goods to pass along great spaces in order to make use of the surface" of the country. "The war has demonstrated that transportation is a service for which the state should accept direct responsibility . . . Unless this happens, the poorer neighborhoods will always suffer."

From all this it is clear that formidable changes lie ahead. The point on which practical men want information is where there is to be state ownership and operation of public utilities, or where there is simply to be state aid and facilities for development along with a certain amount of state co-ordination and control. For the sake of the country itself as well as for the sake of development of the industries concerned, it is to be hoped that the latter will be the alternative. In any event, it is quite clear that a whole host of obstructions to transportation development are likely to be swept away. The municipal as well as the Parliamentary deadhand should be removed. The latest development at the time of writing is a recommendation by a parliamentary committee in favor of unified ownership and management of chief railways either under the state or under a company.

JEALOUSY CROPS OUT

Fresh opportunities continue for the display of jealousy by the English municipal tramway element of all that concerns companies' interests in the matter of tramways. When months ago the Board of Trade appointed a tramways committee to settle priority of claims for materials and to see that under war scarcity conditions all tramways essential for war work should be operated to the fullest extent, the municipal element complained that it was not sufficiently represented on the committee and that the chairman of it was a company, not a municipal, man. An additional municipal representative was then added to the committee, which consists of tramway managers. Fuel has now been added to the old fire by the appointment of A. H. Pott to be visiting technical officer to the committee at a salary of £750 a year. The municipal grievance is that Mr. Pott has been "a company man," having been engineer and manager to the London United Tramways and the Metropolitan Electric Tramways. No doubt exists as to his qualifications for the post. Perhaps the municipal jealousy may be mollified by the reflection that as the war has come to an end the necessity for the existence of the tramways (Board of Trade) committee should disappear.

OTHER CHANGES IN PERSONNEL

The appointment of Mr. Pott is one in a series of linked changes which have recently been made in the management of some of the most important tramway systems in England. The great organization associated under the name of the Underground Electric Railways, London, has from time to time attracted to its service some of the most prominent municipal tramway managers in Britain. The latest transfer of the kind, which took place during the autumn, was that of C. J. Spencer, manager of Bradford Corporation Tramways, and honorary secretary of the Municipal Tramways Association. He entered the service of the London group without any public notification of the post which he was to fill. On the appointment of Mr. Pott to the tramways (Board of Trade) committee, referred to above, it was announced that Mr. Spencer was appointed manager of the Metropolitan Electric Tramways and the London United Tramways, both of which undertakings are controlled by the Underground Electric Railways, London. Mr. Spencer's place at Bradford was filled by the appointment of R. H. Wilkinson, tramway manager and engineer to the Huddersfield Corporation, while now it is announced that A. A. Blackburn, chief engineer and assistant to the manager of the Belfast Corporation Tramways, takes the place of Mr. Wilkinson at Huddersfield.

Some importance to tramway and electric railway undertakings attaches to a report by the Advisory Council of the Ministry of Reconstruction on the standardization of railway equipment. Among other things, the Council proposes that the standardization of wheels, axles, wheel centers, tires, running gear, draw gear, buffing gear, bogies, brakes and underframes should be dealt with immediately by the engineering standards committee. That committee has done valuable work for a number of years in bringing about standardization in engineering industrial products.

COMMITTEE ON PRODUCTION A MISNOMER

That official body with the misleading name, the committee on production, issued in the end of November an award on a further demand by British tramway employees for increases of wages to meet the still advancing cost of living. Some of the claims are not allowed, but for adult men and also for women who are doing the work of men pay is increased to 30s. per week above pre-war rates. Thus the financial position of many tramway undertakings becomes more and more difficult.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Mopping Up

New York Putting the Finishing Touches to Its $300,000,000 of New Rapid Transit Lines

A review by the Public Service Commission for the First District of New York of the progress made in 1918 of the rapid transit work under the dual system shows that about 75 per cent of the work is finished, and the promise is made that nearly all of the remaining 25 per cent will be ready for the operation of trains before the end of 1919.

CITY ADMINISTRATION MUST HELP

Emphasis is laid on the fact that it will not be possible to keep this promise unless there is cordial and prompt co-operation between the commission and the Board of Estimate of the city of New York not only in relation to the work yet to be contracted for, but as to the work now under way and for which appropriations are needed.

There are 341 track-miles in the entire system, and not more than 35 track-miles, or thereabout, will remain uncompleted twelve months hence. Within a few months after New Year's Day in 1920 trains will be operating over the entire stretch of this rapid transit highway, and plans for the extension of the system will be ready for consideration.

These new plans are known to include:

1. The extension of the Queensboro subway from Times Square, its present Manhattan terminus, west to the Hudson River.
2. A subway in Eighth Avenue extending south to the Battery and north to the northern edge of the Bronx.
3. The extension of the Broadway subway from Fifty-ninth Street, where it will turn east and go to Queens via tunnel at the foot of Sixtieth Street, direct north under Eighth Avenue to the Bronx.
4. A moving platform from Times Square to the Grand Central Station instead of the present shuttle, with exits and entrances at all intersections.

FEW UNAWARDED CONTRACTS

The contracts still to be let for the completion of the dual system provide for the construction of the elevated part of the Fourteenth Street-Eastern line in Williamsburg, the extension of the steel work on Westchester Avenue east of the Bronx River on the Pelham Bay Park line, the extension of the Queensboro subway from Park Avenue to Times Square, and for the Nassau Street subway connecting the Centre Street loop in the Municipal Building with the Whitehall Street-Montague tunnel to Brooklyn.

These contracts will be ready to let early in 1919 as well as other contracts for track installation, station finish and the odds and ends to make the work complete. Other important work to be done will be the acquisition of real estate for storage yards for the Pelham Bay Park line, the Corona Elevated line and the Livonia Avenue branch of the Eastern Parkway line in Brooklyn. The time of trouble in getting steel to carry on the work is past, the commission believes, and the hope is expressed that from now until the end there will be plenty of men and material and plenty of money, too, if the Board of Estimate will lend a helping hand.

Contracts already made by the commission for the city-owned lines of the dual system aggregate approximately $208,000,000. The operating companies, exclusive of real estate, have spent about $102,000,000 for equipping these and company-owned lines.

Arbitrators Will Fix Wreck Costs

Whether the Brooklyn (N. Y.) Rapid Transit Company shall charge to operating expenses the costs growing out of the Malbone Street tunnel accident on Nov. 1 is to be decided by a board of arbitration consisting of Louis Marshall of the law firm of Guggenheimer, Untermyer & Marshall, who was named by the Public Service Commission, ex-Secretary of War Lindley M. Garrison of the law firm of Hornblower, Garrison, Miller & Potter, who was chosen by the company, and ex-Justice Charles E. Hughes, who was named by Chief Judge Frank H. Hiscock of the Court of Appeals, because the company and the commission could not agree upon the third member.

Under the dual contracts between the company and the city the latter is entitled to a share of the receipts after operating expenses are met. If all the expenses of the accident were charged against operating expenses the result would be that the city would be paying at least half of the costs of the accident. It was also provided in the contract that any disagreement concerning charges should be determined by arbitration.

The commission has notified the members of the Board of Estimate that arbitration proceedings are under way, so that care can be taken to keep any expenditures due to the accident out of the accounts showing the city's interest on investment or its share in receipts.

Labor Reports

Supply and Demand Seem to Be Pretty Well Equalized in Most of the Country

The statement as to labor conditions throughout the country made up from the weekly reports obtained by the Department of Labor by telegraph from local representatives of the United States Employment Service shows that in Portland, Me., the indications are that supply and demand are equal. In Boston, Lynn and Worcester, Mass., there have been slight decreases from firms reporting, caused by the laying off of men. The rest of the State shows supply and demand equal. Reports from Providence indicate a reduction in employees, with supply and demand equal. Connecticut, according to reports received, is the only state in New England that shows any marked surplus.

In New York Buffalo appears to be the only city in the State reporting a large surplus.

In New Jersey a shortage is indicated by most of the cities reporting, with a marked reduction in Newark.

No surpluses are indicated in Pennsylvania. Throughout that State the principal shortages indicated are found among electricians, laborers, machinists, railroad workers and blacksmiths.

Heavy unemployment is indicated in reports from Cleveland and Dayton.

In Illinois supply and demand are now reported to be about equal. Especially is this true of Chicago. Throughout the State there appear to be shortages in labor, railroad workers, and agriculture. Detroit, Mich., reports a large surplus, probably caused by holiday lay-offs and inventory. A small laying-off of men in Minneapolis and St. Paul is reported. Reports from Duluth indicate a slight increase.

Atlanta, Baltimore, Norfolk continue to show shortages. Shortages in Georgia are indicated in carpenters, laborers and textile workers, with a heavy shortage in Maryland of coal miners and laborers. Nashville reports a surplus of 2000. In New Orleans supply and demand are about equal.

Salt Lake City still indicates a surplus, though slight, with a shortage from Little Rock. Kansas City reports a slight lay-off, St. Louis a slightly increased lay-off.

San Francisco indicates a surplus of 7500 as against 7000 in a previous report. The Oakland surplus is still given as 2500. In Los Angeles supply still equals demand. There is a shortage in Seattle, but supply and demand are about equal in Portland, Ore.

Revenue Bill Provisions

Some Provisions of Measure Regarded as Working Further Hardship on Public Utility Companies

The revenue bill has passed the Senate and is now before the conference committees of Congress. Two sections of the bill are of particular importance to public utility companies.

One of these is Section 240. It deals with the consolidated returns of public utility companies, and was amended by the Senate. The Washington representative of the Electric Railway Journal reports that public utility men who have recently visited Washington from various sections of the country hope that the Senate amendment in respect to consolidated returns will be acquiesced in by the House conferees. These representatives of the utilities express the opinion that the Senate amendment gives an apparent equity and convenience to holding companies whose properties are widely scattered and are operated under varying conditions of public regulation.

Bill Unduly Burdensome

The other section of the bill of interest to public utilities is that embodied in Senate Amendment 488. Public utility men recently in Washington in this instance, however, regard this amendment as imposing an undue burden upon public utility companies for the reason that during the war a great shrinkage occurred in the real value of public utility stocks. As the bill was passed by the Senate, the basis of computing for capital stock tax was made "the net assets shown by the books," instead of "the fair average value of the capital stock for the preceding year." In connection with this measure representatives of the utilities point out that during and since the war, in connection with the great shrinkage in the real value of their stock, dividends have been suspended in order that funds might be made available for the carrying out of the numerous requirements for extensions and betterments of service as demanded by public authorities and by the government's needs in the prosecution of the war.

It is stated, therefore, that the book assets of the companies do not represent an equitable measure of taxable value and that the use of such a basis would constitute a gross injustice to the industry, which has been burdened more than any other during the war because of its inability automatically to increase its rates sufficiently to absorb the enormous advances in the cost of materials, fuel and labor, all of which have been adjusted upwards through agencies of the federal government.

It is regarded as of the utmost importance that the section as changed by Senate Amendment 488 should not be approved by the House conferees and that the former basis of computing the tax from "the fair average value of the capital stock for the preceding year," should be reinstated.

The language of the two sections of the bill in question is as follows:

CONSOLIDATED RETURNS, SECTION 240

(a) That corporations which are affiliated within the meaning of this section shall, under regulations to be prescribed by the Commissioner with the approval of the Secretary, make a consolidated return of net income and invested capital for the purposes of this title and Title III, and the taxes thereunder shall be computed and determined upon the basis of such return.

In any case in which a tax is assessed upon the basis of a consolidated return the total tax shall be computed in the first instance as a unit and shall then be assessed upon the respective affiliated corporations in such proportions as may be agreed upon among them, or, in the absence of any such agreement, then the basis of the net income and invested capital properly assignable to each. There shall be allowed in computing the income tax only one specific credit of $2,000 (as provided in section 311) only one specific exemption of $3,000; and in computing the excess profits credit (as provided in section 312) only one specific exemption of $3,000.

(b) For the purpose of this section, two or more corporations engaged in the same or related business shall be deemed to be affiliated—

(1) If one corporation owns directly or controls through closely affiliated interests or by a nominee or nominees substantially all the stock of two or more corporations is owned or controlled by the same interests, or if one such corporation buys from or sells to another products or services at prices above or below the current market, thus effecting an artificial distribution of profits, or in any way so arranges its financial relationships with another corporation as to assign to it a disproportionate share of net income or invested capital.

(2) A foreign corporation shall not be deemed to be affiliated with a domestic corporation unless a majority of the voting stock is owned or controlled by such domestic corporation or a resident taxpayer or group of resident taxpayers or by such domestic corporation and a resident taxpayer or group of resident taxpayers closely affiliated with the management of said domestic corporation. Where under this subdivision a foreign corporation is affiliated with a domestic corporation, the total tax (computed as a unit as above provided) shall be reduced by the credit authorized in section 238.

TITLE X.—SPECIAL TAXES, SECTION 1000

(a) That on and after July 1, 1918, in lieu of the tax imposed by the first subdivision of section 407 of the Revenue Act of 1916:

(1) Every domestic corporation shall pay annually a special excise tax with respect to carrying on or doing business, equivalent to $1 for each $1,000 of the excess over $5,000 of the amount of its net assets shown by its books as of the close of the preceding annual period used by the corporation for purposes of making its income tax return; but if the corporation made no such return, then of the excess over $5,000 of the amount of its net assets shown by its books as of the 30th day of June preceding. * * *

War Board Challenged

The National War Labor Board on Dec. 30 began an inquiry into hours and conditions of labor on the Third Avenue Railway, New York.

On behalf of the employees, application was made to the board for a recommendation that employees alleged to have been discharged during the present year for belonging to a union should be reinstated and paid for the interval during which they were without employment. The board was also asked to rule that the company, which has employed women in recent months, should take back into its employ all men employees who wish to go back into the service. Higher wages and shorter hours were also asked for.

The company was not represented by counsel at the hearing, but a memorandum was submitted on its behalf, denying the authority of the War Labor Board, as follows:

> Neither the federal government nor any federal agency has power or authority to regulate, interfere with, or in any way control the operation of a street surface railway located wholly within a state. The decisions of your board relative to labor employed by such a street surface railway must necessarily affect the operating expenses of such railway, and yet the power to increase or regulate the rates of fare of such railway is vested only in the state.
>
> Any federal legislation, act, or proclamation purporting to give to your board power to pass upon, or control in any way, matters relative to labor employed by a street surface railway, or otherwise to regulate the expenditure and operation of a street surface railway, is confiscatory and unconstitutional, in that neither the federal government nor any federal agency has the power to afford to such street railway corporation any necessary increase in rates or revenues to enable it to carry out any decision of the War Labor Board requiring, or which may result in, additional or increased expenditures by such street surface railway.

Improving Short Line

Eighteen-Mile Massachusetts Road Being Completely Equipped for Trolley Operation

Plans for further development of the Grafton & Upton Railroad are under way. The company operates a standard-gage railroad about 18 miles long, running from Milford, Mass., through Hopedale, Upton, West Upton and New England Village to North Grafton, where it connects with the main line of the Boston & Albany Railroad about 6 miles east of Worcester.

The passenger service on this road has been operated by the Milford & Uxbridge Street Railway for about sixteen years, the street railway cars using the railroad track between centers of towns, with detours into the streets and village centers at each place above named.

The railroad right-of-way is now being completely equipped with overhead trolley construction (in addition to the sections hitherto used by the Milford & Uxbridge cars) and the company has purchased two 30-ton General Electric locomotives for handling freight over the line at night. One additional electric locomotive may be purchased later if the traffic conditions warrant. Two steam locomotives are owned by the road.

The electric freight service has not yet been started, but the indications are that this will be done during the present winter, or in the early spring at the latest. H. A. Billings, the Draper Company, Hopedale, Mass., is in charge of the operation of the Grafton & Upton line. At North Grafton there is a crossing of the Worcester Consolidated Street Railway. Power is purchased from the Milford & Uxbridge Street Railway.

New York Commissioners Resign

Charles Bulkley Hubbell, chairman, and Samuel H. Ordway, resigned on Dec. 31 as members of the Public Service Commission for the First District of New York. Mr. Hubbell addressed his resignation to Governor Whitman, while Commissioner Ordway wrote to Governor-elect Alfred E. Smith. The term of office for which Chairman Hubbell was appointed would have expired on Feb. 1, 1919, and that of Commissioner Ordway on Jan. 20.

In his letter of resignation Mr. Hubbell recalled Mr. Smith's declarations regarding the reorganization of the Public Service Commission, and said that he wished to resign so as to give the Governor-elect a free hand immediately after he takes office.

Commissioner Ordway explained in his letter to Mr. Smith that he had not sought the office of Public Service Commissioner and had accepted it with reluctance. His appointment was made during a recess of the Senate and has never been confirmed.

News Notes

War Labor Board to Visit Cincinnati.—On Jan. 6 examiners of the War Labor Board will visit Cincinnati to inquire into the scale of wages paid to employees of the Cincinnati Traction Company, other than platform men. The schedule provides for a minimum wage of 42½ cents an hour.

Wage Increase in Youngstown.—The Mahoning & Shenango Railway & Light Company granted the men a substantial increase in wages. A new agreement has also been signed. The men will be advanced from 34 cents to 48 cents an hour. More than 500 men are affected.

New Member Iowa Conciliation Board.—C. F. Harrington, Sioux City, Iowa, banker, has been named to the vacant place on the Iowa Conciliation Board. His selection was agreed upon by the Iowa League of Municipalities and the public utilities organization. Mr. Harrington takes the place of J. H. Ingwerson, who has moved from the State.

Ottumwa Strike Settled.—The strike of employees of the Ottumwa Railway & Light Company, Ottumwa, Iowa, was only of forty-eight hours' duration and was ended by the members of the City Council agreeing to grant the 6-cent fare which was asked by the company in order to increase the wages of the employees. The fare increase is for the period until peace is declared.

I. C. C. Rate Authority to Stand.—Authority of the Interstate Commerce Commission will stand regardless of federal control of the railroads. In a far-reaching decision, the commission has made clear its authority to act, and also determine the status of all cases now before it as well as the validity of decisions rendered before the government took control of the roads.

Hearing on Women Again Changed.—The hearing involving the employment of women on the lines of the Detroit (Mich.) United Railway set for Chicago on Jan. 4 instead of at Washington has again been changed by the War Labor Board and it is understood that the Chicago date has been cancelled and that the hearing will probably be in Washington at a date yet to be determined.

Receiver Satisfies Pittsburgh Men.—Charles A. Fagan, receiver for the Pittsburgh (Pa.) Railways, on Dec. 18 following a conference with union officials, ordered the reinstatement of a carman discharged for refusing to take out an unheated car, and announced that within five days heaters would be installed in the vestibules of all the cars, as provided for in the agreement between the receivers and the employees.

Toronto Fine Sustained.—The judgment of the Ontario Railway & Municipal Board, imposing a fine of $24,000 on the Toronto (Ont.) Railway, as a penalty, at the rate of $1,000 a day, for delay in putting 100 new cars into service, has been confirmed by the Provincial Appellate Court. The company disputed the authority of the Ontario Railway & Municipal Board to impose such a fine. The board was sustained.

Association of Oklahoma Operators.—The Oklahoma Utilities Corporation is the official designation of the union of all public utilities in Oklahoma, including city electric railways, interurban companies, etc. The purpose is to bring into closer touch and co-operation the managers of all such companies and to make for uniform service and regulations throughout the State. Headquarters will be maintained in Oklahoma City.

Labor Department Organizes New Divisions.—Secretary W. B. Wilson of the Labor Department announces the establishment of three new divisions as follows: Division of industrial hygiene and medicine, to develop standards of sanitation and medical practice in industries; division of labor administration, to advise employers as to employment systems and labor management policies; and division of safety engineering, to develop standards and practices for accident prevention.

Wants to Void Occupation Tax.—The Omaha & Council Bluffs Street Railway, Omaha, Neb., has asked the District Court to declare void the occupation tax, under which it pays the city of Omaha between $75,000 and $100,000 a year. The petition was filed in connection with a motion to vacate an injunction obtained by the city against the company in which Mayor Smith sought to have the courts order the company to restore service while the recent strike was in effect.

More Politics.—As a result of the blow aimed at the Public Service Commission for the First District of New York by the Board of Estimate on Dec. 30 almost the entire inspectional force on subway construction had to be cut off. Other employees vital to the pushing of the new subways had to be released. It is probable that the Legislature will be asked to appoint a special committee to investigate the way in which the work of the commission has been hampered.

Up to the Incoming Council.—The City Council of London, Ont., at its final meeting of 1918, rejected a resolution to cancel the franchise, of the London Street Railway and eject it from the streets. It was alleged that the company had refused to comply with the city's time and speed requirements, and that it had defied the Council's order for the collection of a fine of $10 a day for delay. The outgoing Council, however, indorsed the spirit of the resolution and recommended that action be taken at the first meeting of the Council of 1919.

Council Opposes New Depot Ordinance.—A resolution was adopted on Dec. 23 by the City Council of Cleveland, Ohio, opposing the proposed union depot ordinance, initiated by the officers of the Cleveland Union Terminals Company, to be voted upon at an election on Jan. 6. The resolution is intended as a recommendation to voters to defeat the ordinance, in the belief that the company will then propose another grant that will be more satisfactory to the Council and the engineers and organizations which have criticised the proposal.

Co-operative Store Idea Abandoned.—Groceries and canned goods of the New York (N. Y.) Railways valued at $150,000, are being offered at auction. The sale marks the last step in the dissolution of the chain of co-operative stores which the Interborough and the New York Railways Company established to lower the cost of living for their employees. The stores were given up by the companies for lack of patronage on the part of the employees, for whose exclusive use they were opened several years ago. The salaries of grocery clerks and butchers and the upkeep of the stores were paid by the companies so that the goods could be sold strictly at cost without figuring in overhead expenses.

Program of Meeting

Illinois Electric Railway Association

The annual meeting of the Illinois Electric Railway Association will be held in Chicago on Jan. 17. It is expected that P. H. Gadsden, chairman of the committee on readjustment of the American Electric Railway Association, will address the association.

Financial and Corporate

B. R. T. in Receiver's Hands

Lindley M. Garrison Called Upon by Court to Administer Affairs of Sorely Beset Railway

Judge Julius M. Mayer of the United States District Court at New York, after the close of business on Dec. 31, made an order appointing Ex-Secretary of War Lindley M. Garrison temporary receiver of the Brooklyn Rapid Transit Railroad Company, the New York Municipal Railroad Corporation, and the New York Consolidated Railroad Corporation, these two being subsidiaries of the Brooklyn Rapid Transit Company. The order was made upon the application of the Westinghouse Electric & Manufacturing Company, a creditor, for material furnished. The companies did not oppose the action, for they felt that they would be subserved by a temporary receivership.

Many Millions Needed

The immediate requirements were for meeting on Jan. 1 obligations for about $2,000,000, and this could have been obtained, but to complete the construction and equipment work now under contract and to provide for additional expenditures for similar purposes during the coming year will require the raising of many millions more, and the general situation affecting street railroads, with their stationary fares and rising costs, had injured their credit and made impossible up to the present time provision for the investment of fresh capital.

Col. Timothy S. Williams, president of the Brooklyn Rapid Transit Company, made a statement in which he said in part:

"Every possible effort to provide for these construction and equipment needs, including informal applications to the War Finance Corporation, had been taken by the directors, but without substantial results, and it seems wise to face the issue now with the hope that general knowledge and appreciation of the necessities would suggest a way for their solution.

Company Handicapped by City

"The company has been greatly handicapped by the delay of the city in completing its subways. These should have been mostly in operation two years ago.

"The essential parts of them are still under construction. In the meantime a large part of our $60,000,000 investment is unproductive, and existing and completed parts of the system cannot be effectively or profitably operated.

"In addition to this handicap the high cost of labor and materials and the other hardships, caused by the war, have largely reduced the net earnings. The effort on the part of the company to restore rates of fare authorized by their franchises or to get the right to charge fares sufficient to meet the cost of service, has thus far failed.

"It is greatly to the advantage of the property that the court has appointed as receiver a man of executive and of administrative ability, ex-Secretary of War Garrison."

Mr. Garrison, the receiver, was in Washington on Jan. 1 but he denied his visit was for the purpose of seeking further government aid.

W. F. C. Advanced $17,320,500

On June 20 last the directors of the War Finance Corporation decided, upon certain conditions, to make a direct advance of not exceeding $17,320,500 to the Brooklyn Rapid Transit Company for the purpose of enabling the company in part to meet the $57,735,000 face amount of its six-year 5 per cent secured gold notes, maturing on July 1, 1918. For this advance the War Finance Corporation was to receive new three-year 7 per cent secured gold notes of the Brooklyn Rapid Transit Company at par. The War Finance Corporation at that time was willing, on the consummation of the plan then presented for the extension of the maturing notes of the Brooklyn Rapid Transit Company, to make advances in proper cases to banks, bankers, and trust companies, as provided in Section 7 of the War Finance Corporation act, upon the new three-year 7 per cent secured gold notes of the company.

Wants City Representation

Corporation Counsel William P. Burr after reading certain comments on the matter said the situation was too complicated for observations that were only intended to be smart. It was Mr. Burr's judgment that it would be to the advantage of all concerned that the city have representation in the management of the affairs of the company by the appointment of a co-receiver to be named by the city and appointed by the court.

The security holders were quick to organize. A committee headed by Albert H. Wiggin is calling for deposit of stock. The Central Union Trust Company, Kuhn, Loeb & Company and Kidder, Peabody & Company are asking for the deposit of the three-year 7 per cent secured gold notes and the six-year 5 per cent secured gold notes of the Brooklyn Rapid Transit Company and the first mortgage 5 per cent sinking fund gold bonds, series A, due on Jan. 1, 1966, of the New York Municipal Railway Corporation.

New Angles at Columbus

Stockholders' Protective Committee Confers with Management About Settlement of Problems

The stockholders' protective committee of the Columbus Railway, Power & Light Company, Columbus, Ohio, conferred with Norman McD. Crawford, vice-president, on Dec. 27 relative to certain demands which have been made by the members. Chairman Emil Keiswetter afterward stated that conferences so far held had not resulted in much progress. It is said that the committee will insist that the control and responsibility of operation be localized. The committee asks to be represented at the annual meeting on Jan. 28 by three out of the five members of the proxy committee.

Clarence M. Clark, vice-president of the company, conferred with the committee on Dec. 23 and 24. At that time both Mr. Clark and the committee felt that progress had been made toward an understanding. Mr. Clark expressed the belief, however, that the organization of a stockholders' protective committee was ill-advised.

Conclusions of Report Criticised

Both Mr. Clark and Mr. Crawford criticised the conclusions and estimates that E. W. Bemis has drawn from the figures presented in his report. No one, they said, could make an estimate of what the results would have been during September and October, 1918, had the old rate of fare been used. The figures given in the report, they say, bear out the company's claim as to losing money. Mr. Crawford said that, on June 30, before the change in fare had been made, the railway department had $241,584 with which to meet interest charges and depreciation on its proportion of the company's investment, after paying all operating expenses and taxes. The interest charges alone would have been about $210,000, he said, leaving $31,000 to meet depreciation charges of about $333,000. The railway department, therefore, fell short more than $300,000 in six months.

On Dec. 24, an owner of ten shares of stock filed a petition in Common Pleas Court in which the appointment of a receiver was asked. The petition alleged that the repudiation of the old rate of fare of eight tickets for a quarter had damaged the company's securities.

Suit Not Serious

H. W. Clapp, general manager of the company, said on Dec. 30 that this suit was brought by an attorney, representing a number of small stockholders, in order to fix their status in the matter. It did not represent an action by minority stockholders, and there was nothing serious about it. The court, he said, is not likely to take any action on it soon, if at all.

On the same day C. M. Clark, representing the Clark Management Company, and the stockholders' protective committee held another conference.

Fare Increases Show Results

Forty-Three Per Cent of Companies Reporting for September Have Raised Their Rates

The tables just made public by the information bureau of the American Electric Railway Association show the revenues and expenses of electric railways operating over 5000 miles in the United States, for the nine months ending Sept. 30, 1918, as compared with the nine months ending Sept. 30, 1917, and for the month of September, 1918, as compared to September, 1917.

The latter table is particularly interesting as reflecting in some measure the effect of fare increases granted throughout the country. Of the roads, whose statistics are included in this table, nearly 43 per cent have increased their fares since September, 1917. The result is shown in the lowest percentage decrease in net earnings recorded since August, 1917. Fifty-one per cent of the roads reporting in the Eastern District have received increases, and 33 per cent, in both the Southern and Western Districts.

The result is reflected in the figures, the Eastern district showing an actual percentage gain in net earnings, as against a loss in both of the other districts. That the situation is by no means taken care of by the increases already granted, however, is indicated from the operating ratio for the month which is 68.08 per cent for 1918, as against 64 per cent for 1917.

The operating ratio as shown in the table covering nine months operation, is also discouraging, being 67.20 for 1918 as against 63.32 for 1917, an increase of nearly 4 per cent. The operating ratio for the first nine months of 1916 was 60.96 per cent, so that in two years there has been an actual increase of nearly 7 per cent.

A drop in net earnings of 4.26 per cent for the nine months period is shown, with the Western companies showing the largest loss, 8.36 per cent; the Eastern companies 3.10 per cent and the Southern companies 2.59 per cent. The Western showing is further aggravated by the fact that a strike lasting during the first six months of 1917 took place on one of the largest Western properties, and kept earnings down and expenses up during that period.

That there is nearly twice the percentage increase in operating expenses as compared to operating revenues is the outstanding fact of the table for the nine-month period. This holds true in all districts and both with com-

COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS SEPTEMBER, 1918 AND 1917

Account	United States				Eastern District				Southern District				Western District			
		Per Mile of Line				Per Mile of Line				Per Mile of Line				Per Mile of Line		
	Amount, September 1918	1918	1917	% Increase Over 1917	Amount, September 1918	1918	1917	% Increase Over 1917	Amount, September 1918	1918	1917	% Increase Over 1917	Amount, September 1918	1918	1917	% Increase Over 1917
Operating revenues	$11,786,768	$2,234	$2,003	11.53	$7,944,601	$2,298	$2,038	12.76	$1,238,860	$1,760	$1,623	8.81	$2,603,307	$2,332	$2,117	10.16
Operating expenses	8,024,487	1,521	1,282	18.64	5,382,908	1,557	1,318	18.13	819,929	1,169	934	25.16	1,821,650	1,632	1,376	18.60
Net earnings	3,762,281	713	721	†1.11	2,561,698	741	720	2.92	418,931	597	689	†13.35	781,657	700	741	†5.53
Operating ratio, per cent	1918, 68.08; 1917, 64.00				1918, 67.75; 1917, 64.67				1918, 66.19; 1917, 57.55				1918, 69.98; 1917, 65.00			
Av. No. miles of line	1918, 5,275; 1917, 5,192				1918, 3,458; 1917, 3,446				1918, 701; 1917, 648				1918, 1,116; 1917, 1,098			

COMPANIES REPORTING TAXES

Operating revenues	$7,726,357	$2,204	$1,964	12.22	$4,673,232	$2,102	$1,868	12.53	$481,79[illegible]	$2,18[illegible]	$1,828	19.53	$2,571,332	$2,42[illegible]	$2,196	10.29
Operating expenses	5,467,565	1,560	1,318	18.37	3,360,161	1,512	1,299	16.40	311,684	1,414	1,011	39.86	1,795,720	1,692	1,424	18.82
Net earnings	2,258,792	644	646	†0.31	1,313,071	590	5 69	3.69	170,109	771	817	†5.63	775,612	730	772	†5.44
Taxes	431,345	123	124	†0.81	244,493	110	113	†2.65	38,286	174	154	12.99	148,563	140	140	
Operating income	1,827,447	521	522	†0.19	1,068,575	480	456	5.26	131,823	597	663	†9.95	627,649	590	632	†6.65
Operating ratio, per cent	1918, 70.78; 1917, 67.11				1918, 71.93; 1917, 69.54				1918, 64.71; 1917, 55.31				1918, 69.86; 1917, 64.85			
Av. No. miles of line	1918, 3,505; 1917, 3,473				1918, 2,223; 1917, 2,212				1918, 221; 1917, 217				1918, 1,061; 1917, 1,044			

†Indicates decrease.

COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR NINE MONTHS, JANUARY-SEPTEMBER, 1918 AND 1917

Account	United States				Eastern District				Southern District				Western District			
	Amount, January-September, 1918	Per Mile of Line			Amount, January-September, 1918	Per Mile of Line			Amount, January-September, 1918	Per Mile of Line			Amount, January-September, 1918	Per Mile of Line		
		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917
Operating revenues	$97,697,830	$18,844	$17,600	7.07	$65,816,918	$19,547	$18,291	6.87	$10,018,751	$14,286	$13,153	8.61	$21,862,161	$19,586	$18,113	8.13
Operating expenses	65,657,286	12,664	11,145	13.63	43,893,296	13,036	11,572	12.65	6,226,296	8,878	7,601	16.80	15,537,694	13,920	11,930	16.68
Net earnings	32,040,544	6,180	6,455	†4.26	21,923,622	6,511	6,719	†3.10	3,792,455	5,408	5,552	†2.59	6,324,467	5,666	6,183	†8.36
Operating ratio, per cent	1918, 67.20; 1917, 63.32				1918, 66.69; 1917, 63.27				1918, 62.14; 1917, 57.79				1918, 71.07; 1917, 65.86			
Av. No. miles of line.	1918, 5,184; 1917, 5,101				1918, 3,367; 1917, 3,355				1918, 701; 1917, 648				1918, 1,116; 1917, 1,098			

COMPANIES REPORTING TAXES

Operating revenues	$63,374,872	$18,560	$17,264	7.51	$38,025,382	$17,831	$16,761	6.38	$3,745,507	$16,986	$14,742	15.22	$21,603,983	$20,352	$18,810	8.20
Operating expenses	45,556,188	13,342	11,613	14.89	27,962,833	13,112	11,598	13.05	2,286,466	10,369	8,169	26.93	15,306,889	14,420	12,357	16.69
Net earnings	17,818,684	5,218	5,651	†7.66	10,062,549	4,719	5,163	†8.60	1,459,041	6,617	6,573	0.67	6,297,094	5,932	6,453	†8.07
Taxes	4,447,243	1,302	1,181	10.25	2,626,056	1,231	1,148	7.23	308,880	1,401	1,318	6.30	1,512,307	1,425	1,220	16.80
Operating income	13,371,441	3,916	4,470	†12.39	7,436,493	3,488	4,015	†13.13	1,150,161	5,216	5,255	†0.74	4,784,787	4,507	5,233	†13.87
Operating ratio, per cent	1918, 71.89; 1917, 67.27				1918, 73.53; 1917, 69.20				1918, 61.04; 1917, 55.41				1918, 70.85; 1917, 65.69			
Av. No. miles of line	1918, 3,415; 1917, 3,383				1918, 2,133; 1917, 2,122				1918, 220; 1917, 217				1918, 1,062; 1917, 1,044			

† Indicates decrease.

panies reporting taxes and those which do not. It is modified somewhat in the September tables, where fare increases have evidently helped out the revenues of the companies.

The returns from the city and interurban electric railway companies, as shown in detail in the tables on page 69. have been classified acocrding to the following geographical grouping: Eastern District—East of the Mississippi River and north of the Ohio River. Southern District—South of the Ohio River and east of the Mississi River. Western District—West of the Mississippi River.

$116,785,500 in Maturities

Nearly Half Grand Total of $261,887,600 Utility Maturities in 1919 Fall to Electric Railways

Public utility securities maturing during 1919 aggregate $261,887,600, compared with $210,500,000 in 1918, according to the *Wall Street Journal*. Owing to conditions arising from the war public utility companies found it difficult during the last three years to sell long-term bonds at normal rates of interest, so that the short-term method was employed in many cases to tide over the tight money market. Since the armistice was signed, however, market conditions have improved considerably. Therefore, in the coming year, according to the *Journal*, there should be a gradual shift from the practice of short-term financing to the long-term bond method. Below is given in detail, as compiled by Dow, Jones & Company. the various electric railway issues of more than $200,000 maturing in 1919, in order of their due dates.

January

East St. Louis & Sub. Co. conv	6	$2,094,000
Interboro Cons. bank loan	5	700,000
Chattanooga Elec. Ry. 1st	5	625,000
Pensacola Elec. 3-yr. notes	6	500,000
Knoxville Ry. & Lt. 2-yr. notes	6	400,000
Seashore Elec. Ry. 1st ext	6	200,000
General Gas & Elec. notes	6	200,000
Winnipeg Elec. 2-yr. notes	6	750,000
Twin State Gas & El. 1-yr. nts	6	300,000
Total		$5,769,000

February

American Rys. Co. 3-yr. notes	5	1,672,000
Eighth Ave. R.R. ctfs. of debt	6	750,000
Connecticut Co. provis'l deb	5	250,000
Zanesville Electric Ry. 1st	4	250,000
Washington Water Pow. notes	6	2,600,000
Total		$5,522,000

March

Public Serv. of N. J. 3-yr. notes	5	$7,500,000
Union Ry. Gas & El. 3-yr. notes	5	3,000,000
Fort Wayne & N. Ind. tr. notes	6	1,164,000
Jacksonville Trac'n 2-yr. notes	6	750,000
Am. Public Service cv. notes	6	500,000
Total		$12,914,000

April

Montreal Tram & P. 2-yr. notes	6	$5,350,000
Union Ry. Gas & E. 3-yr. notes	5	3,000,000
Denver Tramway 5-yr. cv	6	2,500,000
Denver City Tramway 1st	5	2,000,000
Birmingham Ry. Lt. & P. notes	6	1,312,000
Total		$14,162,000

May

West Va. Trac. & El. 2-yr. notes	6	1,800,000
United Traction Co. deb	4½	456,000
Watervliet Turnpike & R.R. 1st	6	350,000
Marion City Ry. 1st ext	6	328,000
Madison Rys. 3-yr. notes	6	200,000
Total		$3,134,000

June

Michigan Ry. 5-yr. notes	6	$6,500,000
N. Orleans Ry. & Lt. 1-yr. notes	7	4,000,000
Grand Rapids Ry. 1st	5	3,500,000
Elgin, Aurora & So. Tr. 1st ext	5	2,000,000
Ind., Newcastle & East Tr. 1st	6	1,200,000
New Orleans Ry. & Lt. 1-yr	7	1,000,000
Miscellaneous		544,500
Total		$18,744,500

July

Chicago Elev. Rys. notes ext	5	$13,601,000
American Cities Co coll tr	5–6	7,500,000
Piedmont & No. Ry. 5-yr. notes	5	6,286,000
Union Traction of Indiana gen	5	4,611,000
Northern Ohio Traction cons	5	2,995,000
Sioux City Traction 1st	5	750,000
Cin., Lawrenceburg & A. St. Ry	5	750,000
Arkans. Valley Ry., L. & P. nts	6	450,000
Chi., No. Shore & Mil. notes	6	345,000
Total		$37,288,000

August

Reading Trans. & Lt. 2-yr. nts	6	$2,450,000
West End Street Ry. deb	5	1,581,000
So. Shore & Boston St. Ry. 1st	5	335,000
Riverside & Arlington Ry. 1st	4	200,000
Iowa Ry. & Light 2-yr. notes	6	700,000
Total		$5,266,000

September

Am. Pub. Utilities Co. notes	6	489,000
Ohio Traction Co. notes	6	350,000
Total		$839,000

October

Toronto & York Radial Ry. 1st	5	$1,640,000
Milford, Attleboro & W. St. Ry	5	300,000
Total		$1,940,000

November

Brazilian Tr., Lt. & Pr. 3-yr. nts	6	$7,500,000
Memphis St. Ry. 2-yr. notes	6	1,250,000
Total		$8,750,000

December

Boston Suburban Elec. notes	4	$1,100,000
Kans. City Rys. 2-yr. nts. s. A	6	1,000,000
Bay State Street Ry. notes	6	357,000
Total		$2,457,000

Bonds and notes maturing in January	$5,769,000
Bonds and notes maturing in February	5,522,000
Bonds and notes maturing in March	12,914,000
Bonds and notes maturing in April	14,162,000
Bonds and notes maturing in May	3,134,000
Bonds and notes maturing in June	18,744,500
Bonds and notes maturing in July	37,288,000
Bonds and notes maturing in August	5,266,000
Bonds and notes maturing in September	839,000
Bonds and notes maturing in October	1,940,000
Bonds and notes maturing in November	8,750,000
Bonds and notes maturing in December	2,457,000
Total electric railway maturities	$116,785,500
Grand total all public utility issues	$261,887,600

The following electric railway bonds, due in 1919, have been called for payment prior to their due date:

Issue:	Due '19	Called	Amount
Pug Sd Trac, Lt. & Pwr 6s	Feb. 1	Aug. 1, '18	$10,067,000
Monon. Val. Trac. notes 6s	Feb. 1	Oct. 1, '18	2,829,000
W. Penn. Pw. 2-yr. nts. 6s	Aug. 1	Jan. 7, '19	2,000,000
Total called bonds			$14,896,000

The following electric railway bonds, due in 1919, have been extended to a later maturity:

	Due '19	Extended to	Amount
Min. St. Ry. 1st 5s.	Jan. 15	Jan. 15, '22	$5,000,000

Plan to Reclaim Road

The committee of residents and property owners from Ocean City, N. J., and near-by places appointed to take steps toward purchasing the Ocean City Electric Railroad by popular subscriptions has decided to start at once to acquire the road.

Frank H. Stewart, J. Frederick Martin and Harry Headley, Ocean City, have been appointed a committee to consult with J. Pithian Tatem, solicitor for the railway, and the Henry D. Moore Corporation, the largest stockholders. The committee, headed by William E. Massey, president of the Ocean City Title & Trust Company, plans to convert the roadbed into a figure eight shape, permitting the cars to traverse some of the main business streets of Ocean City, with continuous service thereon, and with limited, but sufficient service for South Ocean City.

Some time ago the bondholders' committee of the company notified the City Commissioners that it was planned to "junk" the road, because of its inability to meet running expenses. An offer was made to sell the road to the city for $84,000. Mayor Champion then called a meeting of the citizens to consider the matter.

Wants Its Rental

Cornelius S. Sweetland, secretary-treasurer of the United Traction & Electric Company, Providence, R. I., on Dec. 26 notified the officers of the Rhode Island Company, that unless payment of rental of leased lines, due on Dec. 24, was made on or before Jan. 26 the United Traction & Electric Company would take over and operate the Rhode Island Company's properties under provisions embodied in the lease. Similar action was taken last September when payment was due. The rental due on Dec. 24 amounts to $149,500.

The notice was served on the federal trustees, who hold the stock of the Rhode Island Company. The trustees two days before had decided to defer the payment of the rental indefinitely, because of the decision of the War Labor Board, which instructed the Rhode Island Company to pay $72,066 to its employees, on or before Dec. 24. This sum represents one-third of the total of back wages due the employees under a previous award of the War Labor Board.

Twice during the past year the wages of employees have been increased, once voluntarily on the part of the company in May and again in October following an award of the War Labor Board. Fares have also been increased twice, but the burden of higher operating costs has more than offset the advance in fares.

The Rhode Island Company is controlled by the New York, New Haven & Hartford Railroad through ownership of the entire capital stock. By the dissolution agreement made with the government in 1914, the New York, New Haven & Hartford Railroad transferred to five trustees, 96,855 shares, constituting the entire capital stock of the Rhode Island Company. The trustees were chosen for a term of five years. The electric railway system comprises 353 miles of electric railway and 8.41 miles of steam railroad, of which 39.92 miles are owned and 321.63 miles are leased, serving the cities of Providence, Pawtucket, Central Falls and all the rest of Rhode Island.

Capital Issues Suspends

Committee May Resume Its Functions If Necessary—Legislation to Check Worthless Securities

The Capital Issues Committee, a specially created arm of the Treasury Department for the control of the issue of new securities during the war, announced that it would suspend its activities on Dec. 31. Chairman Hamlin of the committee warns the public of and directs the attention of Congress to the menace to holders of government bonds through the uncontrolled issue of fraudulent and worthless securities. Secretary Glass, in an accompanying statement, says that he will ask for legislation to check the traffic in worthless securities.

2000 APPLICATIONS EXAMINED

From May 17, the date of its organization, to Oct. 21 the committee examined more than 2000 applications. The proposed security issues totaled more than $3,000,000,000. About 20 per cent of these applications were disapproved. These were mostly of a character involving new extensions, which would not be contributory to the winning of the war.

The committee will not be dissolved but will remain inactive, unless it is found that the sale of new securities competes unduly with government financing or for other reasons it may become desirable for the committee to resume its work, pending its dissolution by the President or by operation of law.

It is the intention of the Capital Issues Committee to make a supplemental report to Congress recommending a law to prevent impositions upon the investing public.

Secretary Glass made this comment on the action taken:

"The decision of the Capital Issues Committee to suspend its activities should not be interpreted by the business public as a warrant for any expenditure of capital for needless or unwise purposes, whether public or private in their nature. Should it become apparent that voluntary restraints are not being exercised so as to prevent the misuse of capital, I shall request the committee to resume its control.

INVESTOR SHOULD BE PROTECTED

"My chief misgiving in accepting the action of the committee arises out of the need the committee has frequently expressed, and the importance of which has become increasingly obvious, of protecting the public investor against the flood of worthless or doubtful securities which threaten the market when the restrictions are removed, and present conditions emphasize the importance of obtaining emergency legislation as speedily as possible, so as to be able to cope effectively with this evil. The government not only should protect itself as to future bond issues, but, as well, owes a duty to the millions of Liberty bond buyers to restrain reckless and fraudulent promoters, particularly at this time.

"I intend to ask Congress immediately for legislation that will check the traffic in worthless securities while imposing no undue restrictions upon the financing of legitimate business, and shall urge that it be made effective before the close of the present session. Meantime, it may become necessary before such legislation is passed to reassemble the committee for the purpose of resuming its functions."

WORK OF COMMITTEE REVIEWED

In the period between May 17 and Dec. 7 the Capital Issues Committee had 2855 applications submitted to it for a total of $3,172,912,000. Of this amount $441,733,000 was for construction and equipment, $148,156,000 for working capital, $694,402,000 for refunding and $1,290,055,000 for purposes of exchange. The total passed was $2,574,346,000 and the total disapproved $598,566,000.

There were 308 applications from public utilities. The total applied for from this source was $755,656,000. Of this amount $167,215,000 was for construction and equipment, $6,429,000 for working capital, $255,648,000 classified by refunding and $302,427,000 for purposes of exchange, etc. The total of public utility issues passed was $731,719,000 while the total disapproved was $21,937,000.

Brockton & Plymouth Road to Continue

Under Chap. 288, Acts of 1918, Massachusetts Legislature, the towns of Hanson, Pembroke and Plymouth have voted to extend financial aid to the Brockton & Plymouth Street Railway rather than to have the property suspend operation through inadequate revenue. Stone & Webster, managers of the road, have announced that the service will be continued.

Under the new agreement the present board of directors will resign with the exception of one representative of the company who will remain on the board. The other directors will be chosen from the various towns served. It is planned to increase the present 6-cent fare unit to 10 cents. If the revenue is then inadequate, the deficiency is to be made up from local tax levies. It is expected that the town of Kingston, adjoining Plymouth, will shortly enter into an agreement with the company along the lines above indicated.

A six months' agreement has been accepted by the town of Plymouth, but the other towns have signed an agreement covering one year's operation.

The Brockton & Plymouth Street Railway operates 24 miles of standard gage electric railway connecting Plymouth, Kingston, Pembroke, Hanson, Whitman and Brockton. It has twenty-eight motor cars and eight other cars and sells energy for lighting and power purposes.

Evansville Reorganization

New Company Incorporated and Plans Being Worked Out for Reorganization After Foreclosure

The Evansville & Ohio Valley Railroad, Evansville, Ind., has filed articles of incorporation with the Secretary of State of Indiana, presumably as the successor of the Evansville (Ind.) Railways, operating the Evansville & Eastern Electric Railway, the Evansville, Henderson & Owensboro Railway and the Evansville & Mount Vernon Railway. The new company is capitalized at $1,500,000. The directors are Marcus S. Sonntag, William H. McCurdy, C. Howard Battin, Albert F. Karges, William A. Koch, William A. Carson, and Chris M. Kanzler, Evansville, Ind., Wesley Wilson, Newburgh, Ind.; Danby E. Cadick, Grandview, Ind., and Charles E. Tennis, Pittsburgh, Iowa.

PROTECTIVE AGREEMENT DRAWN

A protective agreement for the holders of the first mortgage 5 per cent gold bonds of the Evansville & Eastern Electric Railway, Evansville & Mount Vernon Electric Railway and the Evansville Terminal Railway was drawn some time ago. On the protective committee are Messrs. Walker, Karges, McCurdy, Sonntag, Jewett, McKee, Gwin, Rhodes and Batlin. In a circular to the depositing bondholders dated Sept. 19 they gave notice of the adoption of a plan of reorganization, to be put into effect in the event of the purchase of the properties by them.

Under this plan the successor company will have $1,000,000 of common stock exchangeable for common stock of the Evansville Railways, $500,000 of 6 per cent non-cumulative preferred stock exchangeable for preferred stock of the Evansville Railways, $200,000 of first mortgage 6 per cent thirty-year bonds issuable for rehabilitation, $1,200,000 of first and refunding 5 per cent thirty-year bonds, $750,000 of thirty-year income bonds limited to a 5 per cent return, and $300,000 of ten-year collateral trust 6 per cent notes.

NEW MORTGAGE PROPOSED

The new bonds will be secured by a mortgage covering all of the properties of the Evansville & Eastern Electric Railway, the Evansville & Mount Vernon Electric Railway and the Evansville Terminal Railway, together with the Evansville, Henderson & Owensboro Railway, subject, however, in the case of this property to $203,600 of preferred stock and to a mortgage securing bonds which are to be issued as collateral for the ten-year notes. The present outstanding bonds and notes of the various companies will be exchanged on the basis of 50 per cent in first and refunding 5's and 50 per cent in general mortgage incomes for the existing issues.

The Evansville (Ind.) Railways went into the hands of W. A. Carson, vice-president, as receiver early in November.

Financial News Notes

Ironwood & Bessemer Bonds Offered.—Halsey, Stuart & Company, New York, N. Y., and Chicago, Ill., are offering $200,000 of first mortgage 5 per cent bonds of the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich. The bonds are dated Feb. 11, 1911, and are due on Feb. 1, 1936. They are being offered at 87 and interest, to yield 6¼ per cent.

Cleveland Interest Fund Again at Minimum.—The November receipts of the Cleveland (Ohio) Railway enabled it to credit $91,804 to the interest fund, which again brought it above the minimum of $300,000. There was a deficit of $80,270 in the fund, created before the maximum rate of fare specified in the Tayler ordinance was increased. The total receipts for the month were $1,140,593.

Springfield Issues Approved.—The Springfield (Ill.) Consolidated Railway has been authorized to issue capital stock to the amount of $79,500 by the Illinois Public Utilities Commission. The company was also authorized in the same order to issue $107,000 of 5 per cent gold bonds maturing in thirty-five years and secured by a mortgage to the Fidelity & Columbia Trust Company and L. N. Bender, trustee, Louisville, Ky., under date of June 1, 1913.

Files Mortgage for Record.—The Fort Smith Light & Traction Company, Fort Smith, Ark., has filed for record a mortgage to secure $1,000,000 of 5 per cent bonds dated Sept. 3, 1918, and due in 1921. The Continental Trust & Savings Company, Chicago, Ill., is made trustee. The new mortgage is subject to a mortgage of $6,000,000, made in 1911.

City Would Intervene in Receivership.—Corporation Counsel Byers of Des Moines, Iowa, acting for the city, has filed a petition of intervention in the Federal Court at Des Moines, alleging that the North American Construction Company, complainant in the action which threw the Des Moines Ciy Railway into the hands of the receiver, is controlled by the same interests that own the railway. He asks that the court dismiss the receivership on the ground that the action was brought not to settle a controversy, but solely to force the railway into bankruptcy.

Seven Per Cents Replace Sixes.—The East St. Louis & Suburban Company, East St. Louis, Ill., has advised holders of its five-year 6 per cent bonds due on Jan. 1, 1919, that it proposes to create a new issue of 7 per cent two-year convertible bonds, maturing on Jan. 1, 1921 to take care of the maturing bonds. Interest on the old convertible 6's was paid as usual on Jan. 1. The new bonds will be offered at 99 per cent in exchange for present issue, with 1 per cent discount, payable in cash. Bondholders are asked to deposit their holdings with the Pennsylvania Company for Insurance on Lives & Granting Annuities, Philadelphia.

Plans for Saving Small Ohio Line.—A. T. Van Diense, general manager of the Columbus, Delaware & Marion Electric Company, Columbus, Ohio, has made a proposition to the residents of Richwood and Magnetic Springs to finance the Columbus, Magnetic Springs & Northern Railway, which has not been in operation for some time. This road connects Delaware and Richwood. It is due to be sold some time in January. People of the towns through which the road passes and along the line are endeavoring to raise funds to meet the offer made by Mr. Van Diense, who also proposes to furnish electric light and power service to Richwood.

Employees' Wages 56 Per Cent. of Gross.—In speaking of the volume of business of the Dallas (Tex.) Railway, Richard Meriwether, general manager, said the company now is maintaining an organization of more than 800 employees, consisting of 500 motormen and conductors, 100 mechanical and electrical men and 180 track workers. In the executive and accounting departments, about sixty persons are employed. Mr. Meriwether said: "At present we are paying in salaries to employees $90,000 a month. The gross income of the company normally is about $160,000 a month, and $90,000 of this is returned in the way of wages and salaries to employees. During the middle of the day in normal times the company operates an average of 104 cars in regular service and during the rush hours it operates 190 cars."

New Cities Service Debentures.—The directors of the Cities Service Company, New York, N. Y., on Dec. 30 announced that the company would offer at par and interest $10,000,000 new series C 7 per cent debentures to stockholders of record of Dec. 31, 1918, the subscriptions from stockholders closing on Jan. 25. The offering of new debentures has been underwritten by a syndicate of bankers. In case any of the $10,000,000 should remain unsubscribed for by the stockholders the unsubscribed portion is to be offered to the public by the banking syndicate. The new series C debentures were created in the following manner: The stockholders authorized an issue of $30,000,000 of 7 per cent debentures, series B. Of these $12,500,000 were classed as series B, and then the issue was closed. In place of the $17,500,000 authorized as series B, the directors on Dec. 30 authorized an issue of $17,500,000 series C debentures, of which $10,000,000 are now being offered. The series C debentures are convertible on and after Jan. 1, 1921, into nine shares of Cities Service preferred stock and one share of common, together with the accumulated cash and stock dividends on one share of common stock to the date of conversion.

Electric Railway Monthly Earnings

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$173,235	*$169,133	$4,102	$37,909	†$33,807
1m., Oct., '17	181,128	*135,239	45,889	35,619	10,270
10m., Oct., '18	1,775,304	*1,530,066	245,238	361,838	†116,600
10m., Oct., '17	1,819,988	*1,301,182	518,806	357,279	161,527

BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$21,564	*$13,398	$8,166	$3,939	$4,227
1m., Oct., '17	19,338	*10,119	9,219	3,616	5,603
12m., Oct., '18	256,810	*136,038	120,772	45,705	75,067
12m., Oct., '17	228,746	*114,337	114,409	42,591	71,818

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$6,247	*$9,295	†$3,048	$1,434	†$4,482
1m., Oct., '17	9,509	*10,226	†717	1,286	†2,003
12m., Oct., '18	106,281	*118,601	†12,320	16,571	†28,891
12m., Oct., '17	124,190	*123,838	352	14,386	†14,034

CLEVELAND, PAINESVILLE & EASTERN RAILROAD,
WILLOUGHBY, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$43,362	*$32,277	$11,085	$16,193	†$5,108
1m., Oct., '17	44,939	*32,250	12,689	11,692	917
10m., Oct., '18	460,188	*308,503	151,685	120,468	31,217
10m., Oct., '17	454,347	*281,900	172,447	116,839	55,609

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug., '18	$94,589	*$59,658	$34,931	$14,315	$20,616
1m., Aug., '17	79,889	*45,938	33,951	12,419	‡23,755
12m., Aug., '18	1,054,375	*586,760	467,615	153,682	‡331,079
12m., Aug., '17	916,137	*498,222	417,915	125,164	‡301,672

EL PASO (TEX.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '18	$104,289	*$73,645	$30,644	$6,744	$23,900
1m., Sept., '17	105,017	*67,806	37,211	6,592	30,619
12m., Sept., '18	1,261,203	*845,119	416,084	80,002	336,082
12m., Sept., '17	1,278,051	*767,460	510,591	63,385	447,206

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$176,118	*$141,018	$35,100	$35,822	†$.722
1m., Oct., '17	142,840	*107,995	34,845	35,321	†476
10m., Oct., '18	1,809,869	*1,303,542	506,327	361,112	145,215
10m., Oct., '17	1,475,625	*999,418	476,207	346,848	129,359

NEW YORK (N. Y.) RAILWAYS

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$934,683	*$821,178	$113,505	$277,151	†‡$120,815
1m., Oct., '17	1,103,614	*819,086	284,528	281,995	‡53,022
4m., Oct., '18	3,715,819	*3,215,793	500,026	1,112,438	†‡438,739
4m., Oct., '17	4,388,906	*3,189,394	1,199,512	1,127,607	‡272,795

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* Includes taxes. † Deficit. ‡ Includes non-operating income.

Traffic and Transportation

Zone Plan Postponement

President McCarter Believes Problem Solved—Commission Grants Extension of Two Months

Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., before the Public Utilities Commission on Dec. 30 requested and received an extension of two months of the period for the preparation of the zone fare report. In the order of the board of last July granting the company the right to charge 1 cent for transfers there was a stipulation that it investigate the possibilities of a zone system and submit the report of its discoveries on or before Jan. 1. The extension which has now been allowed fixes the date for delivering the report as March 1.

NEW PLAN FAIR TO ALL

Mr. McCarter declared the company believed its report would provide a zoning plan "fair to the public and fair to the company." One of the big problems, he said, had been the matter of the collection of fares as the cars pass through the zones that will exist on many of the lines, but he believed this had been solved.

In opening his statement Mr. McCarter said that immediately after the board had incorporated its zone inquiry stipulation in the July order the company had given the question serious consideration. As the first step a committee had been named, with himself as the head, to make the investigation. The other members of the committee were Richard E. Danforth, vice-president and general manager of the railway company; Harry C. Donecker, the assistant general manager; L. D. Howard Gilmour, general solicitor, and Matthew R. Boylan, general auditor.

The committee, he said, had held frequent consultations with Dr. Thomas Conway of the Wharton School of Finance, University of Pennsylvania, and that a sub-committee had later been formed by it. This committee visited every city where zones had been tried. Mr. McCarter said:

WORK OF SUB-COMMITTE DESCRIBED

"This sub-committee has given unremitting attention to the matter. It has employed approximately 100 young men to ride the cars on given days and make tests of the riders for purposes of comparison as to lengths of rides and other facts and we think the tests made have been most comprehensive. This work took some time and involved the expenditure of a very considerable sum. There were two chief questions involved: First, it is possible to devise a plan of zoning that will be fair and acceptable to the public and fair to the company, and second, if devised, was it practicable to collect fares? This question of the collection of fare was early recognized as a very serious matter.

"It would not be practicable to put the zone plan into immediate effect. There are numerous mechanical changes that would be necessary and these would require some time. When our report is complete we might file it as a rate schedule to bring the matter to a hearing with the possibility of making it effective July 1. I think we could be ready by that time."

In granting the time extension President Slocum of the commission said:

"The board knows the company has been working on this matter and that a serious effort is being made to meet its stipulation. It also knows that if its engineers are given access to the company's minutes no time will be lost by granting additional time, and it is therefore granted."

Columbus Fare Brief Filed

Attorneys for the Columbus Railway, Power & Light Company, Columbus, Ohio, filed a brief in the United States Supreme Court on Dec. 27 in support of the company's claim that the city cannot compel it to carry passengers at the rate of fare specified in its franchise. This is the case brought by the company in the United States District Court recently to prevent the enforcement of the terms of the franchise relative to the rate of fare and in which Judge D. C. Westenhaver announced that the court is without jurisdiction to interfere with a contract of that kind.

Arguments presented in the brief follow:

> The claim of the city is based on the proposition that the two franchise grants represent contracts and that these contracts impose obligations upon the Columbus company to continue operating its street railway lines under these franchise grants and to charge the rates of fare therein described. The petition of the plaintiff and appellants may be summarized as follows:
>
> 1. The franchise ordinance granted permission to operate street cars on the streets of the city upon the terms and conditions therein prescribed, and the company was bound to comply with these terms and conditions so long as it continued to exercise the franchises, but these grants were permission only and have been surrendered and abandoned by the company. Its reasons for such surrender and abandonment were that the rates of fare prescribed in the grants were no longer compensatory but on the contrary had become confiscatory.
>
> 2. The situation that has been brought about by the war resulting in a most unexpected increase in operating expenses of all kinds and particularly the compulsory annual wage increase of $560,000, due to the award of the National War Labor Board, cannot be held to have been within the contemplation of the parties when the franchises were granted and accepted and under these circumstances the company is entitled to a release of the obligations, if any, that these grants may have imposed upon it to continue to operate under them.

Transfer Report Released

Results of Conferences With Washington Companies and of Independent Study Now Made Public

Sixteen transfer points, eight of which the companies already have agreed to accept, are recommended by John A. Beeler, expert for the Public Service Commission of the District of Columbia, for establishment between the lines of the Capital Traction Company, the Washington Railway & Electric Company and the Washington-Virginia Railway. The fact that this report had been made to the commission was noted in the ELECTRIC RAILWAY JOURNAL for Dec. 28, page 1157. The report itself, however, was not released by the commission until Dec. 26. It will be considered on Jan. 7.

The Beeler suggestions which are not concurred in by the companies contemplate the exchange of transfers at the busiest railway intersections.

Congestion will be increased at these intersections and Mr. Beeler points out the companies may not be able to carry all the passengers who will want to make use of the transfer privilege. They can, however, even during this period, carry some of them, and during a greater part of the day carry all of them.

Objection of the companies to transferring passengers from suburban to city lines develops in the report as being the biggest stumbling block in the way of universal transfers. It is the crux of the entire situation, Mr. Beeler declares. The companies agree, he states, that, once this is solved to the satisfaction of all parties, the principal difficulty will have been removed.

The reasons given by the companies for their objection to transferring suburban passengers to city lines follow:

1. The suburban passenger is now receiving more than full value for the fare he gives the company, and, therefore, no extension should be made for the benefit of a class already being served at a loss.

2. The long suburban lines have been built and operated with the idea that they should act as feeders only to the lines of the company that is sustaining and developing them. To open these lines as feeders to another company which bore no part of the expense of development appears to the companies unjust as well as a source of financial loss.

Figures are presented by Mr. Beeler in support of his conclusion that inter-company transfers will not affect materially the financial interests of the companies. He points out that at five of the transfer points recommended paid inter-company transfers now are in effect. He proposes that the transfer arrangements outlined in his report shall receive a trial during a period sufficient to determine what the exact financial results will be. If it develops that an injustice is being done by the issuance of free inter-company transfers, an arrangement should be made to compensate the companies.

Renew Fare Pleas

New York Companies Point Out Wherein Conditions Under Five-Cent Fare Spell Disaster

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., in a letter to the Public Service Commission and the Board of Estimate, made public on Jan. 1, urged 8-cent fares on that company's subway and elevated lines and wrote in detail "of the serious situation confronting the dual subway enterprise." He said that the city could gain nothing by starving the Interborough into bankruptcy.

COMPANY AND CITY PARTNERS

In his letter Mr. Shonts describes the situation of the Interborough with the pooling arrangement between the company and the city in effect. At the outset he gives the history of the dual system, and tells of the invitation by the city for the company to share in the enterprise. The plan, he says, provided that the Interborough should contribute $58,000,000, estimated at that time as one-half the cost. The agreement called upon the company to supply an additional $22,000,000 for equipment. The Interborough, he says, raised $160,000,000 by the sale of 5 per cent first and refunding bonds for both subway and elevated improvements. Then the letter says:

> In view of the interest of the city and its taxpayers in the matter, it seems incumbent upon the company again to advise you, as the taxpayers' representatives, of the serious situation confronting the dual subway enterprise. The Interborough had accumulated a cash surplus of $10,000,000 out of which to take care of operating losses during the lean years heretofore mentioned. Had it not been for the war such a sum would have been ample, with a 5-cent fare. But it is no longer adequate, and it is rapidly being exhausted.
>
> For the year ended June 30, 1918, there was a deficit of subway earnings of $620,438 and of elevated earnings of $2,306,818 compared with the amounts the company was entitled to receive under its contracts. These deficits are payable out of future revenues, with interest compounded semi-annually, before the city is entitled to any share in either subway or elevated earnings.
>
> For the fiscal year ending June 30, 1919, the outlook is much worse. Based on the actual figures for the four months ended Oct. 31, 1918, the trend indicates that on June 30, 1919, the deficit under the subway contract will be $3,887,000, and under the elevated contracts, $4,952,000, or a total accrued for the year of $8,839,000 ahead of the city's right to a return for the year ending June 30, 1919. To this must be added the accruals of last year, so that the aggregate subway accruals as of June 30, 1919, without interest, will be $4,507,438, and the elevated accruals, also without interest, $7,258,818, or a total of $11,766,256.
>
> If the fare be increased to 8 cents, recourse to taxation will not only be prevented but the city will receive from the Interborough lines over $2,000,000 in cash into its treasury.
>
> The Interborough Company is entitled to borrow cash against the accruals and thus continue in possession of the property under the leases. But if for any reason it should not be able to raise the money because the city kept it down to a 5-cent fare, and a receivership should follow, the situation would not be changed so far as the city is concerned—indeed, it might be worse, because receivership certificates might be necessary, which would be a paramount lien, thus setting the city's investment further to the rear.
>
> The city can gain nothing by starving the Interborough into bankruptcy. On the contrary, it can indirectly do itself great financial damage through the impairment of approximately $500,000,000 of securities in the combined Interborough system.
>
> It is with great reluctance that the word panic is used in this communication, but the time has come for plain speaking, and it would be a failure of duty to one partner in an enterprise not to point out that the bankruptcy of the other partner might be so disastrous as to result in a financial cataclysm.
>
> The city may by continued refusal to increase fares precipitate bankruptcy and still have to face the problem of increasing fares to escape ruinous taxation. If the city were in possession of the railroads a continuation of a 5-cent fare would be at the expense of the taxpayers and contrary to the spirit of the rapid transit act.

B. R. T. MUST HAVE MORE

Timothy S. Williams, president of the Brooklyn Rapid Transit Company, said on Jan. 1 that without doubt renewed efforts would be made to secure authority to charge a 7-cent fare. He referred to the fact that many cities had permitted the electric railways to increase their fares to 6 and 7 cents. He discussed the "antagonistic attitude" of the Public Service Commission and the Board of Estimate, and of the delay in completing the rapid transit lines.

Indianapolis Denied Six Cents

As the result of an opinion of E. I. Lewis, chairman of the Public Service Commission of Indiana, and concurred in by the other members of the commission, the Indianapolis Traction & Terminal Company has been denied an increase in fare to 6 cents. The company is, however, permitted to continue to charge a 5-cent fare until 100 days after the signing of the treaty of peace, but it was instructed to withdraw the 1-cent charge for transfers on Dec. 31. The commission says that in spite of the apparent increase in facilities the service rendered by the company remains inadequate. On the important point of a return on the investment the commission says in part:

> Petitioner does not plead for an order based on return on reasonable and prudent investment. The plea is for an order establishing rates that will maintain the solvency of petitioner by the payment of operating expenses and "maturing obligations."
>
> In its original decision the commission passed finally and negatively on petitioner's contentions that fixed charges of securities, issued and outstanding, constituted legal and binding obligations which the State must recognize. With equal decisiveness, the commission declined to recognize, even in acting under the emergency section, the inclusion of annual sinking fund charges as an obligation of patrons.
>
> The commission reiterates its declaration that it will not become confused as to the mandate of the Legislature which, according to the interpretation under which it proceeds, is to take the value of the property, used and useful for the service of the public as a basis for rates.
>
> It is inconceivable that the Legislature, in the enactment of section 122, contemplated that the State should (1) guarantee, in times of emergency, values which never existed; (2) protect excess securities; (3) make good losses caused by negligence in collection of revenues, or (4) reward a lack of thrift in times of prosperity.
>
> The emergency section does not seem even to extend to the most meritorious petitioner the assurance of a return on investment that might be declared to be the proper rate of return in a normal period. To use the emergency section to protect obligations for which the commission is unable to find some reasonable basis in values would amount to making the State the protector of unwarranted obligations at the very time when there is a strong tendency for legislation to restrict issuance of unwarranted securities of all kinds.

Fare Advance Voted

Residents of Cedar Rapids Go on Record in Favor of Fare Advance

In an election held on Dec. 17, the Cedar Rapids & Marion City Railway was authorized to increase its fares to 6 cents. The increase was carried by a majority of seventy-eight. It went into effect at once. Previous to the election a commission made up of representatives of the Chamber of Commerce, union labor and leading citizens recommended to the City Council of Cedar Rapids that the increase be granted.

TWO COMPANIES AFFECTED

The fares on the lines of the Iowa Railway & Light Company, which also operates in Cedar Rapids, were not covered by city franchise, but the Cedar Rapids & Iowa City Railway, which is included in the system of the Iowa Railway & Light Company, assumed a 6-cent fare at the time that rate was granted to the Cedar Rapids & Marion City Railway.

Last February the local branch of the railway union submitted a new wage demand to the Cedar Rapids & Marion City Railway. The matter was debated for several weeks. Finally the men were informed that the increase in wage would be allowed effective at once provided the City Council would grant an increase in fares. The Council found itself powerless to do anything under the terms of the franchise, but after it was suggested that the matter be left to a vote of the people the Council gave its consent.

The local Chamber of Commerce and the Federation of Labor indorsed the 6-cent fare and during the ten days previous to the election made an open and vigorous campaign in its favor. Public speakers were sent into the wards where the working people live and the matter was placed squarely before them. The voters were informed that if the measure was defeated it would almost certainly mean unsatisfactory service and might even result in the abandonment of some lines. The railway took no part in advocating the increase. There was no advertising campaign through the newspapers, no appeal to the public. The newspapers merely printed the news of the campaign as it progressed.

OPPOSITION FROM UNEXPECTED QUARTERS

Some opposition developed to the proposed increase in fares, but the vote in the wards inhabited by those dependent almost entirely on the railway for transportation was "yes" while the "no" vote was cast in the wealthier wards.

The Cedar Rapids & Marion City Railway is controlled by the United Light & Railways Company. It operates in all 27.5 miles of line, a considerable part of which is in Cedar Rapids.

Cincinnati Fare Increases Automatically

Under an automatic provision of the revised railway franchise in Cincinnati, Ohio, the rate of fare on the lines of the Cincinnati Traction Company for adults was advanced to 5½ cents on Jan. 1, 1919. At the same time children's fares were made one-half of the adult fare or an advance of ½ cent. Official announcement to this effect was made by W. C. Culkins, street railroad director, following receipt of a letter from Walter A. Draper, vice-president of the Cincinnati Traction Company, notifying him that the earnings during October and November had been insufficient to meet operating expenses. Beginning Jan. 1 six adult tickets for 33 cents and four children's tickets for 11 cents were placed on sale. Cash fares for adults are now 6 cents and for children 3 cents. The new franchise provides that fares shall be increased ½ cent if for the period of two calendar months the income of the city lines is not sufficient to cover the cost of service.

Transportation News Notes

Brooklyn Skip Stops to Go.—The Public Service Commission for the First District of New York has ordered the Brooklyn Rapid Transit Company to discontinue skip stops.

Committee Reports on Louisville Fare.—A committee of the Board of Trade of Louisville, Ky., which has been investigating earnings and expenses of the Louisville Railway Company before recommending an increase in fares, has reported back to the board, but no definite action has been taken as yet.

Westerville Line May Increase Fares.—Indications point to an increase in the rates of fare on the Columbus-Westerville line of the Columbus Railway, Power & Light Company, Columbus, Ohio, according to Commissioner John Scott. The working capital is now only slightly above $15,000, which marks the turning point. The road fell short in November and he believes this will be repeated for December.

Fare Case Carried to Court.—The Dubuque (Iowa) Electric Company plans to take the half-fare ticket case before the United States Circuit Court of Appeals at St. Paul. City Attorney Czizek has been asked by the company to agree to the filing of a supersedeas bond which would protect the patrons of the company against loss but would result in the discontinuance of the sale of half-fare tickets until an opinion is handed down by the appeals court.

Colorado Springs Wants More.—The petition of the Colorado Springs & Interurban Railway, Colorado Springs, Col., for an increased fare, which was announced some time ago, has been filed with the Public Utilities Commission of Colorado. While no definite figure was asked, attorneys for the company feel that a 7-cent fare would be justified, because of the proposed increase in wages to employees to meet the scale in other cities and the rapidly mounting costs of materials and other factors in operation.

Michigan Two-Cent Fare Law Valid.—Federal Judge Sessions, in a decision handed down in the case brought by the Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., against the State to test Michigan's 2-cent fare law and restrain the State from enforcing it, held that the law is valid. He dismissed the company's petition, which was based on the grounds that the law was confiscatory on account of war-time conditions. This suit was referred to previously in the ELECTRIC RAILWAY JOURNAL for July 27, page 173, and Oct. 12, page 676.

Weymouth Refuses Subsidy.—Residents of East Weymouth, Mass., at a special town meeting recently, retorted to a notification from the Bay State Street Railway that certain lines in the town would be discontinued, with a recommendation that in the event of discontinuance of service by the road, the local authorities be urged to revoke the grants of location under which the company is operating in the town and take steps to remove all poles, rails and equipment from the streets. A motion was adopted pronouncing inadvisable a proposal for the town to contribute $13,500 to the company to enable it to continue certain lines.

City Contends Cases Differ.—The decision of the Supreme Court of Missouri in the so-called St. Louis 6-cent fare case, referred to in the ELECTRIC RAILWAY JOURNAL for Dec. 28, page 1155, is said not to affect Kansas City, except as indicating the possible decision of the court in the Kansas City case. City officials of Kansas City, Mo., indicate that the position of Kansas City is different from that of St. Louis; and that even if a decision is rendered that is favorable to the local railway the city will appeal. In the St. Louis case the Supreme Court overruled the lower court and held that the commission was within its rights in authorizing a 6-cent fare.

Auburn Waives Fare Clause.—The Common Council of Auburn, N. Y., by unanimous vote, has adopted a resolution whereby the city of Auburn has waived the electric railway franchise contract clause prohibiting a charge of more than 5 cents on city lines, to Owasco Lake and Soule Cemetery, thus making it possible for the Auburn & Syracuse Railway to go before the Public Service Commission with its application for an advance in fares. The resolution adopted by the Council waives the prohibitory clause for the period of the war, or until peace is finally declared, and for such a length of time thereafter as the Council shall deem wise.

Grand Rapids Increase in Effect.—The Grand Rapids (Mich.) Railway began charging a 6-cent fare on Dec. 5 in accordance with permission recently granted by the City Commission and noted in the ELECTRIC RAILWAY JOURNAL for Nov. 16, page 904. The City Commission, however, made the fare ordinance subject to the will of the people at the November election on a referendum petition. No petitions were filed against the increased fare and it, therefore, went into effect without having come to a vote. Unusual interest attached to the Grand Rapids appeal because of the way in which the local papers met the fare issue. This phase of the matter was referred to in this paper for Sept. 28, page 594.

Wants Additional Omaha Facts.—The State Railway Commission of Nebraska has denied the application of the Omaha & Council Bluffs Street Railway for an emergency increase in fares from 5 cents to 7 cents. The commission has, however, continued the application for further hearing and directed that the books of the company be examined and a valuation of the company's holdings be made in order to arrive at a final decision. The commission says it does not deny that the company should be granted an increase to meet the increased operating expenses, but that the company's valuation figures submitted with the application were not sufficient to form an opinion as to how much the advance in rates should be.

Rochester Still Needs More.—James F. Hamilton, president of the New York State Railways, has made a statement in part as follows about fares in Rochester: "We are still trying to get a 6-cent fare in Rochester. The reduction of service during January, even if it became permanent, would save the company only $650 a day. When the first fall of snow comes the company must put on 100 men to clear the tracks and this will use up $400 a day of the saving made by the reduction of service. The balance will be expended for equipment. This amount is not a drop in the bucket. We are losing money in the Rochester district every day we operate. We have lost $1,000,000 in the last eighteen months. We are not asking for a permanent 6-cent fare, but for an increase that will enable us to give good service and pay the interest on our bonds during the unusual conditions prevailing of high prices for material and labor. A 6-cent fare would not return a cent in dividends to the stockholders, but would give the people good service and pay the interest on the bonds." The reduction in service to which Mr. Hamilton refers was decided upon after conference with the Public Service Commission for the Second District. It was referred to in the ELECTRIC RAILWAY JOURNAL for Dec. 21, page 1118.

Personal Mention

P. R. T. Changes

Charles V. Weston, George Weston and Horace L. Howell Appointed to the Philadelphia Rapid Transit Company

Charles V. Weston has been appointed operating manager of the elevated and subway lines of the Philadelphia (Pa.) Rapid Transit Company. Mr. Weston was formerly president of the South Side Elevated Railroad, which is now a part of the Chicago Elevated Railroads. He has taken an active part in the development of Chicago's rapid transit system, having supervised the construction of the West Chicago Street Railroad tunnel in 1891-94 and having been chief engineer of the construction of the Northwestern Elevated and Union Loop, as well as of many extensions of the Lake Street Elevated and South Side Elevated. Since his resignation from the presidency of the South Side Elevated, following the consolidation of the Chicago elevated lines, Mr. Weston has been engaged largely in valuation and other expert work for electric railways.

GEORGE WESTON ALSO GOES TO PHILADELPHIA

George Weston, engineer for the Board of Supervising Engineers, Chicago Traction, has resigned his position, effective Jan. 1, and will also become associated with the same company. Mr. Weston has been engaged in electric railway work for the past thirty-one years. He received his training in civil engineering by private instruction and entered engineering work in 1880 on the Missouri, Kansas & Texas Railway at the age of nineteen years. Since that time he has done engineering work on various steam lines, has established a reputation as an appraisal engineer of electric railway properties and has been engaged in the construction and engineering operation of electric railways in the city of Chicago for many years.

GEORGE WESTON ON CHICAGO BOARD SINCE ITS CREATION

Upon the creation of the Board of Supervising Engineers at Chicago, in 1907, Mr. Weston was made assistant chief engineer. In 1908 he became a member of the Board of Supervising Engineers to represent the city of Chicago and later became engineer for the board, which position he has held to date. Mr. Weston is a member of the American Society of Civil Engineers, American Institute of Electrical Engineers, Western Society of Engineers, Chicago Engineers' Club, Engineers' Club of New York City, and the American Electric Railway Association.

Horace L. Howell, who has for the past five years been connected with the Board of Supervising Engineers, Chicago Traction, in the capacity of assistant engineer, has resigned and has also accepted a position with the Philadelphia Rapid Transit Company.

Mr. Jackson New Boston Trustee

James F. Jackson of Boston, former chairman of the Massachusetts Railroad Commission, has been appointed a trustee of the Boston Elevated Railway to fill the vacancy caused by the resignation of W. M. Butler, former chairman of the board. The nomination was confirmed by the executive council on Dec. 31 under suspension of the rules.

Mr. Jackson is a native of Taunton, Mass. He was educated at Harvard College and Boston University, graduating from the law school of the latter in 1875. He was city solicitor of Fall River from 1880 to 1889 with the exception of one year, and was elected Mayor of that city on the Republican ticket in 1888 and again in 1889. From 1899 to 1908 he was chairman of the Massachusetts Railroad Commission, predecessor of the Massachusetts Public Service Commission, and his term was signalized by distinguished and constructive service in electric railway regulation, coupled with unusual ability in clearly stating the essentials of complex issues before the board.

Since retiring from the commission, Mr. Jackson has been engaged in private law practice at Boston, having represented the Bay State Street Railway as general counsel in various rate proceedings and other matters. To a representative of the ELECTRIC RAILWAY JOURNAL Wednesday Mr. Jackson expressed his appreciation of the present difficulties of the electric railway financial problem, pointing out the importance of transportation and the interest with which his new duties will be undertaken.

E. W. Tynan has been appointed claim agent of the New York, Westchester & Boston Railway, New York, N. Y., to succeed W. A. Cokeley.

R. E. Town has been appointed auditor of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., to succeed C. W. Clover.

C. C. Yawkey, formerly vice-president of the Wisconsin Valley Electric Company, Wausau, Wis., has been elected president of the company to succeed Neal Brown.

G. C. Blankner and **G. G. Brownell** have been appointed assistant secretaries of the Cities Service Company, New York, N. Y., to succeed Carle B. Gilbert.

Judson Zimmer, master mechanic of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., has also been appointed to succeed F. A. Bagg, resigned.

E. F. Meyers, treasurer of the Philadelphia & Garrettford Street Railway, Upper Darby, Pa., has also been appointed secretary of the company to succeed V. A. Hengst.

G. A. Roffe has been appointed general manager and purchasing agent of the Susquehanna Traction Company, Lock Haven, Pa., to succeed T. C. Keller.

L. A. Reinhardt has been appointed assistant secretary and assistant treasurer of the Eastern Pennsylvania Railways, Pottsville, Pa., to succeed W. C. Austin.

F. P. Bagley, formerly treasurer of the Center & Clearfield Railway, Philipsburg, Pa., has been appointed assistant secretary of the company to succeed F. W. Gregory.

Stephen C. Pohe has been appointed vice-president and general manager of the Center & Clearfield Railway, Philipsburg, Pa., to succeed Warren Partridge.

Joseph B. Eastman of Massachusetts has been named a member of the Interstate Commerce Commission, vice George W. Anderson, whose term of office has expired.

B. D. Haskins has been appointed claim agent of the Chattanooga Railway & Light Company and the Lookout Mountain Railway, Chattanooga, Tenn., to succeed M. J. Horan.

B. F. Wilson has been elected vice-president of the Wisconsin Valley Electric Company, Wausau, Wis., to succeed C. C. Yawkey, who has been elected president of the company.

J. R. Hagy has been appointed secretary and treasurer of the City Electric Company, Albuquerque, N. M., to succeed Lloyd Sturges, who has been elected vice-president of the company.

George A. Peirce has been appointed secretary of the Puget Sound Traction, Light & Power Company and subsidiary companies, with headquarters at Boston, Mass., to succeed T. C. Crawford.

Benjamin C. Bower has been appointed master mechanic of the Trenton & Mercer County Traction Corporation, Trenton, N. J., to succeed H M. Rhoda.

C. E. Fritts, superintendent of power and electrical distribution of the Kansas City (Mo.) Railways, has resigned. Mr. Fritts had been connected with the company for twenty-one years.

B. F. Mortimer, formerly with the Public Service Company of Oklahoma, has accepted a position as superintendent of distribution with the Okmulgee Ice & Light Company, Okmulgee, Okla.

R. E. Morrison has been appointed engineer maintenance of way of the

Chattanooga Railway & Light Company and the Lookout Mountain Railway, Chattanooga, Tenn., to succeed E. R. Dike.

Lloyd Sturges, formerly secretary and treasurer of the City Electric Company, Albuquerque, N. M., has been elected vice-president of the company.

P. C. Eichhorn has been appointed auditor and purchasing agent of the Seattle & Rainier Valley Railway, Seattle, Wash., to succeed Frank W. Goodhue.

J. I. Newell has been apointed electrical superintendent of the British Columbia Electric Railway Company, Ltd., Vancouver, B. C., to succeed W. M. Fraser.

M. Murphy has been appointed secretary of the Seattle & Rainier Valley Railway, Seattle, Wash., to succeed Walter M. Brown, who still retains his position as general manager of the company.

W. Fred Jacobs has been appointed secretary of the Danville & Sunbury Transit Company, Danville, Pa., to succeed Charles P. Hancock, who still retains his position as treasurer of the company.

Henry Ellard has been appointed chief engineer to the Trenton & Mercer County Traction Corporation, Trenton, N. J., to succeed A. E. Gulliver, who resigned to engage in special work for the British government pertaining to marine operations.

Charles Zoller has been named superintendent of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., to succeed Lewis Henry, deceased. Mr. Zoller has been acting as claim agent of the company for some time. He will have his headquarters at Rushville, Ind.

J. H. Vanderveer has recently been appointed master mechanic of the Maryland Electric Railways at Annapolis, Md. He was for five years in the engineering department of Stone & Webster, specializing on the development of the one-man car. He is a graduate of Stevens Institute of Technology.

H. R. Palmer, chief of the lighting and power department of the Virginia Railway & Power Company, supplying railway service and electric light and power to Richmond and other cities of Virginia, will become general manager of the Harrisburg Light & Power Company, Harrisburg, Pa., to succeed C. M. Kaltwasser, vice-president and general manager of the company.

H. A. Nicholl, general manager of the Union Traction Company of Indiana, Anderson, Ind., has returned to Indiana from Hampton Roads, Va., where for several months he was government manager of transportation of the Hampton Roads district. The position in Virginia was a new one for the period of the war and Mr. Nicholl was granted leave of absence by the Union Traction Company in order to assume the place.

Matthew C. Brush, who has been vice-president of the American International Corporation, New York City, has been elected president of the American International Shipbuilding Corporation. The corporation is engaged in shipbuilding, having the largest shipyard in the world, that at Hog Island, Philadelphia, Pa. On Oct. 28, 1918, Mr. Brush was elected chairman of the board of directors of the Boston Elevated Railway.

Daniel A. Scanlon has been appointed acting superintendent of transportation of the Northern Ohio Traction & Light Company with headquarters at Akron, Ohio, succeeding Frank I. Hardy, resigned. For the last fourteen years Mr. Scanlon has been superintendent of the Southern Division of the Northern Ohio Traction & Light Company, with headquarters at Canton, Ohio. Prior to that time he was connected with the Raleigh (N. C.) Traction Company and the Columbus, Buckeye Lake & Newark Railway, Springfield, Ohio.

Edgar Harrison, appointed division passenger and freight agent of the Union Traction Company of Indiana at Anderson, has been with the Union Traction Company since Feb. 5, 1903, commencing as a motorman on the city lines at Anderson. He was on several divisions of the Union Traction as trainman, and knows the system well. He is studious and very observing and in order to qualify for advancements has recently completed successfully special studies in traffic work during his leisure.

General H. T. Douglas, who has been connected with the work of construction of the Interborough Rapid Transit Company, New York, N. Y., as principal assistant engineer of the Rapid Transit Subway Construction Company since December, 1899, has retired from service. He took an important part in the construction of the subways from the beginning until their completion, and gave to the work not only his engineering skill and untiring energy, but the benefit of a very broad and varied experience in railroad and engineering work.

B. N. Grosvenor, recently appointed superintendent of power plants of the Union Traction Company of Indiana, succeeding E. E. Jones, has had considerable experience in the mechanical and steam engineering line. He started as a machinist, and from that calling was made assistant to the professor of steam engineering, at the Rose Polytechnic Institute, at Terre Haute. He left there to take charge of the power plant of the Louisville (Ky.) Railway, where he was located for seven years. After leaving the Louisville Railway, Mr. Grosvenor was in charge of the River Station of the Louisville Water Company for ten years.

Percy S. Turner, manager of the tramway department of the British Westinghouse Electric Company, London, is in this country investigating the latest designs of electric car equipment used with high voltage installations. A more extended electrification of steam lines in England is considered desirable by most of the present railway officials. If the government takes over the lines according to the program already outlined, extended electrification may be postponed as the work will then, of course, depend on the attitude taken by the government. The various manufacturers are preparing to build any new equipment necessary in their own plants.

Obituary

George H. Harvey, general superintendent of construction for the Columbus Railway, Power & Light Company, Columbus, Ohio, died at his home in Columbus on Dec. 20 from influenza and pneumonia.

Maj. Charles B. Clegg, president of the Oakwood Street Railway, Dayton, Ohio, died on Dec. 16 after a long illness. Mr. Clegg became interested in Dayton railway properties when horse cars were used. He and John H. Winters, a banker, secured the controlling interest in the Dayton & Western Traction Company and assisted in completing the road. In conjunction with his son, Harrie P. Clegg, now an officer of the Dayton & Troy Electric Railway, the Oakwood Railroad and the Oakwood Street Railway, Dayton, he built the Dayton & Troy Traction line. Mr. Clegg was seventy-six years of age.

Angus Sinclair, Eng. D., publisher of *Railway & Locomotive Engineering* and for many years treasurer of the American Railway Master Mechanics' Association, died at his home in Milburn, N. J., on Jan. 1. He was seventy-seven years old. Mr. Sinclair was born in Scotland, where he received his early education. After coming to the United States he studied engineering at the University of Iowa. He received his degree of doctor of engineering from Purdue University. Mr. Sinclair at one time was editor of the *American Machinist* and later of the *National Car Builder*. In 1886 he established, with the late John A. Hill, the *National Engineer*, whose name was later changed to *Railway & Locomotive Engineering*, the paper with which he has been actively associated during recent years. In addition to his connection with the American Railway Master Mechanics' Association, of which he has been treasurer since 1901, Mr. Sinclair has been identified with many technical associations, among them the American Society of Mechanical Engineers, the Master Car Builders' Association, the Air Brake Club and the Travelling Engineers' Association. He was one of the founders of the last mentioned organization.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Volume of Purchasing Low During 1918

Review of Production, Distribution and Sales of Electric Railway Equipment During Past Twelve Months

A year mixed with good and bad business has just closed. On the whole the electric railways purchased less during 1918 than during any one of the last ten years. Here and there a business booked an extraordinary large volume of sales. In such cases the article in question was as a rule something comparatively new on the market and for which a demand had arisen on account of the abnormal conditions created by the war.

Pneumatic door-control equipment and one-man car devices, for instance, sold well. Devices to increase economy had the largest call. Each of the different types of devices for giving readings whereby it is possible to reduce the energy consumption per car-mile were in good demand.

MORE CARS PURCHASED THAN IN 1917

Besides, the war brought large sales in specific localities. Wherever there were shipyards or large industrial centers employed in war work the transportation facilities as a rule were found insufficient and additional rolling stock was required. As a result a number of large orders for rolling stock were placed during the year. These brought the total purchases of cars of all kinds for 1918 beyond that for 1917 by a hundred or so. The total number of new cars built in 1918 was 2419 against 2455 in 1917. However, only eighty-nine cars were built in railway company shops in 1918 while 281 were so built in 1917.

It is interesting to see the stride taken by the one-man car in 1918. Of this type 644 were ordered against but 280 in 1917. That this type is beginning to play a large part in the rolling-stock market is seen by comparing the 1918 orders for both one-man and two-man city cars. Of the latter the 1918 orders reached 1074, but 450 more than the one-man total. One car builder in August stated that fully 90 per cent of the year's inquiries for city cars were for the one-man type.

Nor is that all. The rolling-stock orders were not as large as they might have been had deliveries been better. Reports have been received from more than one road that owing to the length of time that they would have to wait it was decided best to postpone purchasing. Shipments, however, were not as bad as was generally believed. Late in February prominent car builders notified the ELECTRIC RAILWAY JOURNAL that shipments could be had in from five to six months. On top of this, however, the railways had to wait some time depending on transportation. If the orders were war transportation orders delivery could be secured more promptly.

Fussiness of car design was not tolerated last year by the builders. Standard design was the rule. If special construction was desired the purchaser found that promised delivery became quite too long.

The conditions of long delivery and immediate requirements resulted in a number of roads going into the used-car market. Little help was here found. Some managers are known to have traveled hundreds and hundreds of miles in an effort to locate and secure a few used cars. Probably at no other time has the market been so bare of second-hand rolling stock. As the year closed conditions were much easier and cars could be secured without any trouble.

Track construction and maintenance offered a very poor field for sales in 1918. Some 410 miles, or less than 1 per cent, was added to the total track mileage. About 150 miles of track was rebuilt out of a total of almost 50,000 miles. Almost all of this work was in small sections.

GOVERNMENT TAKES RAIL OUTPUT

To a large extent, of course, it must be remembered that war requirements prevented purchasing for track construction and maintenance. Some roads were favored in securing new track because of making extensions to shipyards or other war plants. Speaking generally there were no rails available for electric railways last year until after the armistice was signed, when a few tons were shipped on back orders.

Government orders called for a greater production of rails than the mills could handle. There were some rails that had been rolled for Russian roads that were offered for domestic consumption. As a makeshift it is understood that some of these were used by electric roads.

Freight handling for the electric roads opened on the Pacific Coast and elsewhere and to take care of this there was some purchasing of freight cars and trailers although most of such rolling stock was probably built in company shops.

The severity of the winter early last year made for a nice volume of buying in some lines. Trolley wire sold very well for maintenance because of the snow storms. Snow and ice removal equipment was in a brisk demand, especially scrapers, sleet cutters and thawing apparatus. Also there was a large demand in January for immediate delivery of snowplows. These, however, are not kept in stock and take some time to build so that this market went unsatisfied. It is interesting to note in this connection that very few orders were placed during the spring and summer months for snowplows and sweepers.

MAINTENANCE PROMPTS BUYING

Winter conditions also brought a heavy demand for coils. Sales of these continued in good volume throughout the year. Railways formerly used to do most of their coil winding in their own shops but the scarcity of labor in the past year prevented much of this work. This resulted in large sales by the manufacturers.

Maintenance needs prompted most of the buying by traction companies. Welding outfits were in good demand. The necessity for conserving old material added increased duties to welding equipment for shop use and for repairing tracks, and lines.

The carbon brush market was active throughout the year. Car wheel sales were limited to maintenance needs. Car roofing, on the other hand, was very quiet.

In many lines owing to a demand from other than electric railways there was a shortage during the year. These included such items as track and track hardware, construction and track tools and tool handles, window glass and shop equipment.

In many of these lines production was curtailed because of the necessity for conservation of raw materials, transportation, fuel and labor. All tool production was reduced considerably in the number of types and sizes. Metal badges for platform men, condenser equipment many lines of electrical equipment, all were curtailed. These restrictions were removed shortly after the armistice was signed.

On July 26 the War Trade Board placed restrictions on the importation of rattan. Manufacturers of car seating, track sweepers and brooms, however, were sufficiently well fixed so that the industry never suffered from a shortage of supply. This restriction, also has been lifted.

Railway motor demand was not very active. One manufacturing concern early made up a fair stock but otherwise motors were built as ordered.

In the summer months there was a renewed interest in fare boxes. A considerable demand arose also for slack adjusters, owing to labor shortage and conservation measures. These were shipped in carload quantities.

Deliveries varied considerably. On much small equipment there were good stocks available and immediate shipments could be made. On large equipment, however, such as poles, deliveries were greatly delayed owing to transportation troubles.

PRICES WERE HIGHER IN 1918

Prices continued to mount during the year in spite of the small demand from traction companies. There is hardly an item that did not advance in price at least once—rolling stock, track, hardware, paints, glass, etc.—all except wire—hit new high levels. Wire on the average was lower than in 1917 because copper was much lower.

Cotton was by no means an insignificant factor in the year's higher prices. Trolley, bell and register cord, insulated wire, waste cotton, coils and insulation reflected the advancing cost of cotton.

As the year closed some prices came down. The most conspicuous ones were rails and wire.

What to do with scrap became a real question for many roads last year. Scrap iron and steel and other old metals brought high prices up to the time the armistice was signed, when the bottom fairly dropped out of this market. Whether to sell for the high prices or to hold for repair and further use came up continually. The government fixed maximum prices for scrap iron and steel. For old rails $35 per ton was allowed and $47.50 for old railway axles. Owing to conditions of the market railways were not always able to dispose of their holdings at such high prices. Nevertheless, much more was realized for scrap in 1918 than ever before.

Electric railway credits received more than the usual scrutiny in the year just past. On the whole, however, collections were in good shape considering the conditions. Not so many roads took advantage of the cash discount as formerly, and also settlements took longer generally than they used to. Still they were made.

Up to Nov. 11 electrical manufacturers were generally working to the extent that they could get labor to operate the machinery. Since that time there have been many cancellations of war and other contracts, and incoming business is now small. The total output of electrical goods for the year was probably no larger than in 1917, which was in the neighborhood of $750,000,000. Throughout the year labor first and raw materials second have been the controlling factors. In addition to a very acute shortage of each, labor has been very undependable. Dilution was tried and found in most instances to work very well. Women as a rule were found to be more dependable in the work in which they were employed than men.

Wage scales for industrial labor advanced by leaps and bounds. The government labor board did much to prevent loss of time through strikes, but it pretty generally recommended higher wages and the shortening of working time to eight hours. This latter did not actually shorten the hours of work but materially increased wages by making it possible to get in more overtime work. Labor priorities were outlined, and in one instance in the industry labor was in serious danger of being drafted.

Raw materials, particularly iron, steel, copper, tin and brass, were insufficient to supply the demand. Substitutes were urged, particularly for brass. Prices of these products were fixed by the government with provisions for maximum output, but even so there was not enough, to go around. The natural result was that along in the summer the War Industries Board began to limit the supply of raw materials through priority certificates in accordance with the essential character of the production. Nothing was termed non-essential, but many lines of production were considered less essential to the winning of the war than others.

POWER EQUIPMENT MARKET

Large power equipment was hard to get throughout the year. Turbines of over 500 hp. were taken under complete government control as to distribution. After the fighting stopped deliveries on large turbines were quoted at four months and longer, depending on the condition of the individual factories. At the close of the year there was still a large volume of unfilled business in steam turbines.

The transformer demand was not so large last year as in the preceding year. In April it was reported to be down to about 70 per cent of that for 1917.

Around the first of June power equipment, including motors, generators, turbines, transformers, etc., advanced around 10 per cent.

A number of manufacturers began to study the export field during the year. There were quantities of inquiries from South America, but the ban on shipping made it hard to do business. However, as soon as the war ceased the manufacturers began to show unusual activity.

Metal prices, generally speaking, were much lower at the close of the year than at the opening. Copper, which owing to the continuance of the government price of 26 cents until Jan. 1, is apparently higher, was actually being offered for resale during the last two weeks of the year at 21 cents. Producers late in December agreed on a price of 23 cents for export.

All Priorities Are Officially Canceled

Formal Announcement Made of the Passing of Priorities Rules and Pledges on Jan. 1

Circular No. 60 of the Priorities Division of the War Industries Board, addressed to all concerned, says: "Effective Jan. 1, 1919, all the rules, regulations and directions of every nature whatsoever issued by the Priorities Division of the War Industries Board are hereby canceled, and all pledges heretofore made on the suggestion or request of the said Priorities Division are hereby revoked."

This is signed by Edwin B. Parker, Priorities Commissioner, and approved by Bernard M. Baruch, Chairman War Industies Board. It is dated Dec. 20.

Dick, Kerr & Company's Annual Report

The annual meeting of Dick, Kerr & Company, Ltd., was held in London on Nov. 14, and important plans of the future were outlined by the chairman. He referred to the acquisition as announced last year of the bulk of "B" preference stocks of Willans & Robinson, Ltd., and said that the work of consolidating the organization of the company with those of Willans & Robinson and the United Electric Car Company has been completed. An alliance has also been made with Siemens Brothers & Company, Ltd., by which much economy can be effected through the amalgamation of selling organizations and co-ordination of designs and products. There is no competition in manufacture as Siemens Brothers & Company made cables, dynamo machinery, telephones, etc., while Dick, Kerr & Company have specialized in apparatus for railways and tramways, steam turbines and the larger classes of electrical machinery. It has also been decided to establish companies in France and in Japan to exploit manufacturing rights in connection with apparatus for railways and tramways. In the belief of the chairman there would be a large after-war demand for all classes of electrical machinery, especially large-sized steam turbines, and he assured the shareholders that the company's facilities for taking care of this demand would be ample.

Coal Price and Zone Regulations Continue

Maximum prices on coal and zone regulations will not be removed before Feb. 1, 1919, United States Fuel Administrator Harry A. Garfield announced recently.

Track and Roadway

Muscle Shoals Traction Company, Florence, Ala.—A second survey has been completed of part of the proposed Muscle Shoals Traction Company's line between Huntsville and Florence, via Athens. The government has made arrangements with the Muscle Shoals Traction Company to use its terminal in Florence and is desirous of having the company build branch lines to Dams Nos. 2 and 3. Thurston Allen, Florence, secretary. [Sept. 21, '18.]

Municipal Railway of San Francisco, San Francisco, Cal.—The Board of Supervisors has adopted an ordinance authorizing the Board of Public Works to prepare plans and specifications and to enter into contract for the reconstruction of tracks on a portion of Taraval Street and for the construction of a line on a portion of Brighton Street.

United Railroads of San Francisco, San Francisco, Cal.—Mayor Rolph and J. N. Lilienthal, president of the United Railroads of San Francisco, recently signed the agreement between the city and the United Railroads providing for the joint use of street railway tracks west of Twin Peaks. By the agreement the city will get the right to operate over the United Railroads' tracks on Taraval Street in the Parkside district from Twentieth to Thirty-third Avenues and the use of the Ocean Avenue line to Herold Avenue in the Ingleside section. The necessary ordinance has been passed providing for the payment by the city to the United Railroads of $100,000 for this latter privilege, while the city, under the arrangement, must reconstruct the United Railroads' tracks from Twentieth to Thirty-third avenues in the Parkside section.

United Railways & Electric Company, Baltimore, Md.—Contract and plans have been filed in Baltimore County by the United Railways & Electric Company for its proposed double-track extension to the yards of the Bethlehem Shipbuilding Corporation at Sparrows Point. The estimated cost of construction is $145,472.

Boston, Mass.—Special investigators of the Commission on Waterways and Public Lands have started a study of the traffic over the recently inaugurated trolley freight line connecting the Fish Pier in South Boston with the Boston Elevated system, in order to determine the possibilities of an extension of the service. The commission proposes, if the plan is found to be practical, to have the Fish Pier line extended over the State-owned lands so that it will serve the Commonwealth Pier, the dry dock, and the embarkation terminal, which the War Department is building.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has approved an opinion by Commissioner F. J. H. Kracke, and has directed the preparation of a final order fixing the status of the Culver Elevated Line in Brooklyn as a branch of the Fourth Avenue subway. The order will also provide that the Culver line shall be operated as a part of the Fourth Avenue subway when the Whitehall-Montague Street tunnel line shall have been completed and placed in operation. This plan will require that when the new Culver elevated structure in Brooklyn is placed in operation a month or so hence it will be operated as the present Culver line is operated, namely in connection with the Fifth Avenue elevated line in Brooklyn. Thereafter when the tunnel line is completed the Culver trains will be made up of steel cars and diverted near the Ninth Avenue station into the Fourth Avenue subway.

Power Houses, Shops and Buildings

British Columbia Electric Railway, Ltd., Vancouver, B. C.—Work will be begun next spring by the British Columbia Electric Railway on the construction of a receiving station for freight at Chilliwack.

Washington & Old Dominion Railway, Washington, D. C.—A report from the Washington & Old Dominion Railway states that it has ordered three 1000-kw. transformers, six 100-kw. transformers and portable substation outfit of 300-kva. transformer and rotary, etc.; also material for changing 14-mile division high-tension 22,000 volts to 33,000 volts.

Winona (Ind.) Interurban Railway.—The Winona Interurban Railway has completed the installation of a complete coal handling apparatus in its power plant at Winona Lake, Ind. The coal is taken from the storage bins to hoppers and thence to the stokers. The equipment was furnished by the Weller Manufacturing Company, Chicago. The company will purchase one new wheel press and in addition one boring mill.

Pascagoula Street Railway & Power Company, Pascagoula, Miss.—It is reported that the Pascagoula Street Railway & Power Company will construct a new power plant.

Kansas City (Mo.) Railways.—A tract of land 100 ft. x 300 ft. has been purchased by the Kansas City Railways just east of the company's present carhouse at Ninth and Washington Streets and will be used by the company for the storage of cars. The company will in the near future construct a double-deck carhouse on the ground which it now owns. The difference in the street elevation makes the location particularly desirable, there being one grade on the Washington Street side and another on Ninth Street.

Ithaca (N. Y.) Traction Company.—The power plant of the Ithaca Traction Company at Ithaca was recently destroyed by fire, causing a loss of about $75,000. The plant has supplied electricity for operating the railway system and for local lighting service and will be rebuilt immediately.

Columbus (Ohio) Depot Company.—The City Council of Columbus has passed an ordinance extending the period within which the Columbus Depot Company may begin the construction of the proposed interurban railway station at the corner of Town and Rich Streets.

Northern Cambria Railway, Patton, Pa.—A contract has been placed by the Northern Cambria Railway with the General Electric Company, Schenectady, N. Y., for one 300-kw. motor generator set, and power will be purchased from the Pennsylvania Central Light, Heat & Power Company shortly after Jan. 1, 1919.

Philadelphia (Pa.) Rapid Transit Company.—Plans are being made by the Philadelphia Rapid Transit Company for the construction of a one-story brick addition to its substation used in connection with service in Philadelphia, to cost about $12,000.

Dallas (Tex.) Railway.—Plans have been made by Fred A. Jones Construction Company, Dallas, for enlarging the Interurban Building at Dallas by the erection of an 8-story addition to the 2-story portion and a 2-story addition to the 8-story portion of the building.

Professional Notes

V. I. Smart, formerly professor of railway engineering and transportation at McGill University, Montreal, and J. A. Burnett formerly electrical engineer with the Grand Trunk Railway system, are now associated as consulting engineers at the New Quirks Building, Montreal. The lines handled will be civil, electrical and mechanical, engineering.

Fuller Engineering Company, designing and constructing engineers, Allentown National Bank Building, Allentown, Pa., announces that Frederick A. Scheffler, formerly connected with the New York offices of the Babcock &Wilcox Company, has now become associated with them and will make his headquarters at their New York office, 50 Church Street. The Fuller Engineering Company is making a specialty of applying the pulverized-coal method of firing to boilers of all kinds for generating power, and Mr. Scheffler will be in a position to furnish complete information regarding the cost of installation, preparation and probable economies obtainable by the adoption of this method of firing coal.

O. S. Lincoln, Inc., Portland, Me., was enlarged on Jan. 1 and is now known as Lincoln, Hanson & Abbott, Inc. The two new partners were formerly with the Moulton Engineering Corporation, which has given up its Portland office, and one of them, Major Abbott, has just returned from service with the engineers in France. The new firm will occupy the same offices but will enlarge the scope of its work so as to cover civil, mechanical, hydraulic and electrochemical engineering in addition to electrical engineering. The firm proposes to go into the business of consulting and designing engineering and management of properties with renewed energy now that the great war is over. The Electrical Standardizing Laboratories will be retained and enlarged, leading to greater activities than have been possible in the past.

Rolling Stock

Mobile & Pensacola Railway & Navigation Company, Mobile, Ala., reports that it expects to purchase some cars during 1919.

Hydro-Eleceric Power Commission of Ontario, Canada, expects during 1919 to purchase six 50-ton all steel locomotives for the traction roads under its control.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., reports that it expects during 1919 to purchase four four-motor street car equipments.

Norfolk & Western Railroad, Bluefield, W. Va., expects to order six electric locomotives during 1919. These locomotives will be duplicates of those now in use.

Gadsen, Bellevue & Lookout Mountain Railway, Gadsden, Ala., expects during 1919 to purchase three single truck cars, one closed and two 10 bench open cars.

Chicago, South Bend & Northern Indiana Railway and **Southern Michigan Railway,** both of South Bend Ind., and under the same management, expect to purchase twenty new city car motor equipments during 1919.

Trade Notes

Maschinenfabrik Oerlikon, whose works are at Oerlikon, near Zurich, Switzerland, recently filed a report at Zurich as to the nationality of its stockholders as far as it could be determined. Of the 16,000 shares outstanding 15,144 are held by Swiss citizens and only 706 by citizens of other nationalities. Holders of 150 shares did not reply to the inquiry. In other words, more than 94 per cent of the stock is held by citizens of Switzerland.

Wellman-Seaver-Morgan Company Cleveland, Ohio, has opened a San Francisco office at 415-417 Rialto Building, in charge of Norman S. Rose. He will give attention to business originating from California, Nevada west of the 115th meridian, lower California and the counties of Josephine, Jackson and Klamath in Oregon. The company has recently appointed Horace N. Trumbull as advertising manager. Mr. Trumbull was formerly advertising manager of the SKF Ball Bearing Company of Hartford, Conn.

Wheeler Condenser & Engineering Company, Carteret, N. J., announces that it has obtained from the Schutte & Koerting Company, of Philadelphia, through the Alien Property Custodian, the exclusive right to manufacture and sell steam jet air pumps under Patent No. 968,926 in connection with surface condensers, jet condensers, barometric condensers, vacuum pans and evaporating apparatus. This patent covers the valuable feature of two or more steam jets working in series with a condenser between the jets.

National Railway Appliance Company, New York, N. Y., B. A. Hegeman, Jr., president, announces the election of Fred C. J. Dell to the office of secretary of the company, effective Dec. 24, 1918. Mr. Dell has acted in the capacity of president's secretary of the company for the past two years, previous to which time he was connected with the American Electric Railway Manufacturers' Association as assistant to the secretary-treasurer, a position which he held from March, 1911, to May, 1916. In the latter year he resigned to assume charge of the detail work of the exhibit committee for the 1916 convention of the American Electric Railway Association, and in October, 1916, he was elected to the office of secretary of the American Electric Railway Manufacturers' Association, which position he still holds. Mr. Dell received his early training in the office of the vice-president and general manager of the Interborough Rapid Transit Company, where he was employed in a clerical capacity for a period of seven years under Vice-President Frank Hedley.

New Advertising Literature

Truscon Steel Company, Youngstown, Ohio, Pressed Steel Department: Folder of pressed steel shapes.

Walter A. Zelnicker Supply Company, St. Louis, Mo.: Bulletin No. 250, or that for January, 1919. It contains eighty-four pages.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, January 11, 1919 *Number* 2

Skip Stops Demand Better Car Signs

MANY American operators do not fully appreciate the revenue and public-satisfaction value of destination and route signs that can be read by the would-be passenger for the length of an ordinary city block, say one-fifteenth or one-twentieth of a mile. Now with the coming of the skip stop, the need for such signs is all the greater because with the longer distance between stops, the car is going at a good rate of speed while it is one block away from the next permissible stop instead of being at a standstill. If the man in the street cannot make out the sign, he will either signal for an unnecessary stop or else start to walk. The latter action is more likely if he is only a mile or so from his destination. Since it cannot be denied that the skip stop has a tendency to discourage short riding, it would be a serious mistake to accelerate that tendency by continuing the use of car signs that are indistinct both night and day. It is so easy to use conspicuous initial or route number signs as an identification to the native rider at least, that further retention of wooden block and ground-glass monitor lettering is inexcusable.

If You Can't Buy, Try Installments or Rental

WHEN the maker of a money-saving or money-earning device has convinced the railway prospect that he is telling the truth and nothing but the truth, the latter will often throw up his hands, expel a heartfelt sigh and say: "I guess you're right old man, but where in Helvetia can I get the money for your stuff?" If the salesman at this point can go no further than a sincere expression of sympathy, both the sale and the savings are off.

It may be a misfortune, but it is certainly necessary in many instances for the manufacturer to finance the customer by taking his payments in long-time installments or in rentals. Although this means a higher initial cost than outright cash purchase, there is an important advantage in that the manufacturer has the strongest possible incentive to make good because he will not get his money until the customer is satisfied. This policy, of course, works out most logically with devices that need personal instruction, enthusiasm and follow-up to be a success, such as fare-collection and car-checking instruments. If the latter are sold outright, the customer is too prone to make no allowance for these very factors that bring him the highest returns.

When asked for the secret of the perfect blending of the paints in the pictures which he produced, the great Reynolds replied that he mixed his paint with brains. So, too, the makers of efficiency devices also have had to mingle brains with metals and mechanisms. Therefore, they cannot sell their apparatus at a manufacturing profit over the cost of their copper and steel as does the maker of a stock article. They must charge a figure that includes both inventive ability and continuing service to the buyer. Surely, if such manufacturers have the faith that the money for long credits or rentals can be made directly out of savings, the electric railway manager should show equal faith in accepting such opportunities in the helpful spirit in which they are made.

Solve This Business Problem in a Business Way

ONE of the tangible results of the recent reconstruction conference at Atlantic City, held under the auspices of the United States Chamber of Commerce, was the passage of a resolution calling for the appointment of a committee of the chamber "to investigate and study the question of local transportation as it relates to the control of rates and service, franchises, taxes, the attraction of capital into the business, and such other questions which the committee may find pertinent." The scope of the investigation is national in character, and, for its decision to carry the greatest weight, we believe that the members of the proposed committee should be of national standing.

The leaders of the Chamber of Commerce of the United States who have to do with the naming of committees could serve the public interest well if, in appointing this particular committee, they select men capable of broad-gage views and conclusions, with a good knowledge of public relations, as well as some contact with power and electric railway companies. The type of man who should come last in the list of those to be named on the committee is the public utility official who is that and no more.

The war has taught us to think in terms of the public utility industry rather than in terms of special interests in the industry. A consciousness has been aroused among public utility men that they are part of a great national industry instead of being merely officials of local plants and local industries. Public utility men themselves are now beginning to understand this, and they should be the first to come forward and urge that there should be named on the committee, for instance, men such as the following: the president of a great life insurance company—any one of them—in view of the fact that the big insurance companies are owners of from $250,000,000 to $300,000,000 worth of public utility securities; the president or general manager of a great industrial plant using power and local transportation which suffered and which thereby caused industrial war production to suffer during the war because of the lack of power and local transportation; leaders, such as one who sprang to the rescue in Boston, in the organization of street railway and power company.security owners; and last but not least, some representative of the public utilities who has been closely in touch with the industry in a national way during recent years and knows its problems.

A big, broad-gaged committee, which touches at all points the public, namely, the users and the owners, rather than the operators, of the public utilities is what is needed for this work. It could do much to advance the prosperity of the country through the improvement of its local transportation systems.

New York Situation Looks Somewhat More Hopeful

THE New York City situation appears a little more hopeful as a result of the events of the past week. The appointment of a receiver for the Brooklyn Rapid Transit Company and the frank statements from Mr. Shonts of the deplorable condition of the Interborough and New York Railways lines under a 5-cent fare have brought a realization to the public that something must be done. A special feature of the case is that with both the B. R. T. and the Interborough, under the dual subway agreement, the companies are entitled to preferential treatment in the division of the income of the rapid transit system. But the new lines are not yet paying—indeed, are not yet completed—and the rise in operating expenses has robbed the 5-cent fare of its profit and the companies of their ability to finance themselves until things again become normal. The acceptance by Mr. Garrison, formerly secretary of war, of the Brooklyn receivership has installed confidence that the interests of the company will be well cared for, and the treatment of the traction crisis in the press is generally sympathetic. This is considered indicative that the city may be brought to consider some service-at-cost or other plan under which the subway extensions may be completed as proposed and the integrity of the traction properties may be preserved.

The obvious immediate step to be taken is an advance in fare. It is a notable fact that although New York provides the most expensive electric railway construction per mile of track of any city in the country and probably the longest ride for a single fare, it is among the very few cities left which have not permitted an increase in the fare from that which existed before the war. The admission of Comptroller Craig that under municipal ownership fares would have to be raised shows the justice of the demand that they be increased now. The whole theory of the modern public service corporation is that it is entitled to a reasonable return. New York City ought not to run the risk of such obloquy as will surely always attach to it if it deliberately witholds a living fare from properties which up to the outbreak of the war were prosperous and paying dividends. It is running such a risk by employing the tactics which have brought the local railways to their present pass.

"Hooverize" Time by Cutting Out Unnecessary Delays

IN A Middle Western city recently an electric railway company found it necessary to indicate the new stopping places under a skip-stop system by suspending the signs from the overhead wires. These signs were placed at locations exactly over the spot where persons were expected to board the cars. The resulting time saving from having the people wait at the proper distance from the street intersection was quite noticeable and had an appreciable effect on the scheduled movement of the cars. The change was especially worthy of comment because the same company previously had marked stopping places by signs on the nearest trolley poles, even though these supports happened to be 50 or more feet from the spot where persons were expected to board the cars.

We do not refer to this experience with the idea of recommending that all companies should change the location of stop signs, regardless of expense, where they do not happen to conform to this plan. We believe, however, that the incident is worthy of mention as showing how improved operation may result from a discovery brought about by the adoption of the skip-stop system.

The "man on the street" has no idea of the value of minutes, still less of seconds, as connected with railway operation. He is peeved perhaps when a car passes him by and causes a wait of two minutes or so for another. In fact, those two minutes are likely to measure up as a much longer period in his mind. This is what Doolittle calls one of the psychological aspects of street railway service. But he rarely thinks that the railway company is interested in saving time.

The thoughtful railway operator, however, has to give serious consideration to this factor in providing transportation, especially under crowded city conditions. That is why, for instance, he adopts a simple transfer system which eliminates, say, one punch mark even though a more elaborate form of transfer would safeguard the revenues more closely if the conductor had the time to punch every hole or look for every mark painstakingly. That is why there is a constant demand for quicker fare collection methods—especially now that more pennies are being handled. This accounts also for the continual effort toward the development of mechanical devices which will have a tendency to speed up the movement of the car.

When we consider how much thought is given by some officials to details of this kind, we may well wonder why no improvement is made to correct other conditions which should have a very strong tendency to accelerate traffic movement. Take, for instance, the matter of clearing the right-of-way from vehicular obstructions—and, as a necessary corollary in crowded districts, preventing the parking of automobiles along the tracks. Wonderful results are said to have been secured in this last particular in Chicago where the downtown streets formerly were impassable outside of the car tracks. Now, during the rush hours, this nuisance is practically eliminated, with a resultant time saving for every car passing through the "loop district."

These are only a few of the items to be considered in improving car service. Traffic studies made from time to time, such as the one reported for Dallas in our Dec. 7 issue, call attention to many similar instances where transportation facilities may be bettered. It is well to have such recommendations come from experts. The people are more likely to be impressed by such reports from disinterested sources. But, after all, no good can come of even the best traffic study unless it be followed by proper co-operation from the public and the local authorities. The trying times through which we are passing call for such co-operation.

Why the Automatic Substation Is Coming Into Its Own

EVERY technical development involves the balancing of rival financial and other considerations, true engineering being the selection of equipment and methods of operation which are in the long run most economical. This is well illustrated in the progress of electric railway power distribution. At first the electric power was generated and distributed in direct-current form for this purpose, but the distance to which it could be transmitted at the low voltage of 500 or 600 was so small as greatly to hamper progress. For interurban lines and long city lines alternating-current transmission was a necessity. However direct current was practically the only kind available in the early days for use in the motors so that the connecting link, the rotary converter and therefore the rotary converter substation, had to be developed. This institution was accepted as a necessary evil, although from the operating standpoint it was a success practically from the start. It involved extra investment in equipment and expense for operating labor. Hence the number of substation units was limited by the cost. A balance had to be struck between savings produced and cost to produce them.

The necessity for using rotary substations was a prime cause of the interest in the alternating-current motor for cars. The difficulties that had to be overcome in producing a satisfactory motor for this purpose were very great but they were overcome and a number of roads adopted these motors. Here again was the balancing of costs, that of the rotary converter substation against the higher cost of rolling stock. In general the rotary "won out." But while all of this progress was going on labor and equipment costs were mounting. The economic limit set to the number of substations possible on many lines was too low. At this point the automatic control came in to permit the number of stations to be increased without increase in labor cost. Here again the economic balance is being redetermined—with the labor factor largely eliminated.

In last week's issue of this paper a list of practically all of the automatic substations installed or ordered to date was given. By means of this it is possible to trace the story from 1915 to date, the short period covered by the actual operation of railway substations of this type. A considerable number of equipments are still to be delivered, so that it will be possible to keep track of progress for some time to come with the aid of the table. The Des Moines City Railway and the Inter-Urban Railway of the same city are the largest users of this type of substation to date. Next comes the Chicago, North Shore & Milwaukee Railroad, the equipment of which form the basis of an article by Charles H. Jones in this week's issue of this paper. Mr. Jones shows in a very convincing way just how and why the automatic control fits in with the equipment of this very important heavy interurban line.

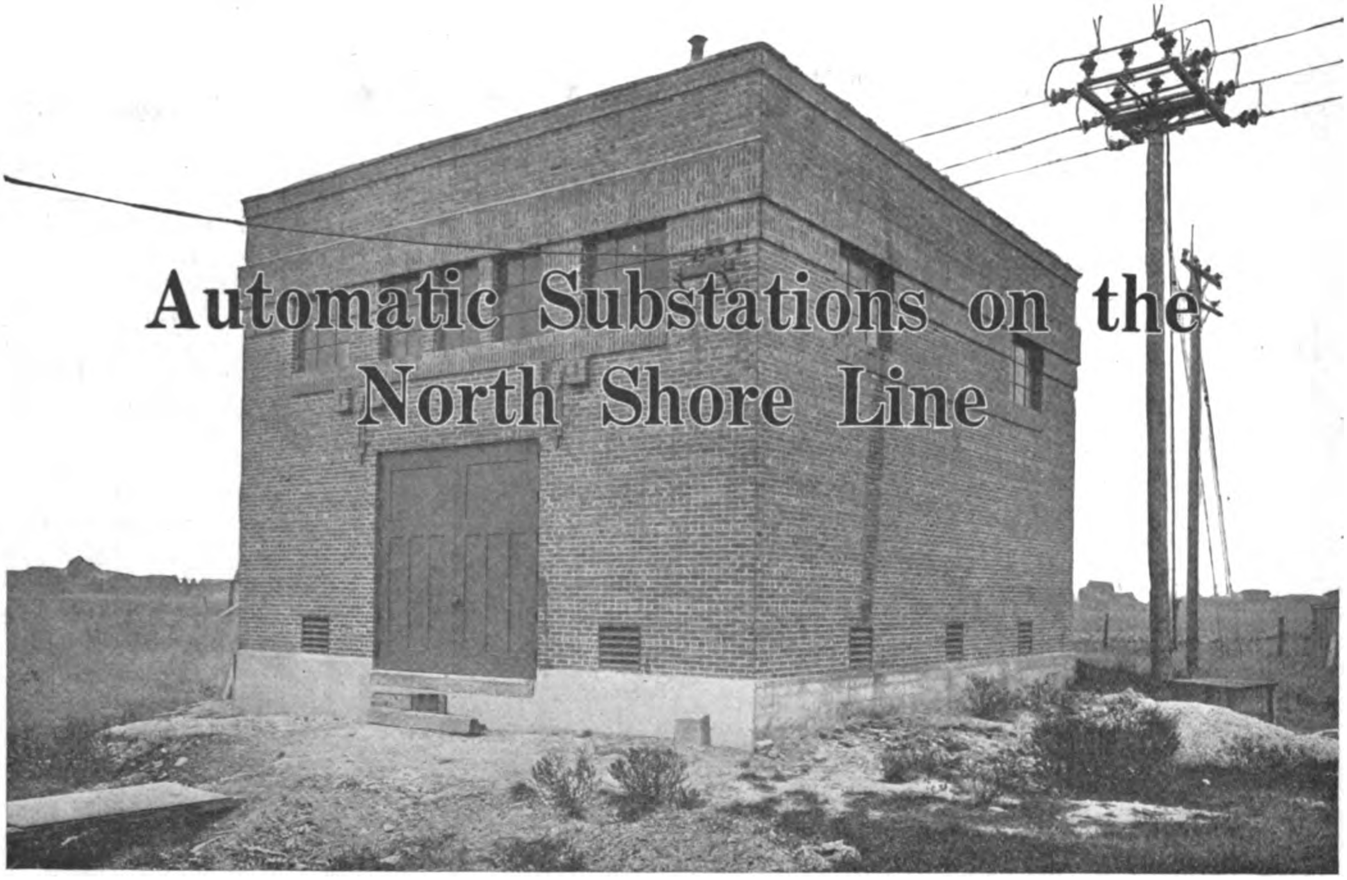
Putting "Square Pegs" in Square Holes, i.e., Selecting Employees Scientifically

EMPLOYERS of labor have not harassed their gray matter very much during the last couple of years about the best manner of selecting employees. The obtaining of help of any kind has been a prime cause for worry, and the finding of a man best fitted for a certain kind of work has not usually been within the realm of practical possibilities. The signing of the armistice has wrought some kaleidoscopic changes, however. War industry workers are scurrying to the cover of more stable if less profitable employment, and peace renders our vast army of fighters a potential host of employment seekers. Because of the inherent stability and attractiveness of the work it seems likely that public utility service will attract many of those who are now or soon will be seeking employment. From the standpoints both of efficiency of work performed and of loyalty to employees the question, "How shall I select my employees?" is a vital one to railway executives today.

In the two or three years preceding the era of labor scarcity from which we are just emerging, considerable progress had been made in the methods of hiring employees by a number of companies. The old haphazard methods were being replaced by those which brought out to some extent the pertinent fact of whether the man was suited for the work in hand. Fitting the man to the job, or the job to the man as the case may be, getting the "square pegs" out of the round holes and into the ones in which they do fit, is scientific selection of labor and yields worth-while results to both employer and employee. The war has given an extraordinary impetus to the development of special tests and methods of determining a man's ability to achieve results along a given line. This is the work of trained practical psychologists, and since our entry into the war the government has had many such experts developing tests and methods of selecting men suited to the innumerable jobs that exist within the confines of a modern military organization. Over one-third of the enlisted personnel of the army has been given these tests. They have been used as the basis of selection of men for positions ranging from field officers to cooks and from air pilots to sappers.

Obviously no one universal test can be employed. A given employment requires a test which will bring out the prospective employee's ability to achieve results in that particular employment. At first glance many of the tests used seem foolish, but one is prone to change his opinions about the matter after taking one of them himself even if it is only one of those devised for the most ignorant and illiterate of the various classes of recruits who so recently were pouring into our cantonments. Of course such tests should be wisely employed and their results should not be regarded as all conclusive. They should not be seized upon as the grand panacea for all the ills that beset the employment office. The results of the War Department's experience have not yet found their way into print, but the growing use of the tests gives some indication of the regard in which they are held and points to their probable value to all employers of labor. At any rate they should be of assistance on electric railways in sifting out worthless applicants for positions.

Automatic Substations on the North Shore Line



Three New Substations in Operation and a Fourth Under Construction Save 177 Miles of 500,000-Circ.Mil Cable Worth $650,000

BY CHARLES H. JONES
Acting Electrical Engineer, Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

THE Chicago, North Shore & Milwaukee Railroad is a high-speed interurban line running between Milwaukee, Wis., and Evanston, Ill., a suburb of Chicago, where it connects with the Northwestern Elevated Railroad, one of the elevated lines entering the city. The interurban road is double track throughout practically its entire length, and among the places of interest located along the line are the largest naval training station in the United States, situated at Great Lakes, Ill., and an army post at Fort Sheridan, Ill. An outline map of the road is given in Fig. 1.

The rolling stock consists of 106 passenger cars, of which thirty are 45-ton steel interurban cars equipped with four 140-hp. motors each, and forty are 38-ton wood interurban cars equipped with four 75-hp. motors each. There are also ten express cars, four locomotives and 150 freight cars, together with the usual complement of line cars, work cars, plows, sweepers, etc.

An hourly high-speed limited service is given between Evanston and Milwaukee, a distance of 73 miles, and half-hourly service on Saturday afternoon, Sunday and holidays. The schedule speed throughout the run is 37 m.p.h. For 21 miles on the southern end of the system the line runs through towns requiring many stops and slow-downs so that on the balance of the run it is necessary to maintain a speed of 60 m.p.h. for a large part of the distance. For this service steel trains of two, three and four cars are used. A half-hourly express service is maintained between Evanston and Waukegan, a half-hourly local service between the same points and a two-hourly local service between Evanston and Milwaukee. On Saturday, Sunday and holidays, and on Wednesday, which has been visitors' day at the Naval Training Station when a public review has been held with an attendance as large as 30,000, service has been added between Evanston and the Naval Training Station so that an average interval of seven minutes for three-car trains has been maintained. In order to accomplish this it was necessary to rent considerable equipment.

In addition to the above passenger service an extensive merchandise dispatch service is maintained on the entire line, and over a portion of the line a great deal of carload freight is handled. This consists mostly of coal, gravel and crushed stone.

As an indication of the rate at which traffic has increased during the past few years, the car-miles run per annum are given as follows: 1915, 2,833,221; 1916, 3,292,559; 1917, 4,742,293; 1918, 6,023,582.

Power is purchased from the Public Service Company of Northern Illinois at Waukegan or Evanston, as the supply company sees fit, and from the Milwaukee Electric Railway & Light Company at Milwaukee. The current is furnished at 25 cycles, 13,200 volts, and is

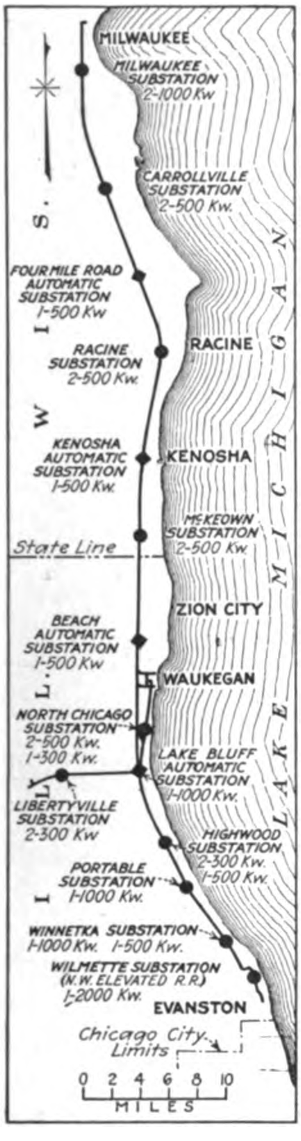

MILWAUKEE
MILWAUKEE SUBSTATION 2-1000 Kw
CARROLLVILLE SUBSTATION 2-500 Kw.
FOUR MILE ROAD AUTOMATIC SUBSTATION 1-500 Kw
RACINE SUBSTATION 2-500 Kw.
RACINE
KENOSHA AUTOMATIC SUBSTATION 1-500 Kw.
KENOSHA
McKEOWN SUBSTATION 2-500 Kw.
State Line
ZION CITY
BEACH AUTOMATIC SUBSTATION 1-500 Kw
WAUKEGAN
NORTH CHICAGO SUBSTATION 2-500 Kw. 1-300 Kw.
LAKE BLUFF AUTOMATIC SUBSTATION 1-1000 Kw.
LIBERTYVILLE SUBSTATION 2-300 Kw
HIGHWOOD SUBSTATION 2-300 Kw. 1-500 Kw.
PORTABLE SUBSTATION 1-1000 Kw.
WINNETKA SUBSTATION 1-1000 Kw. 1-500 Kw.
WILMETTE SUBSTATION (N.W. ELEVATED R.R.) 1-2000 Kw.
EVANSTON
Chicago City Limits
WISCONSIN
ILLINOIS
LAKE MICHIGAN
0 2 4 6 8 10
MILES

FIG. 1—OUTLINE MAP OF C., N. S. & M. R. R.

distributed over the transmission lines of the railway company to the various substations on the line, the transmission voltage between Evanston and North Chicago being 13,200 and that between North Chicago and Milwaukee, 33,000. Step-up transformers are provided at the North Chicago and the Milwaukee substations, there being 3000 kw. of transformer capacity at Milwaukee and 1500 kw. at North Chicago. The power system as originally laid out consisted of substations at Milwaukee, Carrollville, Racine, McKeown Road, North Chicago, Highwood, Winnetka and Libertyville. From time to time, as the service was increased, feeder cable was added until the feeder system had reached the extent indicated in Fig. 2. With the addition of steel cars to the rolling stock in 1916 and 1917, the power system became inadequate. This condition was greatly exaggerated when the United States entered the war, at which time extensive plans were made to enlarge the Naval Training Station and the army post, both of these projects causing a great increase in travel along the line. A very close study of various methods available for enlarging the power system, among those considered being the addition of feeder copper, the changing of the trolley voltage from 600 volts to 1200 and the addition of new substations.

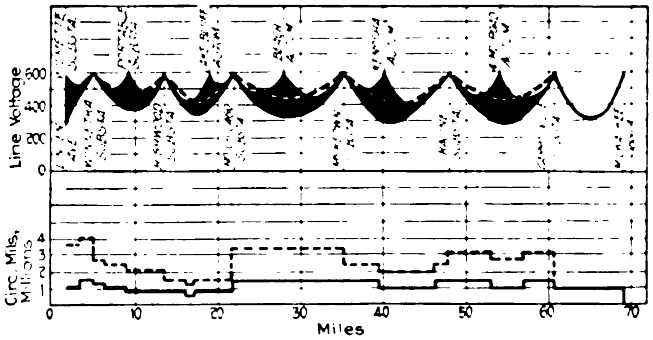
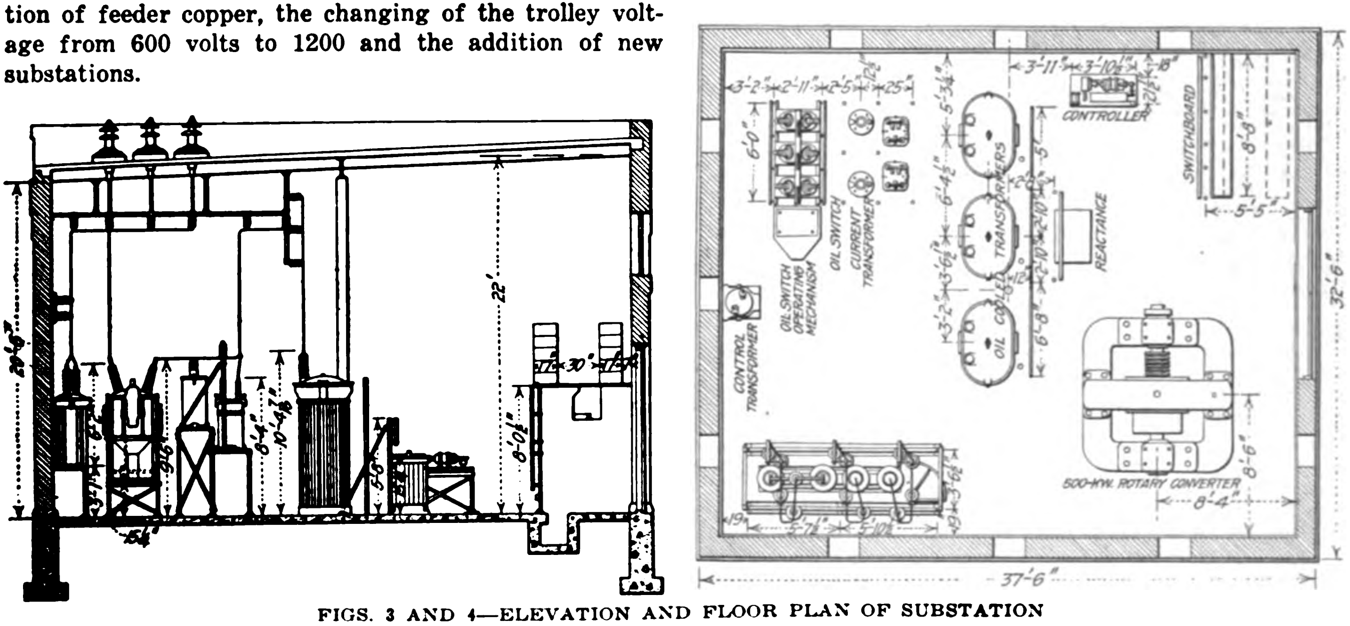


FIG. 2—ABOVE, CHART OF CALCULATED VOLTAGE ALONG LINE WITH 1500-AMP. CONCENTRATED LOAD; BELOW, POSITIVE FEEDER CAPACITY DIAGRAM

In upper figure, bottom border of shaded area shows voltage before new substations were added. Average voltage Linden Avenue to Carrollville, 421. Top border shows voltage with new substations added. Average voltage Linden Avenue to Carrollville, 510. Dotted line shows voltage with enough cable added to produce the lowest voltage obtained between substations in the various zones. Average voltage Linden Avenue to Carrollville, 498.

In lower figure, solid line shows amount of copper in positive circuit at present. Dotted line shows amount of copper required in the positive circuit to give line voltage shown dotted in the voltage chart above. Additional copper amounts to 177 miles of 500,000-circ.mil cable. Negative circuit consists of four 65-lb. rails Linden Avenue to North Chicago Junction; four 80-lb. rails North Chicago Junction to Carrollville, and four 80-lb. rails Carrollville to Milwaukee except for 3½ miles of single track.

A graphic representation of the results which would have been obtained by adding feeder copper or by adding new substations is shown in Fig. 2. The calculations were based on the assumption of a concentrated load of 1500 amp. traveling through the section. The resultant voltage which would be obtained at every mile point on the line was calculated and the drop to that point was plotted. It is evident from this drawing that an average of 421 volts existed throughout the system before the substations were added. With the substations put in as shown the average voltage was raised to 510. In order to determine what amount of copper would have to be added to the present system in order to produce the same low voltage point between substations as would exist under the new substation plan, the drop to the center point was assumed and the calculations were worked backward. The voltage drop at each mile point was then refigured and the resultant graph was drawn. This gave an average voltage throughout


22'
20'-6"
8'-0½"
CONTROLLER
SWITCHBOARD
OIL SWITCH
CURRENT TRANSFORMER
OIL SWITCH OPERATING MECHANISM
OIL COOLED TRANSFORMERS
REACTANCE
CONTROL TRANSFORMER
500-KW. ROTARY CONVERTER
8'-4"
37'-6"
32'-6"

FIGS. 3 AND 4—ELEVATION AND FLOOR PLAN OF SUBSTATION the system of 498, and approximately 177 miles of 500,000-circ.mil cable would have been necessary. As this would cost approximately $650,000, while it was estimated that the additional substations could probably be installed for $150,000, assuming that new equipment was used in each of these added stations, it is quite apparent that the power system could not be built up economically by adding feeder copper. There were many complications to be considered in a proposed change in trolley voltage, due to the fact that in many places the line was operated through towns where it was not considered safe to use the higher voltage on the trolley. Therefore the control equipment would have had to be provided to take care of two line voltages. Furthermore, there were a great many old-type 600-volt motors in use which would have had to be discarded if the trolley voltage was

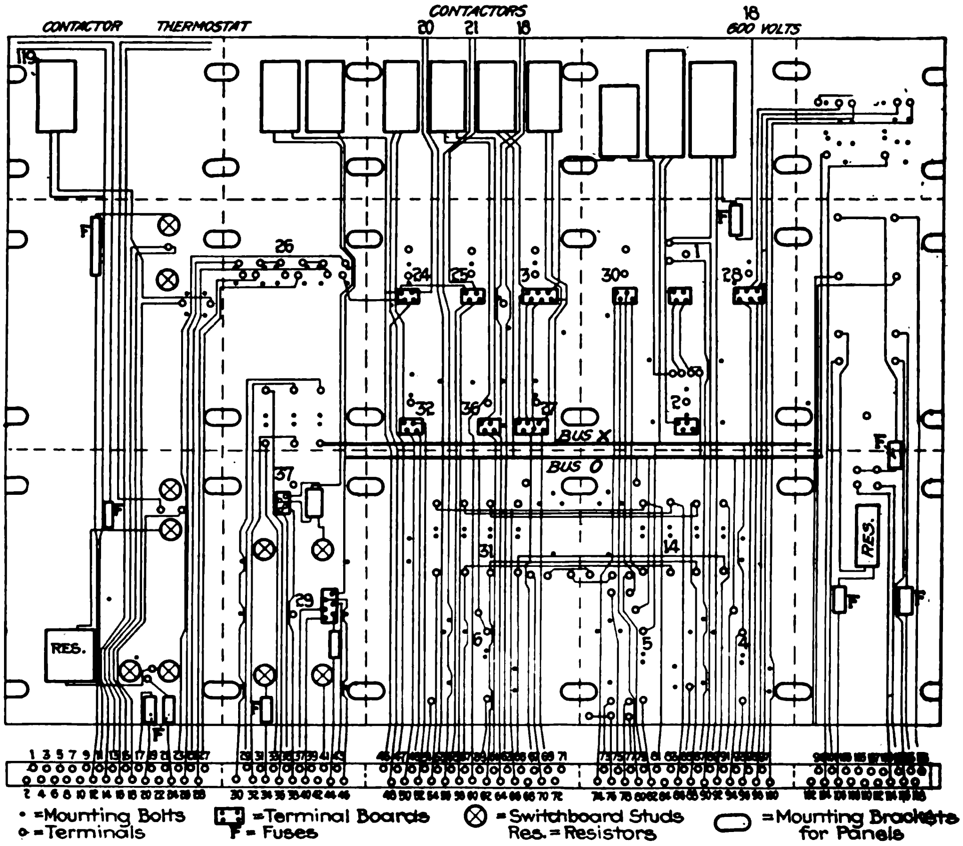


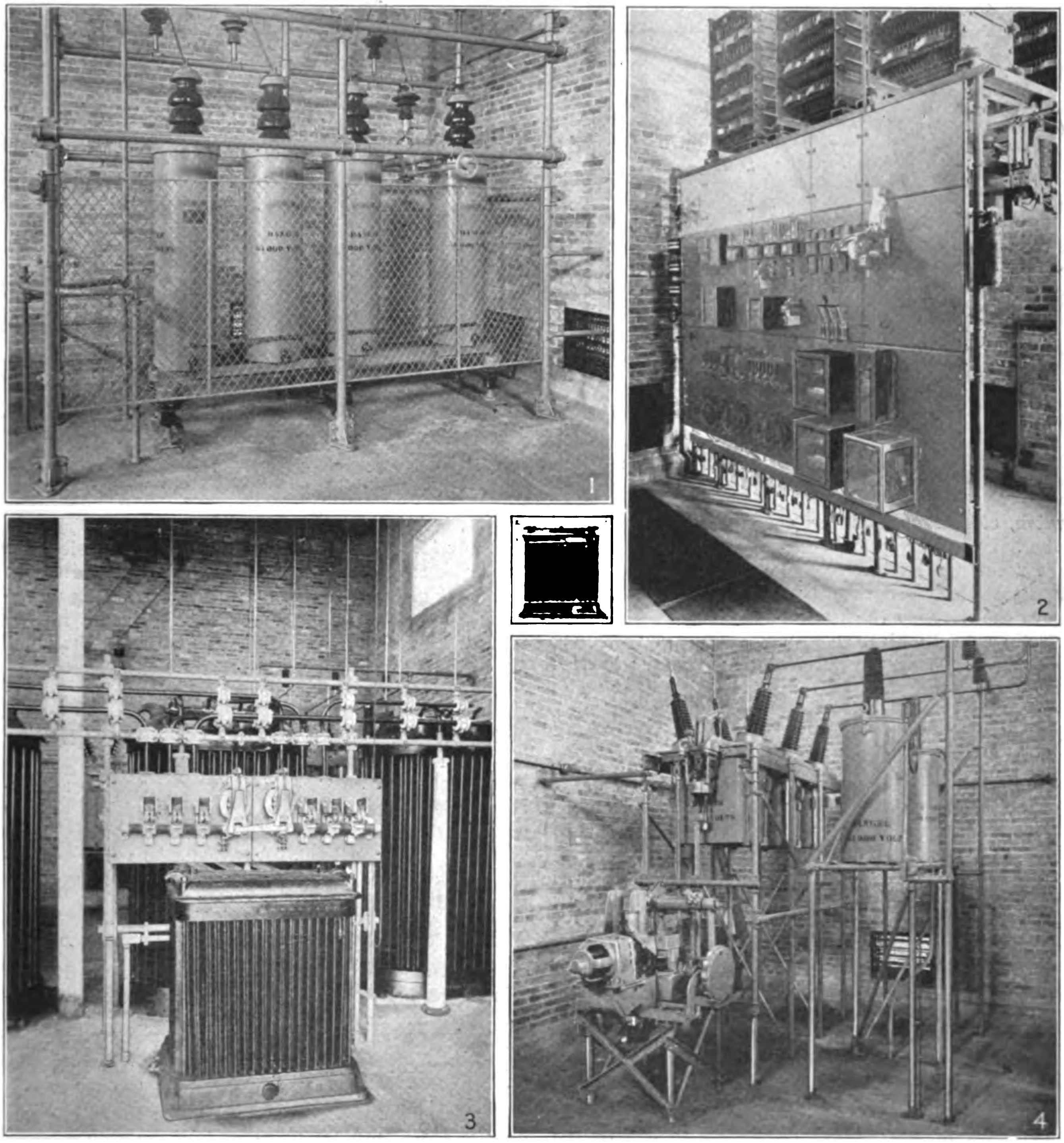
FIG. 5. WIRING LAYOUT ON BACK OF SWITCHBOARD
(See table for details)

TERMINAL BOARD DETAILS

No.	To Switchboard	To Apparatus	To Apparatus
7		Over speed limit	Ground
8		Series field shunt coil.	No. 12 controller
9		Under speed limit device	No. 20 controller
10		North bearing thermostat	South bearing thermostat
11	Resistance grid thermostat.	North bearing thermostat	
12	Positive bus	No. 111	
13	Circuit breaker interlock	No. 26	
14	Resistance grid thermostat	No. 69	
15	No voltage release—C.B	Over speed limit No. 12	
16	Circuit breaker interlock	No. 85	
17	Fuse and No. 20	No. 50	
18	Contacts, series relay No. 23.	Ground	
20	Fuse and No. 17	One-third tap on contactor No. 10	
23	Contact on relay No. 26	No. 67	
24	D.C. wattmeter	Ground	
25	All coils on relay No. 26	Each low tension current transformer	Three wires—ground
26	Contact on relay No. 26	No. 13	
27	Coil on relay No. 26	No. 116	
28	Coil on relay No. 26	No. 58	
29	3-pole switch bus O No. 2	Control transformer	
30	3-pole switch bus X No. 1.	Control transformer	
32	Three-pole switch No. 2	No. 104	
33	Three-pole switch No. 3	No. 47	
34	Rev. current relay No. 29	Controller No. 7	
35	Underload relay No. 37	No. 89	
36	Three-pole switch No. 3	No. 106	
37	Underload relay No. 37	Auxiliary contact, oil switch	
38	Underload relay No. 37	No. 90	
40	Reverse current relay No. 29	No. 77	
41	Machine positive	No. 60 and No. 114(2)	Rheostat No. 1
43	Rev. current relay No. 29	Exciter negative	Controller 21 (1 wire)
44	Underload relay No. 37	No. 64	
45	Relay No. 24	Ground	
46	Reverse current relay No. 29	No. 54	
47	Resistance for relay No. 24.	No. 33	
48	Relay No. 24	North low-tension current transformer	
49	Relay No. 32	Controller No. 2	
50	Relay No. 32	No. 17	
51	Contactor No. 6	Controller Nos. 16, 17, 18	
52	Relay No. 32	Top contact No. 16 interlock	
53	Contactor No. 6	Controller No. 10	
54	Ex. field contactor No. 31	No. 46	
55	Relay No. 25	South low tension current transformer	
56	Contactor No. 20	Controller No. 11	
57	Shunt field bus	Rotary shunt field	
58	Relay No. 25	No. 28	
59	Contactor No. 6	Controller motor	
60	Resistance for relay No. 36.	No. 41	
61	Relay No. 36	Ground	
62	Shunt field bus	Rotary shunt field	
63	Contactor No. 18	Lower contact No. 16 interlock	
64	Relay No. 36	No. 44 and controller No. 8	
65	Shunt field bus	Rotary shunt field	
66	Exciter field bus	Exciter pos., controller No. 22	
67	Relay No. 27	No. 23	
69	Relay No. 27	No. 14	
70	Top contact 31 interlock	Controller No. 4	
71		Controller No. 5	Interlock No. 10
73	Top contact No. 5 interlock	Controller No. 23	No. 94
74	Relay No. 30	Ground	
75	B't'm contact 14 interlock	Ground	
76	B't'm contact 5 interlock	Controller No. 15	
77	B't'm contact 5 interlock	No. 40	
78	Top contact No. 5 interlock	Controller No. 19	
79	Top contact No. 14 interlock	Controller No. 3	
80	Relay No. 30	Bottom contact No. 16 interlock	
81	Exciter field bus	Rotary shunt field No. 4	
82	Contactor No. 5	Controller No. 1	Oil sw. closing coil 1
85	Coil of contactor No. 4	No. 16	
86	Exciter field bus	Rotary field No. 3	
87	Voltmeter No. 1	Ground	
88	Exciter field bus	Rotary field No. 2	
89	Resist. for voltmeter No. 1.	No. 35	
90	Voltmeter No. 1	No. 38	
91	Coil of contactor No. 4	South bearing thermostat	Oil switch No. 4
92	Exciter field bus	Field rheostat No. 2	
93	Contactor No. 4	Controller No. 13	
94	Contactor No. 4, bus X	No. 73, controller 23.	Controller motor, O. S. No. 3
95	Relay No. 28	South high tension current transformer	
96	Relay No. 28	North high tension current transformer	
97	A. C. bus circuit breaker	No. 1 trip coil oil switch E	
98	Relay No. 28	Oil switch trip coil, high tension current transformer	Ground
99		Oil switch opening coil	Controller No. 24
100	A.C. bus circuit breaker	Oil switch trip coil No. 1	
101	Reactive volt ampere ind		
104	A.C. bus circuit breaker	No. 32	
106	Reactive volt ampere ind	No. 36	No. 1 lead power transformer
111	Voltmeter receptacle	No. 12	
113	Reactive volt ampere ind	No. 3 lead power transformer	
114	Voltmeter receptacle	No. 41	
115	D.C. voltmeter	Ground	
116	Reactive volt ampere ind	No. 27	
118		O.S. auxiliary contact	Controller 14 underspeed device 13

changed. Therefore, the only plan that appeared feasible was to add new substations, and this was adopted. A careful study was next made of installations of automatically-operated substations, with the result that two equipments were ordered. The rotary converters for use in these two stations were obtained by installing a 1000-kw. rotary in Winnetka substation, thereby releasing two 500-kw. machines. Two more equipments have since been installed and a fifth is on order. Some details of the construction follow.

The substation buildings are one story in height without basement, and have shallow machine pits, the floor being raised about 2 ft. above the surrounding ground level to prevent water accumulations in the pit. The foundations are of concrete and extend to a point about 6 in. above the floor level, the walls from this level up being built of brick. Pressed brick is used on the outside and common brick on the inside. The roof, which is of 3-in. reinforced concrete, is supported by heavy steel beams, one steel column being located approximately in the center of the building. The floor is of concrete, 6 in. thick, laid on a cinder foundation. Light is admitted through wire-glass windows set in steel frames just below the ceiling level on three sides, and a pair of double doors are located on the track side of the building for use in bringing in the equipment. In one of these doors is set a small door for general use. Ventilation is provided by louvers on all sides just above



APPARATUS IN A CHICAGO, NORTH SHORE & MILWAUKEE AUTOMATIC SUBSTATION
No. 1—Lightning arresters. No. 2—Switchboard with resistors above. No. 3—Transformers and resistance coils.
No. 4—Oil switch with operating mechanism, and current transformers.

the floor level and Burt ventilators in the roof. Two ventilators are used in the 500-kw. stations and three in the 1000-kw. stations. The high-tension line entrance is made through the roof, with 45,000-volt entrance bushings. Figs. 3 and 4 show an elevation and floor plan of the stations giving the general arrangement of the equipment, while the head piece of this article furnishes a good idea of the external appearance of a typical station.

All high-tension work is made of ⅜-in. copper tubing mounted on pipe racks suspended from the ceiling. Oil switch, control transformer, current transformers and potential transformers are elevated above the floor on pipe racks, the lowest point to which high-tension bus or exposed connections are brought being 9 ft. 6 in. above the floor, so that it is impossible for anyone to come in contact with them without deliberately planning to do so. The arrangement of all apparatus is such that it is not necessary to reach across any "high tension" to work upon disconnecting switches or fuses. A 33,000-volt outdoor-type lightning arrester is installed within the building, wire guards being placed on the front of it to prevent anyone from accidentally coming in contact with the tanks.

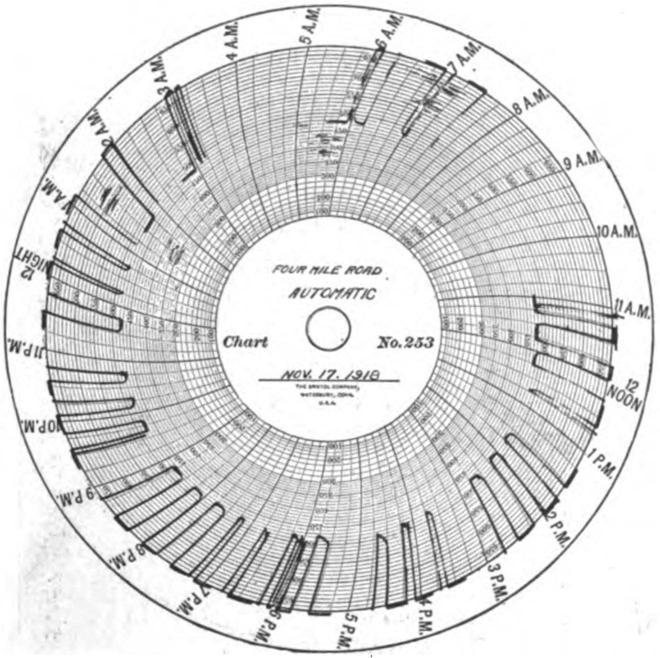


FIG. 6—SAMPLE SUBSTATION VOLTMETER RECORD CHART

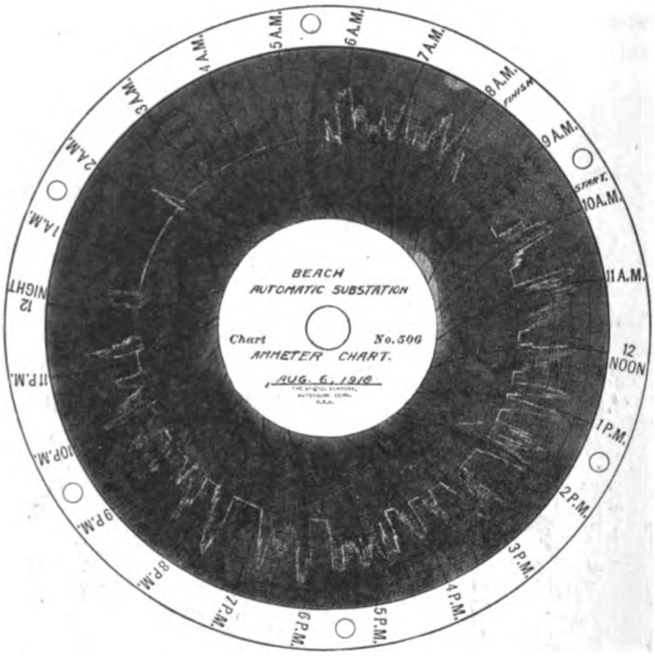


FIG. 7—RECORD, ON SMOKED PAPER, FROM RECORDING AMMETER

The oil-switch operating mechanism is mounted on a pipe rack about 2 ft. above the floor and a direct connection is made between the operating mechanism and the shaft, instead of the usual connection on the side. This makes possible a better arrangement between the switch and the mechanism.

Low-tension connections between the transformer and the alternating current side of the rotary are made with rubber-insulated, lead-covered copper cable mounted on a pipe framework set up in front of the transformers. The starting and running contactors are mounted in front of the middle transformer and directly over the external reactance. An air duct is provided from one of the intake ventilators to the rotary converter pit to furnish cool air to the rotary during hot weather.

All control wiring is installed in iron conduit buried in the concrete floor, and the switchboard is mounted in one corner of the building about 6 ft. from the wall. Ample working space is thus provided behind the board. A trench is located in the floor at the rear of the switchboard and in this all control conduits terminate, short pieces of conduit extending through the floor into this trench from the terminal strip located at the bottom of the switchboard. The trench is provided with a slate cover.

The controller is mounted on an angle-iron table about 2½ ft. above the floor, thereby providing easy access to it. Wires from the controller are carried in a 3-in. iron conduit which extends from the wire trench to one leg of the table, then up the leg and along underneath the controller with three 1½-in. short nipples welded in the horizontal run so as to bring the wires out at their proper place.

The current-limiting resistors are mounted on channel iron racks supported at one end by the building wall and resting on the switchboard stanchions at the other end, with the shunting contactors suspended from the bottom of the resistance grid supports. These supporting irons are mounted at such a height as to give at least 6 ft. clearance from the bottom of the contactor to the floor level. All connections between resistance boxes, contactors and circuit-breaker studs on the board are made with bar copper.

SWITCHBOARD WIRING GREATLY SIMPLIFIED

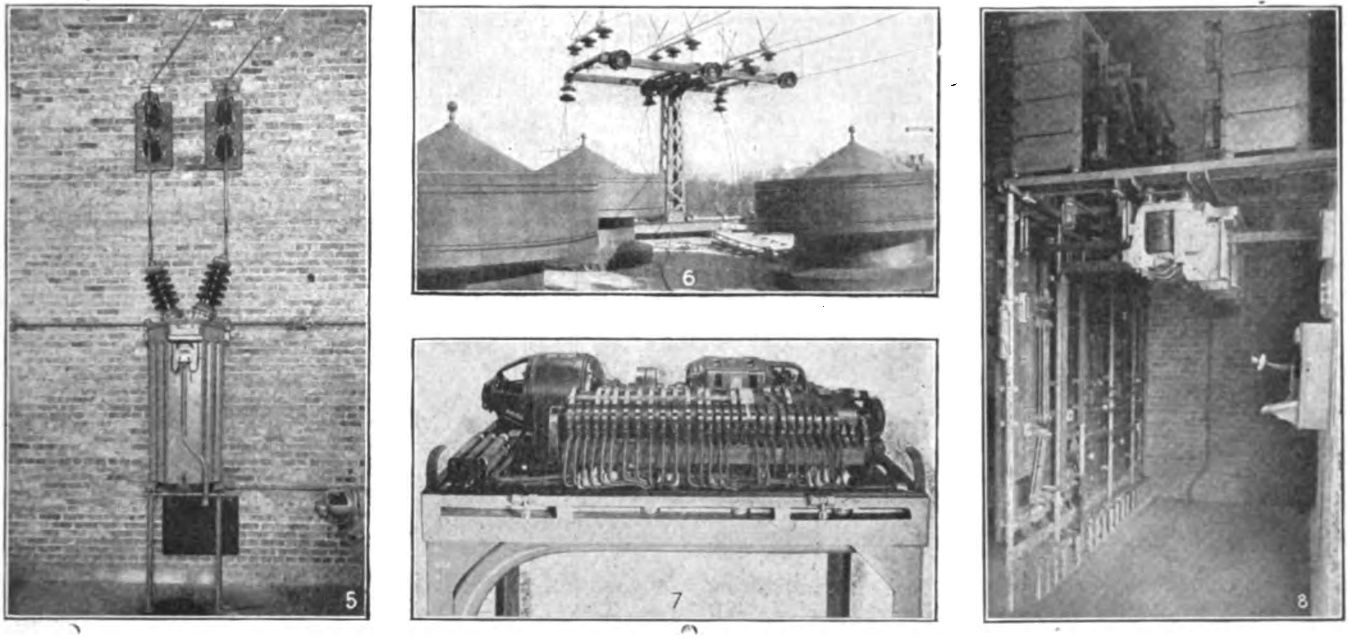
The switchboards themselves were wired on the job. Additional panels were provided above the regular instrument and equipment panels and on the back of these all instrument and apparatus resistors were mounted. At the bottom of the board is a slate strip on which terminals are provided, all control wiring being run direct from the apparatus through the conduit in the floor to these terminal strips, and all connections from the instruments and apparatus on the panels being run down to this same terminal strip. This arrangement, and the mounting of the resistors at the top of the board, make it possible to install very straight and direct switchboard wiring, eliminating practically all wiring crosses on the back of the board. Fig. 5 (page 85) shows the wiring layout on the back of the board, together with the terminal strip, and the table accompanying the drawing shows where each of the wires leads from the terminal post.

A system of ground cables was laid in the concrete floor. This was connected to a ground cone and the track rail, and all pieces of apparatus were connected to this system. All grounding connections were made by welding with an acetylene torch. All through the station a great deal of work was done with these welding and cutting torches, as in making up the control transformer and controller stands and many special pipe fittings.

The buildings are of sufficient size to accommodate a machine of larger capacity, and if it should ever become necessary to provide a two-machine station, the extension for the second machine would be made at the side toward the controller so that the switchboards would join.

Each of these stations is tapped off from the high-tension line. Therefore, in order to make each one as flexible as possible, pole disconnecting switches are provided on both sides of each station so that it is possible to work on the high-tension line on either side of the station and still keep the station running. On the last station built, two steel towers were used in place of the wooden poles, with very pleasing results, the operating rod for the switch being extended down inside the station walls.

For the purpose of checking operation considerable experimental work has been done in order to obtain a record from which some information will be available daily as to determine what is occurring in the stations. A summary of some of the plans tried follows, and, while no one of them gives all the information desired, each has some merits. Further experiments are being conducted along these lines.



DETAILS OF THE SUBSTATION EQUIPMENT, SUPPLEMENTING THOSE SHOWN ON PAGE 87
No. 5—Control Transformer. No. 6—High-tension Connections on Roof. No. 7—Main Controller.
No. 8—View Behind Switchboard, Resistors above with Shunting Contactors Beneath Them

First a recording voltmeter, with stops arranged to limit the range of motion of the pen, is used to indicate when the station is running and when it is shut down. This gives a record of the length of time the station is running, indicates false starts and also serves to indicate failures of any pieces of the apparatus. A sample chart is shown in Fig. 6.

Second, a recording ammeter is used to give a record similar to that obtained with the voltmeter. It also shows the load which the station carries while it is on the line and gives more information about equipment failures than the voltmeter. A sample chart from this instrument is given in Fig. 7.

Third, as a further check on operation, mechanical counters are being installed on the following apparatus: Controller, main contactor, shunting contactor, thermostats and no-voltage relays. By means of these it is possible to determine the number of times these pieces of apparatus operate. By following the registration of these counters from day to day, any failures of apparatus can be observed. A daily inspection of stations is made at which time the charts are changed, counters and meters are read, apparatus is inspected and cleaning done. This, however, is not sufficient and a record of what takes place when nobody is in the station is very desirable.

The first of these stations was put into service as an "automatic" in December, 1917, and went through the following severe winter with very gratifying results. This station carries an extremely steady load and runs continuously about eighteen hours per day. The second station was put into service in the early part of April, 1918. It operates practically 50 per cent of the time during eighteen hours of the day. The third station was put into service in the early part of November, 1918, and runs about 50 per cent of the time, but it does considerable more starting and stopping than either of the other two stations. The fourth station is now under construction and will be put into service during the early winter. This is a 1000-kw. station. It will carry a heavy load for about twenty hours per day with very little starting up and shutting down.

The construction work on these stations was carried out by Caesor Antonio, construction foreman, under the supervision of the writer.

Rehabilitating the Disabled French Soldier

The Author Tells How Steps Are Being Taken to Utilize Disabled Soldiers in the Electric Railway and Other Industries

BY LUCIEN A. H. PAHIN
Pontoise, France

THE French law of April 17, 1916, provided under special conditions for the employment of soldiers and sailors invalided home, or retired on account of infirmities resulting from wounds received or diseases contracted at the front in the course of actual warfare. One article of this law provides that certain public departments, as well as industrial or commercial enterprises which enjoy concessions, monopolies, or state, departmental or communal subsidies, must furnish lists of occupations and indicate the conditions under which employment may be secured by returned soldiers and sailors, and must give their order of preference in these lists. They must also include the proportion of such openings with respect to their total staffs which have not been "reserved" in accordance with previous military laws.

In applying the provisions of the above law four electric railways in and about Paris have established lists of the occupations which will be available for the disabled soldiers and sailors, and the President of the Republic has approved the plan of the companies by a decree under date of May 13, 1918. The railways referred to are the one connecting Paris and Arpajon, the north-south subway line in Paris, the Bois de Boulogne railway and the tramway line on the left bank of the Seine in Paris.

Each list indicates in regard to each employee the following: (1) The category into which each occupation falls in accordance with a classification under four heads established by a law of Aug. 26, 1905. (2) For the various parts of the body, those which when affected by wounds will not necessarily interfere with employment in the occupation in question. (3) The conditions which the applicants must fulfill in order to be employed in the several lines of work. (4) The ratio of the number of disabled soldiers and sailors to the total which the employer considers preferable. (5) The probable annual number of vacancies for disabled men. (6) The wages or salaries to be paid, and the rights of the employees with respect to pensions.

It is understood that former employees who have been injured but are available for re-employment will be reinstated without delay by their former employers either in the lines of work previously occupied or in different work.

To illustrate the kind of report which is prepared the accompanying list from the Arpajon railway is reproduced. Those of the other railways are similar in general, varying only in accordance with local conditions.

Of course in regard to all parts of the body there are certain tasks which impose restrictions not indicated in the table. For example, for the hands, arms and feet the infirmity can involve only a certain amount of functional disability. Again in most of the cases it is necessary that the employee be able to talk.

The Paris lines have been cited as examples, but similar provision has already been made or will ultimately be made in the case of many other railway lines. The tables which they have prepared do not differ essentially from those prepared earlier. The law of April 17, 1916, provided that in future no industrial or commercial enterprise may obtain a concession or monopoly, or state, departmental or communal subsidy, except on the condition of reserving for the military purposes mentioned a certain number of positions, and they will be expected particularly to consider the cases of fathers of large families.

TABLE OF OCCUPATIONS FOR DISABLED SOLDIERS AND SAILORS

Classification Number	Occupations	Parts of Body Which May Be Wounded Without Disqualifying the Worker	Special Conditions of Employment, Examinations, Etc.	Proportion of Rehabilitated Men Desirable	Probable Number of Annual Vacancies	Wages or Salary—Right to Pension
2	Accountants, draftsmen......	Skull, face, eyes, ears, neck, chest, genital organs, back, pelvis, thigh, leg, foot......	Written and oral examinations...	50 per cent	Rare	5 fr. per day
3	Copyists, clerks, warehousemen, storekeepers, etc......	Skull, face, eyes, ears, neck, chest, genital organs, back, pelvis, thigh, leg, foot.....	Written and oral examinations...	50 per cent	Rare	5 fr. per day
3	Inspectors..................	Skull, chest, genital organs, arms, thigh, leg, foot.........	Written and oral examinations...	15 per cent	Rare	5.5 fr.
4	Conductors.................	Same except omit skull	Must be able to read, write and calculate....................	15 per cent	Rare	5 fr.
4	Doorkeepers, night watchmen	Skull, face, chest, genital organs, thigh, leg, foot	Written and oral examinations...	10 per cent	2	5 fr.
4	General workmen...........	Skull, face, chest, genital organs, thigh, leg, foot..............	Must be able to read, write and calculate.....................	10 per cent	2	5 fr.
4	Locomotive drivers..........	Face, genital organs...	Same plus professional knowledge	15 per cent	Rare	5.5 fr.
4	Chauffeurs..................	Face, genital organs...	Same plus professional knowledge	15 per cent	Rare	5.5 fr.
4	Motormen...................	Face, chest, genital organs, thigh, leg, foot................	Same plus professional knowledge	15 per cent	Rare	5.5 fr.
4	Mechanics..................	Skull, face, eyes, neck, chest, abdomen, genital organs.........	Same plus professional knowledge	10 per cent	1	0.45 to 0.70 fr. per hour

Canadian Lines Near Breaking Point

Despite Higher Costs of Operation, Municipal Authorities Demand Old Fares and More Service—Municipally Owned Lines Are Losing Money—Service-at-Cost Plan, as Adopted in Massachusetts, Is Being Sought by Ontario Investors

BY ERNEST P. FREDERICKS
Publicity Director Association of Holders of Public Utility Securities, Toronto, Ont.

ELECTRIC railway history is repeating itself in Canada, where the cost of operation is more than it is in the United States and where most of the lines are getting less than a 5-cent fare. The inevitable has happened, and it is hardly surprising that practically every railway in the Dominion is in financial difficulties. This does not except those that are municipally owned.

For some time prior to the war there were evidences that the tramways of Canada were destined to suffer from the same conditions that have since become country-wide in their influence. Rising costs in every department of operation, scarcity of labor and a pronounced political antagonism have rendered the position of the tramways in Canada well-nigh intolerable. What aggravates the situation is that there is very little apparent inclination on the part of municipal authorities to meet the issue half-way.

In most cases the tramways have contracts in the respective cities running anywhere from twenty-five to thirty years. In a number of instances these contracts provide that when the agreement expires the city can take over the roads, as has already been done in a number of the smaller communities. To appreciate fully the trend of conditions, one must realize that Canada is the hotbed of municipal ownership. Yet, on the record of past performances, one is justified in wondering why this feeling is so intense or why municipalization is regarded as the panacea for all tramway ills. Certain it is that public ownership of tramways in Canada has anything but a clean slate.

MUNICIPAL OPERATION SHOWS DEFICITS

In Port Arthur and Fort William, the publicly-owned tramways are losing about $100,000 a year; this, too, despite the fact that fares are double what they were when the war started. The London & Port Stanley Railway, a municipal enterprise, through favorable action on one application has had an increase in fares allowed and is now asking for another.

The Toronto Civic Railway, which has been operated by the city for the last four years, will show a deficit this year of about $200,000. For the four years it will show an aggregate loss of $687,000.

In Saskatoon, St. Thomas and Edmonton the municipal tramways are working on the wrong side of the ledger and have been for some time.

The Brantford Municipal Railway was compelled to readjust its rates this summer in order to overcome a $12,000 deficit.

Calgary has been in a bad way and even after being bolstered up is barely breaking even on its municipal tramways. A year ago the Calgary Municipal Railway showed a deficit of more than $19,000; this year, up to the end of August, there was a surplus of a little more than $7000, but owing to a 4 per cent tax which was placed on the railway in June by the City Council this surplus will be eaten up.

The Regina Municipal Railway for the nine months ended Sept. 30 showed a deficit of more than $40,000, and it is believed that this will be increased to $50,000 by the first of the year.

All things considered, public ownership has not proved the ideal arrangement that its advocates would have us believe.

OBSTRUCTIONS OFFERED TO HIGHER FARES

In the few cases where increased fares have been allowed in Canada the companies have found it almost impossible to put the new schedules into effect because of injunctions and other court proceedings prompted from a variety of sources. The case of the British Columbia Electric Railway is a striking example of how some of the rate situations have been handled. In this case, the Vancouver City Council granted the company the right to charge a 6-cent fare. As a result of this decision the company began paying increased wages and thereby averted a strike. Some weeks later, after the order had been signed by the city clerk, the Mayor refused to sign it. Thereupon the City Council decided that it had overstepped its powers in granting the increase. The question was finally put up to the people for a vote, and, as in the case of other referendums on the same question, the increase was turned down by the people.

The company then issued a statement in which it said that there was no doubt that the City Council had authorized the increase and that the company would proceed forthwith to charge the 6-cent fare. The city applied for an injunction, but the court refused to issue one and the case has been thrown into the courts to be fought out at a later date. Such cases are not unique either in Canada or in the United States, but they stand out more clearly in the Dominion because rate increases are so seldom allowed.

Despite the inevitable consequence of trying to pay yesterday's liabilities with next week's assets, the railways are being held strictly to the fare schedules of twenty or more years ago. The result is that in a number of cities as many as nine rides for a quarter are being sold, and 25 cents for six rides is almost everywhere the maximum charge. The companies say they cannot continue under such rates, and the City Councils, which in most cases are the clearing houses for tramway troubles, are almost unanimous in declaring that the companies must not only continue at the old fares but must give additional service. It is evident, from this condition of affairs, that the breaking point is not far distant.

ONTARIO SECURITY HOLDERS ORGANIZE ASSOCIATION

As far as Ontario is concerned, the shareholders of the tramway companies have organized for the purpose of devising a plan of relief that will tide over the situation. The Association of Holders of Public Utility Securities, organized along much the same lines as the Massachusetts association a year ago, is conducting a campaign of education to let the riding public know just what the real conditions are and to urge the adoption of the service-at-cost plan of operation for the Ontario roads that need relief. The plan proposed will be formed along the lines of the general service-at-cost plan adopted for Massachusetts with such changes as may be necessitated by the local conditions.

Articles explaining the proposed form of relief are being sent to the leading papers of the Province, and literature giving more detailed explanation of the service-at-cost plan is being prepared for general distribution. Much publicity has already been secured, and the plan has been very favorably received outside of Toronto, where the City Council candidly admits that it wants, and expects, service at less than cost. Perhaps later on, if the city takes over the railway in 1921, the people may be willing to contribute several hundred thousand dollars a year out of the city treasury to make up the deficit resulting from a less-than-cost service.

In the meantime an effort is being made to put the electric railway business of Ontario on a business basis. Montreal has already done this through the service-at-cost plan; Winnipeg is about to launch such a plan, and Ottawa is looking into the merits of the zone system. The Ottawa Electric Railway franchise expires in 1923, and if the city does not acquire the property the franchise will automatically continue for a further period of five years. The company has been asked to make a number of extensions and improvements, but it is not felt that these large expenditures can be made in view of the uncertainty that confronts the company. As far as the zone system is concerned it is not generally indorsed in Canada because experience has shown that where traffic is heavy the fare collection problem is one that makes the zone system impractical.

SERVICE-AT-COST IDEA GAINING FAVOR

In Toronto the situation is about as acute as it is anywhere in the Dominion. On Oct. 9 the Toronto Railway, which is the privately owned railway in the city, petitioned the City Board of Control for its co-operation in obtaining a straight 5-cent fare. Without any investigation of the merits of the case the board decided unanimously to refuse to entertain the proposal. This refusal was subsequently supplemented by what many consider a continuous performance of persecution, and at the present time the city is trying to collect a fine of $24,000 and $1,000 a day imposed by the Board of Control because the company failed to increase the number of its cars as ordered by the board. Just what the outcome will be no one can prophesy, but in view of the present unfriendly attitude of the city government the company can hardly look for much co-operation from that source. In justice to the company it should be said that the service in Toronto is as good as, if not better than, that in most cities of the same size anywhere on the continent and much better than in a number of cities where fares are much higher.

In Hamilton the Radial Electric Railway secured permission to increase its rates last summer, but there was such unanimous opposition that the company decided to waive the proposed increase and announced instead that it would reduce the service. This also met with widespread opposition, and the company was ordered to maintain its regular schedule. Matters have been allowed to drift along from month to month without much sign of improvement, and the company has now announced that one of three things must be accomplished: (1) an increase of fares sufficient to meet expenses of operation; (2) the cessation of operation entirely and realization on the company's physical property at the present high prices of material, or (3) the adoption of the service-at-cost plan of operation. [Since this article was written the Hamilton Radial Electric Railway completely suspended service.—**EDS.**]

The situation in London is also rather interesting. For a little over a year the London Street Railway has been trying to get the City Council to approve a service-at-cost plan of operation, but thus far efforts have been unavailing. Nor can the company get any other form of relief. The inconsistency of this position is attested by the fact that the London & Port Stanley Railway, which is a municipally controlled road, made a plea for relief on exactly the same grounds as the London Street Railway did and the municipal line was at once authorized to make a sufficient advance in fares to cover the increased costs of operation and to provide a sufficient surplus for taking care of its capital obligations. It has never been clearly explained or understood why relief was granted in the case of the municipal line and denied the privately-owned company.

The opinion generally throughout the Province of Ontario is that it is only a question of time when the tramways, municipal as well as privately owned, will be on a service-at-cost basis. Sir Adam Beck, one of the most stalwart advocates of municipalization, in pleading for increased fares for the London & Port Stanley Railway, is credited with saying that "all the road wanted was enough to cover the cost of service." This is characteristic of the position that is being taken by everyone in the Dominion who has investigated tramway conditions and who realizes that the lines cannot continue to give adequate service if they are obliged to sell this service at less than its actual cost. When this self-evident fact becomes generally recognized, the tramways of Canada will be on the road to a solution of their problem, and the riding public will be more likely to secure the kind of service that manifestly cannot be given by companies constantly hovering on the verge of financial disaster.

In his annual report for the year ended March 31, 1918, C. J. Spencer, until recently manager of the Bradford Corporation Tramways, states that excellent results have been secured with a railless trolley battery vehicle which has been used to carry stores required for car repairs, sand, etc. The cost of operating the vehicle is less than that of gasoline lorries engaged in similar work.

Equipment Accessories Desirable in Electric Arc Welding*

Proper Protection for the Operator Is Essential and Conveniences Added Insure Better Workmanship

TO INSURE a high class of workmanship in arc welding and properly to protect the worker from injury, certain equipment accessories have come to be recognized as absolutely essential in carrying out electric welding.

Face shields are of great value. The practice is to provide two types for protecting the eyes and skin from the light rays of the arc when welding. One is a shield so constructed that when it is held in front of the face by one hand, the arc will be observed through a combination of colored glasses located in the center. The shield is of such size as to cover the entire face in order that the skin will not be blistered by the rays from the arc. Fig. 1 shows a sketch of such a shield designed to be held in the hand. This type has been found to be satisfactory. Such a shield is cooler than the helmet type and as a rule is preferred for "down-hand" welding, since ordinarily this class of welding does not require a free hand to steady the body. A face shield should always be made of material which is a non-conductor. Where a metal shield is used, holes will accidentally be burned in it, after which it is often used to the detriment of the operator's eyes. Also slight shocks are often felt when welding with a metal face shield in close places, especially when the face and hands are moist from perspiration. This tends to make an operator nervous and may result in a poor weld.

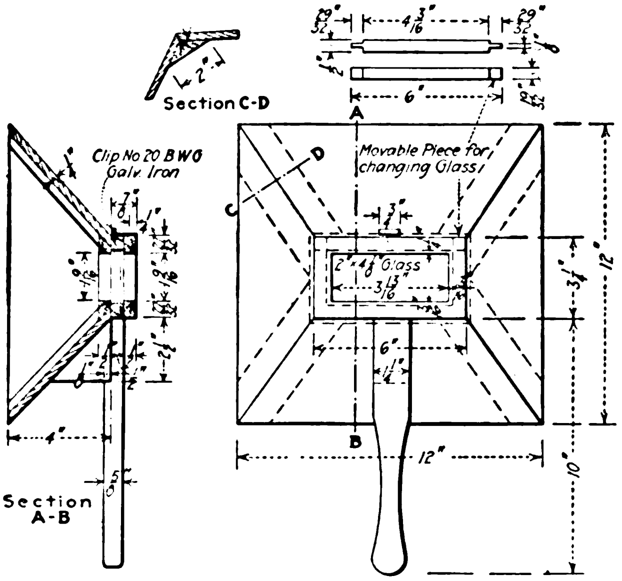

Section C-D
Clip No 20 BWG Galv. Iron
Movable Piece for changing Glass
2"x4¼" Glass
3 13/16
6"
12"
12"
10"
4"
A
B
C
D
Section A-B

FIG. 1—WOODEN FACE SHIELD FOR HAND USE

For the more difficult operations, such as overhead welding, or welding which requires the operator to be in a standing position, a shield of the helmet type should be provided, in order that the operator may be able to use one hand to steady himself. Many different satisfactory designs of head helmets are on the market. Fig. 2 shows a face shield of the helmet type. A combination of glasses which has proved satisfactory is two red glasses, one green glass and one clear glass. The clear glass is used between the colored glasses and the work to protect the former from being pitted by the flying particles of hot metal. It is replaced when it becomes so badly pitted as to interfere with the vision. All glasses should be of single strength thickness.

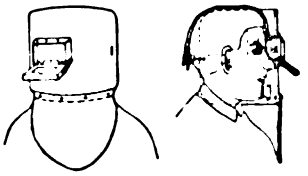


FIG. 2—HELMET TYPE OF FACE SHIELD

In practice it is found that the density of the coloring in the glasses does not run uniform, *i. e.*, one red glass may be very dark while another may be comparatively very light. The same holds true with green glasses. This variation can be used to advantage by operators as it permits them to select a set of glasses having coloring of such density as is best suited to their eyes. The requirements vary greatly among the differ-

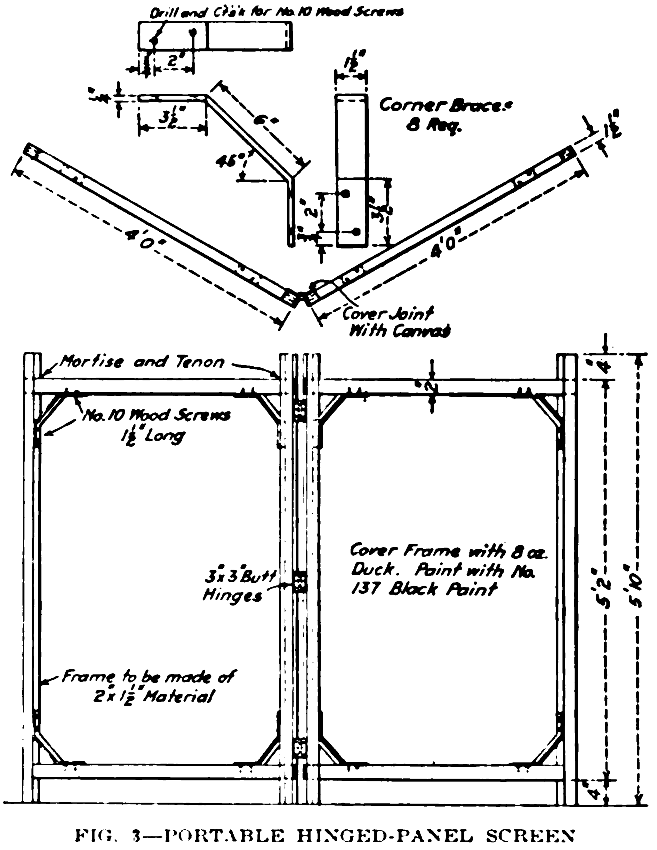

Drill and Cts'k for No. 10 Wood Screws
2"
1½"
3½"
6"
45°
Corner Braces 8 Req.
1½"
4'0"
4'0"
Cover Joint With Canvas
Mortise and Tenon
4"
No. 10 Wood Screws 1½" Long
3x3 Butt Hinges
Cover Frame with 8 oz. Duck. Paint with No. 137 Black Paint
Frame to be made of 2x1½" Material
5'2"
5'10"
4"

FIG. 3—PORTABLE HINGED-PANEL SCREEN

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*From 1918 report of committee of Association of Railway Electrical Engineers. While prepared for railway electrical engineers primarily, this report contains much information of value in the electric railway shop or on the track.

ent operators. Special glasses put out under various trade names are also satisfactory.

Since there is a considerable amount of welding to be done in the shops and out in the open on parts that are too heavy to be transferred to a welding booth, sets of portable screens are provided which can be placed at one side or completely around the work on which the welding is being done, to provide protection for other men working in the near vicinity from the light of the arc. The portable screens are made of two panels hinged together, and usually two portable screens for each welder are provided. When it is desired completely to surround a part, two screens will be required. Fig. 3 shows a sketch of such a screen now in use.

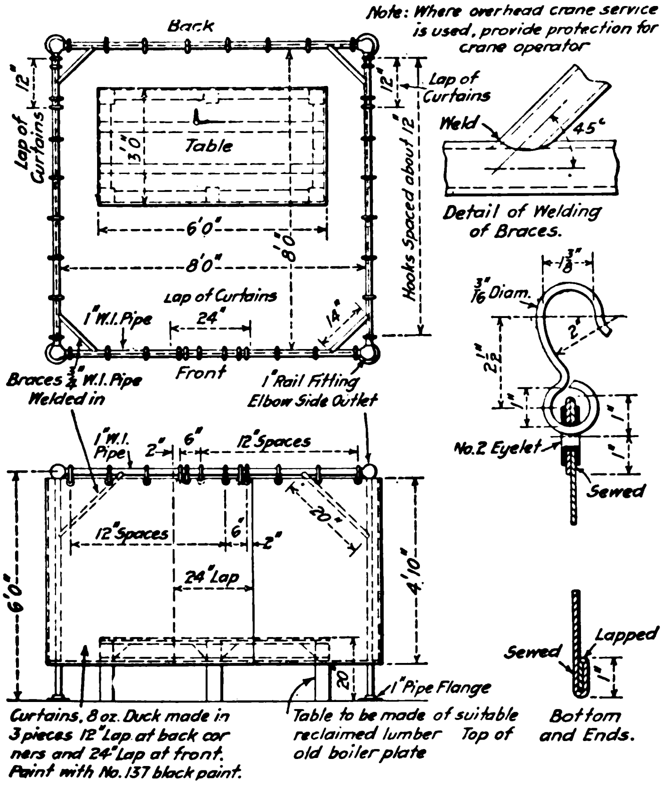

Note: Where overhead crane service is used, provide protection for crane operator
Back
12"
Lap of Curtains
Table
3'0"
6'0"
8'0"
8'0"
12"
Lap of Curtains
Hooks Spaced about 12"
Weld
45°
Detail of Welding of Braces.
Lap of Curtains
24"
1" W.I. Pipe
14"
Front
Braces 3/4" W.I. Pipe Welded in
1" Rail Fitting Elbow Side Outlet
1 3/8"
3/16" Diam.
2"
2 1/2"
1"
1"
1"
No.2 Eyelet
Sewed
1" W.I. Pipe
2"
6"
12" Spaces
12" Spaces
6"
2"
20"
24" Lap
6'0"
4'10"
20
1" Pipe Flange
Sewed
Lapped
1"
Curtains, 8 oz. Duck made in 3 pieces 12" Lap at back corners and 24" Lap at front. Paint with No. 137 black paint.
Table to be made of suitable reclaimed lumber Top of old boiler plate
Bottom and Ends.

FIG. 4. BOOTH FOR WELDING MISCELLANEOUS PARTS

There should always be one or more stationary welding booths located at some convenient place in the shop, where all the small miscellaneous parts may be brought for welding. Fig. 4 shows a sketch of a booth designed for this purpose. The curtains are hung in such manner as to permit parts to be brought into the booth from any one of the four sides. A space between the table and the curtains is provided to prevent sparks from lodging on, and burning holes in, the latter. The booth may be made smaller than that shown if space is limited.

The work on which welding is to be done forms one of the poles of the circuit, and it is necessary that the connection to the work be secure to aid the flow of the current. The practice in most cases has been to connect the ground wire to a plate, the plate then being laid on the work. This kind of a ground connection is very poor unless the plate is tack-welded to the work. A better method for connecting the ground wire is to use an extra heavy forged clamp having an opening of at least 4½ in., and a threaded bolt that can be tightened down with a wrench.

The ground wire should be permanently connected to the clamp, and the point on the work where the clamp is to be attached should be perfectly clean and bright so as to insure a good connection between the clamp and the work.

For cleaning the dirt and oxides from surfaces on which welding is to take place there is nothing that will do the job quite as well as the sand blast. There are cases where the scale is so heavy and hard that the use of a roughing tool is required to loosen the scale, after which the sand blast is used to remove the small particles untouched by the roughing tool. It is found that a small portable type of sand blast is best suited for this class of work, as it can be taken into restricted spaces, and its weight is not so great but what it can be handled with reasonable ease. Fig. 5 is a sketch of a small sand blast which has been in use for some time and has given good results.

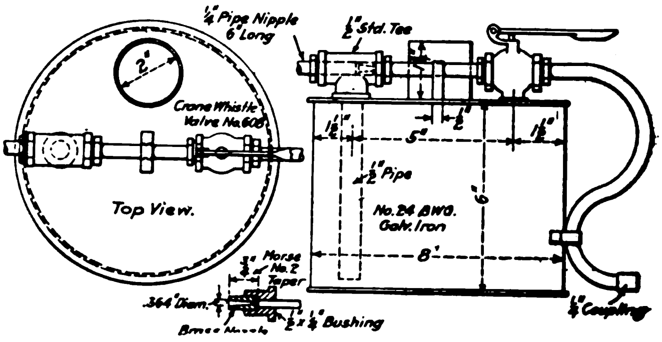

1/4" Pipe Nipple 6" Long
1/2" Std. Tee
2"
Crane Whistle Valve No. 606
Top View.
1 1/2"
5"
1/2"
1 1/2"
1/2" Pipe
No. 24 BWG. Galv. Iron
6"
8"
1/8" Morse No. 2 Taper
.364" Diam.
Brass Nozzle
1/2" x 1/4" Bushing
1/2" Coupling

FIG. 5. SMALL SAND BLAST OUTFIT

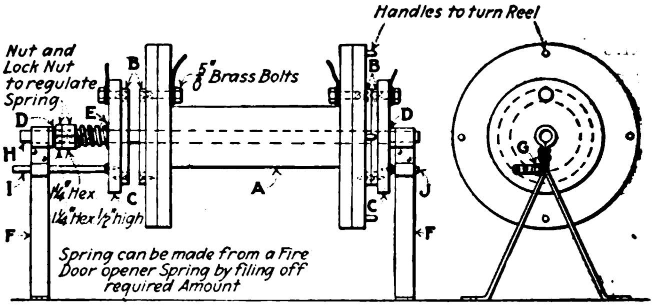

Handles to turn Reel
Nut and Lock Nut to regulate Spring
B
5/8" Brass Bolts
B
D
E
D
H
I
1¼" Hex
1¼" Hex ½" high
C
A
C
J
G
F
F
Spring can be made from a Fire Door opener Spring by filing off required Amount

FIG. 6—CABLE REEL FOR PORTABLE WELDING OUTFITS

As the use of a sand blast is necessary on a large number of the operations, a shield to protect the eyes and skin from the sand is required when the blast is being used. The removal of the colored glasses from one of the face shields, the clear glass being left in place, permits the face shields to serve for this purpose.

For removing dirt and oxides which are very light, two steel wire brushes are provided; one is about 2½ in. wide by approximately 6 in. long, the other is very narrow, approximately 1 in. wide, and 4 or 5 in. long. The narrow brush is used for cleaning in close places.

A selection of carbon blocks and rods should be carried in stock for the purpose of making forms. The blocks are often used as a backing when closing a gap from one side where it is desired that the finished weld be flush and smooth on the opposite side from which the welding was done. The carbon rods are used to insert in holes when it is necessary to do welding on parts which are drilled, without filling in the holes.

When the welding machines are made portable, it is found to be good practice to mount a cable reel on the end of the truck on which the welding circuit cables are wound. The use of a cable reel will preserve the wire and will save considerable time in the handling of the cables.

A sketch of a reel designed for this purpose is shown in Fig. 6. Collector rings are placed at each end to provide for the flow of the current between the terminals of the machine and the cable on the reel. A spring is placed at one end to keep the rings firmly in contact with each other. A reel like that shown has been in service for approximately two years without giving any trouble.

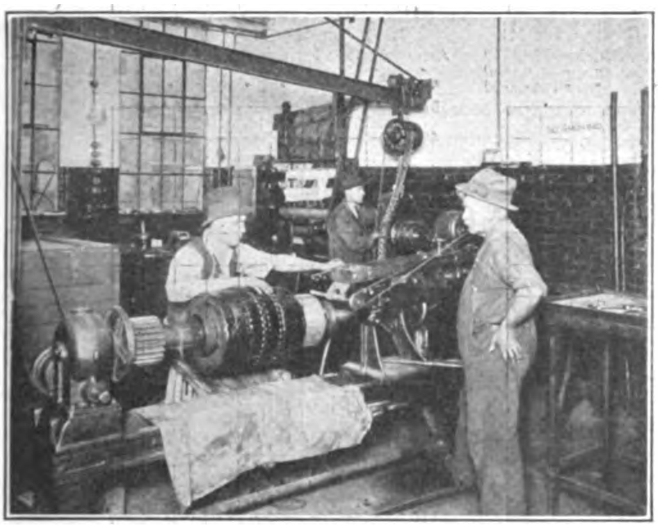
System in the Armature Room

An Armature Rack Conserves Space, Facilitates Handling and With Lathes Adjacent to Crane Much Labor Is Saved

By GEORGE E. PELLISSIER

Assistant Manager Holyoke (Mass.) Street Railway

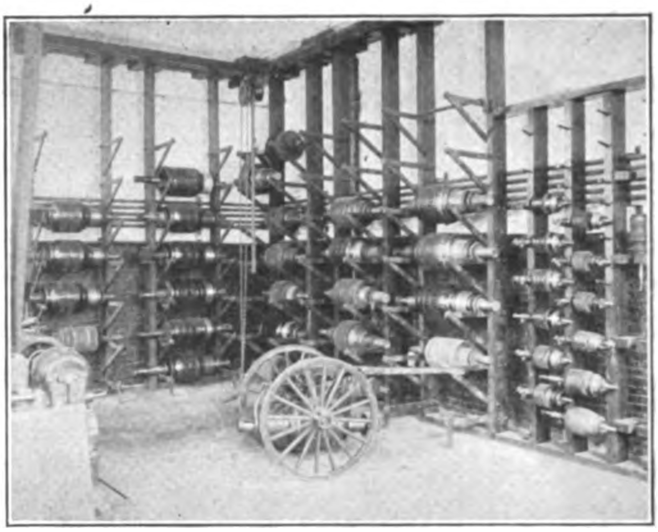
AN ACCOMPANYING illustration shows a type of armature rack which we have at our shop and which has proved of great convenience. The advantages of this particular method of storing armatures lie in the small amount of space taken and the facility with which each armature can be reached by chain block without interfering or damaging other armatures in the rack. To remove an armature it is rolled out to the end of the bracket on which it rests where the sling for lifting it is adjusted, and the armature can then be lifted out with the home-made traveling hoist which serves the rack. After the armature is dropped it is picked up by the armature buggy and carried to the motor for installation.



CORNER OF SHOP USED FOR BANDING ARMATURES AND TURNING AND SLOTTING COMMUTATORS

This rack will accommodate thirty-five armatures with one on each pair of brackets, and seventy armatures with two on each pair of brackets. The rack for storing air-compressor armatures shown at the right in the photograph will store twenty armatures.

In the construction of this rack we used 3-in. x 8-in. wooden uprights to which the brackets were attached by ⅝-in. bolts. The top pieces of the brackets were made of 2-in. x ⅜-in. strap iron and the braces were 2 in. x ½ in. The brackets extended out a distance of 20 in. from the uprights and the top piece was installed with ¼-in. pitch to prevent the armatures rolling towards the end. The ends of braces also projected above the top surface to act as a stop. The uprights were set out from the wall a sufficient amount to clear the steam pipes which may be seen in the illustration.



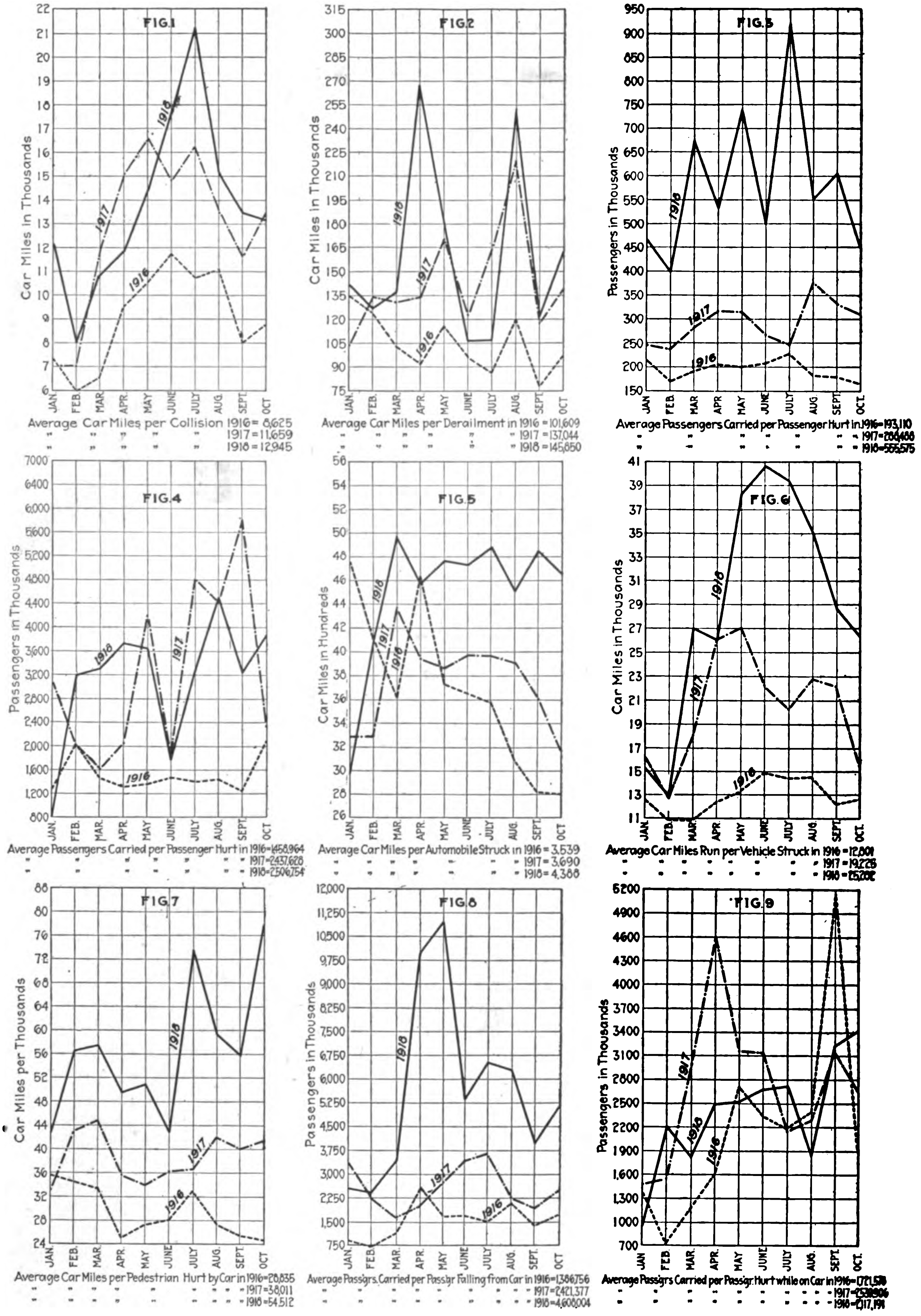
ARMATURE STORAGE RACK OF THE HOLYOKE STREET RAILWAY

By installing a machine for banding armatures and slotting the commutators adjacent to the lathe used for turning down commutators the same jib crane is used to serve both machines.

One of the accompanying illustrations shows the arrangement, together with the banding and slotting machine used which was made by the American General Engineering Company, New York City.

A. S. M. E. Takes Over the Engineering Index

THE American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York City, has acquired the engineering index formerly published by the *Engineering Magazine* and later by its successor, *Industrial Management*. The society will issue the index in three forms: As a part of the journal, as a separate monthly publication and as an annual volume. This famous index originated with Prof. J. B. Johnson of Washington University in 1883. For twelve years it was prepared under his direction and for the following twenty-five years had the personal attention of John R. Dunlap, president of the Engineering Magazine Company. The index will be published with the following classifications: Mechanical engineering, thirty-one subheads; electrical engineering, eleven subheads; civil engineering, nine subheads; mining engineering, fourteen subheads; metallurgy, seven subheads; aeronautics, nine subheads; marine engineering, four subheads; organization and management, thirteen subheads; industrial technology; railroad engineering, fifteen subheads; munition and military engineering; general science, three subheads.



GRAPHICAL RECORD OF SAFETY OF SKIP-STOP OPERATION IN DETROIT

Fig. 1—Chart showing car-miles run per collision of cars.
Fig. 2—Chart showing car-miles run per derailment of cars.
Fig. 3—Chart showing passengers carried per passenger hurt in boarding and alighting.
Fig. 4—Chart showing passengers carried per passenger hurt otherwise than by boarding and alighting.
Fig. 5—Chart showing car-miles run per automobile struck.
Fig. 6—Chart showing car-miles run per vehicle struck (including animals but excepting automobiles).
Fig. 7—Chart showing car-miles run per pedestrian hurt.
Fig. 8—Chart showing passengers carried per passenger falling from car.
Fig. 9—Chart showing passengers carried per passenger hurt while on car.

Skip Stops Spell Safety

Records from Detroit Are Quoted to Show that the Skip Stop Means Greater Safety to the Passenger as Well as to the Vehicle and Pedestrian on the Street—The Data Are Shown Graphically and Cover Ten Months in 1916, 1917 and 1918

BY E. J. BURDICK
Assistant General Manager Detroit United Railway

AS ALL of us know, every progressive measure appertaining to street railway operation meets with opposition—sometimes with those of the craft, I am sorry to state; more often, because more naturally, the opposition comes from the public.

Of these progressive measures probably none has been so bitterly attacked as skip-stop operation, and without sane reason, for such operation is conservation of great import and of the highest type.

I feel certain now that all operating officials, and certainly the public where the system is effective, fully appreciate the conservation of time. The engineering staff of the National Fuel Administration has most thoroughly demonstrated that the system is a great conserver of fuel. Our own records prove conclusively that skip-stop operation in densely-populated communities is a most important reducer of accidents.

Surely, then, a measure conserving all these things I have mentioned is entitled to a vigorous propaganda until it becomes a fixed and settled institution throughout the country.

From the very first study I gave to this method of operation I was convinced of its usefulness as a safety-first measure. The deeper I went into it the more this feature appealed to me, and the longer skip-stop operation has been in effect upon the city service lines of the Detroit United Railway the greater the proof piled up.

The figures given herein and the charts prepared therefrom are based upon the actual records of the company as to car mileage, passengers carried and accident reports, major and minor, filed with our claims department. The population figures are the estimates from the issuers of our city directory, and the figures of automobile licenses issued are officially from the State authorities, as issued to the residents of Detroit. They cannot, of course, include automobiles from other communities that traverse our streets, but this has no basis in the comparison as the conditions thereto have been the same during the period under discussion.

In 1916 Detroit did not have skip-stop operation; in 1917 there was partial skip-stop operation, and throughout 1918 there has been full skip-stop operation.

It should be borne in mind that throughout the years referred to there has been no difference in the other well-recognized measures of safety. In all three years there have been safety zones, near-side stops and safety-step cars (though these have been added to, there being an increase in 1917 over 1916). On the other hand, the class of platform men deteriorated with us as with others, due to war enlistments and profiteering labor shifts, and it is safe to say that had the force of platform men of 1918 been of the standard of ability prevailing in 1916 the advantage of the skip stop as a measure of safety would have been even more startlingly illustrated. The figures I give are for the first ten-month period of the years mentioned.

For the first ten months of 1916 within the one-fare zone we carried 1,458,964 passengers for every one injured. With skip-stop operation gradually developing in 1917 the factor of safety increased to one injury for every 2,437,628 passengers, and in 1918 under adverse labor conditions becoming much worse we carried safely 2,506,754 passengers to one hurt.

Similar evidence of safety by skip-stop operation is demonstrated by comparing the number of car-miles operated to every collision between street cars:

AVERAGE NUMBER OF CAR-MILES OPERATED TO EVERY CAR COLLISION

Non-skip-stop, 1916	8,625 car-miles
Partial skip-stop, 1917	11,659 car-miles
Complete skip-stop, 1918	12,945 car-miles

And this is despite the labor conditions!

Opponents of skip-stop operation have often muddled themselves as between increased speed and decreased running time due to the elimination of stops and hence less wastage through acceleration, and have feared that faster operation would increase the element of danger. There has, of course, been no increase of maximum speed so that their fears are unfounded.

A corollary to the collisions between the company cars may be taken as the collisions between the company cars and the growing number of automobiles. Here again is ample proof of the safety to be found in the skip stop.

In 1916 we operated 3539 car-miles to every automobile struck; in 1917 this was increased to 3690 car-miles and in 1918 to 4388 car-miles. Certainly the observation of none of us can possibly lead to the credit going to any increasing care being taken by the mass of automobile drivers.

Again proof of the safety to be found in skip-stop operation through the elimination of the number of places where passengers may board and alight is most clearly shown in the number of accidents of platform nature—those in boarding or alighting. Here is the table of comparison:

AVERAGE NUMBER OF PASSENGERS CARRIED PER PASSENGER INJURED IN BOARDING OR ALIGHTING

Non-skip-stop, 1916	193,110 passengers
Partial skip-stop, 1917	288,488 passengers
Complete skip-stop, 1918	555,575 passengers

The detailed tables follow, Table I showing the same data as Fig. 1, Table II as Fig. 2, etc. No especial explanation is required as to their compilation except possibly with Tables V and VII, shown graphically in Figs. 5 and 7. In determining the proper allowance in Table V, for the increasing number of automobiles in use, the number of licenses issued for 1918 was taken as the unit 1.00. It was then found that the number in 1917 was 0.82 of the 1918 figure and that in 1916 it was 0.66 of the 1918 figure. These constants, multiplied by the passenger car-miles for their respective year, were taken as giving the relation of the passenger car-miles each year one to the other. This result is divided by the number of "automobiles struck" to determine the car-miles per automobile struck. The same general plan was followed in Table VII, which gives the car-miles run per pedestrian hurt. The population in 1918 was taken as the unit 1.00, and it was found that the unit constant for the population in 1916 was 0.83, and for the population in 1917 was 0.92. These constants, multiplied by the passenger car-miles for their respective year, give the relation of the passenger car-miles each year one to the other. This result is divided by the number of "pedestrians hurt by car" to determine the car-miles run per pedestrian hurt by car.

Surely, skip stop means "safety first."

TABLE I—SHOWING CAR-MILES RUN PER CAR COLLISION

	1916		1917		1918	
Month	Pass. Car-Miles	C.M. per Collision	Pass. Car-Miles	C.M. per Collision	Pass. Car-Miles	C.M. per Coll'n
January	3,092,395	7,311	3,696,929	7,015	3,395,650	12,348
February	2,962,281	5,960	3,337,579	7,056	3,166,590	7,956
March	3,186,272	6,516	3,939,313	11,937	3,560,089	10,854
April	3,112,040	9,546	3,605,150	15,084	3,216,331	11,868
May	3,257,674	10,509	3,761,212	16,569	3,456,461	14,342
June	3,186,853	11,716	3,658,864	14,753	3,300,340	17,649
July	3,282,132	10,726	3,743,624	16,206	3,310,871	21,224
August	3,351,320	11,060	3,739,385	13,548	3,262,398	15,104
September	3,350,306	8,015	3,523,197	11,589	3,065,026	13,443
October	3,631,965	8,773	3,509,600	13,498	3,082,483	13,117
Total	32,413,238	8,625	36,316,853	11,659	32,816,239	12,945

TABLE II—SHOWING CAR-MILES RUN PER CAR DERAILMENT

	1916		1917		1918	
Month	Pass. Car-Miles	C.M. per Derailment	Pass. Car-Miles	C.M. per Derailment	Pass. Car-Miles	C.M. per Derailment
January	3,092,395	134,452	3,696,929	102,692	3,395,650	141,485
February	2,962,281	123,428	3,337,579	133,503	3,166,590	126,664
March	3,186,272	102,783	3,939,313	131,310	3,560,089	136,927
April	3,112,040	91,531	3,605,150	133,524	3,216,331	268,028
May	3,257,674	116,346	3,761,212	170,964	3,456,461	181,919
June	3,186,853	96,571	3,658,864	121,962	3,300,340	106,463
July	3,282,132	86,372	3,743,624	162,766	3,310,871	106,802
August	3,351,320	119,690	3,739,385	219,964	3,262,398	250,953
September	3,350,306	77,914	3,523,197	117,440	3,065,026	122,601
October	3,631,965	98,161	3,509,600	140,384	3,082,483	162,236
Total	32,413,238	101,609	36,316,853	137,044	32,816,239	145,850

TABLE III—SHOWING PASSENGERS CARRIED PER PASSENGER HURT IN BOARDING AND ALIGHTING

	1916		1917		1918	
	Passengers	Carried	Passengers	Carried	Passengers	Carried
Month	Total	Per Pass. Hurt	Total	Per Pass. Hurt	Total	Per Pass. Hurt
January	31,732,257	215,866	37,097,629	247,318	30,373,116	467,279
February	30,303,538	171,206	33,867,547	238,504	28,668,032	398,167
March	33,690,601	191,424	38,278,999	283,548	32,904,264	671,516
April	33,692,728	206,704	36,770,852	316,990	29,799,500	532,134
May	35,476,121	200,430	37,920,658	316,005	32,734,744	743,971
June	35,194,325	209,490	36,817,210	268,739	31,974,760	499,606
July	34,922,954	228,255	36,697,586	247,957	32,525,219	929,292
August	35,848,273	183,837	36,376,844	378,925	31,469,892	552,103
September	36,217,310	180,186	34,808,529	334,697	32,138,851	606,393
October	37,237,442	164,767	34,570,768	310,547	30,755,893	445,737
Total	344,315,549	193,110	363,206,622	288,488	313,344,271	555,575

TABLE IV—SHOWING PASSENGERS CARRIED PER PASSENGER HURT OTHERWISE THAN BY BOARDING AND ALIGHTING

	1916		1917		1918	
	Passengers	Carried	Passengers	Carried	Passengers	Carried
Month	Total	Per Pass. Hurt	Total	Per Pass. Hurt	Total	Per Pass. Hurt
January	31,732,257	1,269,290	37,097,629	3,091,469	30,373,116	843,697
February	30,303,538	2,020,236	33,867,547	1,992,208	28,668,032	3,185,337
March	33,690,601	1,464,809	38,278,999	1,594,958	32,904,264	3,290,426
April	33,692,728	1,295,874	36,770,852	2,042,825	29,799,500	3,724,938
May	35,476,121	1,364,466	37,920,658	4,213,406	32,734,744	3,637,194
June	35,194,325	1,466,430	36,817,210	1,840,860	31,974,760	1,776,375
July	34,922,954	1,396,918	36,697,586	2,822,891	32,525,219	3,252,522
August	35,848,273	1,433,931	36,376,844	2,425,123	31,469,892	4,495,699
September	36,217,310	1,248,873	34,808,529	5,801,422	32,138,851	3,213,885
October	37,237,442	2,068,747	34,570,768	2,304,718	30,755,893	3,844,488
Total	344,315,549	1,458,964	363,206,622	2,437,628	313,344,271	2,506,754

TABLE V—SHOWING CAR-MILES RUN PER AUTOMOBILE STRUCK

	1916		1917		1918	
Month	Pass. Car-Miles	C.M. per Auto Struck	Pass. Car-Miles	C.M. per Auto. Struck	Pass. Car-Miles	C.M. per Auto. Struck
Jan.	3,092,395x0 66	4,791	3,696,929x0 82	3,288	3,395,650x1.0	2,943
Feb.	2,962,281x0 66	4,116	3,337,579x0 82	3,282	3,166,590x1.0	4,044
Mar.	3,186,272x0 66	3,626	3,939,313x0 82	4,365	3,560,089x1.0	4,951
Apr.	3,112,040x0.66	4,636	3,605,150x0 82	3,942	3,216,331x1.0	4,569
May	3,257,674x0 66	3,734	3,761,212x0.82	3,860	3,456,461x1.0	4,761
June	3,186,853x0 66	3,645	3,658,864x0 82	3,974	3,300,340x1.0	4,735
July	3,282,132x0.66	3,569	3,743,624x0 82	3,961	3,310,871x1.0	4,883
Aug.	3,351,320x0 66	3,085	3,739,385x0.82	3,911	3,262,398x1.0	4,512
Sept.	3,350,306x0 66	2,820	3,523,197x0 82	3,602	3,065,026x1.0	4,850
Oct.	3,631,965x0 66	2,804	3,509,600x0 82	3,162	3,082,483x1.0	4,656
Total	32,413,238x0.66	3,539	36,316,853x0.82	3,690	32,816,239x1 0	4,388

	1916	1917	1918
Automobiles	28,050 = 66 per Cent.	of	42,500
Automobiles		34,850 = 82 per Cent. of	42,500

TABLE VI—SHOWING CAR-MILES PER VEHICLE STRUCK (INCLUDING ANIMALS AND EXCEPTING AUTOS)

	1916		1917		1918	
Month	Pass. Car-Miles	C.M. per Vehicle Struck	Pass. Car-Miles	C.M. per Vehicle Struck	Pass. Car-Miles	C.M. per Vehicle Struck
January	3,092,395	12,622	3,696,929	16,214	3,395,650	15,227
February	2,962,281	10,971	3,337,579	12,690	3,166,590	12,820
March	3,186,272	10,949	3,939,313	17,906	3,560,089	26,970
April	3,112,040	12,448	3,605,150	26,124	3,216,331	25,938
May	3,257,674	13,351	3,761,212	27,059	3,456,461	38,405
June	3,186,853	14,892	3,658,864	22,175	3,300,340	40,744
July	3,282,132	14,459	3,743,624	20,236	3,310,871	39,415
August	3,351,320	14,571	3,739,385	22,663	3,262,398	35,080
September	3,350,306	12,227	3,523,197	22,158	3,065,026	28,645
October	3,631,965	12,655	3,509,600	15,461	3,082,483	26,346
Total	32,413,238	12,801	36,316,853	19,225	32,816,239	25,282

TABLE VII—SHOWING CAR-MILES PER PEDESTRIAN HURT BY CAR

	1916		1917		1918	
Month	Pass. Car-Miles	C.M. per Pedest. Struck	Pass. Car-Miles	C.M. per Pedest. Struck	Pass. Car-Miles	C.M. per Pedest. Struck
Jan.	3,092,395x0 83	35,648	3,696,929x0 92	32,704	3,395,650x1.0	42,446
Feb.	2,962,281x0 83	34,565	3,337,579x0 92	43,107	3,166,590x1.0	56,546
Mar.	3,186,272x0 83	33,476	3,939,315x0 92	44,743	3,560,089x1.0	57,421
Apr.	3,112,040x0 83	25,078	3,605,150x0 92	35,664	3,216,331x1.0	49,482
May	3,257,674x0 83	27,312	3,761,212x0 92	33,925	3,456,461x1.0	50,830
June	3,186,853x0 83	28,139	3,658,864x0 92	36,195	3,300,340x1.0	42,861
July	3,282,132x0 83	32,821	3,743,624x0 92	36,598	3,310,871x1.0	73,574
Aug.	3,351,320x0 83	27,541	3,739,385x0 92	41,954	3,262,398x1.0	59,316
Sept.	3,350,306x0.83	25,420	3,523,197x0.92	40,017	3,065,026x1.0	55,728
Oct.	3,631,965x0.83	24,709	3,509,600x0.92	41,395	3,082,483x1.0	79,038
Total,	32,413,238x0.83	28,835	36,316,853x0.92	38,011	32,816,239x1.0	54,512

Population	1916 = 83 per Cent of 1918	1917 = 92 per Cent of 1918	1918 = 100 per Cent
Detroit	820,778	914,896	986,699
Highland Park	25,000	27,125	39,000
Hamtramck	21,520	20,000	20,000
St. Clair Heights	10,000	13,000	13,000
	876,298	975,021	1,058,699

TABLE VIII—SHOWING PASSENGERS CARRIED PER PASSENGER FALLING FROM CAR

	1916		1917		1918	
	Passengers	Carried	Passengers	Carried	Passengers	Carried
Month	Total	Per Pass. Falling	Total	Per Pass. Falling	Total	Per Pass. Falling
January	31,732,257	881,452	37,097,629	3,372,512	30,373,116	2,531,093
February	30,303,538	739,111	33,867,547	2,257,836	28,668,032	2,389,003
March	33,690,601	1,161,745	38,278,999	1,664,304	32,904,264	4,113,033
April	33,692,728	2,591,748	36,770,852	2,042,825	29,799,500	9,933,167
May	35,476,121	1,689,339	37,920,658	2,708,618	32,734,744	10,911,581
June	35,194,325	1,675,920	36,817,210	2,347,019	31,974,760	5,329,127
July	34,922,954	1,518,389	36,697,586	3,669,759	32,525,219	6,505,044
August	35,848,273	2,108,722	36,376,844	2,273,553	31,469,892	6,293,978
September	36,217,310	1,392,973	34,808,529	1,933,807	32,138,851	4,017,358
October	37,237,442	1,773,212	34,570,768	2,469,340	30,755,893	5,125,982
Total	344,315,549	1,386,756	363,206,622	2,421,377	313,344,271	4,608,004

TABLE IX—SHOWING PASSENGERS CARRIED PER PASSENGER HURT WHILE ON CAR

	1916		1917		1918	
	Passengers	Carried	Passengers	Carried	Passengers	Carried
Month	Total	Per Pass. Hurt	Total	Per Pass. Hurt	Total	Per Pass. Hurt
January	31,732,257	1,379,663	37,097,629	1,483,905	30,373,116	949,160
February	30,303,538	721,513	33,867,547	1,539,434	28,668,032	2,205,233
March	33,690,601	1,161,745	38,278,999	2,944,538	32,904,264	1,828,015
April	33,692,728	1,604,416	36,770,852	4,596,357	29,799,500	2,483,292
May	35,476,121	2,707,556	37,920,658	3,160,055	32,734,744	2,518,057
June	35,194,325	2,346,288	36,817,210	6,136,202	31,974,760	2,664,563
July	34,922,954	2,182,685	36,697,586	2,158,682	32,525,219	2,710,435
August	35,848,273	2,389,885	36,376,844	2,273,554	31,469,892	1,851,170
September	36,217,310	5,173,901	34,808,529	3,164,412	32,138,851	3,213,885
October	37,237,442	1,959,865	34,570,768	2,659,290	30,755,893	3,417,321
Total	344,315,549	1,721,578	363,206,622	2,539,906	313,344,271	2,117,119

Service at Cost for Youngstown

M. & S. Line Secures New Twenty-Five Year Franchise With Initial Fare of Five Cents and Penny for Transfer

THE city of Youngstown, Ohio, has released the Mahoning & Shenango Railway & Light Company from its obligation to furnish transportation at the rate of six tickets for a quarter, and it has granted the company a renewal of railway rights for twenty-five years on the service-at-cost plan. The new franchise is effective from Jan. 16. The old grant still had fifteen years to run.

The action of the city ends a controversy between the company and it on the subject of service and a more recent dispute between the company and its employees regarding wages. The company contended that its revenue from six-for-a-quarter fares was inadequate under present service and high costs. The trainmen last September threatened to suspend work unless their wages were increased. The city engaged Peter Witt, former street railroad commissioner of Cleveland, who investigated and reported that the company was unable to meet either the service or wage requirements on its present revenues.

BASIS FOR RATE OF RETURN

For purposes of the ordinance, the value of the property covered was agreed to be $4,000,000. On this the return to the company will be made monthly from the stabilizing fund at the rate of 7 per cent per annum. Return on additions to capital value is to be made at the rate per cent at which the company in good faith is able to secure the money for such additions.

The capital value thus determined and the return thereon should not be confused with the existing capitalization of the owning company. The corporate rights of the company are unabridged. The settlement is, in effect, a lease of the property at a fixed rental with option to purchase, lessor and lessee being partners in the leasehold. Should the company organize a new corporation to take over the property covered by the ordinance and give opportunity to Youngstown citizens to purchase stock of such new company at its par value, the capital of the proposed new corporation being limited to the then capital value of the segregated property, the city binds itself in the event of purchase to pay 10 per cent additional to the capital value at the time of purchase, unless this be at the expiration of the grant. No plans at present are being made for the formation of such a corporation.

The salient features of the new Youngstown franchise are:

1. *City Supervision:* City fixes schedules, routes, character of cars, amount of service, but should company's return be threatened under rate of fare in force or under any higher rate by service requirements, arbitration may be had. City inspects and approves accounting, disagreements to be submitted to committee on standard classification of accounts of the American Electric Railway Accountants' Association. City may check and supervise all additions and betterments, and the cost of same shall not be added to capital value except on its approval. Salary of Street Railroad Commissioner is not to exceed $600 a month, and those of assistants $900 per month.

2. *Arbitration:* Any difference arising must be arbitrated save with respect to capital value, fixed return to company, methods of accounting, and city's right to prescribe service except when company's return is threatened. Arbitration board forms quickly. Party demanding arbitration may name board on fourth day after demand if other party does not join. Both parties naming representatives, the United States District Judge for the Youngstown district names third arbitrator if first two cannot agree on third within three days. Board must decide question within twenty days from date of appointment of third arbitrator or unanimously agree to extension of time. Expenses of arbitration are fixed by board as part of award and paid as operating cost unless in excess of $1000 in any six months' period, when they shall be paid from the stabilizing fund. Questions arbitrated may not be arbitrated again within three months from date of first finding. Failure to comply with award is penalized: if on city's part, the rate of return to the company increases; if on the company's part, the rate decreases—in neither instance more than 1 per cent.

3. *Allowances:* For operating costs, 22 cents per car mile is allowed for motor-cars and 60 per cent of trailer-car mileage; and for maintenance, repair and renewal costs, 8 cents per car mile for motor-cars and 60 per cent of trailer-car mileage. Should gross revenue at any time be insufficient to pay these allowances, deficiency shall be taken from stabilizing fund. Any residue of the operating cost allowance unexpended at the end of each calendar year shall be transferred to the stabilizing fund. Either allowance may be increased or decreased by agreement or arbitration.

4. *Stabilizing Fund:* This is constituted by setting aside $100,000 of the agreed capital, credited monthly with interest earned thereon, to which are added monthly the gross receipts of the property less the allowances noted above. From this fund is paid monthly the 7 per cent return to the company, as well as taxes as they become due.

5. *Rates of Fare:* Nine rates of fare are provided, with more possible. A charge of 1 cent for transfer is made under each rate. The scale follows:

A	3 cents cash, nine tickets for 25 cents
B	5 cents cash, eight tickets for 25 cents
C	5 cents cash, seven tickets for 25 cents
D	5 cents cash, six tickets for 25 cents
E	5 cents cash, no tickets
F	6 cents cash, nine tickets for 50 cents
G	7 cents cash, eight tickets for 50 cents
H	8 cents cash, seven tickets for 50 cents
I	9 cents cash, six tickets for 50 cents

At such time as Rate B becomes effective, Council shall establish a further lower rate bearing the same relation to Rate A as Rate A bears to Rate B, and should Rate H become effective Council shall establish a further higher rate bearing the same relation to Rate I as Rate I bears to Rate H, to the end that there shall always be two rates of fare higher or lower than the fare in effect.

Rate E, 5 cents cash and 1 cent for a transfer, will be the initial rate. Whenever the amount in the stabilizing fund at the end of any calendar month exceeds $150,000 the next lower rate becomes effective; whenever the amount in the stabilizing fund is reduced to $50,000, the next higher rate becomes effective. Should such change fail to reduce the balance in the stabilizing fund below $150,000 at the end of the next calendar month after change is made, then the next lower rate becomes effective, and so on until the balance in the stabilizing fund is reduced to $150,000. The rate of fare then in effect shall remain until the fund is reduced to $50,000. Similarly, the fare shall be increased monthly when the fund is less than $50,000 until it is more than $50,000. The rate then in effect shall remain until the fund exceeds $150,000.

The fare may be changed by agreement but not by arbitration; changes must be automatic, dependent upon the balance in the stabilizing fund. Whenever a change in rate is made, tickets under former rate are not acceptable as fares, and they are redeemable only within thirty days from date of change at any office of company at cost. School or special tickets may be sold at rate to be fixed by city and company, but such tickets are invalid Sundays and holidays and between the hours of 4.30 p.m. and 7.30 a.m. on week-days. Any child under six years of age accompanied by person paying fare shall be carried free; two such children shall pay for a single fare. Free transportation is limited to motormen, conductors, linemen, shopmen and trackmen, going to or returning from work.

6. *General Provisions:* The company must maintain all pavements within outer rails and 1 ft. outside each outer rail, but it shall not be required to pave or repave except where repaving is necessitated by reconstruction of track or building of extensions. In the former case, such repaving shall be charged to maintenance, repair and renewal account and in the latter to the cost of the extension. All expenses of change in tracks and paving necessitated by public improvements shall be paid by the city. Damage claims arising in connection with work or improvements shall be considered part of the cost of such work and paid for out of funds and added to capital value.

The company shall charge to operating costs a rental for offices, supplies and equipment used under the new plan, the amount to be fixed by agreement between the company and the city. Outstanding damage claims against property covered by the ordnance shall be charged to operating cost. The company's portion of grade crossing eliminations shall be paid by the company and added to capital value. Either the company or the city may propose extensions, but the city loses this right whenever the unexpired term of the franchise is less than fifteen years. Any replacements in excess of the cost new of the property replaced shall be capitalized to the extent of such excess cost, the balance being charged to maintenance account. Additions to capital value shall be at the par value of the securities sold or debt created for the extension or betterments.

PLANS FOR SPEEDING UP SERVICE

During the consideration of the new grant, the company joined the city in working out re-routing and stop-elimination plans to speed up service. All lines were terminated at the center of the city, known locally as the "Diamond," and operating supervision was established at that point.

Because of the lateness of the season, however, and the impossibility of securing all of the needed special work for the change the complete layout for the "Diamond," which includes waiting rooms and loading platforms, was deferred. Temporary rooms have been constructed, however, and cars are now operating on routes and past the points scheduled in the new plan.

Mayor A. W. Traver has named W. L. Sause, former Director of Public Service, as City Street Railroad Commissioner. The pay-leave system of fare collection will be used on out-bound cars and the pay-enter system inbound. The company is pledged to the immediate conversion of such of its cars as do not now permit the use of this system.

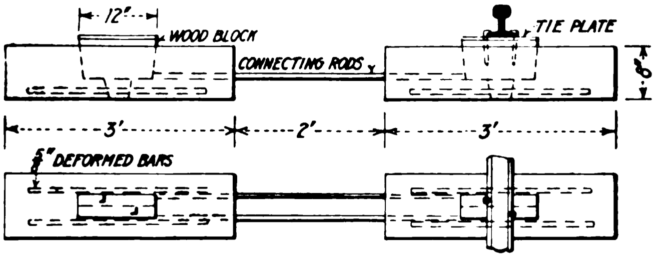
Paper Substitutes for Driving Belts in Germany

Foreign papers state that machine-driving belts made of paper substitute are being introduced in German workshops. The belts are woven or braided and may be either of the paper fabric or paper thread type. The paper fabric is first cut into bands and a core of strengthening material, either cotton or sheet metal, is interposed. The core is surrounded with paper strips and the whole sewn with strong thread. The tensile strength of the woven belt is stated to reach from 550 to 700 lb. per inch width.

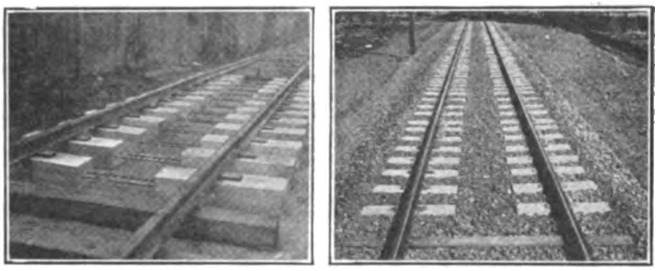
New Type of Track Tie

UP TO the present time wood or steel ties have been used quite generally in track construction. Concrete, however, has considerable possibility as a tie material, and a specially constructed tie, developed by Edgar N. Goodlett, is worthy of study. Quantities of ties of this type have now been in experimental service for four years and are reported to be giving good satisfaction.

This special tie is made up of two reinforced-concrete end sections. Each end block is 10 in. x 36 in. face and 8 in. deep and the blocks are held together by two steel rods. In the middle of each face is an open slot 4 in. x 12 in. at the top and going down at a slight bevel to a 3½-in. x 11½-in. seat at the bottom. The rail is spiked in the usual manner to wooden blocks which are inserted in the slots. These blocks protrude about 1 in. above the concrete and take the weight of rail, providing resilience. The open construction and the wooden spiking blocks are said to overcome the objections which have been made against the use of concrete ties. In service the wooden block inserts compress into the beveled recesses, conducing to durability and increasing the spike holding power of the ties.



DETAILS OF CONCRETE TIE CONSTRUCTION



NEW TYPE OF CONCRETE TRACK TIE
At left, ties in place ready for ballasting on the Municipal Railway of San Francisco. At right, stretch of track with concrete ties on the Oakland, Antioch & Eastern Railway

Repair work with these ties is very simple. To remove the wooden insert a bar is placed between the two joining rods and the tie is pried over onto its side. A hole in the tie running through the bottom permits the introduction of a tool by which the wooden block can be driven out and a new one inserted. The tie can then be again turned over and adjusted for service. As the wood block insert is protected by the concrete, its life should be much greater than that of the ordinary wood ties. The reinforced-concrete structure is practically permanent.

These ties have been tested by the Municipal Railway of San Francisco, by the Southern Pacific Railroad, and by the Oakland Antioch & Eastern Railway. The accompanying illustrations show some typical construction.

What the Governors Say

Public Opinion Is Usually Reflected Accurately in the Messages of the Chief Executives of the States to the Legislatures

NOT since the cycle of economic legislation which started more than ten years ago and ushered in the system of state regulation of the utilities as it stands at present have the sessions of the legislatures of the many states been looked forward to with more concern than they are this year. The electric railway situation is acute. In many cases fair play to the utilities is possible only after legislation. Thus the legislatures, more than ever, would seem to be the destiny that will help to shape the ends of the industry at this time. The legislative directing force in most cases will be the Governors. The instances are few in which their messages do not sense or reflect public feeling accurately. For this reason the ELECTRIC RAILWAY JOURNAL plans to publish extracts from the messages promptly as received. This week there follow remarks of the Governors of New York, Massachusetts and Connecticut.

ONE STRONG COMMISSION AND MUNICIPAL OWNERSHIP DESIRED IN NEW YORK

Governor Smith of New York, in his inaugural address, declared for a single headed public service commission and for municipal ownership. He said in part:

There is widespread dissatisfaction, particularly in New York City, with the Public Service Commissions. In the First District, a radical change should be made in the structure of the commission itself, if it is to accomplish results. At the time of its formation, in 1907, there was expressed grave doubt as to whether or not it would work out well. There were many who believed that the function of constructing rapid transit railroads for the city of New York should be divorced from the function of regulating public utility corporations generally. In my opinion, experience has demonstrated that they were right.

For years the trend in New York City, as well as in the State, has been toward single headed commissions, to the end that the responsibility may be fixed upon one man. During the recent war, the federal government taught us the lesson that results can best be obtained by a single executive, clothed with proper power, when any great work is to be carried out successfully. What we do in time of trouble is brought about by the very best judgment we can exercise. Why is it not sound in time of peace?

It is my belief that the subway rapid transit system of the city of New York can be built better and quicker under the direction of a rapid transit commissioner whose entire time, brains and energy would be devoted to the completion of the subway system. The regulatory functions of the commission in the First District also might be performed by a single public service commissioner. Not only will this result in an economy of administration but it will be productive of results. The argument has been made that a separation of the functions of the commission might interfere with the work. This I do not believe to be the fact.

I therefore recommend that legislation be enacted to bring about this change, and I make this recommendation after years of observation.

Upon the same principle outlined above, I also believe that the affairs of the Public Service Commission in the Second District will be more economically and more efficiently managed by a single headed commission, and I recommend that legislation be enacted to bring this about.

I further call your attention to the weakness of the law itself in not giving to the commissions sufficient power to enforce their orders. These weak spots history has taught us seem to have been inserted for the benefit of the corporations to be regulated. Without enumerating them in detail in this message, I would refer you to that part of the report of the joint legislative committee, appointed to investigate the Public Service Commissions transmitted to the Legislature on March 10, 1915, and I ask you to enact such legislation as will remedy these defects and strengthen the arm of the commissions that they may more effectively carry out the functions for which they were organized.

Recent years have been marked by a great opening of the popular mind to the true scope of enlightened municipal administration. There is everywhere a recognition that it is only through the application of progressive conceptions of public duty that life can be made tolerable in our teeming cities with their unprecedented growth in population and the consequent living conditions.

From every city in the State, represented by their chief executives in conference, there comes the demand that the State confer upon the cities the power to acquire, own, operate and control their public utilities. The supply of transportation, light, heat and power is of the utmost importance to each local community. The services rendered have become a necessity to the life, health, comfort, convenience and industry of the cities. These great services are monopolies, and whatever is of necessity a monopoly should be a public monopoly, especially where it offers a service of universal use.

I therefore recommend that legislation be passed granting to our cities the power to acquire, own, operate and control their public utilities.

RAILWAYS IN MASSACHUSETTS SHOULD BE ON ENDURING BASIS

Governor Coolidge of Massachusetts says that public ownership is no answer to the electric railway problem, as it would not increase revenue. The Governor turned to the electric railway situation after touching upon railroad questions. He said:

But this (steam railroad problem) is not so urgent as the *street railway problem.* While sufficient data are not at hand for a final and complete solution, and conditions are changing much from day to day, yet there are some things which are apparent and which must be kept in mind seeking a remedy. Street railway service in some form is now a public necessity. It ought to be supplied at moderate rates of fare to workers, to children and to the public generally. It has been provided as a private enterprise. It was expected to be more profitable than it ever turned out to be, and for that reason, and because it used the public street, certain extra taxes were laid on it, and conditions requiring expense were often attached to grants of location.

The problem is where to get more money. There are only two sources—increased fares and the public treasury, directly by grant or indirectly by remission of taxes or other payments. Public ownership is no answer to this problem, as it would increase no revenue. The question is one of our needs and our duty, and must be squarely met. As a business enterprise the government desires its success, but no more so than any other private enterprise. As a public necessity the government is warranted in giving aid. As it is a public enterprise the public ought to realize that whatever revenue it has they must furnish. Fares have been increased, but in some places there is no rate high enough to pay for operation, for raising rates too high diminishes the number of passengers.

So long as a street railway can be operated with fair service, paid for by its patrons, it is on a sound and enduring basis. That ought to be the standard. The moment that is abandoned there is no standard to measure the soundness of the principle applied. No one knows how to assess the benefits or where they apply. Any other standard should be adopted with great caution and for a very limited period.

The only other course is by local and State aid. This shifts the burden, but does not diminish it. Instead of paying the fare on the car it is paid in taxes, in rent and the cost of living. But in the period of readjustment we may have to apply extraordinary remedies.

The information even to state the problem accurately is not at hand. It is therefore recommended that there be at once a survey of the street railway situation by experts to report the amount of deficiency in revenue, the amount of taxes and other public charges paid, and what, if any, part of the deficiency should be met by remission of taxes and other public charges, and by appropriations of money, coupled with public control, by the localities and the Commonwealth in order to keep necessary transportation facilities in operation. Knowing the requirements and the resources, it ought not to be difficult to make them balance.

The question of the policy toward public utilities should be taken out of politics. No greater harm can be done the public than by an attempt to make the operation of these agencies, which ought to be purely a matter of business, a means of partisan advantage. Unless this is done there can be no hope of reaching a proper solution.

SPECIAL INVESTIGATION COMMISSION SUGGESTED

Governor Holcomb of Connecticut regards the electric railway situation as very serious and recommends that a special commission be appointed to consider the matter and report at the present session. He said in part:

> The electric railway situation in Connecticut is such as to require serious consideration. Our whole industrial fabric is in a measure dependent upon our electric railway systems and it is of the utmost importance to the future welfare and development of our State that their operation should be efficient and their facilities ample. The report of the Public Utilities Commission just rendered shows that practically all the street railway companies are operating at a loss, which if continued long enough must result in dissolution, loss of investment and suspension of service. The commission in its report states:
>
> > There are numerous contributing causes for present street railway conditions, some inherent, some temporary, and some apparently permanent. Among the principal may be mentioned general war conditions involving high cost and difficulty of procuring material and supplies; high and constantly increasing cost of labor, and difficulty on account of the advantages afforded by private and governmentally controlled industrial enterprises of securing sufficient and competent help; the increasing burden of taxation; the municipal and statutory requirements of laying and maintaining street pavement; the loss of patronage naturally incident to the use of privately owned automobiles; and the more or less unrestricted competition of public service automobiles or "jitneys" so-called, operating at the option of the owner in the most profitable sections of the street railway company's chartered territory, during favorable weather conditions and on improved highways.
>
> The report further states:
>
> > It is the opinion of this commission that the best interests of the State require and will continue to require electric street railway service as an essential transportation agency, but if both of these competing transportation agencies are to survive and render proper service, some protecting legislation should be enacted whereby the necessary burdens would be more equitably apportioned and competitive rights more definitely limited.
>
> Under the street railway transportation system in Connecticut, the indirect taxation for street pavement in certain localities creates a burden upon other localities not thus favored, and requires the companies to construct and maintain a right of way not only for themselves but for competing transportation agencies which are not at present required to contribute their proportionate share toward the maintenance of such rights of way. The jitney or public service automobile, carrying passengers for hire, is in every sense of the word a public utility and as such should as in the case of all other similar agencies, be brought under the regulation of the Public Utilities Commission, and the traveling public should be protected in the matter of accident or damage from irresponsible common carriers and in the service they render. This whole electric railway situation is so serious and it is a matter involving to so great an extent the general welfare of our people, that it seems to me to be advisable for your honorable body to appoint forthwith a special commission to take it under consideration and to report at this session.

A misprint occurred in the heading of the first column of the table published on page 59 of last week's issue. The heading of this column, which showed a total of 991, should have read "number of companies" instead of "number of cars." The accompanying text showed that companies were intended.

Women in Steam Railroad Service

Increase of 40,000 in Number of Women Employed by Railroads in Ten Months—All Fields of Service Covered

IN JANUARY, 1918, the number of women employed by steam railroads in the United Stated was 60,000. By July it had increased to 81,000, and by Oct. 1 to approximately 100,000. These figures were presented on Dec. 6 before the labor reconstruction conference of the Academy of Political Science at Columbia University, New York City. The speaker was Pauline Goldmark, manager women's service section United States Railroad Administration.

Of the 81,000 employed on July 1, 61,000 were working as clerks of all kinds, stenographers, accountants, comptometer operators, etc. In this class appear women ticket sellers and bureau of information clerks, who served the public for the first time. The next largest group of 4000 comprised cleaners. Women had long been cleaning stations, offices, etc., but 800 were also employed in the yards to clean coaches and Pullman cars, both inside and outside, and in the roundhouses to wipe locomotives. In personal service, including work in dining rooms and kitchens, as matrons and janitresses, 2000 were found. In the railroad shops, women entered the greatest variety of new occupations. Three thousand were employed, ranging from common laborers to skilled machanics earning the machinist's or carman's rate of pay. The policy of equal pay to men and women for equal work has been followed by the United States Railroad Administration.

The skilled steam railroad operations in which women have become proficient, according to Miss Goldmark, are as follows: They are operating a number of machines such as bolt threaders, nut tappers, drill presses, for which no great skill or experience is needed, but they are also employed for highly skilled work. A number have succeeded as electric welders and oxy-acetylene burners. They have been found well adapted for work on the air-brake equipment and are cleaning, testing and making minor repairs on triple valves. In some places they are now working in a separate group on the lighter weight valves, weighing not more than 40 pounds. Women are found now performing the duties of crane operators and hammer operators in the shops, of turntable operators in the roundhouses and of packers of the journal boxes in the yards. They are acting as attendants in tool rooms and storehouses, and they are doing block signal work and acting as lever women in the signal towers.

In the post war period, while there is federal control of the railroads, Miss Goldmark states, the women will retain their own seniority rights, including the privileges of promotion. The railroads will of course recognize the seniority rights of all their employees returning from military service, but as far as the new employees are concerned, women will have the same privileges as other new employees in retaining their positions or being assigned to other jobs. The present indications, however, are that they will remain as a permanent part of the great army of clerical workers, rather than in the out-of-door occupations and in the shops and roundhouses where the environment is oftener unavoidably unsuitable.

More Terminal Loops

New Plan Relieves Congestion in San Francisco—Approximately 290 Cars an Hour During Rush Periods Pass Over Loop

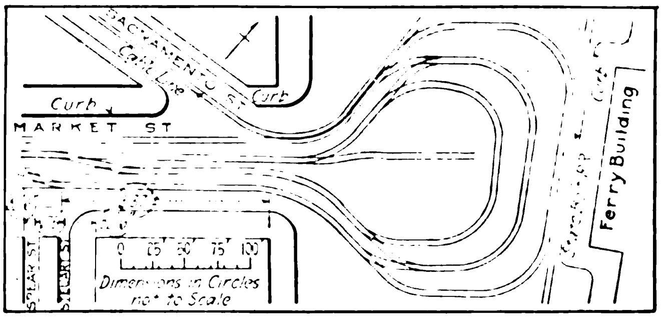
THE ferry loop at the foot of Market Street in San Francisco has been the limiting factor in the rush-hour traffic for some time. When the municipal lines began sending cars to the ferry on the new outer tracks on Market Street, the loops had to handle an additional forty cars per hour. This at once produced serious congestion. In the rush hours cars were blocked for five to eight squares from the loops, and the system could not serve the commuters who had to catch boats. Then the loop arrangement was changed and the change has been so effective that the limiting factor in the system has been shifted to another point, that is, cars can now be loaded and moved out of the loops faster than they can move along Market Street.

The changes made at the loop provided for three tracks instead of two, the new arrangement being as shown in the accompanying drawing. The inner loop remains as it was, the middle loop is a new track and the outer loop is the original outer loop moved over closer to the Belt Line Railway. Operation of the steam line is not frequent enough to interfere seriously with the street cars. Sixteen cars can now stand on the three loops as compared to nine, which was the limit of the old double loop. With sixteen cars on the loops there is still space for 8-ft. and 12-ft. traffic lanes between the standing cars so that access to the inner loops is provided.

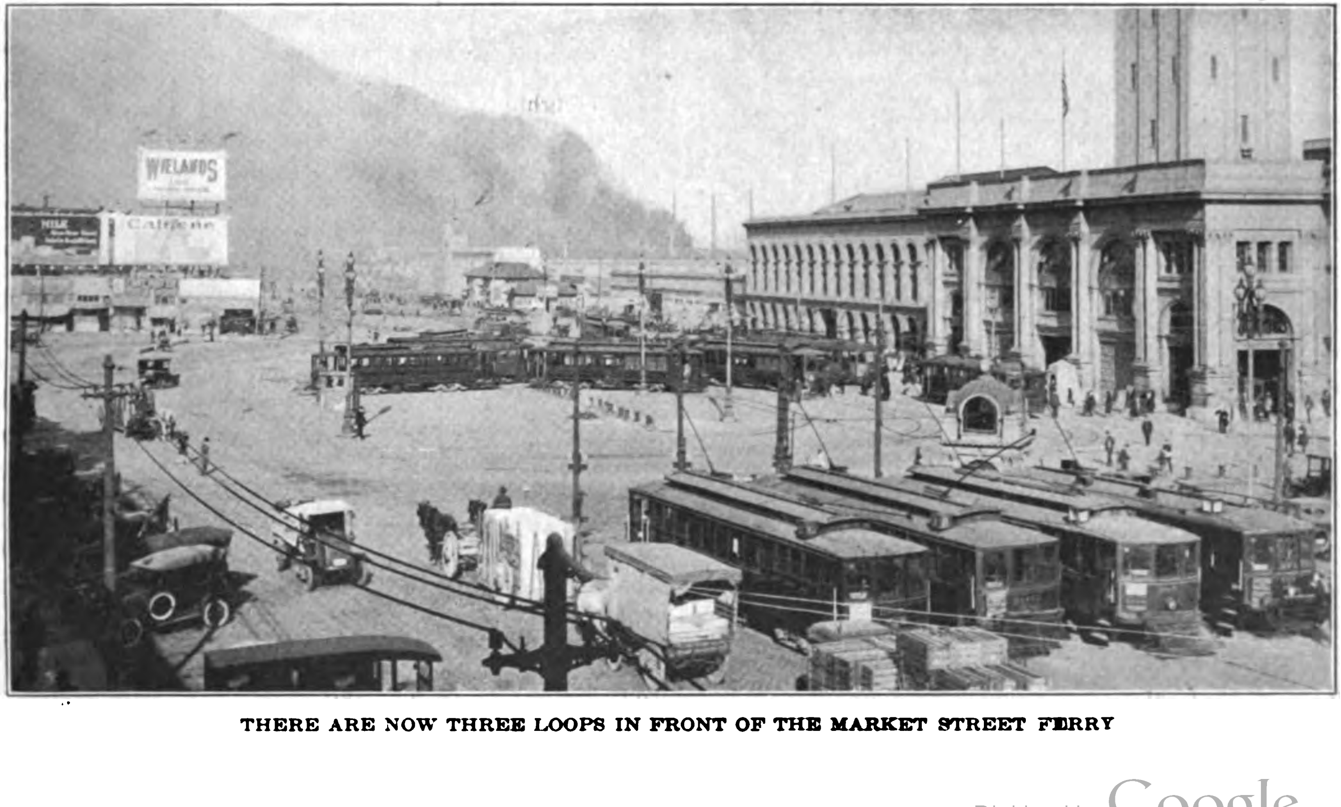
During the morning and evening rush hours about 290 cars per hour now pass around the loops, 110 on the inner track, eighty on the middle track and 100 on the outer track. This is no faster than the rate at which the old loops were handling cars, but now the increased standing capacity on the loops makes it possible for cars to remain there long enough to afford ample time for loading. Meantime the vehicular traffic along the Embarcadero crosses the neck of the loops. When this is stopped a number of loaded cars are ready to leave the loops promptly as an equal number of cars enter.

LOOPS HAVE RESERVE CAPACITY

The capacity of the loops could be increased 20 per cent over the figures above given, it is believed, were it not for the fact that the cars cannot be operated out of Market Street away from the ferry any faster than they are now being put around the loops. That is, with 152 cars per hour going out on the outer Market Street tracks, there is a headway of only twenty-six and one quarter seconds. This is not sufficient to allow passengers to get through to the inner tracks and as passengers cannot safely stand between moving cars on the inner and outer tracks, the outbound cars are blocked while the inner cars are loading. At present 137 cars per hour move from the loops onto the inner track and 153 onto the outer track. The congestion on the outbound tracks, while not so serious as that formerly obtaining at the loops, delays cars so that at Sansome Street, where the first United Railroads cars turn off, they are seven to twelve minutes late during the rush-hour periods.



PLAN OF TRACKS AT FOOT OF MARKET STREET



THERE ARE NOW THREE LOOPS IN FRONT OF THE MARKET STREET FERRY

Simplifying the Automatic Substation Wiring Diagram

ONE of the most recent automatic substations to be commissioned is the Warrenville substation of the Aurora, Elgin & Chicago Railroad, of which E. S. Gillette is electrical engineer and S. E. Johnson is superintendent of substations and lines. This substation contains a number of ingenious devices but the present note is intended primarily to call attention to a simplified form of circuit diagram of its wiring which has just been developed by the substation and line department. In its usual form this kind of diagram is decipherable only to the expert, but it is desirable if possible to have a diagram in which the circuits can be traced out by an intelligent maintainer. The A. E. & C. diagram developed for this purpose is reproduced herewith.

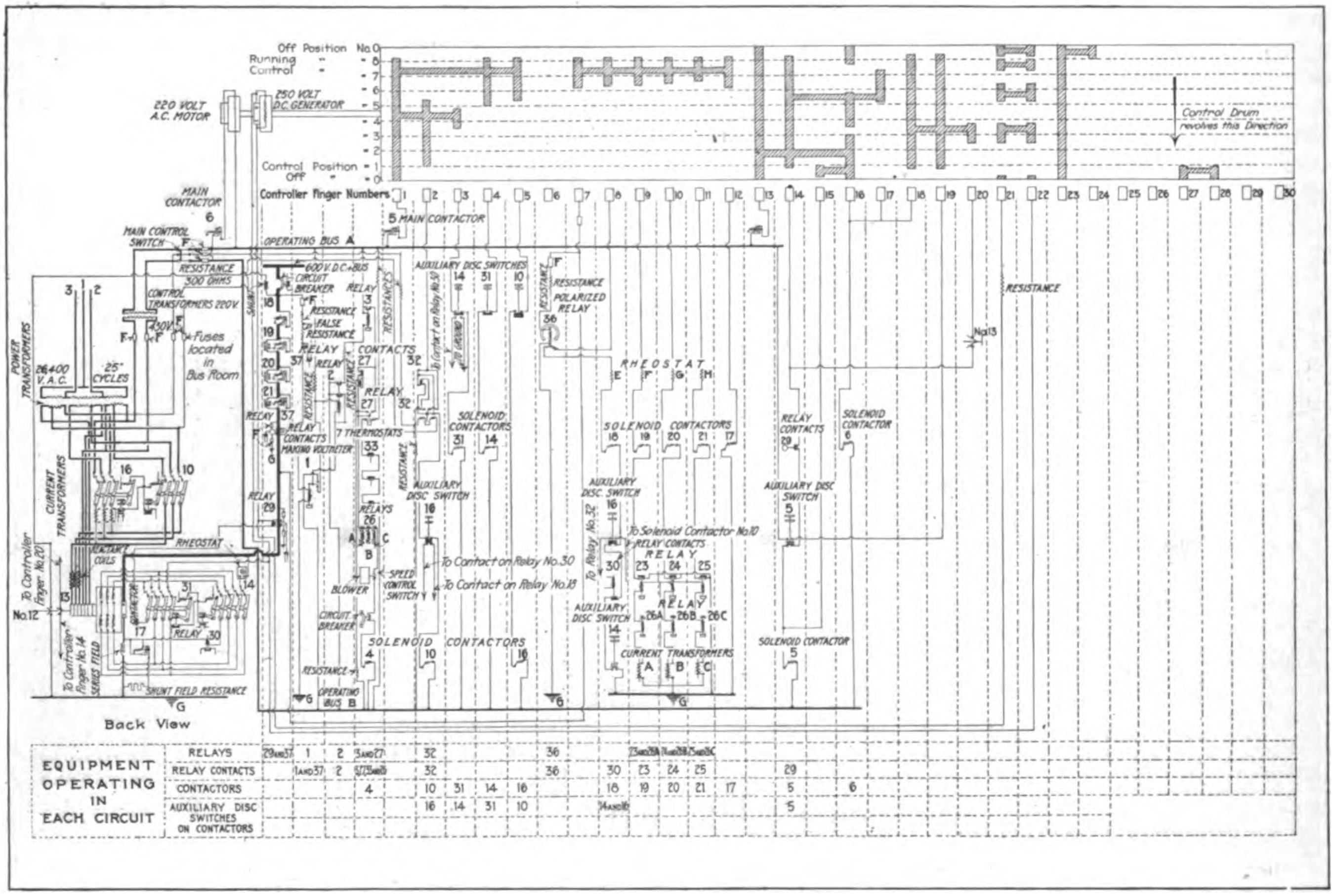
In this diagram the controller is developed and stretched out across the top of the drawing, with the contact fingers and segments plainly indicated and numbered. The main power apparatus is set off at the left, all power wires being indicated by heavy lines. The control apparatus and circuits are laid out as nearly as possible vertically in line with the controller fingers so as to facilitate the use of the diagram. To this end the same relay or contactor will ordinarily be shown in two places, one in the control circuit and the other in the power circuit. Each piece of equipment is labelled as well as numbered. The standard numbering of the apparatus is used, however, so that anyone at all familiar with substation diagrams will feel perfectly at home with this one.

At the bottom of the chart is a table showing graphically as well as by numbers the pieces of apparatus in circuit when each controller finger is engaged with a segment. This permits almost instant checking because the finger numbers are given directly below the controller fingers. To aid the eye and prevent error light vertical lines are drawn between fingers. The original diagram also contain an auxiliary table, omitted in the cut for simplicity, showing the relay settings. This table is as follows:

RELAY SETTINGS FOR AUTOMATIC SUBSTATION

Relay Number	Time Setting	Current Setting D.C. in Amperes at 600 Volts	Current Setting A.C. in Amperes at 430 volt-seconds	Remarks
37	......	Close at 150 amp.	....	Under load relay.
36	......	Close at 300 volts D.C.	....	Open on wrong polarity.
32	......	....	....	Close at 190 volts. Open at 180 volts.
30	......	Close at 2 amp. Open at 0.78 amp.		....
29	......	Open at 50 amp. reverse	....	Reverse power relay.
27	......	....	....	Close at 190 volts. Open at 180 volts.
26	......	....	....	Overload inverse T.L.
25	12 sec.	....	1400	Opens instantaneously.
24	10 sec.	....	1500	Opens instantaneously.
23	8 sec.	....	1600	Opens instantaneously.
3	5 min.	....	....	....
2	Instantaneous	....	....	Opens on short circuit.
1	3 sec.	....	....	Close at 500 volts D.C.

An excellent diagram in the usual form was given in connection with W. C. Slade's article in the issue of this paper for Dec. 14, 1918, page 1040. It will be of interest from comparison with the simplified diagram.



Off Position No. 0
Running Control
Control Position Off
220 VOLT A.C. MOTOR
250 VOLT D.C. GENERATOR
Controller Finger Numbers
Control Drum revolves this Direction
MAIN CONTACTOR 6
5 MAIN CONTACTOR
MAIN CONTROL SWITCH
OPERATING BUS A
RESISTANCE 300 OHMS
CONTROL TRANSFORMERS 220V.
Fuses located in Bus Room
POWER TRANSFORMERS
26400 V.A.C.
25 CYCLES
CURRENT TRANSFORMERS
REACTANCE COILS
RHEOSTAT
To Controller Finger No. 20
To Controller Finger No. 14
SERIES FIELD
SHUNT FIELD RESISTANCE
No. 12
600 V. D.C. + BUS
CIRCUIT BREAKER
RELAY
RESISTANCE
FALSE RESISTANCE
RELAY CONTACTS
MAKING VOLTMETER
7 THERMOSTATS
AUXILIARY DISC SWITCHES
POLARIZED RELAY
SOLENOID CONTACTORS
AUXILIARY DISC SWITCH
RELAYS 26
BLOWER
SPEED CONTROL SWITCH
To Contact on Relay No. 30
To Contact on Relay No. 18
To Contact on Relay No. 30
To Relay No. 32
To Solenoid Contactor No. 10
RHEOSTAT E F G H
CURRENT TRANSFORMERS A B C
SOLENOID CONTACTOR
OPERATING BUS B
Back View
EQUIPMENT OPERATING IN EACH CIRCUIT
RELAYS
RELAY CONTACTS
CONTACTORS
AUXILIARY DISC SWITCHES ON CONTACTORS

SIMPLIFIED DIAGRAM OF AUTOMATIC SUBSTATION CIRCUITS, AURORA, ELGIN & CHICAGO RAILROAD

Exterminating Ground Squirrels on the Pacific Electric Railway

BY CLIFFORD A. ELLIOTT
Cost Engineer Maintenance of Way Department, Pacific Electric Railway, Los Angeles, Cal.

THIS company has experienced considerable trouble with the ground squirrel pest, which imposed a difficult maintenance problem upon the way department. Climatic conditions in southern California favor the breeding of these squirrels in large numbers. The rodents burrow into the banks of cuts along the right of way and also honeycomb the roadbed. The resulting porous condition of the ground is the cause of softening of roadbeds and cuts. The most damage is done during the rainy season, when storm waters enter the openings, loosen the cuts and cause landslides. The depredation of the squirrels in the embankments of bridges is also extensive. These pests infest some localities quite extensively and considerable trouble is experienced in wiping out their villages. The constant undermining of the tracks by them soon results in a general deterioration of the roadbed. During the spring months the rodents leave the company's right-of-way, going into adjoining fields to destroy the growing crops.

The damage to the crops on abutting farms each year is very great, and the farmers complain continually of the pests which inhabit the company's right-of-way. The company each year co-operates with the farmers in carrying on a campaign to eliminate them, and additional aid is given by the State Horticultural Commission.

Attempts have been made to exterminate the squirrels by putting out poison-soaked hulled barley. This has done some good, but during the spring season the plan is of no avail as the ripe, juicy roots of growing grain in the fields are more appetizing, and the rodents refuse to eat the barley that has been scattered near their burrows.

The company has recently found in the market an automatic distillate vapor machine for gassing the squirrels in true war-time fashion, and the use of this device has gained excellent results. The squirrels are gassed in their burrows, as well as other small animals, such as rabbits, badgers, snakes, owls, etc., which unfortunately inhabit the same holes as the squirrels.

Regular engine distillate is used in the machine, which produces a white vapor. The gas when generated is forced into the burrows, effort being made to have the wind in the operator's favor so that the gas may be forced deeper into the burrows. Adjacent holes are carefully watched for the vapor to appear and these are then tamped up at least 1 ft. deep by the operator's assistants. The vapor displaces the air in the holes and effectively disposes of the rodents. Usually when the large chamber, or main burrow, is gassed six to eight other outlets for the escaping vapor are discovered and these are immediately closed in order to get the desired results. The gas is not ignited when discharged into the burrows, the vapor alone accomplishing its object. When the complete gassing process has been efficiently undertaken, the burrows are refilled with vapor and the hole in which the gas discharge pipe has been operating is then closed.

Upon entering a cut to gas, one foreman and four assistants are engaged. Two men with a gas machine work on one side of the cut, while two more with a second machine work on the opposite side. The best time to gas is after a rain, when the holes have been opened up by the water. One foreman and four men will average eighty main burrows in a ten-hour day, the two machines consuming 3 gal. of distillate during this period.

"GASSING" OUT RODENTS ON PACIFIC ELECTRIC RAILWAY
At left, typical infested right-of-way; in middle, group of men "gassing" out squirrels; at right, device used in producing destructive vapor.

Electric Railway Section, N. S. C., Inaugurates Monthly News Letter

The first of a series of monthly news letters signed by H. B. Adams, chairman electric railway section National Safety Council, has been sent to the 131 company members of the section. This letter contains an article on "Efficiency and Accident Prevention," and it also raises a number of points of interest to electric railways generally.

Among other things, the executive committee of the Safety Council desires to know if there is considerable demand for special electric railway safety films for moving picture machines, and to what extent electric railways have produced such films or arranged with outside firms to have them produced. Mr. Adams sets as a standard for the nine months before the next Safety Congress a reduction of one accident per mile of track represented in the membership. As the present members operate 14,542 miles the standard is thus placed at 15,000 accidents, or at the rate of 20,000 per year.

LETTER TO THE EDITORS

Cinders for Ballast Should Receive More Consideration

UNION TRACTION COMPANY OF INDIANA
ANDERSON, IND., Jan. 7, 1919.

To the Editors:

In the JOURNAL for Dec. 21, 1918, R. C. Cram set forth very clearly the necessity for using ballast in sufficient quantity and of proper quality. As stated by the author, ballast is the foundation that transmits the load from the track structure to the subgrade. The character of the foundation depends on the amount of load on the track structure, eliminating, of course, unusual conditions in the subgrade.

For electric interurban railway tracks other than those located in paved streets, having axle loads up to 37,500 lb., the writer believes that cinders should not be placed so far down the list of desirable materials as Mr. Cram places them. Cinders can be worked at lower temperatures than most other ballast materials, especially bank run gravel, and they can be worked after heavy rains in wet weather. Cinders also retard the growth of vegetation.

It may be that cinders produced from some kinds of coal, when used as ballast, will decrease the life of ties, but the writer's experience with this material for eight years, as produced by the power plants of the Union Traction Company of Indiana, is that cinders do not in any way decrease the life of ties.

Cinders should not come in contact with the rails, especially where track circuits for automatic signals are used, as there probably will be greater leakage of return currents through cinder ballast than through any other kind of material used. Leakage of electric current should not be a criterion, however, in the use of cinders, as all ballast material should be kept from contact with the rails. When ballast is up to the top of the ties at the rails, small particles will work between the rails and the ties and increase the mechanical wear of the tie by breaking down the wood fibers.

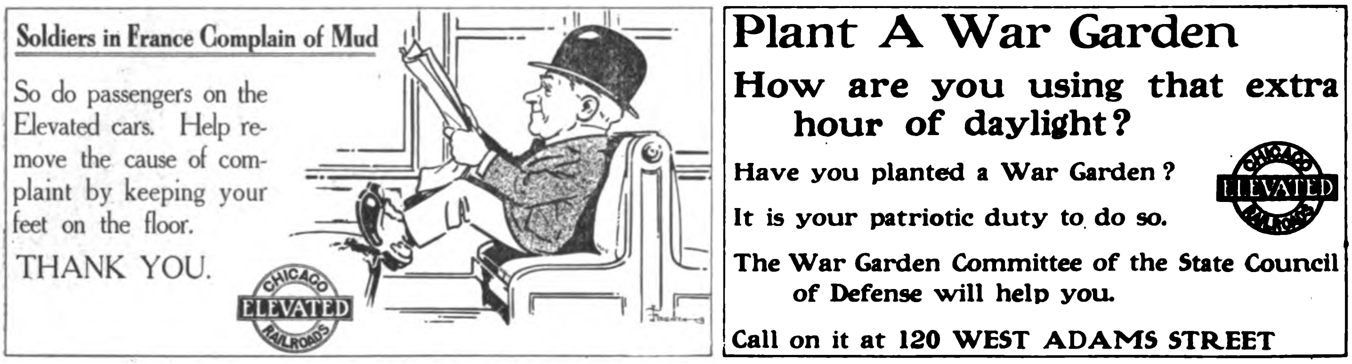
Cinders are a by-product of steam generating power plants and should not be wasted unless the financial condition of the railway will permit. They cost nothing as ballast. Any other kind of ballast material must be purchased, and then in addition there is the usual expenditure for loading, hauling and placing. Cinders must be loaded, hauled to destination and placed, but then they are on hand and some disposition must be made of them.

Concerning the track-center distance where more than one track is used, the best practice for permanent main-line structures, such as poles, platforms and bridge support is a minimum distance of 7½ ft. from the center of the track. Center-pole line construction will require a track-center distance of 16 ft. assuming that the diameter of the pole is 1 ft. at the point of minimum clearance from the car body.

L. A. MITCHELL,
Engineer of Maintenance of Way.

Putting Ideas Across in Chicago

THE car posters reproduced herewith constitute part of a series of eight which were recently used by the Chicago (Ill.) Elevated Railways. The first appeared about July 1. The posters, which measure 18 in. x 10-in., are glued onto the windows in a conspicuous location.



Soldiers in France Complain of Mud

So do passengers on the Elevated cars. Help remove the cause of complaint by keeping your feet on the floor.

THANK YOU.

Plant A War Garden

How are you using that extra hour of daylight?

Have you planted a War Garden ?

It is your patriotic duty to do so.

The War Garden Committee of the State Council of Defense will help you.

Call on it at 120 WEST ADAMS STREET

EXAMPLES OF POSTERS USED BY THE CHICAGO ELEVATED RAILWAYS TO LAY ITS PROBLEMS BEFORE THE PUBLIC

The title of each poster and the "Thank You" are always printed in red, and in some cases also the company insignia.

The posters have brought forth some letters of suggestion from the public and have been mentioned in the local papers. They will be continued and will be used to present some of the serious problems confronting the company.

Future Electrification in Great Britain

In his presidential address before the Institution of Civil Engineers of Great Britain Sir John A. Aspinall had considerable to say with regard to electrification of steam railroads. "It has been remarkable," said he, "how when each suburban line has been worked by electrical trains with great frequency and increased rapidity there has been a very great growth of passenger traffic.

The probable course of events will be that we shall find that electrification of the lines immediately around our great towns will quickly take place all over the country, but it is not until these widening circles begin to touch one another that we shall see electrical energy used for long-distance passenger trains. The additional revenue required to pay interest on the large capital outlay can be made most rapidly from the suburban traffic in well-selected districts."

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Buffalo Talks Purchase

International Railway Willing to Relinquish Control If Guaranteed 8 Per Cent on Valuation

After the return of Mayor George S. Buck and the other members of the City Council of Buffalo, N. Y., from Cleveland, E. G. Connette, president of the International Railway, sent a communication to the Mayor setting forth that the railway wants the city to control its service and is ready to relinquish operation in the city if the city guarantees a return of 8 per cent on the valuation of the property.

DRAFTING TENTATIVE AGREEMENT

After the receipt of this communication from Mr. Connette, the Council directed the Corporation Counsel to confer with the traction officials and draft a tentative agreement so that the Council will have a concrete plan before it upon which to work. The city law department is now preparing this tentative agreement. It is expected that the City Council will demand only a 6 per cent return.

In his communication to the City Council, Mr. Connette called attention to the fact that the owners of the property were desirous of reaching an agreement with the city and pointed out that certain bases set down by the Mayor are acceptable to the company if taken together. Mr. Connette added:

"I am prepared and authorized to agree to any method by which the fair valuation of our Buffalo property can be determined within the rules laid down by the courts to govern a valuation for rate-making purposes. The public service commissioners for this State have quite generally allowed 8 per cent as a fair return on the capital valuation. We regard this as low, but with proper guarantees in the shape of reserves, maintained either by the city or by the right to raise the fare, if necessary, we would accept 8 per cent. I do not think it would be profitable to enter upon any effort to estimate the needed improvements.

COMPANY NEEDS MORE REVENUE

"I think that Buffalo has a very fair equipment. What we need most is money to pay the increased cost of operating the equipment which we have. The public's good-will has been against us for so long that I fear that we do not receive credit even for our good intentions."

The Mayor says it would be desirable in some way to substitute two mortgages for the present liens, one covering the lines within the city of Buffalo and the second covering all properties outside the city.

The Public Service Commission has denied the petition of the railway for the commission to receive its answer to the rate complaint filed with the commission several years ago when the city thought there was a reasonable prospect of getting the 5-cent fare reduced. The right of the commission to hear the case was questioned by the company and court proceedings were brought to enjoin the commission from hearing the case. The company contended that its franchise from the city protected its right to charge a 5-cent fare. Some time ago the city made application to withdraw its complaint from the commission and the company made an application asking the commission to receive its answer. It is said that the company by a certiorari or mandamus proceeding may try to compel the commission to receive its answer and go on with the rate case. The question of jurisdiction is still to be tested.

Rapid Transit Can Proceed

The Court of Appeals at Cincinnati, Ohio, has affirmed the decision of the Common Pleas Court in refusing an injunction against the Rapid Transit Commission to prevent it from issuing $80,000 of bonds for the purpose of paying for the preliminary surveys for the proposed rapid transit loop and other necessary work to be done in preparing for its construction.

While the Common Pleas Court held that the commission was not bound by its resolution not to spend any of the money provided in the authorized $6,000,000 bond issue until the plan of operation is definitely determined and approved, the higher court goes further and says this declaration is analogous to those contained in political platforms and for a similar purpose. Moreover, the court holds that the resolution was not a contract and that the commission is clearly unable to bind its own hands in this matter and thus disable itself from exercising its discretion in proceeding with further preliminary work that might become necessary to the direction of the enterprise. It cannot divest itself of the incidental and necessary right to spend money for such purposes.

Attorney John C. Rogers brought the suit as a taxpayer, alleging that the commission adopted a resolution before the bond issue was voted upon, to spend none of the money until the plans for the loop had all been completed and approved.

Brooklyn Outlook

Receiver Friendly to Press but Not Over-communicative—Wants Facts First

Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, after two hours' interview with Federal Judge Mayer on Jan. 3, when asked as to the future of the road, said:

"Until I have an opportunity to make a survey of the physical and financial properties of the company, I shall be unable to make any statement in regard to definite plans."

PHYSICAL SURVEY LIKELY

In a formal statement issued later, the receiver said in part:

"We desire to operate this property with the greatest attention to the safety of the traveling public that is possible, and I propose to set about at once ascertaining the information that can be obtained on this subject and putting into practice whatever will give the greatest assurance of safety to the traveling public.

"I propose obtaining from the Public Service Commission, a physical survey of the property, if the members have already made one, and if not, propose requesting them to do so, so that I may benefit by any observations or suggestions resulting from the facts developed.

"In respect to damages accruing to the individuals, on the occasion of the recent lamentable accident, I, of course, cannot at present give any assurance, because I do not know the financial resources of the company available for the purpose, but I can say that it is the intention of the court and the receiver to do everything humanly possible to see that funds are available to pay all just claims.

FACTS NECESSARY TO DECISIONS

"With respect to the matter of increased income in order to maintain the roads at a proper standard of efficiency and give the best possible service, I cannot at this time usefully make any statement, as I am not advised of the facts. I propose to set about immediately acquiring all available information under this head, so as to be able to inform the court and carry out whatever policy is adopted by the court.

"In respect to the questions that have been mooted in regard to the subsidiary companies, and what will be done in respect of them, I have no information and shall have to acquire the same before I can have any views or make any recommendations, or aid the court in carrying out any policy."

Chicago Electrification Proposed

Terminal Plan Divided into Stages with Time Limit to Be Fixed Before Ordinance Is Passed

A new ordinance, drafted by the Railway Terminal Commission of Chicago, has been submitted to the City Council as a basis for further dealing with the railroads on the subject of electrification. The ordinance covers the erection by the Illinois Central Railroad of a new passenger terminal at East Twelfth Street, and the railroad is ordered to proceed to rearrange and relocate its tracks, stations and appurtenances on its main line in the city so as to make them suitable for operation by electric power in accordance with time limits to be decided upon before the ordinance is passed.

MICHIGAN CENTRAL INCLUDED

The Michigan Central Railroad, which also uses the East Twelfth Street station, is at the same time ordered to arrange to operate its trains and cars by electric power from Kensington Station north to the Chicago River.

Electrification of the Illinois Central Railroad is to be put into effect in four different stages, but the time limits for each have not yet been decided upon. Stages of development are as follows:

1. The entire suburban passenger service within the city limits.
2. Freight service on all tracks north of East Twelfth Street.
3. Freight service on the main line south of Twelfth Street to the city limits and over the South Chicago Railroad, the Blue Island Railroad and the Kensington & Eastern Railroad.
4. All remaining freight service and through passenger service within the city limits.

Electrification of the Michigan Central Railroad will take place in two stages as follows:

1. Freight service on all tracks north of East Twelfth Street.
2. All remaining freight and passenger service north of Kensington Station.

SUBURBAN SERVICE AFFECTED

Other railroads not operating by electricity will be permitted to enter the city over the Illinois Central tracks for the interchange of freight and the Illinois Central Railroad will be permitted to handle similar exchange business by steam.

The ordinance contains provision for suburban service underneath Grant Park in connection with the development of plans for subways for street and rapid transit railways. Authorization is also given to change from time to time the type of construction or operation and to extend systems of distribution for power, light and water along the right-of-way of the companies affected.

The attitude of the Railway Terminal Commission has been that a railroad can be electrified when it can be shown that it is financially practical. For this reason it was considered advisable not to institute an ordinance covering the electrification of all steam lines, but to separate them, and provide for the electrification of each as financial conditions warranted. The large suburban service of the Illinois Central Railroad naturally made that line the first to receive attention.

An ordinance was submitted by the Illinois Central Railroad more than a year ago which provided only for the electrification of its suburban service. This was not acceptable to the city, and thus the new ordinance is the next step in the development. Public hearings have been and will continue to be held on this ordinance, and as a result of these the dates for the completion of the various stages of the work will be decided upon. It is believed that these will be periods of approximately five-year intervals.

AGITATION STARTED IN 1915

Numerous items concerning the development of plans for electrification at Chicago have appeared in the ELECTRIC RAILWAY JOURNAL during the last three years, beginning with the smoke abatement report which appeared late in 1915. As the present ordinance is concurred in in practically every detail by the railroads affected, it is believed that it will be passed without difficulty, and that work on the electrification will start without delay.

M. O. Bill Ready in New York

A bill which is favored by the State Conference of Mayors, permitting each city in the State of New York to purchase and operate every public utility within the city limits, has been drafted and perfected and will be introduced in the Legislature soon, according to present plans. Governor Smith also favors such legislation. One provision of the Mayors' conference bill avoids the debt limit prohibition by permitting a city to issue public utility securities which would not be included in computations of a city's debt limit. This is now the rule concerning New York City subway bonds and water and dock bonds. Where a city's debt limit does not interfere, a city may issue the usual obligations of a municipality to purchase public utilities.

Travis H. Whitney, of the Public Service Commission for the First District of New York, was one of the committee which drew the bill favored by the Mayors' conference. The measure provides that a municipality shall not commence the acquisition or establish or begin the operation of a public utility without first securing the consent of the Public Service Commission, and all municipal public service corporations would be under the jurisdiction of the public service commissions, the same as when they were under private control.

Each city is to create a municipal director of public utilities with power to appoint and remove employees, who would have the power to provide adequate and continuous service at reasonable rates without undue discrimination.

Another provision would permit several municipalities or political divisions of the State to organize into a single utility district and jointly acquire and operate public utilities.

Terminal Approved

Cleveland Votes for Union Station Facing the Public Square—For Steam and Electric Passengers

The franchise giving the Cleveland Union Terminals Company a right to erect a union station facing the Public Square at Cleveland, Ohio, was approved by a vote of the electors on Jan. 6, by a majority of 10,842. The plan includes both steam and interurban passenger station service, to the exclusion of the lake front proposition which was intended to take care of the steam roads only.

O. P. Van Sweringen, president of the company, stated that construction will probably be begun in March. Approval of the Federal Railroad Administration will be sought at once. Funds for the construction are said to be ready. Within a few days a meeting of the heads of the railroads which will use the station will be called to complete details.

Besides occupying all the space facing one-fourth of the Public Square on the south from the new Hotel Cleveland, also a Van Sweringen proposition, to Ontario Street, the west side of the latter street will be improved with new structures. In addition, the same interests are building a freight terminal and a system of warehouses where all freight will be delivered and received at high-level for the roads which enter the basement section of the terminals from the river valley, thus saving cartage up and down the steep hills to the depots where they are now located.

A portion of a rapid transit line reaching Cleveland Heights and Euclid Heights, now becoming an extensive residence district, has been built. This will be completed to the new depot. Rapid transit service will also be furnished to other suburban districts.

MR. ARNOLD REPORTS ON PLAN

Bion J. Arnold, who has been investigating the transportation problem of Cleveland for the Chamber of Commerce, made a report to that body on Dec. 17, in which he stated that the location of a union station on the Public Square would eventually cause such great congestion that another station would have to be built. The growth of the city has been such, he said, that it will double its normal operations in about eight years. All business statistics prove this.

The proposed trackage for the entrance of steam roads to the Public Square site might be adequate for fifteen years, but should much new commuter service be introduced, another depot might easily have to be built within that time. Electrification would appear essential for a depot in that location. Mr. Arnold advises against the abandonment of the suburban depots, as they accommodate people on the crosstown lines and will aid in the development of steam commuter service.

Location of the station on the Public Square is advantageous because of convenience of access, but there are many objections to it in other ways. Considering the expense of building track entrances of interurbans to the station and the readjustment of operations required in other ways, Mr. Arnold doubts the feasibility of the plan mapped out for them. On the original plan of building a station on the lake front, which is recommended for further consideration, a separate station for the use of interurbans would have to be built, as outlined in the original plan, shown in the Cleveland & Youngstown Railway ordinance.

Omaha Labor Case Settled

Joint Chairmen William H. Taft and Basil M. Manly of the National War Labor Board held a hearing in Omaha, Neb., on Jan. 2 and 3 in connection with grievances charged by the carmen against the Omaha & Council Bluffs Street Railway.

A decision read by Mr. Taft at the close of the hearing directs that the railway shall make some changes in schedules in the interest of fairness and justice to the men. It was held that the company acted within its rights, under the rules of the War Labor Board, when it refused on Dec. 3 to enter into a contract with the union.

Messrs. Taft and Manly held, however, that the pride of union men and the technical sensitiveness of the company led to controversies. Union recognition was not a vital factor of the hearing, although the decision, in effect, read that sometimes too much stress has been placed by the company on the question of whether a commitete of its employees represented a union.

In the matter of alleged discrimination against union men by the company, the decision held that the company is endeavoring to comply with the orders of the War Labor Board. The application for a modification of the award in the matters of increased wages and a fundamental change of schedules was overruled, because a hearing may be had before the entire War Labor Board on Feb. 1, when a revision of the award will be considered.

The matters in dispute went before the board for settlement following a short strike.

Kansas City Service Nearly Normal

Company Looks Upon Strike as Ended — Peculiar Angles of a Peculiar Controversy

The Kansas City (Mo.) Railways resumed service on Dec. 13, two days after the strike started. By Jan. 1 half the normal number of cars were in service, and cars were running as late as 9 o'clock at night. On Jan. 4 owl car service was restored on the important lines, marking the turning point in the resumption to normal service.

The court proceedings which have assisted the restoration of service have been diverse, because of the different conditions in Kansas City, Kan., and Kansas City, Mo.

The company had filed in both Judge Van Valkenburgh's court, Missouri side, and in Judge Pollock's court, Kansas side, its suit to get light on the War Labor Board's decision of Oct. 24, and for injunction against hindrance in raising fares. On Dec. 2, the courts en banc, rendered their decision, the company appealing to the Supreme Court of the United States. Meanwhile, the company had instituted its petitions to the State Public Service Commissions, to secure authority to increase fares as the War Labor Board had recommended.

The employees struck on Dec. 11.

On Dec. 17 the company sought leave to file suits for injunction against the strikers and others, in both federal courts. These suits for injunctions were supplemental bills to the suit regarding the War Labor Board's decision. Judge Van Valkenburgh, in the Missouri district, granted a restraining order. Hearing as to an injunction was set for Dec. 27; postponed from time to time. The defendants had emphasized the question of jurisdiction; and had attacked the filing of the petition as a supplemental bill. On Jan. 4 Clyde Taylor, attorney for the company, filed, as attorney for the Continental & Commercial Trust & Savings Bank of Chicago, an Illinois corporation, an original bill, asking injunction; this proceeding seeming to meet all possible objections as to jurisdiction and as to supplemental bills, in the matter. Hearing of this application was set also for Jan. 11.

On the Missouri side of the state line, the city police had promised protection to property, and were trying to give it; the company had also the protection of the Missouri National Guard.

The course of events on the Kansas side was somewhat different. Judge Pollock denied an injunction, but he ordered the railway to restore service; ordered the city officials to provide protection, and retained jurisdiction. On Jan. 2 the Kansas City (Kan.) Chamber of Commerce was allowed to intervene, with a showing that the railway had not complied with the order to restore service, and that the city had not provided guards. The court thereupon ordered the marshal to enforce its orders that cars should run and protection be provided; and granted, at this time, the restraining order asked on Dec. 17 by the company. The marshal, advised of the prospective order, had many deputies ready; he swore in others, and also gave commissions and stars to motormen and conductors operating cars in Kansas. The marshal reported daily to the court in regard to the enforcement of the court's orders.

Meanwhile, the strikers appeared before the War Labor Board in Omaha, and were instructed to present evidence of their allegation that the company was not in good faith seeking to secure higher fares that higher wages might be paid. The War Board suggested that they would appear to better advantage if they returned to work; the company, however, definitely declined to restore their contract, or take them back except individually as the merits of each of the applications warranted.

Following the refusal of the War Labor Board on Jan. 3 at Omaha, to reopen the Kansas City case, E. M. Harber, city counselor of Kansas City, Mo., sent a telegram on the strike situation to the board. Mr. Harber stated emphatically that charges were unfounded that the company was not doing its best to secure higher fares. Mr. Harber, however, asked the board to restate its findings, to remove all possible misunderstanding.

President Kealy issued a statement on Jan. 5, after hearing of the proposal the strikers were about to make as to returning to work. This statement he concluded as follows:

TOO LATE FOR FORMER CONDITIONS

It is too late for anyone to talk of returning under former conditions and restoring the status quo. This might have been possible during the first few days before hundreds of new men were employed and before the company had given its word to those hired. Lapse of time and acts of violence have foreclosed the rights of any former employee of this company who has broken a contract and put this community to loss and inconvenience, now to come back and demand to be returned to his former status. This is a physical impossibility. We have more than 1,400 men in train service and are adding to these at the rate of 100 a day. Complete restoration of normal service now only waits upon the instruction of students.

A number of our ex-employees are taking advantage of this and have returned to work to-day. Many more have made their arrangements to do so to-morrow. In view of the fact that we have practically rebuilt our organization, all those wishing to return to the work for which they are trained should do so without any delay. Every day means that more places are filled, and if they continue to wait a larger number of them cannot be used.

For the benefit of the business and civic interests of the two Kansas Cities, we are insistent upon a termination of this matter in such a way as to insure an uninterrupted continuation of railway service in the community. The necessity for this has been clearly shown by the fact that there have been three strikes in a period of sixteen months.

For the first time in three years we are now able to rebuild our organization to the size it was before the war.

New York City Conferences

Explanation Made of Negotiations with City Looking Toward Settlement of Transit Matters

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., appeared before the Public Service Commission for the First District on Jan. 7 and corroborated the testimony given by James L. Quakenbusch, general attorney for the company. Mr. Quakenbusch testified on Jan. 6 before the commission that he and Grenville McFarlane, a Boston lawyer, who is said to have been associated with William Randolph Hearst in the promotion of public ownership legislation, had had several conferences with Mayor Hylan over the matter of increased fares for the Interborough.

RAILWAY OFFICERS CONFER WITH MAYOR

Mr. Shonts said that he personally had called upon the Mayor and suggested that the city be represented on the Interborough board of directors. Mr. Shonts is quoted as follows:

"Mayor Hylan told me that there must be some solution of the fare problem. I suggested that a committee from the roads and the Board of Estimate get together and try in some way to thresh the whole thing out. Mayor Hylan said he did not know but that it would be a good thing."

During the present inquiry there has been much talk about a "protocol" drawn following conferences between the railway and city officials whereby the city would assume control of all the transit lines. In its original form this document provided that, as the city and the Public Service Commission would not consent to an increase in fare unless the companies agreed to convey their railroads and assign the leases of those they did not own, trustees be appointed by the public authorities to manage the lines so as to furnish the best possible service and to protect the investors.

EIGHT-CENT FARE SUGGESTED

It further provided that the fare should be increased to 8 cents, with 3 cents additional for transfers; that all of the profits should be deposited with a trust company, and that the profits, if there be any, should be divided between the city and the companies. It is also provided that the Legislature be petitioned for an amendment to the Constitution, so that the city could make a trust agreement similar to that between the city of Boston and the Boston Elevated Railroad. Other necessary laws, to enable the carrying out of the plan, were also to be sought, so that all the lines could be operated as a unified system after the Chicago plan.

It was also provided that the Interborough and the Brooklyn Rapid Transit Companies receive their preferentials from the city as a guaranteed payment. The plan provided that the city should transfer to the trustees any accumulated funds out of its one-half part of the sum in excess of the minimum returns above the cost of service, and that if this sum did not amount to sums set forth in tables to be known as "Guaranty Fund Tables," the trustees must make up the difference out of the funds in their possession after paying the costs. If the fund was not then full the plan provided for payments by the city to complete the amount necessary. The cost of service was to cover these items;

All operating expenses, including damages and maintenance, repairs, and renewals.

Taxes.

Rentals and interest on all funded debt.

Such allowance for depreciation of property and for obsolescence and losses in respect to property sold, destroyed, or abandoned property, as the trustees may deem necessary or advisable, or prior to their appointment as may be agreed upon, or fixed by arbitration.

All other expenditures and charges which, under the laws of the State of New York, now or hereafter in effect, may be properly chargeable against income or surplus.

The city and the Public Service Commission were to have the right to appoint two directors.

On Jan. 7 Mr. Shonts referred to the feeling between the Mayor and the commission, and said that he represented a client that was, figuratively speaking, between two fires, and that the conferences were conducted so that an agreement could be reached with the Mayor, and then submitted to the commission on its merits. Mr. Shonts said that Mr. Quakenbusch's explanation was quite correct.

Mr. Cameron Exonerated

Cases against employees of the United Railways, St. Louis, Mo., including Bruce Cameron, superintendent of transportation, hastily indicted in July last for their alleged connection with the disappearance of the referendum petitions calling for a vote on the new franchise for the railway, since refused by the company as too onerous in its terms, have been dismissed in court for lack of evidence. When the case was called recently, attorneys for the railway announced their readiness to proceed, but no one appeared to prosecute for the city.

In proclaiming his innocence at the time the indictments were returned Mr. Cameron said:

"I have been indicted upon the evidence of one Jackson, who confesses he committed the deed himself, and of which I am innocent and had no knowledge or connection. My case will be tried in court, where my innocence will be established."

Carhouse and Cars Destroyed

The carhouse and twelve cars, belonging to the Southwestern Gas & Electric Company, Texarkana, Tex.-Ark., were destroyed by fire on Dec. 27, causing a loss of more than $100,000. The company operates 14 miles of electric railway.

Council Approves Purchase

Seattle Body Votes to Take Over Local Railway—Friendly Suit to Fix City's Purchase Right

The City Council of Seattle, Wash., on Dec. 31, passed, by a vote of five to two, the ordinance authorizing the city to purchase the railway property of the Puget Sound Traction, Light & Power Company, for $15,000,000 in utility bonds. The ordinance was passed after negotiation lasting over a period of four months.

DATE OF DELIVERY UNCERTAIN

While the exact date for the delivery of the properties cannot be set, A. W. Leonard, president of the company, states that unless unexpected obstacles arise, the transaction ought to be closed in forty-five to sixty days.

To determine the legality of the transaction, and to interpret the meaning of the utility bonds, the City Council and traction officials agreed to file a "friendly" case in the King County Superior Court. Papers in an injunction suit restraining the city from issuing bonds had been prepared, and the case was filed immediately after the ordinance was passed.

By the terms of the purchase ordinance, the company is required within forty-five days after the termination of any litigation in connection with the transaction to deliver the property to the city free and clear of all incumbrances. All franchises are to be surrendered to the city and the company is to dismiss all legal actions pending against the city. All taxes are to be paid up to the date of the transfer, including the gross earnings tax for 1918. The company is required to pay a forfeit of $400 a day, for every day after the forty-five days following the termination of the litigation, which transpires before the deed to the property and the bill of sale are delivered.

The ordinance also provides that the company must replace any property destroyed by fire or otherwise pending delivery to the city. When delivery is made, the company will be required to submit a statement showing that from Oct. 1 last up to the time of delivery, there has been spent monthly on maintenance the same average monthly sum that was spent for that purpose during the last five years. If this sum is not spent on maintenance, the company will be required to turn the cash over to the city. Until all of the above conditions are fulfilled, the city will retain the $15,000,000 in utility bonds.

MORE THAN 200 MILES INVOLVED

The property to be acquired by the city includes 203 miles of track, 540 cars, carhouses and yards, repair shops at Georgetown, cable stations and all equipment and supplies required in the operation of the railway system. The railway is said to comprise only about one-fifth of the Puget Sound Traction, Light & Power Company's properties in the Seattle district. Company headquarters will be continued in Seattle, with A. W. Leonard president, at the head.

Councilman Oliver T. Erickson, the father of municipal ownership in Seattle, voted against the purchase, on the ground that the price was too high.

It has been reported that a referendum would be invoked on the railway purchase, but city officials do not expect any such development in view of the fact that at the time the advisory ballot was submitted in November the people voted four to one in favor of the purchase.

Omaha Ready to Sell

The appointment of a committee of three to include the Mayor is being urged upon the Council of Omaha, Neb., to confer with the officers of the Omaha & Council Bluffs Street Railway, Omaha, Neb., with respect to the matter of the possible purchase of the property by the city. The company's position on the matter has been stated through G. W. Wattles, its president. He is quoted as follows:

"I will be very glad to talk to the committee appointed by the City Council. I have stated openly to the Council that we are willing to sell the street railway. But there are two sides to that proposition. If the city wants to pay us the money we have put into the development of this property to its high standard of the present day, plus the legal rate of interest on that money, then we won't lose much time in agreeing and I shall advise the stockholders to sell. But if, on the other hand, the city is going to try to take away from the stockholders of this company the property which their money and their efforts and their foresight have developed, if they are going to try to take this property away without a just compensation to those who have put their money into it, then we shall have a great deal to say."

News Notes

Municipal Ownership Bee Buzzing.—The City Council of Columbus, Ohio, on Dec. 30 asked City Attorney Scarlett for an opinion on the legal and financial measures necessary to acquire the railway property of the Columbus Railway, Power & Light Company. This is regarded as a first step toward municipal ownership, but is really incidental to the franchise and fare dispute between the company and the city.

City Wants Leased Lines Abolished.—One of the first measures presented after the new City Council at Providence, R. I., had organized provides that the Council committee on Rhode Island Company affairs be directed to prepare a plan and present it to the General Assembly abolishing the leased line system, reducing the capital stock and eliminating unprofitable lines. The resolution calling for these changes has been referred to the committee for consideration.

Accepts Wisconsin Indeterminate Permits.—At the instigation of President A. M. Robertson, the Duluth-Superior Street Railway has surrendered its franchise to operate in Superior, Wis. The system operating between the two cities is now on the indeterminate permit basis so far as Wisconsin is concerned. Difference in the terms of the permit and franchise is mainly based on the appearance before the State instead of city officials for any grants to be made in behalf of the company or public.

Hudson Tunnel Bill Rejected.—The Senate interstate commerce committee voted on Dec. 12 its disapproval of the Calder bill, providing for an appropriation by the government of $6,000,000 to build a vehicular tunnel under the Hudson River at New York. A decision not to report the bill to the Senate was reached after the committee had heard representatives of the Joint Tunnel Commission of New York and New Jersey and other advocates of the tunnel scheme. The project was rejected on the ground that Congress would be setting a precedent for tunnel and bridge enterprises, backed by government capital.

Question of Contract Rights in New Jersey.—The report of the committee of the New Jersey League of Municipalities to decide whether the United States Supreme Court will pass upon the power of the Board of Public Utility Commissioners of New Jersey to abrogate municipal franchise contracts providing for maximum rates for utility service, will be submitted at a meeting to be held in Trenton, N. J., on Jan. 20. The question has been referred to the executive committee of the league. If the matter goes to the United States Supreme Court, it is said that the test will be made in connection with the decision of the State Commission authorizing the Public Service Railway to raise its fares.

Moving Platform Plan Presented.—The Continuous Transit Securities Company, of which M. Everhart Smith is president, has filed with the Public Service Commission for the First District of New York a plan for the establishment of a moving platform in Forty-second Street in place of the present shuttle subway operation between the East and West Side subway lines. It is proposed to utilize two of the four tracks and to construct three moving platforms, the fastest of which will operate at a speed of 9 m.p.h. and its seating capacity 31,600 passengers an hour. The cost is estimated at less than $1,000,000. The commission has taken the plan under consideration.

Berkeley Preparing for Blanket Franchise.—As the first step toward granting a resettlement franchise to the San Francisco-Oakland Terminal Railways, the City Council of Berkeley, Cal., has requested the State Railroad Commission to place a valuation on all properties owned by the company in Berkeley. A revaluation as requested by the Council will be placed on holdings of the company as they existed on March 2, 1917, which is the date of the first request made by the railway for a blanket franchise. Under the proposed betterment franchise the company will operate under a single permit instead of a multitude of franchises covering various units of the system.

Brooklyn Officials Ask Change of Venue.—The attorneys for President Timothy S. Williams, of the Brooklyn (N. Y.) Rapid Transit Company, and other officers of the company indicted in connection with the accident on Nov. 1, have secured an order directing the District Attorney to show cause why a change of venue to a county outside of New York City should not be granted. The order is returnable before Justice Callaghan in Special Term of the Supreme Court, Part I, on Jan. 16. Justice Kapper was to have tried the first of the cases on Jan. 6, but the order of Justice Jenks acts as a stay, and no trial can be had until Jan. 30, at the earliest. The stay remains in operation until three days after the court makes a decision on the argument for the change of venue.

Programs of Meetings

New England Street Railway Club

The New England Street Railway Club will hold its annual Manufacturers' Night on Jan. 23, at the Hotel Somerset, Boston, Mass. A large committee is making unusual preparations for the dinner, entertainment, music and vaudeville.

Illinois Electric Railway Association

The annual meeting of the Illinois Electric Railway Association will be held at the Hotel La Salle, Chicago, Ill., on Jan. 17. It is expected that P. H. Gadsden, chairman of the committee on readjustment of the American Electric Railway Association, will address the meeting. There will also be an address on safety by H. B. Adams, chairman of the electric railway section of the National Safety Council. John Leisenring of the Illinois Traction System, H. A. Johnson of the Chicago Elevated Railways, B. J. Fallon of the Chicago Elevated Railways and W. P. Potter of the Illinois Traction System, chairmen of the electrical, mechanical, way and traffic committees respectively will each present a paper. The allegory "The Grim Reaper," which was presented before the Central Electric Railway Association at Indianapolis in November, will be presented at Chicago.

Financial and Corporate

More Revenues Needed

New York Railways in Latest Fiscal Year Lacked $153,000 of Meeting First Mortgage Bond Interest

During the year ended June 30, 1918, the income of the New York (N. Y.) Railways was $153,634 less than the sum required to pay its operating expenses, rentals and interest on its first mortgage bonds. In other words, it lacked by this amount sufficient to pay the interest on its first real estate and refunding 4 per cent bonds and paid no interest whatever on its $30,609,487 of 5 per cent adjustment bonds. Naturally the stock, which under the reorganization was reduced from $52,000,000 to $17,500,000, received nothing. The company has no surplus to draw upon to make good these losses. In fact, it had an existing deficit at June 30, 1918, of $1,355,880.

The result, the company's annual report states, is inevitable. Reserves have been depleted, and available funds from all other sources are being used up in an endeavor to maintain the service until an increased fare can be had. Unless this is speedily forthcoming a receivership cannot be avoided, with its attendant losses and probable disruption of service, as under a receivership a large portion of the service now rendered by the company at a loss would be discontinued.

Since strikes on the lines of the system were in effect within the first half of the fiscal year ended June 30, 1917, which created abnormal results both as to revenue and expenses, extended comparison between 1917 and 1918 revenues and expenses would be useless. The following comment, therefore, while setting forth the amount of the increases and decreases as between 1918 and 1917, is confined generally to a comparison between the year ended June 30, 1918, a year free from strikes but within the war period, and the year ended June 30, 1914, a period prior to the war.

The gross passenger revenue for the year ended June 30, 1918, showed an increase over that of the preceding year of $419,518 or 3.75 per cent. As compared with 1914, the revenue from passengers during 1918 fell off $1,806,433 or 13.46 per cent. There was also a decrease approximately corresponding thereto in the number of revenue passengers carried, there having been 34,849,794 less passengers carried in 1918 than in 1914. Other street railway operating revenue increased $6,406 over 1917, and as compared with 1914 decreased $104,021.

Railway operating expenses during the last year were $8,131,471, an increase over 1917 of $262,661 or 3.34 per cent.

The total charge to the maintenance accounts during 1918 (equal to 20 per cent of the total operating revenue) was $2,384,007, an increase of $85,175 as compared with 1917. The total expenditures for maintenance during the year were $2,822,916, or $438,909 in excess of the charge, thus reducing the company's reserve for maintenance and depreciation. During 1914 the actual expenditures for maintenance were $2,447,395, and there was credited to the depreciation reserve account $324,773, the total charge for maintenance and depreciation being $2,772,168.

COMPARATIVE INCOME STATEMENT OF NEW YORK RAILWAYS FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Revenue from transportation	$11,615,247	97 45	$11,195,729	97 40
Other railway operating revenue	304,786	2 55	298,380	2 60
Total revenue from railway operations	$11,920,033	100 00	$11,494,109	1000.00
Operating expenses:				
Maintenance of way and structures	$1,368,433	11 48	$1,249,171	10 87
Maintenance of equipment	1,454,483	12 20	910,467	7 92
Horsepower—revenue car service	908	0 01	53,151	0 46
Operation of power plant	675,366	5 66	608,615	5 30
Operation of cars	3,593,811	30 15	3,526,824	30 68
Injuries to persons and property	1,157,154	9 71	1,051,400	9 15
General and miscellaneous	641,495	5 38	597,697	5 20
Total "actual" expenditures	$8,891,650	74 59	$7,997,325	69 58
Maintenance of way and structures, reserve	$33,186	0 28	$99,768	0 87
Maintenance of equipment, reserve	472,095	*3 96	39,416	0 34
Injuries to persons and property, reserve	321,240	*2 69	267,699	*2 33
Total reserves	$760,179	*6 37	$128,515	1 12
Total operating expenditures, and reserve credits	$8131,471	68 22	$7,868,810	68 46
Taxes assignable to railway operations	1,170,223	9 82	1,032,011	8 98
Total operating expenses and taxes	9,301,694	78 04	$8,900,821	77.44
Income from railway operations	$2,618,339	21 96	$2,593,288	22 56
Non-operating income	627,118	5 27	647,600	5 64
Gross income	$3,245,457	27 23	$3,240,888	28 20
Deductions from gross income	2,676,550	22 45	2,666,052	23 20
Net income available for interest on 4 per cent bonds	$568,907	4 78	$574,835	5 00
Interest on 4 per cent bonds	722,541	6 07	722,887	6 29
Net income before deducting interest on adjustment mortgage income bonds and other requirements	*$153,634	*1 29	*$148,052	*1 29
Add—surplus account	*1,202,246	*10 09	*996,679	*8,67
Surplus	*$1,355,880	*11.38	*$1,144,731	*9.69

*Decrease or deficit.

TRAFFIC STATISTICS OF N. Y. RAILWAYS

	1918	1917
Cash fares	223,765,819	215,672,697
Revenue transfers	14,377,030	13,866,986
Free transfers	83,891,488	85,088,109
Total passengers	322,034,337	314,627,792
Ratio of free transfer passengers to revenue passengers, (per cent)	35.23	37.07
Average fare per passenger:		
Per passenger, including transfers (cents)	3.607	3.559
Per revenue passenger (cents)	4.877	4.877
Operating expenses per passenger:		
Per passenger including transfers (cents)	2.525	2.501
Per revenue passenger (cents)	3.415	3.428
Car-miles	26,993,360	28,918,483

During 1918 the amount expended for injuries to persons and property was $1,157,154, an increase of $105,754 over 1917. The costs as accrued during the year, however (on the basis of 7.2 per cent of the gross passenger revenue), resulted in a net charge to operating expenses on this account for 1918 of $835,884, the difference between the amount expended and accrued representing the balance in the accumulated reserve account which was discontinued after June 30, 1918.

Taxes assignable to railway operations showed a rise of $138,212 or 13.39 per cent as compared with 1917. This increase is accounted for principally by additional federal income and excess profits taxes applying to leased lines, the burden of which will, it is anticipated, be relatively even greater during the coming year.

The gross income for 1918 was an increase of $4,569 over 1917. As compared with 1914, however, there was a decrease of $1,208,131. Income deductions during 1918 increased $10,150 over 1917, due principally to an increase in interest on bills payable, less decreases in charges on account of interest on other unfunded debt, and decreases in sundry rents, etc.

There was a deficit of $153,634 in net income for 1918, and the deficit at June 30, 1918, was $1,355,888, an increase as compared with 1917 of $211,148. A comparison of 1914 with 1918 shows that at June 30, 1914, the amount of surplus available for interest on adjustment mortgage income bonds and other requirements, was $1,196,164 or $2,552,044 more than on June 30, 1918.

Miscellaneous operating statistics of the company for the years ended June 30, 1917 and 1918, are shown in the table above.

Effect of Higher Fares

Revenue Increased and Riding Decreased in Most Cases—Interurban Traffic Suffered Less than Urban

In a recent canvass made by the information bureau of the American Electric Railway Association among electric railways which are collecting increased rates of fare, the replies indicated that the riding habit of the patrons of 53 per cent of the companies was adversely affected by the fare increases. On the other hand, 40 per cent of the companies found no alteration, and 7 per cent experienced an actual increase. This information was obtained from 161 companies with about 16,513 miles of single track. This is 34.12 per cent of the total mileage for the United States.

Revenue Decreased in Few Cases

In 81 per cent of the cases the operating revenue of the company was increased. In 10 per cent there was no increase, and in 9 per cent there was an actual decrease.

Of the purely urban companies, seventy-one of which reported, 58 per cent showed a decrease in riding, 36 per cent showed no adverse effect, and 6 per cent reported an increase. Seventy-eight per cent reported increased revenue, 10 per cent no change and 12 per cent actual losses.

Of the thirty-four purely interurban companies reporting, 29 per cent showed a loss in riders, 52 per cent no change and 19 per cent a gain. Eighty-six per cent reported increased revenues, 11 per cent no increase and 3 per cent a loss.

Of fifty-six companies doing both urban and interurban business, 61 per cent reported a decrease in riding, 37 per cent no change and 2 per cent an increase. Eighty-two per cent of the companies reported an increase in revenue, 13 per cent no change and 5 per cent a loss.

The accompanying table gives the ratio (expressed in per cent) between the actual percentage gain in revenues and the theoretical increase in revenue or percentage increase in fare. For instance, if a company secured a gain of 20 per cent in actual revenues from a 20 per cent increase in fare, its ratio would appear as 100 per cent. Less than the theoretical gains in revenue, therefore, are reflected by ratios of less than 100 per cent.

Eighty-five Companies Reported

The table represents the experiences of eighty-five companies reporting definite results of advances in fares. In the determination of the percentages, the cash fare was used as a basis, owing to the lack of definite figures on reduced rate tickets. The table, therefore, should not be used as a criterion for measuring very accurate results.

Fifty-two per cent of the companies, in their fare increase campaigns, used publicity in order to educate the people, either by newspaper advertisements or by company organs and leaflets distributed among the car patrons.

Of 100 companies stating whether or not valuations were required before the increases were permitted, thirty-seven replies were in the affirmative. Some stated that either the commission granting the increase had estimated the value or that questionnaires were submitted by the commission and answered by the companies. There were sixty-three negative replies.

One hundred companies answered as to the duration of the award. Fifty-nine of the companies received emergency awards, ranging from the duration of the war to certain specified periods after the signing of the treaty of peace. The other 41 per cent received permanent awards, several of them, however, being subject to further review by the commissions.

RATIOS BETWEEN PERCENTAGE INCREASES IN REVENUE AND PERCENTAGE INCREASES IN FARES IN 85 CASES OF REVENUE GAINED

Urban		Interurban	Urban and Interurban
1 to 19 Per Cent Increase in Fares			
Per Cent		Per Cent	Per Cent
86.6		19.2	29.4
100.0		29.4	57.5
100.1		42.0	
137.5		100.0	
20 to 49 Per Cent Increase in Fares			
10.6	60.0	17.5	22.5
24.3	60.0	21.0	22.5
24.5	60.0	33.3	30.0
25.0	64.0	40.0	31.7
27.0	64.3	40.5	37.5
32.0	64.8	60.0	50.0
36.0	67.5	60.0	50.2
36.5	70.0	67.6	63.2
37.5	75.0	83.3	71.5
37.5	75.2	112.0	75.0
37.5	83.3	120.0	80.0
40.0	84.0	135.0	90.0
41.0	90.0	147.1	91.0
50.0	94.0		100.0
50.0	100.0		100.0
50.0	100.0		107.0
50.0	100.0		110.0
50.0	100.0		150.0
50.7	100.1		
51.0	118.8		
50 to 100 Per Cent Increase in Fares			
20		10.6	50.0
		40.0	80.0

Mr. Tone Returns as Receiver

S. La Rue Tone, engineer, former president of the company and former Public Service Commissioner, was named, accepted and sworn in on Dec. 31 as receiver for the Pittsburgh (Pa.) Railways. Mr. Tone was president of the company when it went into the hands of receivers last spring. He was appointed to succeed J. D. Callery, resigned. It is the second time he has succeeded Mr. Callery in the affairs of the road, having been elected to the presidency when Mr. Callery resigned.

Charles A. Fagan and W. D. George, his fellow receivers, issued the following statement when informed of Mr. Tone's appointment:

"We are highly gratified with the appointment of Mr. Tone as one of the receivers. His standing as an engineer and his long experience as vice-president and then as president of the Pittsburgh Railways, coupled with his wide and comprehensive knowledge of public utility matters gained during his service as Public Service Commissioner of the Commonwealth, all render him eminently qualified to discharge his duties to the satisfaction of all."

Columbus Proxy Fight

Local Interests Assume Arbitrary Attitude Toward Management Interests Now in Control

The contest between the stockholders' protective committee and the Clark interests for control of the Columbus Railway, Power & Light Company, Columbus, Ohio, has centered in the selection of the proxy committee and each side has been contending for the balance of power in that respect.

At a metting of the directors of the company on Dec. 31, measures were taken to support the Clark Management Company and a proxy committee, consisting of F. R. Huntington, William C. Willard and E. R. Sharp was named. At least two of these men are residents of Columbus. They evidently do not see the necessity which is insisted upon by other Columbus interests of localizing the control and responsibility to the public.

This step forestalled the committee in its demand for three out of five members of the proxy committee, to which Clarence M. Clark, representing the management company, refused to yield. The committee, however, has selected three men as its proxy committee and it has been proposed that a joint committee of seven handle the proxies. The fight has thus centered about the selection of the seventh member, and up to Jan. 4 no agreement had been reached. The protective committee insists that it be allowed to name the seventh man and Mr. Clark and his associates were just as determined to name him themselves.

Mr. Clark, it is said does not expect to be a member of the committee, no matter what settlement may be arranged.

Several members of the committee, however, expressed the belief that an agreement would finally be reached and that it would not be necessary to canvass all the stockholders.

On Dec. 31 Mr. Clark issued a statement which in part reads in the following way:

> There is no desire on our part to control the board of directors or the management of the company. The only question at issue between me and the stockholders' protective committee this morning was as to the proxy committee of five. I at all times have been willing to agree on five names for such committee, all names to be satisfactory to both sides, or I agreed to have the stockholders' committee choose two, the board of directors two and these four to select the fifth member of the proxy committee.
>
> I also stated to the stockholders' committee that I would agree now on a board of directors, practically all of whom should be local men of standing, and on their selection such board could take such steps as desired in changing and creating the executive management of the company.
>
> The stockholders' committee would agree to nothing but the acceptance of its ultimatum—that on the proxy committee of five the committee must have three—Messrs. Kiesewetter, Kurtz and Massie. It was upon this issue alone that we agreed to disagree. There is really no issue between the purposes desired by the stockholders' committee and the interests all represent, in so far as the local management is concerned.
>
> The ultimatum of the stockholders' committee was presented to the directors of the company this afternoon and the directors concurred in my position in not consenting to the appointment of a minority of the proxy committee.

Vote Not Mandatory

Plymouth & Sandwich Company Loses Action to Compel Town Authorities to Subscribe for Stock

The full bench of the Supreme Court of Massachusetts has issued a decision in favor of the town of Plymouth in an action brought by the Plymouth & Sandwich Street Railway to compel the Selectmen to subscribe for 500 shares of stock in accordance with Chap. 95 Acts of 1911.

Town to Subscbibe to Stock

By this act the town was authorized to subscribe for the above shares at not more than par value ($50,000), to facilitate the construction of the road, and the town voted soon after the passage of the act that "the Selectmen . . . be and are hereby authorized in the name of and on behalf of the town to subscribe for . . . 500 shares . . . at a price not exceeding the par value thereof. Such subscription or purchase shall not be made by the Selectmen until they are satisfied that the balance of the amount necessary for the construction and equipment of said road is fully provided for."

In February, 1917, the railway made demand on the Selectmen for the purchase of 500 shares of its capital stock and on the refusal of the Selectmen a petition for mandamus was brought.

The court finds that on Jan. 1, 1917, the cost of construction and equipment of the road amounted to about $387,000, "with some thousands of dollars yet to be expended for necessary construction." Of the $387,000, $152,000 had been provided by the issue of capital stock; $217,000 by borrowing money on notes payable in one year after the money was borrowed (some of these notes were overdue), and for the balance of the $18,000 the company had run in debt.

The decision holds that by the true construction of the vote of the town the Selectmen were given permission to subscribe to the stock and that this is not an instance in which votes giving authority to do an act are to be construed to be votes directing that act to be done. Beyond this, says the finding, the authority or permission to subscribe was made conditional on the Selectmen being satisfied that the balance of the amount necessary for the construction and equipment of the road has been fully provided for; *i.e.* on the Selectmen being satisfied that the amount necessary for the construction and equipment of the road in addition to the $50,000 which would come to the company from the subscription of the town, had been fully provided for.

Selectmen Not Satisfied

A single justice found that the Selectmen in good faith, and after consideration of the situation, are not so satisfied, and the full bench upholds the previous finding. "In saying this," says the finding, "we have not overlooked the fact that the petitioner (the company) had no mortgage debt, that it planned to refund the construction notes by an issue of stock or other form of permanent security when the road had been completed and was in a position so to do, and the bankers for the petitioner agreed with the petitioner to effect a renewal of such said notes as were not exchanged at maturity for preferred stock, and at the meeting held on Feb. 1, 1917, between representatives of the petitioner and the Selectmen, the former agreed to accept the bonds of the town issued under the votes passed at the meeting of March 25, 1911, or to find purchasers for the same."

B. R. T. Receiver Will Raise $8,000,000

Lindley M. Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Company, on Jan. 7 outlined to an extent his financial plans for the immediate future of the property. In answer to a question as to whether the financial condition of the company at the present time was sound, he said:

"That depends on what you call sound. The company has enough money to pay its current operating expenses, the salaries of the motormen, conductors, etc. It has not enough money to complete its construction and equipment of new lines. About $8,000,000 is needed. Of this $3,500,000 will be required to obtain the necessary increase in motive power to operate the new type of cars which will be used when the new lines are in operation. It will be necessary to build additions to the existing power stations. The further sum of $4,500,000 will be needed to provide equipment such as rolling stock, wiring and finishing up certain construction work.

"I expect to apply to the court to obtain this amount of $8,000,000 through the necessary issuance of receiver's certificates to that amount. I will not, however, apply to the court until after Jan. 15 when the matter of making the receivership permanent comes before the court."

Interest Safeguarding Indianapolis

At a meeting of the directors of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., held on Dec. 31, it was decided to pass the payment of $120,000 interest charges on the Indianapolis Street Railway general mortgage 4 per cent bonds, and also the payment of $60,000 to the sinking fund account, due on Jan. 1, 1919. According to statements of officials of the company, this step was taken to safeguard the interests of all concerned in the financial integrity of the company until a meeting of the security holders could be arranged. The semi-annual rental of $150,000 on the Indianapolis Street Railway was paid on Jan. 1 when due. These developments should all be viewed in the light of the emergency fare matter reviewed elsewhere in this issue.

New Buffalo Committee

Local Interests Promise Co-operation on Modification of Previous Deposit Agreement

While the members of the City Council of Buffalo, N. Y., are touring the country investigating the railway situation in the large cities, the situation in Buffalo as regards the International Railway is becoming more acute. The International Traction Company of New Jersey, which owns the stock of the International Railway, failed to pay, on Jan. 1, the interest on its $18,000,000 of collateral trust 4 per cent gold bonds. The interest was not paid because the International Railway has not declared a dividend since last March.

Previous Agreement Criticised

A second committee has been organized to protect the holders of these securities. Those on this committee are all Buffalo men. The Manufacturers & Traders' National Bank, Buffalo, has been designated as depository for the committee.

In a public announcement this committee says that the so-called protective committee organized on Dec. 10 fails to place any limit whatever on the expenses to be incurred by the committee for compensation of itself and legal counsel and also prevents a bondholder from withdrawing from the agreement after once having deposited his bonds unless 30 per cent of the holders of the deposited bonds file written objections to the plan adopted by that committee. Even then a bondholder can withdraw only by paying to the committee such amount as it may determine to be his proportionate share of its obligations and expenses incurred up to that time.

The new committee, of which H. T. Ramsdell is chairman, fixes the compensation to be paid to the members of the committee and its counsel at not more than 1 per cent of the face value of the deposited bonds. Any bondholder may withdraw from the agreement upon paying his proportionate share of any liability at that time incurred by the committee, provided that not more than 1 per cent of the face value of his bonds shall be charged for compensation and expenses of the committee. Mr. Ramsdell says that the main purpose of this committee is to co-operate with the so-called protective committee already formed, and to endeavor to obtain a modification of the agreement under which it is acting to conform with the above provisions. If this is accomplished the new committee will immediately deposit all of the bonds in its hands with the committee formed previously.

A 5-cent fare is still being charged in Buffalo. The company must weather the financial storm until after the special referendum election in March and there is every indication that the 6-cent fare proposition will again be defeated by the voters.

Financial News Notes

Goshen Suspension Vetoed.—The petition recently filed by the Chicago, South Bend & Northern Indiana Railway for permission to discontinue city service in Goshen and remove certain tracks has been denied by the Council of that city.

Receivership Hearing Put Off.—The hearing of the petition for receivership of the Montgomery Light & Traction Company, Montgomery, Ala., filed by the Commercial Bank and Savings Company, New Orleans, La., which was set for Dec. 20, was continued by Judge Henry D. Clayton of the United States District Court, with the consent of all parties. No definite date has been fixed for the hearing.

Evansville Foreclosure Sale on Jan. 18.—Judge Robert J. Tracewell, of the Vanderburg County Superior Court, has fixed Jan. 18 as the date of sale for the properties of the Evansville Railways. William A. Carson, who has been acting as receiver for the company, has been appointed master commissioner. The tentative plan for the purchase of the road by the bondholders and for its reorganization by them was reviewed in the ELECTRIC RAILWAY JOURNAL for Jan. 4, page 71.

Interurban to Be Sold.—The Columbus, Magnetic Springs & Northern Railway will be sold by the receiver, Charles J. Finger, at Delaware, Ohio, on Jan. 15. As noted in the ELECTRIC RAILWAY JOURNAL for Jan. 4, page 72, the Columbus, Delaware & Marion Electric Company has made a proposition to the residents of the town through which the line operates to assist in financing the road and keep it in operation if they meet certain conditions which are laid down.

Takes Advantage of Grace Period.—Holders of the 4½ per cent general mortgage bonds of the New Orleans Railway & Light Company, New Orleans, La., were recently notified in respect of the interest due on Jan. 1, on the bonds, that the company found it necessary because of abnormally high operating costs to avail itself of the days of grace as provided by the mortgage securing the bonds. It is confidently believed that interest will be paid within this period of grace.

Colorado Springs Default.—Default having occurred in the payment of the interest due on Jan. 1 on the first mortgage 5 per cent bonds of the Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., James Timpson, Robert Struthers, Jr., and Emerson W. Judd, owning or representing a substantial amount of the bonds, have consented to act as a committee to protect the interests of the bondholders. A protective agreement is in the course of preparation. Holders of the bonds are requested to notify the secretary of the committee, Mr. Judd, New York, of the amount of the bonds which they hold.

City Will Ask for Co-receiver.—The Board of Estimate of New York City on Jan. 3 decided to protect the city's investment in the dual subways by asking for the appointment of a co-receiver of the Brooklyn Rapid Transit Company, for which Lindley M. Garrison, ex-Secretary of War, was appointed temporary receiver. The motion to make the temporary receivership permanent will be heard by Judge Julius M. Mayer of the Federal District Court on Jan. 15, at which time the city of New York will be represented by the Corporation Counsel. It is probable, however, that a formal application for a co-receiver on behalf of the city will be made before that time.

Fresno Interurban Suspends Passenger Service.—The California Railroad Commission on Dec. 24 gave the owners of the Fresno Interurban Railway permission to discontinue street-car service in the city of Fresno on the ground that the traffic offered did not justify a continuance of operation. The commission found that every day the line was operated resulted in a heavy loss which the company was not able to stand. At the time suspension of passenger service originally came up, the commission ordered the installation of automobile service, but even this failed to pay. The company will, however, continue its freight service.

Receivership Suit Goes to Trial.—A motion by the United Railways, St. Louis, Mo., for dismissal of receivership proceedings brought against it by stockholders has been dismissed by Federal Judge Dyer in the District Court. This means the case will go to trial, probably at the March term of court. The court gave the railway until Jan. 20 to file an answer to the stockholders' bill of complaint. Suit for a receivership was filed on Jan. 7, 1918, by John W. Seaman, New York, a stockholder. On Jan. 31, 1918, the railway filed a motion for dismissal. This was sustained on Feb. 8, Judge Dyer ruling that the bill of complaint was defective. An amended bill was filed on July 13, and the railway again moved it be dismissed. It is this move for dismissal that has now been denied.

Communities Willing to Come to Terms.—The disposition of Bay State Street Railway representatives and remonstrants against the proposed discontinuance of non-paying lines of the road, to come to terms of agreement whereby the road will be enabled to continue operations through the present crisis in its affairs, has led Judge Morton in the United States District Court to terminate the hearing on the receiver's petition to discontinue the non-paying lines. S. H. Pillsbury, attorney for the receiver, suggested to Judge Morton that the decision on the petition be postponed indefinitely, as the majority of the district representatives had made arrangements with officials of the railway whereby their lines will continue to be operated, and that the other community representatives have indicated their desire to discuss similar terms.

Electric Railway Monthly Earnings

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$207,068	*$172,775	$34,293	$39,531	†$5,238
1m., Oct., '17	197,919	*126,614	71,305	38,403	32,902
12m., Oct., '18	2,599,424	*1,741,101	858,323	470,016	388,307
12m., Oct., '17	2,028,899	*1,349,087	679,812	447,661	232,151

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$21,060	*$18,725	$2,335	$5,026	†$2,691
1m., Oct., '17	26,023	*17,850	8,173	5,076	3,097
12m., Oct., '18	325,155	*219,455	105,700	60,282	45,418
12m., Oct., '17	341,821	*208,703	133,118	61,631	71,487

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$3,435,686	*$2,345,068	$1,090,618	$1,536,845	§‡$239,827
1m., Nov., '17	3,454,687	*1,900,069	1,554,618	1,097,265	§‡685,035
5m., Nov., '18	16,170,935	*11,440,439	4,730,496	7,230,483	§‡439,963
5m., Nov., '17	15,928,087	*9,018,680	6,909,407	5,380,053	§‡2,765,798

JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$73,973	*$72,515	$1,458	$16,892	†$15,434
1m., Oct., '17	59,743	*42,606	17,137	15,819	1,318
12m., Oct., '18	887,295	*649,781	237,514	196,759	40,755
12m., Oct., '17	678,268	*455,967	222,301	188,242	34,059

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$200,632	*$147,242	$53,390	$28,172	‡$34,800
1m., Oct., '17	298,951	*142,029	156,922	29,148	‡137,357
12m., Oct., '18	3,028,815	*1,855,037	1,173,778	339,746	‡949,031
12m., Oct., '17	2,363,682	*1,346,955	1,016,727	349,354	‡676,956

PENSACOLA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$40,173	*$34,135	$6,038	$8,533	$2,495
1m., Oct., '17	25,807	*15,592	10,215	7,808	2,407
12m., Oct., '18	473,692	*320,377	153,315	97,739	55,576
12m., Oct., '17	331,242	*193,106	138,136	93,405	44,731

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$106,443	*$83,115	$23,328	$25,767	$2,439
1m., Oct., '17	88,589	*59,743	28,846	24,526	4,320
12m., Oct., '18	1,145,310	*788,949	356,361	300,375	55,986
12m., Oct., '17	942,348	*625,264	317,084	288,959	28,125

TAMPA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$82,785	*$48,241	$34,544	$5,087	$29,457
1m., Oct., '17	82,709	*46,814	35,895	5,501	30,394
12m., Oct., '18	1,034,114	*603,753	430,361	61,529	368,832
12m., Oct., '17	1,007,494	*557,897	449,597	54,532	935,067

* Includes taxes. † Deficit. ‡ Includes non-operating income. § Includes accruals under rapid transit contracts with city payable from future earnings.

Traffic and Transportation

Washington Wants More

Indications That Companies There Will Apply for More Than Present Five-Cent Fare

The Washington Railway & Electric Company and the Capital Traction Company, Washington, D. C., will probably ask for an increase in fares in the near future. This was intimated by railway officials at a public hearing conducted by the Public Utilities Commission of the District of Columbia to consider arguments for and against inter-company transfers.

COMPANIES WANT FULL HEARING

The hearing was a result of recommendations made by John A. Beeler, traffic expert in the employ of the commission, advocating inter-company transfers at certain points, affecting all car lines operating in Washington.

While the railway companies are opposed to some of the transfer points recommended, George E. Hamilton, president of the Capital Traction Company, stated that his company would not contest a full hearing. It is presumed that the other companies will assume the same attitude.

Mr. Hamilton stated that it was the belief of the officials of his company that the 5-cent cash fare which has been in effect was insufficient at present to produce the revenue necessary for a reasonable return to stockholders and bondholders. If it became evident that this was true, he said, the companies would expect the commission to increase revenues through whatever method was deemed best.

It was pointed out by John A. Hanna, vice-president of the same company, in charge of operations, that the operating revenues for December, under the straight 5-cent cash fare, had been less than the operating income for any month during the period from March, 1917, to August, 1918, inclusive. He said the general falling off in operating revenues was due in part to the influenza epidemic and in a measure to a decrease in population, following the cessation in war activities.

DISAGREE ON ESTIMATED LOSS

Aside from any monetary loss the companies might incur by reason of the proposed inter-company transfer points, which was estimated at approximately $30,000 in the Beeler report, but which railway officials state will reach to between $50,000 and $60,000 annually, Mr. Hanna pointed out that such a system would cause increased congestion at certain transfer points which are now troublesome problems and would also seriously overcrowd cars now running to capacity.

Railway officials stated that under the proposed inter-company transfer system the companies would be compelled to carry long-haul passengers at a loss and suggestions were made tending to introduce a new scale of fares which would increase the passenger fare on lines running to suburbs.

Latest Fare Tabulation

American Electric Railway Association Again Reports Fare Increases in Thirty-one Cities

The information bureau of the American Electric Railway Association announces fare increases in thirty-one more cities since its last report. The supplementary list now made public is as follows:

City	Population	Nature of Increase
Chicago, Ill. (el. lines)	2,547,201	Five to 6 cents.
Boston, Mass	767,813	Seven to 8 cents.
Syracuse, N. Y	158,559	Five to 6 cents.
Grand Rapids, Mich	132,861	Five to 6 cents.
Cambridge, Mass	114,293	Seven to 8 cents.
Utica, N. Y	89,272	Five to 6 cents.
Somerville, Mass	88,618	Seven to 8 cents.
York, Pa	51,770	Five to 7 cents.
Malden, Mass. (Bos. el.)	52,243	Seven to 8 cents.
Chelsea, Mass. (Bos. el.)	43,403	Seven to 8 cents.
Newtown, Mass	44,345	Seven to 8 cents.
Dacatur, Ill	41,483	Reduced rate tickets abolished
Charlotte, N. C	40,759	Five to 7 cents.
Everett, Mass	40,160	Seven to 8 cents
Brookline, Mass	33,526	Seven to 8 cents
Medford, Mass	26,681	Seven to 8 cents
Walla Walla, Wash	26,067	Five to 8 cents.
Gloversville, N. Y	22,314	Five to 6 cents.
Enid, Okla	21,356	Five to 6 cents.
Tucson, Aris	17,324	Five to 8 cents.
Glens Falls, N. Y	17,160	Five to 6 cents.
Ithaca, N. Y	16,017	Six to 7 cents.
Long Branch, N. J	15,733	Five to 6 cents.
Watertown, Mass	15,186	Seven to 8 cents.
Asbury Park, N. J	14,629	Five to 6 cents.
Saratoga, N. Y	13,839	Five to 6 cents.
Helena, Mont	13,789	Five to 6 cents.
Morristown, N. J	13,410	Five to 6 cents.
Arlington, Mass	13,073	Seven to 8 cents
Tiffin, Ohio	12,962	Five to 7½ cents.
Tuscaloosa, Ala	10,824	Five to 6 cents.
Johnstown, N. Y	10,678	Five to 6 cents.
Bowling Green, Ky	9,900	Five to 10 cents, (twelve tickets for $1.)
Ballston Spa, N. Y	4,138	Five to 6 cents.
Salisbury, N. C	7,153	Five to 7 cents, (four tickets for 25 cents.

A recapitulation of fare information for cities of more than 40,000 population has been made by the association. A summary of this information follows:

Fare Increases Granted	No. Cities
Six-cent unit zones, two zones, or more	1
Five-cent unit zones, two zones	3
Six-cent central zone, 2-cent suburban zone	9
Five-cent central zone, 2 cents outside zone	2
Five-cent central zone, 3 cents a mile outside	1
Eight-cent fares	7
Seven-cent fares, plus 1 cent for transfer	11
Seven-cent fares	5
Six-cent fares	44
Five-cent fare, plus 1 cent for transfer	4
Reduced rate tickets eliminated	13
Fare Increase Applications Pending	
For 10-cent fare	10
For 8-cent fare	2
For 7-cent fare	8
For 6-cent fare, one cent for transfer	1
For 6-cent fare	23
For a charge for transfers	2
For a zone system	3
For general relief to be left to authorities	4
Note—This list includes fifteen cities in which one increase has already been granted.	
Cities negotiating for purchase of property	2
Cities in which no action has been taken	15
Cities in which relief has been refused	13

Four Cents a Mile

Road in Thinly Populated Farming Country Allowed Extraordinary Rate for Cash and Ticket Fares

The Public Service Commission for the Second District of New York on Dec. 31 passed an order fixing the maximum fare on the Southern New York Power & Railroad Corporation's lines, outside Oneonta, at 4 cents a mile for cash and ticket fares and 3½ cents per mile for mileage book rate. The commission's order says no changes are to be made in the present schedule of fares in force in Oneonta. The railroad operates from Mohawk to Oneonta, with a branch extending from Index to Cooperstown and a local system in Oneonta. The present fare rate is 3 cents a mile. The company alleged that this charge was insufficient to yield reasonable compensation for the services rendered.

It was shown that for the year ended Aug. 31, 1918, there remained of total receipts of the company, after paying operating expenses, taxes, rent of track and equipment, $66,457 out of which to pay fixed charges, depreciation and contingencies and any return on capital invested. The company has outstanding $952,000 of bonds and unfunded interest-bearing debt amounting to $122,725. Annual interest payable on this indebtedness amounts to between $50,000 and $55,000. Increases in pay dating from Sept. 1 will increase operating expenses by $15,000 per annum, not reflected in the above figures. It appeared probable that the company, provided the volume of its business and rates remained the same, would be in receipt of barely sufficient revenue to pay its operating expenses, taxes and fixed charges.

COMMISSION GUIDED BY COURT

Commissioner Cheney, who wrote the opinion in the case, said:

> We have hesitated before consenting to an increase of fare to 4 cents per mile, which is a higher rate than is charged for the carriage of passengers by any other road in the State except a few short lines operating under peculiar conditions. The reason of the hesitation is that we doubt the efficacy of the remedy for the ills this corporation is suffering and we fear that the loss of traffic will offset any benefit to be derived from the increase of fare. But the Court of Appeals has held that "the question what general policy should be adopted by the respondent in developing suburban trade was one to be decided by it and not by the State. The methods and rates which it should apply to the development of any policy were subject for regulation, but the question whether the welfare of the road would be best subserved by one policy or another was a subject to be decided by the officers and stockholders of the corporation."
>
> In view of that decision we are inclined to adopt the only method which appears to be available to enable this road to render service to the communities whose principal transportation facilities are afforded by it, and not assume to decide questions of policy in corporate management.
>
> We therefore find that the rates and charges of passenger service now charged by the Southern New York Power & Railway Corporation are insufficient to yield a reasonable compensation for the service rendered and are unjust and unreasonable and that the just and reasonable fares and charges for such service to be hereafter observed and in force by it as a maximum shall be at the rate of 4 cents per mile for tickets and cash fares and 3½ cents per mile for mileage books.

Interurban Advances

Indiana Board Approves Indianapolis & Cincinnati, Union Traction and T. H., I. & E. Petitions

Interurban passenger fares were increased to 2¾ cents a mile on the lines of the Indianapolis & Cincinnati Traction Company and the Union Traction Company of Indiana by orders issued on Dec. 31 by the Public Service Commission. The order in the case of the Terre Haute, Indianapolis & Eastern Traction Company, the third line asking for an increase over the present fare of 2½ cents a mile, was not handed down until Jan. 6.

NEW RATE EFFECTIVE JAN. 10

The increased rate was to take effect on Jan. 10 and the order is to remain operative until June 30, 1919. The rate of the Indianapolis & Cincinnati Traction Company was increased from 2 to 2½ cents a mile early last year and the rate of the Union Traction Company was increased from 2 to 2½ cents in June, 1918.

The commission takes the position in the orders that it is not primarily interested in the valuation of the interurban companies, but that its chief concern is to keep the electric system of transportation in operation.

The commission points out that the chief source of revenue for the interurban companies is the passenger fare. The order relates that interurban railways in Ohio and Illinois are now operating under a 3-cent rate, the same as is charged by the steam railroads.

Whether the increased rate from 2½ to 2¾ cents will have a tendency to reduce the number of passengers and thereby defeat the purpose of the order, is considered by the commission in the order. It is noted that the various companies showed that there was a decrease in passenger traffic under the operation of the 2½-cent rate and that very little of the theoretical increase was realized.

INTERURBAN OUTLOOK NOT PROMISING

In summarizing the interurban situation in Indiana the order says:

"This railroad system, made up of several railroads, is easily one of the great assets of the State and its future, on an assumed basis of $30,000 to $32,000 a mile, is menaced by new conditions of which the most prominent are greatly increased costs of operation due to conditions growing out of the war, and the inroads of the auto passenger and truck cars. The signing of the European war armistice will tend to ease the situation somewhat, but it will probably increase the building of good roads and the number of automobiles—the 'natural enemies' of the interurban railroads of this character."

The order says that the commission did not accept the book value of the Terre Haute, Indianapolis & Eastern property submitted at the hearing of the case in December. This valuation was $26,050,558. "The prayer of the petitioner is justified on a basis of approximately half this sum," the order says.

Attention is called to the fact that the only remonstrance to the increase in rates by the Terre Haute, Indianapolis & Eastern Traction Company was made by the citizens of Ben Davis. The evidence showed that 90 per cent of the travel between Indianapolis and Ben Davis was on commutation tickets not affected by the basic mileage rate increase.

In the order of the Union Traction Company it is observed that the net operating revenue of this company under the operation of the 2½-cents fare in July, August and September, 1918, was $343,982 and in 1917 for the same period was $342,197. But in 1918 it is shown that the cost of maintenance of way and structures was 12.96 per cent greater than for the same period in 1917.

EMERGENCY RATES ONLY

The 2¾-cent rate is designated as an emergency rate in all three orders. It is to be computed upon the penny zone system and the minimum charge is to be 10 cents, except within the limits of incorporated cities and towns.

New York Opposed to Fare Increase

The attitude of the present city administration of New York toward the applications of the Interborough Rapid Transit Company and the New York Railways for increases in fares was announced at City Hall on Jan. 3 at the conclusion of a two-hour executive session of the board. The Interborough has petitioned for the right to charge 8 cents on the subway and "L," and the surface car lines 8 cents, with 3 cent transfers. Announcement of the Board of Estimate policy was made by Comptroller Craig, as spokesman for the Board. After some preliminary remarks the Comptroller said:

"We have determined not to consent to an increased fare to any private operator such as the Interborough. If the dual subway contract is modified at all it must be modified in other particulars so as to make the modification reciprocal and mutual."

"Are you impressed with the need of higher fares?" was asked.

"Temporarily," said Mr. Craig, "there is an occasion for a greater fare than conditions justified at the time the contracts were made."

This, however, applied only to the subways and elevated as operated under the dual subway contract and did not in any wise include reference to the surface situation.

"What if the lines were operated by the city?" was another question.

"Under the rapid transit act," answered the Comptroller, "municipally operated lines must be self-sustaining. Fares would have to be adjusted to meet the situation."

Higher Fare Warranted

Higher Wages and Fair Return for Milwaukee Must Come from Increased Fares

As the return on the investment of the Milwaukee companies is much below what can be regarded as a fair amount, the entire cost of any increase in wages should be met through increased rates. Such is the conclusion reached by Hagenah & Erickson as a result of an examination made for the employees' association of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company.

VALUATION CONSERVATIVE BASIS FOR RATES

In answer to specific questions asked by the association, the examiners found that the valuation of $47,564,162, adjusted to June 1, 1918, by the method followed by the Wisconsin Railroad Commission, presents an extremely conservative basis for rate adjustments, and that an annual allowance of 3 per cent of the depreciable property for depreciation is well within the range of what would be considered by any authority a fair amount.

In regard to what constitutes a fair rate of return, the report points out that this is ordinarily not less than 7.5 per cent of the fair value. Courts and commissions have generally held that a return of from 7.5 to 8 per cent is not only reasonable but necessary to attract capital. At present a return of 8 per cent is probably too low. In the past ten years, it is said, the Milwaukee companies' return has not been unreasonable. The estimated return for 1918 is 4.8 per cent. The railway system alone shows 3.84 per cent; the electric and heating system, just over 6 per cent. These returns are said to be too low for the best interests of the service.

WAGE INCREASE MUST BE MET BY FARE ADVANCE

Lastly, the report states that the adoption of the standard of wages recognized by the War Labor Board would mean an increase of $640,000 a year for railway employees and shop men and $265,000 a year for electric and heat department employees, a total of $905,000. On the point of electric railway wages Mr. Erickson says:

> The entire cost of any increase in wages in this department must come through increased fares, and we believe that such increase should be sufficient not only to cover the advance in wages to the National War Labor Board standard, if such action is contemplated, but that action should also be taken at such time to further increase the earnings of this department to the end that the net earnings, after such increase in wages, will yield a return more in accord with what public service commissions and courts have regarded as a fair return on a public utility investment.

The auditing committee of the employees' association, in recommending the adoption of the examiners' report, states that it has no suggestions to make regarding the rate of return ex-

cept to point out that savings and loan stock secured and protected by rigid State laws earns in excess of 7 per cent. Continuing the committee says:

> Since the report was written, the Wisconsin Railroad Commission has increased electric rates. In addition to providing for increased cost of coal, materials and taxes, the commission has allowed 1.9 mills for wages in the electric and heating departments. This amounts to $350,000 per year. This increase in wages was made on the date the commission's order was delivered. The electric order made no provision for increased wages for electric railway employees. The $640,000 a year needed to bring the wage scales of such employees up to War Labor Board standards can be provided only through increased railway fares.

Features of Indianapolis Decision

Emergency Relief Granted Previously to Company Considered Sufficient in View of Downward Price Tendency

The ruling of the Public Service Commission of Indiana in the case of the Indianapolis Traction & Terminal Company declining to grant a further increase in fares on the Indianapolis city lines beyond the 5-cent fare established last October and abolishing the 1-cent charge for transfer, with rebate, all referred to briefly in this paper for Jan. 4, states that the emergency relief which has been granted the company in the increase to a straight 5-cent fare will continue in effect until 100 days after the final peace terms are signed and ratified by the United States.

SINKING FUND MONEY ALL EXPENDED

The commission finds that an emergency still exists, but believes that owing to a downward tendency in prices, the company will now secure relief from the excessive operating costs which have existed, and with voluntary action on the part of the company in reducing sinking fund and fixed charge accounts, sufficient revenue will be received to discharge all its obligations.

The commission suggests that a special meeting of stockholders and bondholders be arranged with a view to diverting the money collected in sinking funds to the immediate purchase of additional modern equipment. At the time of issuing the order the commission apparently was under the impression that amounts aggregating more than $2,000,000 which have been paid into sinking fund account were in cash, and the order was intended to provide for the use of these funds for improvements to the property.

This money, however, has been used to purchase bonds for the sinking fund, and these bonds have been canceled and the money is not available for the purchase of equipment, etc.

The commission also ordered the company to reorganize its transportation department as a possible means of bettering service, and suggested changes in the personnel of that department at least during the period of reorganization.

The order discusses at some length the financial structure of the company; its earnings during the sixty-day trial period of the 5-cent fare established in October, the result of which the commission believes was misleading owing to the existence of the "flu" ban during a part of that period; the reports filed by the company and the former public directors; the discrepancy between the report of the company's checkers and those of the commission as to the percentage of uncollected fares, which varied from 3 to 13 per cent, etc.

MR. MORGAN HOPEFUL

Marshall S. Morgan, Philadelphia, vice-president of the company, who has been in Indianapolis assisting in formulating steps to carry out the order of the commission, stated that the situation was very hopeful in that the commission in its order of Oct. 12 had placed a tentative valuation on the Indianapolis property of between $14,000,000 and $16,000,000, which the commission's engineer had stated was a low estimate.

Mr. Morgan stated that if the commission based its rate on this valuation and allowed 7 per cent for a just return on the investment and 3 per cent for depreciation, as had been done in the case of other Indiana utilities, the company would have sufficient funds to meet all fixed charges, obtain new capital and make improvements to the property. It was stated by officials of the company that the points suggested by the commission would be taken up in turn and every effort made to comply with the terms of the order. It was pointed out that very little time had been given the company between the date of the order, Dec. 28, and Jan. 1 when the payment of bond interest and dividends and the installment into sinking fund were due.

PREPAYMENT COLLECTION PROPOSED

The company is arranging for adapting all of its double-truck closed cars for prepayment fare collection.

New I. T. S. Interstate Tariff

New tariffs recently approved by the Interstate Commerce Commission allow the Illinois Traction System, Peoria, Ill., to charge the same rate of fare as that of the steam carriers. Previously the system has maintained 2 cents a mile fares, but a charge of 25 cents has been made for handling each piece of baggage.

Although the new interstate tariffs, which correspond with the intrastate rates now prevailing on the traction lines by order of the Federal Court, will be on the same basis as the steam carriers, it is stated that a differential in rate will still exist between points in Illinois and St. Louis in favor of the Traction System. This is because of the fact that in preparing its interstate tariffs the Traction System has pursued its past policy of straight mileage fares into St. Louis and has made no special or arbitrary charge for transportation across the Mississippi River at St. Louis.

Free handling of baggage on the same basis as that prevailing on the government-operated steam railways is announced by the Illinois Traction System to take effect with the establishment of the new 3 cents a mile interstate passenger rates on Jan. 10.

Rhode Island Fare Case Jan. 13

The hearing set for Dec. 30 before the Supreme Court of Rhode Island on the appeals taken by several municipalities of the State from the recent ruling of the Public Utilities Commission increasing the fares on the lines of the Rhode Island Company was postponed to Jan. 13 by agreement of counsel.

The hearing was originally set for Dec. 16, but before that date G. Frederick Frost, attorney for the Rhode Island Company, was injured in an automobile accident and at his request the hearing was postponed for two weeks as it was expected by Dec. 30 he would be able to appear in court. His condition, however, did not improve as rapidly as was expected and accordingly another postponement was permitted.

Several months ago the Public Utilities Commission authorized the company to increase fares and approved the establishment of a zone system. This aroused the taxpayers in a number of the towns and East Providence, North Providence, Johnston and Warwick through their attorneys filed an appeal from the ruling of the commission.

Denver Fare Demonstration

Service on the lines of the Denver (Col.) Tramway was completely suspended for six and a half hours on the evening of Jan. 2 because of demonstrations by crowds of men and boys who objected to the collection of a 7-cent fare. Service was resumed early on Jan. 3 on regular schedules.

The trouble began when homeward-bound workmen in the stock yards district refused to pay more than a 5-cent fare, ejected the trainmen and ran the cars into the city. As incoming cars reached the business district, they were abandoned.

The 7-cent fare, which was approved by the State Public Utilities Commission, although opposed by the city officials, was put into effect on Dec. 26. For several weeks previous to Dec. 26 a 6-cent fare had been in effect with the approval of both the State Utilities Commission and the City Council. The conditions of the grant of the 7-cent fare in Denver were reviewed briefly in the ELECTRIC RAILWAY JOURNAL for Dec. 21, page 1119.

Transportation News Notes

Wisconsin Road Wants Increase.—The La Crosse & Onalaska Street Railway, La Crosse, Wis., operating an interurban line, has filed with the Railroad Commission of Wisconsin a petition for an increase in fare.

P-A-Y-E in St. Paul.—The pay-as-you-enter system was adopted for use on the St. Paul lines of the Twin City Rapid Transit Company on Dec. 27. This method of operation has been in use for some time in Minneapolis except on the suburban, intercity and two or three city lines of the company.

Stockton to Charge Six Cents.—The Railroad Commission of California has authorized the Stockton Electric Railroad to charge a 6-cent fare, on the ground that the increase is necessary to meet wage increases and the higher cost of materials and supplies. The company had applied for permission to charge 7 cents.

Columbus Request Denied.—The Public Service Commission of Indiana has denied the petition of the Central Indiana Lighting Company for an increase in fare from 5 to 7 cents at Columbus. As in several other cases decided recently the commission ruled in effect that the war emergency urged by the company in its petition no longer existed.

Kansas City Fare Award Sustained.—The Supreme Court of Missouri on Dec. 31 sustained the Utilities Commission of that State in the 6-cent fare award to Kansas City (Mo.) Railways. All the judges concurred in reversing the Cole County Circuit Court and in ordering the lower court to affirm the action of the commission. This is merely a reflection by the court of the action taken in the St. Louis fare case, referred to previously in this paper and again elsewhere in this issue.

Kokomo Petition Withdrawn.—The Public Service Commission of Indiana on Dec. 26 issued an order permitting the Indiana Railway & Light Company to withdraw the petition it filed with that body some months ago for authority to increase fares in Kokomo. The company filed its motion on Dec. 14, but the commission did not take immediate action on it. The review of the commission indicates that the relief that was asked for by the company would have been denied had the petition been carried to a hearing.

Distinction Between Cash and Ticket Fares.—Because the ticket fare under the new ordinance is 5½ cents on cars of the Cincinnati (Ohio) Traction Company, two persons, a man and woman, attempted to ride on the payment of 11 cents in cash. C. W. Culkins, Street Railroad Director, approved the act of the conductor in ejecting them. The ordinance provides for a cash fare of 6 cents each for passengers and for the sale of tickets at 5½ cents each in strips of six. An increase in fare under the Cincinnati service-at-cost franchise went into effect on Jan. 1.

St. Louis Fare Rehearing Denied.—The State Supreme Court of Missouri has overruled the motion of City Counselor Daues of St. Louis for a rehearing before the court, in connection with its decision reversing the lower court in the 6-cent fare case affecting the United Railways, St. Louis. As explained in the ELECTRIC RAILWAY JOURNAL for Dec. 28, page 1155, the Supreme Court of the State reversed and remanded the decision of Circuit Judge J. G. Slate of the Cole County Circuit Court, who on Sept. 7 held that the Public Service Commission was without jurisdiction to grant an increase in fare.

Plans Appeal to Legislature.—The formal order of notice of a petition to the General Assembly, at its coming session, to amend the charter of the Danbury & Bethel Street Railway, Danbury, Conn., by repealing the portion of section 6 of the charter which provides for the collection of a 5-cent fare within the borough of Danbury and within the borough of Bethel. Since the granting of the charter, in 1885, Danbury has become a city, but the 5-cent fare provisions apply to the limits of the city as now extended. The application is made by Judge J. Moss Ives, as receiver for the company.

St. Louis Company Wants Action.—An early hearing on the proposal for a zone system and on other plans for increasing the revenue of the United Railways, St. Louis, Mo., is reqested in a letter written by President McCulloch of the company to the Public Service Commission of Missouri. Mr. McCulloch declares that the 6-cent fare, with the increase in wages which went into effect even before the fare increase did, does not enable the company to meet its expenses and net a 6 per cent return on the investment, and that further relief must be had. Mr. McCulloch's request for such relief was first made to the commission on Aug. 31.

Auburn Increase Allowed.—The Public Service Commission for the Second District of New York on Dec. 31 authorized the Auburn & Syracuse Electric Railroad to charge a 6-cent fare in Auburn, including the lines to Owasco Lake and to the Sole Cemetery, effective on five days' notice. The increase is during the war and for a reasonable time after the peace treaty becomes effective. Because of franchise restrictions the company's application for 6-cent fare came within the Court of Appeals decision in the Quinby case. The Auburn authorities, however, on Dec. 10 waived the franchise restrictions and submitted the matter to the commission for determination.

Skip Stops Withdrawn in Springfield.—After receiving an order from the Fuel Administration on Dec. 12 A. D. Mackie, general manager of the Springfield (Ill.) Consolidated Railway, announced that the skip stops would be abolished. The fuel administrator at Chicago for the district in which Springfield is located notified the local administrator in Springfield that the matter of skip stops was purely optional with the Council and citizens of Springfield and that he did not insist upon the order being carried out to continue the stops. Mr. Mackie had previously stated to the Mayor that skip stops would be continued in Springfield until the fuel administration ordered otherwise.

Special Courtesy to the Blind.—A step toward greater courtesy was taken by the Tampa (Fla.) Electric Company on Dec. 9 when cards instructing operators to give special assistance were distributed to the blind people of Tampa. A person holding one of these cards may have a car stopped at any place on the line, whether a corner or within the center of a block, and a like convenience will be accorded them when boarding cars. They will only have to stand near the track and hold the card in the air, where it can be seen by the motorman. The new plan to assist the blind was devised by C. F. W. Wetterer, general manager, following a discussion at a meeting of the Blind Welfare Association.

New Albany I. C. C. Hearing, Jan. 22.—Col. Charles L. Jewett, head of the legal department of New Albany, Ind., has been notified that the Interstate Commerce Commission on Jan. 22 will hold an oral argument on the petition of the Louisville & Southern Indiana Traction Company, and Louisville & Northern Railway & Lighting Company, regarding increases in fares between New Albany, Jeffersonville and Louisville. M. A. Pattison, attorney examiner, conducted a hearing on the petition in Louisville last July, after which a finding was returned in which the petition was denied. When the objections of the company were sustained by the commission, Colonel Jewett was apprised of the hearing that has been scheduled.

Front-End Collectors Now "Ground Conductors."—The Dallas (Tex.) Railway is using "ground conductors" to handle the crowds boarding cars in the downtown sections during the rush hours. Under this plan, men with authority to collect fares have been stationed at the most important boarding points on Main, Commerce and Elm Streets. These men stand at the front end of cars as they stop to take on passengers, and the patrons are thus permitted to board the cars by both front and rear entrances, thus effecting a saving in the time required to load the cars. This system of fare collection at congested points has been used elsewhere with success, but to Dallas evidently belongs the credit for coining the term "ground conductors," as applied to the front end collectors.

Gary Increase Denied.—The Public Service Commission of Indiana has denied the application of the Gary Street Railway for an increase of its city fares to 6 cents. This means that the present 5-cent fare will remain in force. The application of the company was filed with the commission on Aug. 8 but the hearing was not held until Nov. 12. The company also asked for authority to increase its fare on the Gary and Hammond line and on the Gary and Indiana Harbor line from 5 cents to the city limits to a fare of 8 cents. Denial of this application was also included in the decision handed down by the commission. This means that the present 10-cent fare between Gary and Hammond and between Gary and Indiana Harbor will remain in force.

Six-Cent Fare Request Refused.—The State Railway Commission of Nebraska on Dec. 28 refused to grant the Lincoln Traction Company an increase in fares on its city lines, and the present 5-cent fare was ordered to remain in force until June 30, 1919, when the commission promises to reconsider the matter. The company's application, filed on Nov. 10, last, asked for a 6-cent fare with an additional charge of 1 cent for transfer privileges. In August last the commission authorized a 5-cent fare, effective from Sept. 1, with 6 cents between certain suburban points. Appeals are now pending in the courts from previous decisions of the commission on fare. Previous reference to the matter were made in the ELECTRIC RAILWAY JOURNAL for Aug. 10, page 262; Sept. 21, page 529; Dec. 7, page 1030.

Tampa Discusses Skip Stops.—The responsibility of eliminating skip stops in Tampa, Fla., will fall on the shoulders of the City Council, if this move is taken in the near future by the Tampa Electric Company. C. F. W. Wetterer, manager, has been informed by the Electric Railway Board at Washington that the fuel administration has not authorized the elimination of the skip stop. The company was on the verge of putting cars back on the old schedules, but the order was rescinded and a letter was written the City Council stating the skip stop would not be eliminated without a resolution from that body ordering stops at every corner. Several of the Councilmen have agitated the elimination of the skip stop and during the week ended Dec. 7 a letter from the city clerk, written at the direction of the Council, asked the railway to get back on the old system.

Butte Denied Seven-Cent Fare.—The Public Service Commission of Montana has denied the petition of the Butte Electric Railway for a cash fare of 7 cents. The commission has also restored the 2½-cent fare for children and mail carriers on duty, thus doing away with the 3-cent fare provided for in its order giving the company the right to increase its fares from 5 cents to 6 cents. This order was made on Nov. 30, and the company had until Dec. 5 to file its schedule of rates in conformity with the rates of 6 cents for adults and 3 cents for children and mail carriers on duty. Before Dec. 5 arrived the company petitioned the commission to amend its order of Nov. 30, by striking therefrom all reference to the tariff for "children and mail carriers on duty, 3 cents," and "all reference to 2½-cent fares and modify the order to provide for a ticket fare of 6 cents for the service as had heretofore been provided for 5 cents and to provide a cash fare of 7 cents."

San Diego Hearing This Month.—A public hearing on the application of the San Diego (Cal.) Electric Railway to the Railroad Commission of California for investigation of rates, and, in fact, all other conditions bearing upon the conduct of the railway will, it is expected, be held in San Diego during the present month. The company, although losing money, is not asking any definite increase in its present fares; it is simply laying its cards face up on the table before the commission and the public with the object of acquainting all concerned with the serious conditions now confronting the owners and management. The company has most carefully prepared its case, giving a detailed history of operation and financial conditions from the horse-car days to the present time. So the public may know, its exhibit may be found at the Chamber of Commerce by all who wish to read it. Copies are also in the hands of city attorneys of San Diego, Coronado, East San Diego and National City.

Municipal Line Increases Fare.—The London & Port Stanley Railway, London, Ont., a municipally-owned radial line, is to have its second war-time rate increase. Rates were fixed following electrification and rehabilitation in 1915. Six months ago passenger and freight tariffs were advanced, but a 30-cent round-trip summer excursion rate was retained for the benefit of residents of London. The commission operating the road reported to the City Council that within the past six months costs increased at the rate of $50,000 per annum, and the Council determined to support an application to the federal parliament to alter the charter by striking out the provision for the 30-cent fare. A rate of 50 cents for adults and 25 cents for children will be substituted. The provincial government has denied an appeal by the city of St. Thomas and the village of Port Stanley for the right to tax the London & Port Stanley Railway, which is now exempt as a publicly-owned utility.

Utica and Syracuse Service Inquiry.—The Public Service Commission for the Second District of New York arranged to confer with the municipal authorities in Utica and Syracuse on Dec. 10 over local transportation facilities. Representatives of the New York State Railways were also invited to attend. At prior conferences arrangements were made whereby additional power service was to be provided the New York State Railways in Utica by the Adirondack Electric Power Corporation, and while there have been delays it is stated they were due to unavoidable happenings. The Adirondack Power Corporation, which is installing a new transmission line from Amsterdam to Utica to enable it to supply more power to the electric railroad, is progressing its contract and the line is expected to be completed by Dec. 15. The commission some time ago investigated transportation conditions in Syracuse with the result that service was improved. The Syracuse conference will be to review the present conditions.

Riders Should Decide Skip-Stop Question.—Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, sent a letter to Councils on Jan. 2 in which he further defended the skip-stop system. He declared the system in full effect increased the company's carrying capacity equal to 200 cars, that it would save $1,000,000 a year and reduce the riding time of patrons on the lines from five to fifteen minutes a day. The number of automobile buses in Philadelphia increased more than 250 per cent since 1914, and to that, according to Mr. Mitten, could be credited a considerable portion of increased electric railway accidents. Mr. Mitten sent with the letter a copy of the address delivered by him on the skip-stop system before the committee of thirteen at a meeting in City Hall on Dec. 27. In connection with this address he again informed Councils that, as publicly stated, the plan of the management of the company provides that the car rider finally shall say whether the skip-stop system shall go or stay.

Charleston Suburban Fare Increase.—It was announced on Dec. 28 that the State Railroad Commission of South Carolina at its next meeting would issue an order allowing an increase in the passenger fares of the suburban lines of the Charleston Consolidated Railway & Lighting Company, effective on Jan. 1. There will be a straight fare of 5 cents from the incorporated limits of the city of Charleston to the Navy Yard, and a straight fare of 3 cents form the Navy Yard to North Charleston, round-trip tickets between the two latter points, however, being 5 cents each. The order of the commission is for ninety days and, at the expiration of that time, should there be no complaint to the commission the revised rate will be permanent. Should there be a complaint, a new hearing will be granted. The increased rates are the result of a hearing held by the commission on Dec. 12. At the time of the award of the War Labor Board in the Charleston wage case that body directed the attention of the commission to the need of more revenue by the company. This phase of the matter was referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 14, page 1068.

Personal Mention

Henry S. Lyons retired on Dec. 31 as secretary of the Boston (Mass.) Elevated Railway.

C. E. Cole has been appointed roadmaster of the York (Pa.) Railways to succeed R. E. L. Kelb.

J. H. Richards has been appointed secretary of the Boise (Idaho) Railway to succeed T. R. Hamer.

H. A. Smeck has been appointed claim agent of the Binghamton (N. Y.) Railway to succeed A. K. Martin.

David Wilson has been appointed secretary of the Railroad Commission of Arkansas to succeed J. B. Dunlap.

W. D. Humphrey has been appointed chairman of the Oklahoma Corporation Commission to succeed J. E. Love.

T. J. O'Connor has been appointed roadmaster of the Texas Electric Railway at Dallas, to succeed J. L. Adams.

Robert MacKenzie has been elected president of the Sarnia (Ont.) Street Railway, Ltd., to succeed James Flinteft.

Charles England has been appointed auditor of the Fort William (Ont.) Electric Railway to succeed J. C. Crawford.

D. L. Waters has been appointed auditor of the United Traction Company, Albany, N. Y., to succeed W. H. Elder.

W. T. Lee has been appointed chairman of the Corporation Commission of North Carolina to succeed Edward L. Travis.

L. Demery has been appointed master mechanic of the Hornell (N. Y.) Traction Company, to succeed M. J. Gordon.

William F. Breidenbach has been appointed secretary of the Sheridan (Wyo.) Railway to succeed William R. Sullivan.

J. Milton has been appointed master mechanic of the Chicago, Aurora & DeKalb Railroad, Aurora, Ill., to succeed William Harmes.

E. H. Mason has been elected second vice-president of the City & Suburban Railway, Brunswick, Ga., to succeed A. deSola Mendes.

S. L. Lupton has been appointed a member of the State Corporation Commission of Virginia to succeed Alexander Forward.

L. LeMay has been elected secretary and treasurer of the Memphis (Tenn.) Street Railway to succeed the late W. H. Burroughs.

Harry K. Tompkins has been appointed secretary of the Fishkill Electric Railway, Beacon, N. Y., to succeed W. H. Southard.

A. Shiel has been appointed auditor of the Northwestern Pennsylvania Railway, Meadville, Pa., to succeed C. H. Allen.

Orin Stiffler has been appointed superintendent of the Indiana County Street Railway, Indiana, Pa., to succeed Irwin Barry.

William J. Bradley has been appointed auditor of the Second Avenue Railway, New York, N. Y., to succeed N. M. Hudson.

C. J. Callahan has been appointed secretary of the Public Utilities Commission of the State of Idaho to succeed E. G. Gallet.

C. D. Donovan has been appointed master mechanic of the City Electric Company, Albuquerque, N. M., to succeed Antonio Vargas.

E. A. Hoffman has been appointed superintendent of transportation of the Wilkes-Barre (Pa.) Railway to succeed C. F. Crane.

George Schneider has been appointed claim agent of the Westchester Electric Railroad, Mount Vernon, N. Y., to succeed A. P. Guion.

J. A. Mower has been appointed claim agent of the Eastern Pennsylvania Railways, Pottsville, Pa., to succeed James E. Burr.

S. R. Inch has been elected vice-president of the Utah Light & Traction Company, Salt Lake City, Utah, to succeed O. J. Salisbury.

E. S. Chesebro has been appointed treasurer of the Yarmouth Light & Power Company, Yarmouth, N. S., to succeed Carl T. Keller.

Frank Gardner has been appointed engineer maintenance of way of the Houston (Tex.) Electric Company to succeed C. R. Brewster.

J. A. Strite has been elected president of the Chambersburg & Shippensburg Railway, Chambersburg, Pa., to succeed W. H. Fisher.

F. A. Zimmerman has been appointed secretary of the Chambersburg & Shippensburg Railway, Chambersburg, Pa., to succeed J. G. Schaff.

A. E. Lane has been elected president of the Ephrata & Lebanon Traction Company, Ephrata, Pa., to succeed Charles O. Collett.

E. C. Given has been appointed treasurer and auditor of the Boise Valley Traction Company, Boise, Idaho, to succeed E. A. Wetmore.

S. W. Hardwich has been appointed master mechanic of the Northern Texas Traction Company, Fort Worth, Tex., to succeed Theodore Taylor.

Herbert W. Trafton has been appointed a member of the Public Utilities Commission of the State of Maine to succeed John E. Bunker, who died some time ago.

Miss Julia A. Prasch has been appointed treasurer of the Yakima Valley Transportation Company, North Yakima, Wash., to succeed C. A. Becker.

C. F. Dupuis has been appointed a member of the Board of Railroad Commissioners of North Dakota, effective Jan. 1, 1919, to succeed C. W. Bleick.

S. Larue Tone, president of the Pittsburgh (Pa.) Railways when it was placed in receivers' hands last April, was on Dec. 31 appointed the third receiver.

J. P. Keeney has been appointed chief engineer of power plants and substations of the Virginia Railway & Power Company, Norfolk, Va., to succeed W. C. Bell.

H. L. Harris, auditor of the Twin State Gas & Electric Company, Brattleboro, Vt., has also been appointed secretary of the company to succeed H. H. Bechtel.

E. H. Kifer has been appointed general manager of the San Antonio (Tex.) Public Service Company to succeed W. B. Tuttle, who still retains his position as vice-president of the company.

William E. McGovern has been appointed auditor of the Eastern Wisconsin Electric Company, Sheboygan, Wis., to succeed Simon Kurtz, who has been appointed assistant auditor of the company.

J. P. Costello has been appointed superintendent of railways of the Reading Transit & Light Company, Reading, Pa., to succeed S. E. Smith, who is now general superintendent of the company.

E. F. Goetz, master mechanic of the Chambersburg & Shippensburg Railway, Chambersburg, Pa., has also been appointed general manager and purchasing agent of the company to succeed S. M. Coover.

J. S. Goldsmith has been appointed assistant general counsel of the Public Service Commission of Maryland, Baltimore, Md., to succeed Osborne I. Yellott. James C. Legg has also been appointed as a commissioner.

P. E. McChesney has been appointed purchasing agent of the Eastern Texas Electric Company at Beaumont to succeed E. J. Davis, who now has general supervision over the city and interurban lines of the company.

E. P. Summerson has been appointed secretary of the Lehigh Power Securities Company, New York, N. Y., which controls the Lehigh Valley Transit Company, Allentown, Pa., to succeed A. E. Smith, who still retains his position as treasurer.

L. B. Martin has been appointed to the newly created position of general superintendent of interurban lines of the Illinois Traction System, with headquarters in Springfield. Mr. Martin has been superintendent of maintenance of way of the company for several years past. His successor as superintendent of maintenance of way has not been named.

Thomas B. Pratt, formerly with the publicity department of the New York, New Haven & Hartford Railroad, has succeeded Peter D. Vroom as publicity manager of Henry L. Doberty & Company, New York, N. Y. Mr. Vroom is to take up active newspaper work in another city.

F. D. Howells, former chief engineer of public utilities for the city of Los Angeles, has become general manager of the California Highway Transportation Association. This organization, made up of freight and passenger automobile companies, is endeavoring to aid in the development of workable state laws governing automobile transportation utilities.

F. W. Bedard has been appointed general superintendent of the Urbana & Champaign Railway, Gas & Light Company, Champaign, Ill., and E. A. Roehry has been made general superintendent of the Cairo Railway & Light Company, Cairo, Ill., according to announcement from the office of H. E. Chubbuck, vice-president, executive of the Illinois Traction System.

Frank Ring has been appointed traffic manager of the Walla Walla (Wash.) Valley Railway. Mr. Ring formerly was employed by the Pacific Power & Light Company and later was promoted to the management of the Kennewick office, which place he resigned to take a position in the Baker-Boyer Bank in Walla Walla. He succeeds E. G. Miller as traffic manager of the railway.

Joseph H. Lyons, widely known among labor union men of the Coast, has been appointed superintendent of transportation on the Tacoma (Wash.) Municipal Railway. Mr. Lyons assumed his new duties on Jan. 1, when the city took over the city-owned lines from the Tacoma Railway & Power Company, which has been operating them ever since they were opened.

A. A. Blackburn, who for fourteen years has been chief engineer and assistant to the general manager of the Belfast (Ireland) City Tramways, has been appointed engineer and manager of the Huddersfield Corporation Tramways to succeed R. H. Wilkinson, whose appointment as manager of the Bradford City Tramways was noted in the ELECTRIC RAILWAY JOURNAL for Dec. 7, page 1017.

Herman M. Aldrich for the last four years superintendent of the Northampton (Mass.) Street Railway, and for ten years superintendent of the Amherst & Sunderland Railway, has resigned to become superintendent of the Claremont Railway & Lighting Company, Claremont, N. H., the property of which was sold recently to local manufacturers of Claremont after abandonment had been threatened by the original owners.

Godfrey Goldmark has been appointed counsel to the Public Service Commission for the First District of New York to succeed Judge William L. Ransom, whose resignation took effect at midnight on Dec. 21. Mr. Goldmark formerly was a partner of ex-Judge Hiram R. Steele. He entered the commission as secretary to Chairman Straus. A year later he became assistant counsel and recently has specialized in regulation.

J. M. Barry has been appointed local manager of the Alabama Power Company at Anniston, Ala., to succeed Laurence W. Jackson resigned. For some time Mr. Barry was in charge of the distribution of electricity for the Great Western Power Company, at San Francisco, and prior to that was chief of the San Francisco department of electricity, to which position he came from Portland, Oregon, where he was electrical engineer for the Northwestern Electrical Company.

H. Ware Barnum, Ware, Mass., has been appointed general counsel for the Boston (Mass.) Elevated Railway, according to announcement made by the trustees of the company. Mr. Barnum has been Assistant Attorney-General of Massachusetts since January, 1915. He is about forty years old and for a number of years was a member of the firm of Elder, Whitman & Barnum. He has had a large experience in legislative work. He is a graduate of St. Lawrence School, New York; Harvard, A. B., 1900, and the Harvard law school, 1903. Mr. Barnum succeeds Russell A. Sears.

S. T. Phillips, heretofore general electrical equipment foreman, New York State Railways, Rochester Lines, has resigned to become master mechanic of the Gary (Ind.) Street Railway. Previous to going to Rochester Mr. Phillips was associated with J. F. Uffert, now superintendent of equipment New York State Railways, when Mr. Uffert was master mechanic of the Hudson Valley Railway and the United Traction Company, at Glens Falls and Albany, N. Y., respectively. He was for a number of years connected with the New York Edison Company and the Hudson River Electric Power Company, Glens Falls, N. Y.

Lindley Miller Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Company, was born in Camden, N. J., in 1864. He was educated in the public schools, at Philip Exeter Academy, at Harvard, New York University, Rutgers and Brown and was awarded the LL.D. degree at New York University. He studied law in the offices of Redding, Jones & Carson in Philadelphia and was admitted to the Pennsylvania bar in 1886. He practiced with Redding, Jones & Carson and their successors, Jones & Carson, from 1883 to 1888. In the latter year he was admitted to the bar of New Jersey and practiced at Camden, N. J., until 1898. From 1899 to 1904 he was a member of the firm of Garrison, MacManus & Enright, Jersey City. He was vice-chancellor of New Jersey from June, 1904, to March 5, 1913, and was Secretary of War in the cabinet of President Wilson from March 5, 1913, until Feb. 10, 1916, when he resigned. He was lately been a member of the law firm of Hornblower, Milier, Garrison & Potter, New York.

Obituary

Mr. Turner Dead

Walter V. Turner, manager of engineering for the Westinghouse Air Brake Company, died at Columbia Hospital, Wilkinsburg, Pa., on Jan. 9. He had been seriously ill since the middle of November. In his death the air-brake industry has lost its greatest expert.

Mr. Turner was born in England in 1866, and before he came to America in 1888 he was in the wool business. After a short time spent on a ranch in New Mexico, he entered the employ of the Atchison, Topeka & Santa Fe Railroad and soon became chief inspector. Becoming interested in air brakes, he soon gained a reputation for proficiency in them and was placed in charge of the air-brake instruction car on that road. From general air-brake instructor he was promoted to mechanical instructor for the entire system. During this time he took out twenty-two air-brake patents, which were sold to the Westinghouse Air Brake Company.

He became connected with the Westinghouse Company in 1903; in 1907 he was made mechanical engineer; in 1910, chief engineer; in 1915, assistant manager and in 1916, manager of engineering. His first task with that company was to develop the K triple valve, of which there are now over 2,000,000 in use. By his untiring energy and ingenuity the art of braking trains has developed by leaps and bounds. He has taken out more than 400 patents and a hundred or more are still pending. Among his latest inventions are those which have contributed extensively to the success of electric train operation, the electro-pneumatic brake and the system of empty and load brake control stand out pre-eminently. By making use of these features the capacity of the New York subways has been increased tremendously. Mr. Turner was also an author, among the more important of his books being "Train Control—Its Development and Effect on Transportation Capacity," which was published in two volumes. He was awarded the Longstreth medal in 1911, and the Elliott-Cresson medal in 1912. He was a fellow of the Royal Society of Arts, England, and a member of the American Society of Mechanical Engineers, the American Electric Railway Association, Franklin Institute (Philadelphia), and the Pennsylvania State Chamber of Commerce. The degree of "Doctor of Engineering" was conferred on him by the University of Pittsburgh in 1918.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Soft Coal Output Increased Six Per Cent in 1918

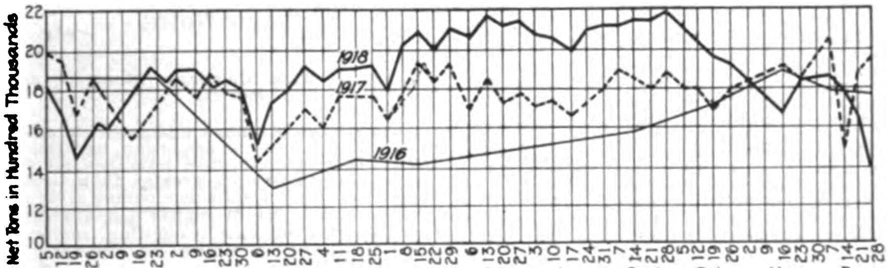
Production for the Last Year Estimated by the Geological Survey at 447,748,000 Net Tons

The lowest weekly production of bituminous coal reported in the last three years was brought about by the time lost on account of the Christmas holidays during the week ended Dec. 28, according to the Geological Survey. Estimates for this week place production at 6,385,000 net tons, 3,746,000 net tons or 37 per cent behind production of the week ended Dec. 21, and 3,352,000 net tons or 34 per cent behind production of Christmas week of last year. The average daily production for the current week (five days) is estimated at 1,277,000 net tons as compared with 1,913,000 net tons for this coal year to date and 1,763,000 net tons for the same period of 1917.

BITUMINOUS PRODUCTION INCREASED 35,187,000 TONS IN NINE MONTHS

Total production of bituminous coal for the period April 1 to Dec. 28 is estimated at 447,748,000 net tons as against 412,561,000 net tons during the period April 1 to Dec. 28, 1917, or an increase of 35,187,000 net tons.

The production of bituminous coal and lignite in the calendar year 1918 is estimated at 585,883,000 net tons, an increase compared with 1917 of 34,092,000 net tons or 6.2 per cent. Four states reported decreases, Georgia, Iowa, Missouri and Texas. The most important increases were in Pennsylvania, 11,264,000 tons, Ohio, 5,715,000 tons, Illinois, 5,064,000 tons and West Virginia, 4,908,000 tons. The estimates indicate that West Virginia still retains second place as a coal producer but the lead is so small that final returns may place Illinois in this place, which was assumed by the State of West Virginia in 1908.



ESTIMATED AVERAGE TOTAL PRODUCTION FOR WORKING DAY OF BITUMINOUS COAL, INCLUDING COAL COKED

The loss of time brought about by the Christmas holidays caused anthracite production during the week of Dec. 28 to decrease more than 500,000 net tons, compared with the production of the week preceding and was approximately 200,000 net tons lower than the production during the corresponding week of 1917. For the period April 1 to Dec. 28 the production of anthracite is estimated at 73,830,000 net tons which is 1,606,000 net tons or slightly more than 2 per cent below the production of a similar period of last year.

Copper Wire Goes Lower

Rubber Covered on 27 to 28-Cent Base, Represents a Drop of Seven Points

As a result of the drop in copper price wire has fallen many points. Of ten prominent manufacturers three were quoting on Monday 27 cent base on rubber-covered, two 28 cents, four 30 cents, and one 32 cents. Considering discounts, however, rubber-covered base is probably between 27 and 28 cents, a drop of around seven points. Quite recently one or two manufacturers have stopped selling on base, and they are now selling on cost.

On Saturday bare wire was quoted in Chicago at from 25 to 26 cents, while weatherproof ranged from 28 to 29 cents a pound.

Since Monday copper has made further reductions and if the wire quotations continue to follow the downward trend of copper still lower prices should prevail next week.

A prominent wire producer said a couple of weeks ago that the wire people could expect to do business on 19-cent copper. Deliveries in the second quarter of the year are already selling at this figure it is understood. Spot electrolytic copper on Tuesday was quoted at 20.62½ cents and there were some recessions from that price later in the week.

Iron and Steel Scrap Prices Drop

Mills Making Almost No Bids, But Dealers Holding Off Until More Definite Prices Develop

Iron and steel scrap values are still dropping and no sales of any consequence are being made. The drop here is greater than in the new product.

Almost no bids are being made by consumers, and dealers still hesitate to buy while values are so uncertain.

A further disturbing factor is the heavy offering of scrap arising from the termination of war contracts. The Canadian government is offering around 150,000 tons of scrap and the U. S. Government is known to hold a large tonnage. This, however, is expected to come on the market only slowly so that values will not be unduly sacrificed.

Dealers seem to feel that it will be several weeks before any definite and safe market for scrap develops.

It is hard to secure any real quotations but resales were made this week on the following basis in Chicago: Rerolling and short old steel rails, $24.00-$25.00 per gross ton; frogs, switches and guards, $19.00-$20.00 per gross ton, car wheels $24.00-$25.00 per gross ton, old iron rails, $26.00-$28.00 per gross ton; old iron and steel axles, $28.00-$30.00 per net ton.

With the exception of old steel rails which are quoted in New York as $17.00-$18.00 per gross ton, the Chicago prices above quoted are lower than the quotations received for the Pittsburgh, Cincinnati, New York and Philadelphia districts. In these cases, however, prices are f.o.b. buyer's mill, whereas the Chicago quotations were based on exchanges between dealers and brokers.

G. E. Employees Back

Men Return as Work Is Provided—Company Does Not Admit Jurisdiction of War Labor Board

A hearing was held in New York on Wednesday of this week by the War Labor Board in the General Electric Company sympathetic strike case. At its conclusion the board announced that it would take under consideration and state later whether or not it would assume jurisdiction in a case where one of the parties was unwilling to be bound by the decision.

Manager H. Griswold, Jr., of the Erie Works expressing his unwillingness to submit the controversy to the board or to be bound by any finding it might make, expressed willingness to refer any differences to the system of representatives at Erie which is similar to that set up by the War Laboar Board at Pittsfield and Lynn. E. W. Rice, president of the company, said that the only controversy between the management and the workers existed at Erie, where 20 per cent of the employees went out because of alleged unfair discharge of ten men. The Schenectady and Pittsfield plants were working under an award of the War Labor Board, and in violation all Schenectady employees and 50 per cent of the Pittsfield employees went out in sympathy. The Fort Wayne works were operating under an agreement between the management and workers made through a Department of Labor representative, and in violation of it 75 per cent went out in sympathy.

So far as work was available, the men at the various plants have gone back. At Schenectady, where about 15,600 went out, all but about 1000 have been taken back, and there was no work for these at the time. The situation is similar at the other works. None were out at Lynn. The men were taken in a preferential order, the general result being that first preference is given to those who had been in war service, then those having dependents, etc.

The Department of Labor does not look forward to any unemployment crisis, according to a statement on the general labor situation by Assistant Secretary of Labor, Louis F. Post: "There is no reason," he says, "why either business men or wage-earners should be apprehensive with regard to commercial stagnation. The war has on the whole increased the purchasing power of the masses and has created new markets. America must assist in the rebuilding of Europe, and avenues for foreign trade hitherto closed to us are now open. Raw materials which were denied to private and non-essential industry during the war are now accessible to the manufacturers of America through their release by the War Industries Board. Credits which were similarly denied to private concerns because they were needed for Government use have also been released by the Capital Issues Committee. There is no reason for anyone to be alarmed over the future."

Street Cars Still Subject to Mexican Tariff

By the decree of Aug. 27, 1918, machinery of all kinds unless otherwise specified, as well as separate parts, was to be admitted free of charge into Mexico. Subsequently, however, by the circular of Oct. 21, 1918, the Director General of Customs of Mexico directed that exceptions be made in the case of certain articles which will continue to stay at the old rate of 45 cents per 100 lb. gross weight. Included in the articles still subject for duty, as transmitted by Vice-Consul Joseph W. Rowe of Mexico City, are motor cars for railway use, and electric batteries.

Track and Roadway

Waterbury & Milldale Tramway, Waterbury, Conn.—It is reported that the Waterbury & Milldale Tramway contemplates the construction of an extension from South Street, Bristol, over Wolcott Street and through Wolcott, connecting with the car line from Waterbury to Hotchkiss Lake. J. H. Cassidy, secretary.

Detroit (Mich.) United Railway.—Two new extensions have recently been placed in operation by the Detroit United Railway. One of these lines is the Northwestern Belt Line, a single-track extension of the Hamilton line operating to Woodward Avenue through the company's carhouse and shop property in Highland Park and connecting with Grand River Avenue near the westerly city limits. This line will later be double-tracked. The other line placed in operation is the Ferndale line from Springwells Avenue, around the edge of Woodmere Cemetery to Dearborn Avenue and connecting with Fort Street. A branch line is being built northward paralleling with Solvay Avenue.

Cincinnati (Ohio) Traction Company.—**Walter A. Draper,** vice-president of the Cincinnati (Ohio) Traction Company, recently notified city officials that the company is prepared to lay new rails on Eastern, Freeman and Central Avenues whenever the city is ready to undertake improvements on those streets.

Peterboro (Ont.) Street Railway.—The Hydro-Electric Power Commission of Ontario, which operates the Peterboro Street Railway, reports that it proposes to erect 20 single-track miles of overhead construction.

Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.—This company reports that during 1919 it will reconstruct 3 or 4 miles of track if labor can be procured.

Dallas (Tex.) Railway.—Plans of the Dallas Railway for 1919 call for the completion of its building program which is now under way. The program involved the expenditure of $800,000. About half of that sum has now been spent. The remainder is to be spent this year. This is in improvements and extensions. The maintenance charges and general repairs for 1919, it is expected, will be higher than usual because it has been difficult to keep up with the demands during 1918. The plans for extensions call for the building of the Oak Lawn line out to the cemetery. The Second Avenue extension is just being completed. There will be some work in Oak Cliff, the Colonial Avenue line is to be double-tracked and the Lake Avenue line is to be extended to the hospital. It is probable that additional plans for extensions will be made during 1919 and some of the additional work will doubtless be under way before the close of the year.

Power Houses, Shops and Buildings

Southwestern Gas & Electric Company, Texarkana, Ark.—Fire recently destroyed the carhouse of the Southwestern Gas & Electric Company, together with twelve cars, causing a loss of about $100,000.

Pacific Electric Railway, Los Angeles, Cal.—A new passenger station has recently been completed by the Pacific Electric Railway at Fullerton.

Washington Railway & Electric Company, Washington, D. C.—A contract has been awarded by the Washington Railway & Electric Company to Lake Stone, Washington, for the construction of a new one-story, concrete substation at Fourteenth and East Capitol Streets, at $3,000.

Hammond, Whiting & East Chicago Railway, Chicago, Ill.—This company advises that during 1919 it expects to construct a new 400-kw substation and an addition 50 x 50 ft. to its carhouse.

Danville Street Railway & Light Company, Danville, Ill.—The carhouse of the Danville Street Railway & Light Company, containing nine city cars, was recently destroyed by fire, causing a loss of about $75,000.

Chicago & Joliet Electric Railway, Joliet, Ill.—A report from the Chicago & Joliet Electric Railway states that during 1919 it proposes to install one 1500-kw substation at Joliet, one 300-kw. automatic substation at Dellwood Park and 6000 ft. of 250,000 C.M. 12,000-volt underground cable connecting the Joliet substation with the substation of the Public Service Company at Jackson and Ottawa Streets. All euipment has been purchased, except cable and small material, such as bus bar supports, disconnect switches, insulator racks, etc.

New Advertising Literature

Eugene F. Phillips Electrical Works, Ltd., of Montreal, Canada: A 270-page handbook entitled "Philips' Wires and Cables." The book, which is pocket-size and handsomely bound in leather, is printed on coated paper, is illustrated and comprises five sections. The subjects of these are electrical conductors, bare and weatherproof wires and cables, magnet wires and cotton-covered wires, rubber-insulated wires and cables and flexible cords, paper-insulated power cables and telephone cables and varnished-cambric insulated cables, and general information. Aside from the complete information furnished about the company's many different varieties of wires and cables, tables of wire weights and diameters and other very useful information to the wire user are given.

Rolling Stock

St. Cloud (Minn.) Public Service Company expects to purchase two motor cars this week.

Municipal Railway of San Francisco expects to purchase this year five automobile buses and twenty 32-ft. steel city passenger cars.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., intends to purchase some time during the year one single-truck work car, 30 ft. over all.

Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., expects to purchase ten steel ash cars this year.

Winnipeg (Canada) Electric Railway is reconstructing its present rolling stock at the rate of ten cars per month, forty cars having already passed through its hands. It is understood that the ten new cars that were ordered from the Ottawa Car Company, as reported in the July 31 issue of the ELECTRIC RAILWAY JOURNAL are at present in the last stages of construction.

Trade Notes

C. E. A. Carr Company, Montreal and Toronto, has added H. F. Powell to its selling force.

Ohmer Fare Register Company states in a recent issue of its house organ, the *Ohmer Fare Register,* that there is a demand for the company's product greater than it can supply and that when peace comes a bigger business than ever in registers is expected.

Walter N. Polakov, consulting engineer, announces the founding of Walter N. Polakov & Company, Inc., consultants in power production methods, industrial investigations, labor problems, scientific record systems and production accounting, with offices at 31 Nassau St., New York City. With the close of hostilities a number of capable engineers formerly associated with him have joined the staff of the corporation.

National Car Coupler Company, Attica, Ind., has issued a statement in which it is affirmed that 93 per cent of its employees have petitioned the company to continue operation under the old system, and have voluntarily waived any rights they might have under the recent award of the National War Labor Board granting a basic eight-hour day, collective bargaining and reinstatement of certain discharged employees. The statement says that in view of this petition and of its harmonious relations with its employees during twenty years of its existence, the company "respectfully but decidedly declines to abide by the award."

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, January 18, 1919 Number 3

Standardization Is More Than Ever a Timely Topic

IN LOOKING forward to the 1919 convention of the Engineering Association one tries to visualize what he would like to see in the program. Involuntarily his mind turns to standardization, now more timely than ever because everything costs so much more than it did before the war. Before anything new in this line is started, it would be profitable to ask why present association standards are not more widely used, so that future standards may be more closely fitted to the industry's needs. A lot of unused standards on the books do not add to the association's usefulness and prestige. Better a few in daily use than many "damned with slight regard," to paraphrase a well-known quotation. There are, however, some fields for new standards which might be entered at this time. Take, for example, the matter of car design. Here a beginning might be made in unifying certain dimensions for the purpose of utilizing standard materials and thus reducing cost. Many detail parts of a car and its equipment are subject to some standardization. Track special work also might come in for attention, a good place to begin being the report on spiral standardization by E. M. T. Ryder prepared originally for consideration by the committee on way matters and printed in the form of an article in the issue of ELECTRIC RAILWAY JOURNAL for April 6, 1918, page 649. Most important of all, the engineers should determine just what they can do best to help in the reconstruction work and then "get busy" in the coming year to do that and only that.

Why Not Stake the Manufacturer?

TEMPORARILY the electric railway industry is in the dumps, but perhaps for that very reason the manufacturer of electric railway devices has never tried harder to help his customers. It is our frank opinion, however, that electric railways are not meeting the manufacturer half way as often as they ought when it comes to the question of inventing or adapting something to meet their needs exclusively. They expect him to hear without murmuring all the development expenses and do not always give him at least the comfort of being without competition. Thousands of dollars are spent. Then, to cap the climax, the bidders may be told that the devices offered are not perfect, that the board of directors won't approve the appropriation or that the price is too high as compared with some stock article that weighs as many pounds, contains as much material or that stands as many inches high or wide!

As a matter of simple justice, any railway that wants something unusual should be willing to bear a part of the development charges—all the more so as the device, though satisfactory for its own conditions, may be worthless everywhere else and may also impose a future burden upon the manufacturer because of storage and other charges in connection with special patterns, jigs, tools, etc. No manufacturer relishes being put in the position of appearing to charge an excessive unit price just because the order is special. He would far prefer to sell at a price comparable with his standard output. This he can do only if the development charges for a special application are billed and paid for as a separate item instead of being concealed in the unit selling price. Then the customer will not look upon the manufacturer as a monopolistic profiteer, while the manufacturer will feel encouraged to develop his inventive facilities to the utmost.

What Equipment Tests Are Necessary or Desirable?

TESTS of electric railway equipment are of two kinds; those which are made during and immediately after the construction of the apparatus to determine the fitness of the materials used and to make certain that the workmanship is all that is desired, and service tests with the assembled equipment operated under every-day conditions. Tests of the latter type are analyzed in an article in this issue by C. W. Squier. The tests which he outlines are very extensive and are such as are frequently made on large electric railway systems. On smaller properties there are not the facilities or instruments for carrying out tests on such a large scale and on these properties the managers would, no doubt, consider the cost of making elaborate tests to be prohibitive. Certain of the tests discussed may, however, be within the reach of the smaller properties, and all can gain much information from this article as to how such tests should be carried out. For the purpose of enabling them to supplement and check manufacturers' claims, a number of roads maintain quite complete testing organizations. The care which they take in testing their equipment shows that they appreciate the importance of this work. The same conviction as to the value of careful testing should pervade even the smallest roads, where the spirit of getting at the root of difficulties by resorting to some form of test rather than by cut-and-try repair methods should be fostered.

For apparatus to be tested by a railway, is no disparagement of the exhaustive work of this character which is done by manufacturers. We all know that the latter have systematized testing procedure until it is well nigh a science. Furthermore, it is the custom of manufacturers to follow up the performance of their equipment in service to enable them to make good any defects in design or workmanship. A little later we plan to publish some articles showing just what the manufacturers do along this line. However, even when the railways receive their equipment in perfect condition, it is necessary to maintain some kind of periodic testing work, with occasional special investigations, in order to determine whether or not the equipment continues to do what is expected of it.

Engineering Association Wisely Decides to Go Forward

THE ELECTRIC RAILWAY JOURNAL has deplored the fact that the American Electric Railway Engineering Association did not continue its activities during the war period, and has expressed this thought on several occasions. It seemed to us and to many others that the association was needed, if ever, to assist its members in doing their work well under adverse conditions. To be sure, it would not have been easy to work under war conditions, and the lines of activity would necessarily have been modified and curtailed; but much could have been done. In view of this conviction we are pleased to note that, after cessation of association activity for many months, the executive committee has opened the throttle and the machinery will soon be in operation again.

For the present attention will be focused on but a few subjects, but these will be selected by a specially appointed committee on subjects which will presumably have several considerations in mind, as follows: First, railway men competent to do effective committee work are heavily overburdened due to the run-down condition of physical equipment. Second, a very limited period is available for the preparation of reports. Third, the program for the convention should be made interesting, stimulating and constructive—in other words, the antithesis of tiresome. Fourth, whatever is done now, whatever is said and done at the convention, and whatever plans are laid for future work, all should be done with the definite object of helping to get electric railways back onto their feet.

To the above end a commendable step was taken by the executive committee in deciding to ignore the present committee organization in preparing a program, in order that the future work may be unhampered by tradition, precedent or committee personnel. As we have pointed out editorially before, there is in the electric railway association (and elsewhere as well) a tendency to keep committees going almost regardless of what they do. Committees are appointed for special purposes, but they are frequently not discharged when they achieve this purpose or prove their incompetence by failing to do so. It is a favorite diversion at public meetings to appoint committees for this or that purpose, sometimes without due consideration. The average committees so appointed do little, prepare perfunctory reports which make unattractive programs, and drag on a miserable existence until somebody suggests that they be "discharged with the thanks of the association." Now is a good time for a committee clean-up in all fields.

Temporary War-Time Construction May Now Have Become a Menace

TEMPORARY structures are quite as much a part of the necessary equipment of a construction company as are wheelbarrows and hammers. But useful as they may be while construction work is on they constitute a menace as well as a nuisance if permitted to remain, and, therefore, like the wheelbarrows and brickbats they should be carted away when the job is finished. We as a nation have just been engaged in one of the largest rush-order construction jobs ever tackled by any people—the creating out of nothing and over night, as it were, of a mighty military machine. We have done the job and in doing it we have had a perfect orgy of temporary construction. As a people we have spent enough money on such construction to build a Panama Canal, an Assouan Dam, and irrigate a chain of small deserts besides. It was all necessary, and we are not bemoaning the expenditure of time, money and materials. The electric railways have done their share along with the other industries. Some of their temporary structures were built because the money was not available to build otherwise, others because the need was known or thought to be transient.

Great as the immediate need of these structures may have been or may now be their presence carries with it a certain element of risk. Regarding them, the motto of the insurance companies is "Beware." Every insurance man knows that a temporary building once in service in the operating field is likely to remain where it is until it either falls down or burns down. In such service not only are they risks themselves but they constitute risks to neighboring property as well. This is the more true since, because of its convenience and general availability, wood is the building material commonly used. Owing to advances in the building art comparatively cheap temporary structures can be built with such materials as concrete, metal lath and plaster, and their use seems desirable wherever temporary operating structures are necessary. In any event, however, a temporary structure should be removed at once when its immediate purpose has been served.

What Causes Curve Resistance?

"CURVE resistance has never been exhaustively investigated, and our knowledge is in several respects deficient." So wrote A. M. Wellington many years ago. Despite the fact that we have developed refined methods of measurement and learned a vast deal about the mechanics of railroading since Wellington wrote the classic volume, "Economic Theory of Railway Location," the statement quoted pretty well sums up the present status of the matter. To engineers who have ever had anything to do with railway location or the selection of motive power, curve resistance possesses a certain fascination. This is because of the presence of some elusive variables which so far have escaped being charted to everybody's satisfaction.

Various theories have been propounded to account for curve resistance. By some writers centrifugal force is assumed to play a major part. Others account for it on the basis of obliquity of traction, that is to say, of the tendency of a train passing around a curve to draw itself straight. Still others believe that the skidding of the wheels incident to the different distances traveled by the inner and outer wheels of an axle is the cause. In a paper contributed by Bulletin 207 of the American Railway Engineering Association, J. G. Sullivan discusses the older theories and presents one of his own which seems to possess some merit.

Mr. Sullivan discounts the centrifugal force theory because with proper superelevation of the outer rail the action of centrifugal force is simply to place more of the weight of the car body on the outer rail. He considers the obliquity of traction theory absurd since a locomotive will push practically as many cars around a curve as it will pull, and all experience has been that it is the outer rail head reather than the inner one that is cut away. Regarding the skidding of the wheels along the rails, Mr. Sullivan makes the point that, even assuming a coefficient of friction of 22 per cent, only one-fourth of the force usually assumed to represent curve resistance would be accounted for.

His own theory is that the reason that the outer wheels "exert a pressure against the outer rail on a curve is the fact that a revolving cylinder tends to rotate on a straight line perpendicular to the axis of rotation"; in other words, he attributes the attempt of the outer wheel flanges to climb the rail head as due to the gyroscopic action of the wheels.

It has been customary to express curve resistance either in terms of grade which would produce an equivalent resistance or as a certain number of pounds per ton per degree of curve. Such expressions neglect the effect of speed and track and truck conditions. If the gyroscopic theory is the correct one it would be expected that curve resistance would vary as some power of the speed. Tests reported in Bulletin 92 of the Engineering Experiment Station of the University of Illinois indicate the truth of this assumption. Other tests made by Prof. L. E. Endsley for the American Steel Foundries show that curve resistance is affected to a very marked degree by the condition of the track rails, truck frames, and wheel treads and flanges. While many experimenters have worked on the problem and a great many more engineers have formulated opinions relative to it, there seems to be nothing available inclusive enough to serve as a basis for general reasoning.

In view of the almost negligible amount of construction work in progress the matter of curve resistance is not of very great interest at the present time. It has never received as much attention as true train resistance because it is usually much smaller in magnitude and, besides, curves ordinarily form a small percentage of the mileage of a railway. These engineers, however, who have to do with mountain grade steam railway electrification could well make use of a more exact knowledge of the subject, as mountain roads have a great deal of curvature, and in some cases the use of special rolling stock is involved. For such equipment the old arbitrary figures of 0.7 or 0.8 lb. per ton per degree of curve do not necessarily apply. At any rate it is better engineering practice to base empirical formulas on known facts than on guesswork and tradition. With the possibilities of accurate power measurement afforded by electric traction and with the recent developments in methods of measuring track stresses, an extensive new investigation of the subject should yield results of considerable technical value.

How Far Can Wages Be Standardized?

IT IS NOW more than five months since the first wage awards to electric railway employees were made by the War Labor Board. The results to the companies following the fixing of comparatively high wage scales for these men have been reviewed from time to time in these columns, and it is conceded generally that these awards brought to a crisis the financial difficulties of many a transportation agency. The harm has been done, however, and there is no prospect of relief from the wage burden unless at the end of six months the companies are able to make a showing which will convince the board that an injustice has been done in any case or that new conditions have arisen which warrant a change.

In this connection some thought might be given to the question of requesting the War Labor Board to depart from its policy of attempting to fix standard wages. This principle undoubtedly was adopted as one of expediency during war times. But the point might well be raised as to whether this policy is strictly fair. In the November issue of the Monthly Labor Review of the United States Bureau of Labor there is an article entitled "Comparison of Food Costs in Forty-Five Cities." From this article one is likely to form the conclusion that if the establishment of a 48-cent maximum wage per hour in a number of cities is fair to some companies, it must inevitably work an injustice on others.

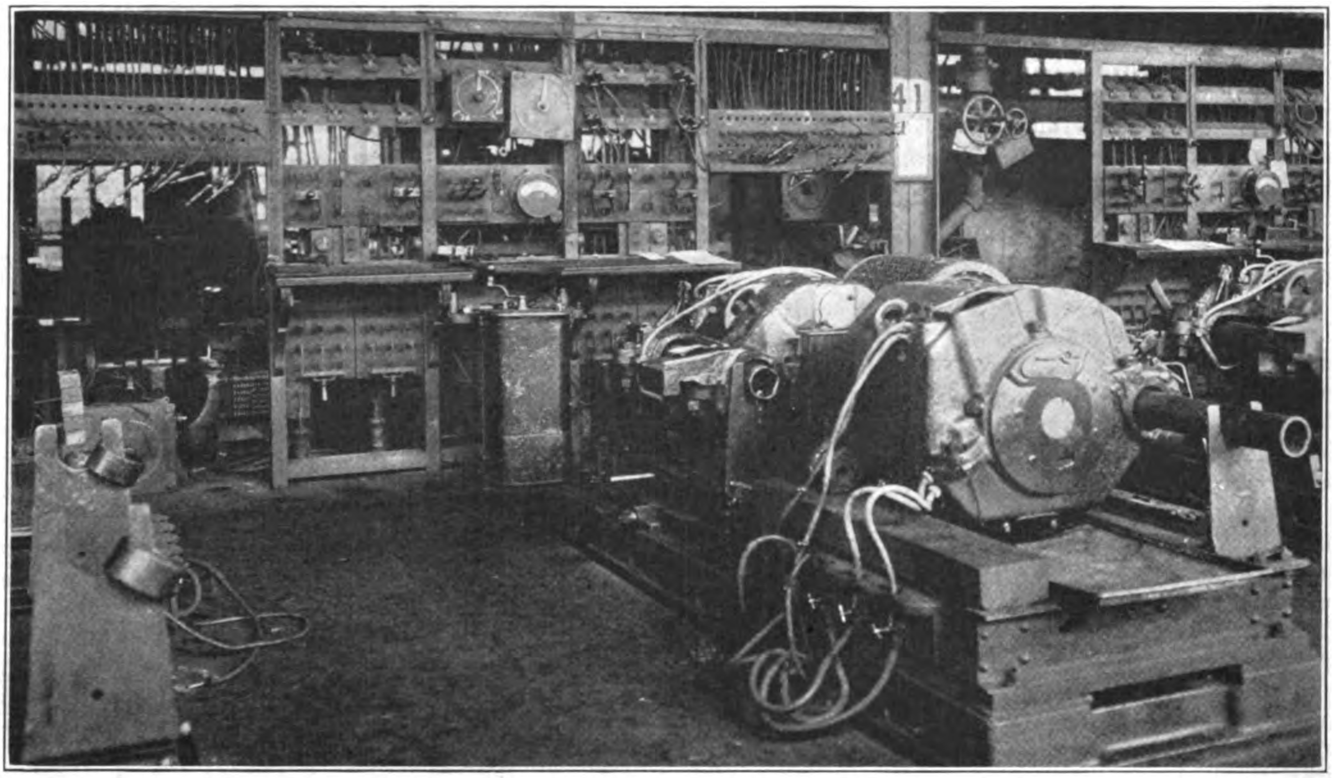
It is true that the board departed somewhat from a fixed standard when it established a 42-cent maximum in some districts, 45 cents in others and 48 cents in still another group of cities. But even these distinctions do not appear to have been based on a careful weighing of "local conditions," if one is to judge from the weighted averages of food prices as listed in the article mentioned above. One finds, for instance, that, as compared with an average of 100 for the United States as a whole, the food cost averages in four of the cities having a 48-cent maximum wage scale for trainmen are 94.20, 98.74, 99.63 and 99.95, while another city for which the 48-cent wage was recently established has an average of 115.02. It is true that these percentages are based entirely on food costs and on only a portion of the articles constituting the entire expenditure for food. Inasmuch as food costs take about 40 per cent of the average expenditure in the cost of living, it is not unlikely that similar differences would be found to prevail on the other items in family maintenance in various localities. To this extent at least there is shown a decided lack of uniformity as between cities. In fact, this contention has been made frequently by employers and employees alike in arbitration hearings where wage scales were the subject of discussion.

If some of the cases over which the War Labor Board has jurisdiction are to be reopened during the next few months the question might well be raised as to whether the interests of justice are best served by the continuance of the present policy of fixing standard wages.

Electric railways can now supply data to show just what effect the standardizing has had upon their operating problems.

Car Equipment Service Tests Determine Fitness of Apparatus

BY C. W. SQUIER
Electrical Engineer



RAILWAY MOTOR TEST AT MANUFACTURER'S PLANT

The Author Describes the Methods of Making Operating Tests and Heat Runs, Tells How Sections of Test Track Can Be Best Laid Out to Represent Actual Service Requirements, Outlines the Organization Necessary for a Proper Test Force and Gives the Results Obtained in a Specific Test

BEFORE ordering the equipment for electric railway cars the operating and designing engineers of the railway devote a large amount of time to preparing specifications and working out the proper materials and apparatus necessary for satisfactory operation. As soon as the manufacturer begins his work on the various parts which enter into the equipment, inspectors from the railway follow the construction carefully to make certain that the material is proper and is used as called for in the specifications.

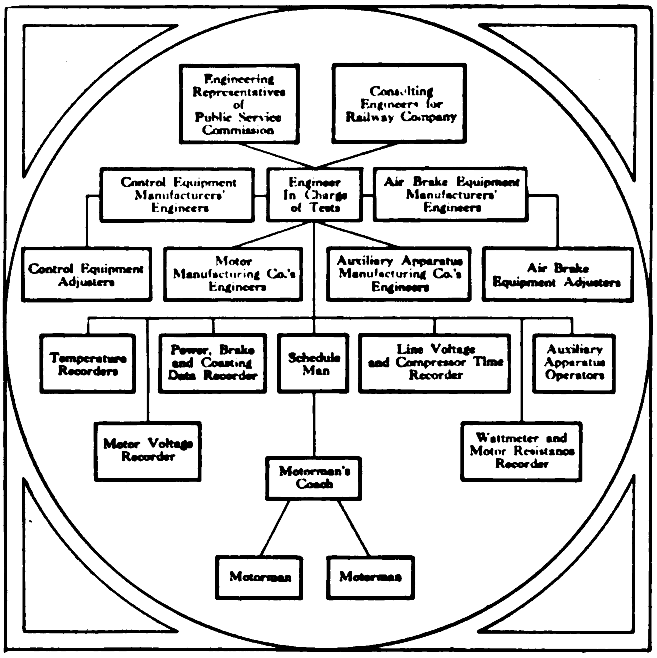
Preliminary tests are usually made at the manufacturer's plant for determining the fitness of the apparatus for the service conditions to be encountered. These commercial tests are intended to locate any defective material that may have been used and also to make certain that the workmanship is up to the standard expected. They are very important and the various manufacturing concerns have provided very complete testing facilities. Each separate piece of apparatus which goes to make up the complete equipment of an electric car is given test after test from the time that its construction is first started until it is assembled for the final running tests. After it has passed the commercial tests at the manufacturer's plant the equipment is usually shipped to the railway company for installation on the completed cars.

After the equipment is received and installed on the cars the officials of the road naturally want to know if it is going to give the service specified satisfactorily and otherwise meet the operating conditions laid down in the specifications. Tests are necessary if this is to be determined with any degree of accuracy. These should preferably be made under actual operating conditions approximating as nearly as possible the service as given in the specifications under which the equipment was purchased. These tests should extend over a considerable period. If made on lines where passenger service is maintained they will seriously interfere with regular operation. It is therefore preferable where possible to to make use of a section of track not used for regular service, but very few roads have such track. Sometimes by rerouting the cars on a portion of a line temporarily, or by using only one track of a double-track section for passenger traffic, a short portion of a line can be made available for test purposes. Most tests except the service-heating test can be made during the off-peak hours.

This usually requires from eight to twelve hours of continuous operation and if it is interrupted for even a few minutes the results become worthless, and the test must be made over again.

TEST RUNS SHOULD APPROXIMATE ACTUAL SERVICE CONDITIONS

With a certain section of track available for the test the first thing to be done is to lay out runs along this track of lengths so as to reproduce the service specified. To illustrate the procedure I shall describe briefly a series of tests of which I recently had charge. The cars were for operation in both local and express service on a high-speed line using train operation. The control equipment was of the multiple-unit type and two motors were used per car. The tests were carried out with a two-car train on a section of track about 3 miles in length. For the motor heating tests, local and express runs were chosen which represented the most severe conditions. Table I gives a comparison of the specification distances and the distances actually laid out for the test of express service. A complete trip was 43,380 ft. long and was made up of six runs of varying length. As the test track was not long enough to make a complete trip operating in one direction, the various runs were made by operating back and forth over the test section. It was, of course, necessary that the point of ending each complete trip should be the same as the starting point, for test operation must be continuous until the apparatus reaches constant temperature. In order to bring the runs back to the starting point the express runs of 9560 ft. and 9870 ft. as given in Table I were changed to 9650 ft. and 9780 ft. respectively by adding and subtracting 90 ft. from the actual distance of these runs. The chart given on page 130 shows the various runs as laid out with the different grades of the lines.


Engineering Representatives of Public Service Commission
Consulting Engineers for Railway Company
Control Equipment Manufacturers' Engineers
Engineer In Charge of Tests
Air Brake Equipment Manufacturers' Engineers
Control Equipment Adjusters
Motor Manufacturing Co.'s Engineers
Auxiliary Apparatus Manufacturing Co.'s Engineers
Air Brake Equipment Adjusters
Temperature Recorders
Power, Brake and Coasting Data Recorder
Schedule Man
Line Voltage and Compressor Time Recorder
Auxiliary Apparatus Operators
Motor Voltage Recorder
Wattmeter and Motor Resistance Recorder
Motorman's Coach
Motorman
Motorman

ORGANIZATION CHART OF TESTING FORCE

STOPPING SIGNS ARE OF GREAT ASSISTANCE

The various stopping points were indicated by large white signs with black numerals printed thereon. These stopping signs were located on the right-hand side of the track as they were being approached by the train. The motorman's operating cab was located on the right-hand side of the car when facing the front end, and this location of the signs was most convenient for the motormen. All lengths of runs were laid out so that the front end of the train would stop opposite the stop sign. Where the direction of operation was changed, as was necessary in operating back and forth on the test section of track, allowance had to be made, of course, for the length of the train, so that the motorman at each stop could bring the front end of the train to rest opposite the stop sign in each case. By using large signs with conspicuous numerals painted on them the motorman was able to see where the stop was to be made a considerable distance in advance of the stopping point. An accompanying illustration shows one of these stopping signs in position. For the test a two-car train was used and it was loaded with bags of sand to give a weight equal to that of a standing load of passengers. The motor equipment consisted of two motors per car mounted one on each truck. By the use of two cars the difference in temperature of the motors at the ends and in the center was obtained. For operating the train two motormen were used, one at each end of the train. This was necessary as the duration of stop was insufficient for the motormen to change ends. The complete test force was as follows: One engineer in charge; two motormen; one motorman's coach; one schedule man; one power, brake and coasting data recorder; one line voltage and compressor operation recorder; one motor voltage recorder; one wattmeter and motor resistance recorder; eight temperature recorders, and two auxiliary apparatus operators. The entire testing force was under direct supervision of the engineer in charge of the tests.

In addition to the test force the various manufacturers of the equipment under test had engineering representatives present and workmen ready to make any adjustment of the equipment that was considered necessary. Representatives of the Public Service Commission and various consulting engineers for the railway also assisted the engineer in charge of the tests. An organization chart of this test force is shown in an accompanying illustration.

TABLE I—DISTANCES AND RUNNING TIME FOR EXPRESS RUNS IN MOTOR-POWER-CONSUMPTION AND HEATING TESTS

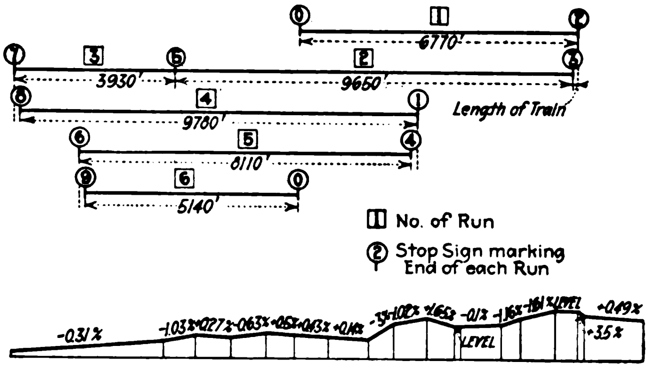
Specification Distances, Feet	Distances Used, Feet	Running Time, Min.	Running Time, Sec.	Duration of Stops, Seconds	Total Time, Min.	Total Time, Sec.
6,770	6,770	2	34	30	3	4
9,560	9,650	3	32	30	4	2
3,930	3,930	1	43	30	2	13
9,870	9,780	3	35	30	4	5
8,110	8,110	3	4	30	3	34
5,140	5,140	2	12	30	2	42
43,380	43,380	16	40	180	19	40

Average length run, 7,230 ft.; schedule speed, 25.05 m.p.h.

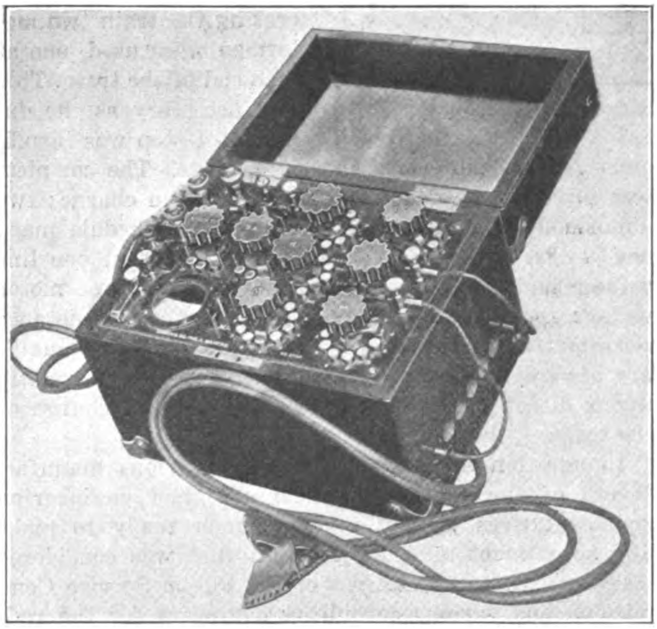
TEST INSTRUMENTS USED

All test instruments were located in one car and the connections for the various instruments are shown in an accompanying illustration. Three wattmeters were connected as follows: The first in the main motor circuits measured the total power used for propelling the car. The second in the battery circuit measured the power used for operating the control, air brakes, door apparatus, signal system and other auxiliary apparatus using battery current. The third was connected in the compressor, heater and light circuits and was arranged with switches so that the power used by each could be measured separately.

Indicating ammeters and voltmeters were also installed as follows: A voltmeter was connected to indicate line voltage. A second voltmeter was connected to show the voltage across No. 2 motor and by the use of a single-pole double-throw switch to read the voltage across the tapped field of the same motor also. A third voltmeter was connected to show the voltage of the battery. Ammeters were connected in the main motor circuits to give the total current used in propelling the car, in auxiliary circuits to show the current taken by the compressor, the lamps and the heaters, and in the battery circuit to indicate the current taken in operating the various pieces of apparatus using battery current.



HEATING TEST RUNS FOR EXPRESS SERVICE



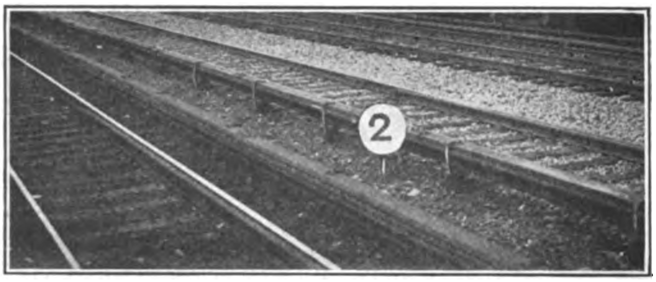
TESTING SET FOR MEASURING RESISTANCE

A Queen's "dial decade" testing set was connected across the full field of No. 2 motor on the test car. The resistance of this field was measured at the end of each complete trip and from these readings the temperature of the field winding was computed. As already stated this furnished an accurate method of determining when the temperature of the field had become constant.

An indicating lamp was connected in the circuit of the compressor governor so that this lamp remained lighted while the compressor was running. An observer was thus enabled by observing this lamp to record the time that the compressor was operating.

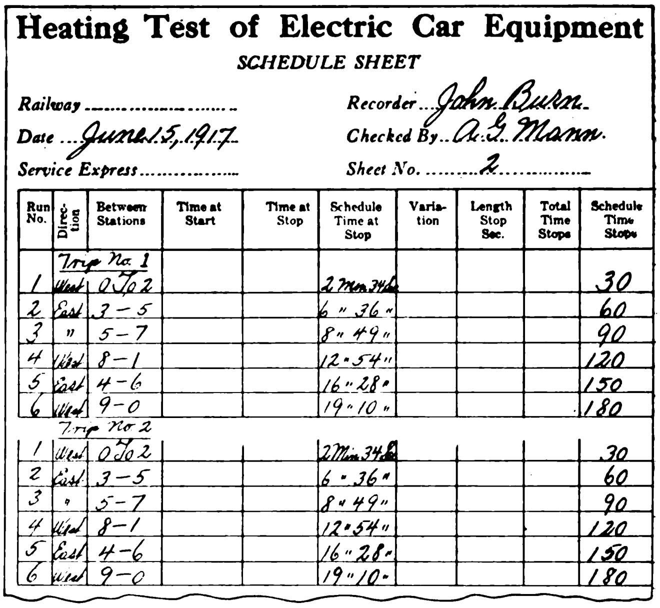
A Johns-Manville speed indicator with a friction device on one of the car wheels gave the speed at which the cars were operating at all times.

Thermometers were located inside the car, underneath the car at either end and in the center, and on station platforms, to give the temperature of the outside air. At the end of the heat test additional thermometers were placed inside the motors to give the temperature of the various windings and of the commutator.



STOPPING SIGN IN POSITION ON TEST TRACK

Variations in voltage, current, speed, etc., are more accurately recorded where automatic recording instruments are used. In the particular tests outlined such instruments were not available but in a later series of tests made on this same equipment graphic recording ammeters and voltmeters manufactured by the General Electric Company were used. A chronographic mechanism was employed with these and with some pressure recording instruments installed in the air brake system. This provided a time record which was the same for all instruments and made it easy to transfer the records to a common sheet later. A graphic recording ammeter with time-marker clock is shown herewith.



Heating Test of Electric Car Equipment

SCHEDULE SHEET

Railway ....

Recorder John Burn

Date June 15, 1917

Checked By A. G. Mann

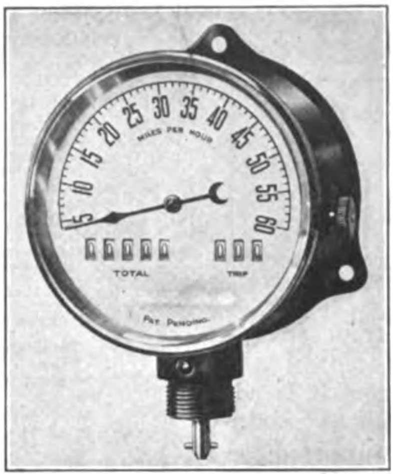
Service Express ....

Sheet No. 2

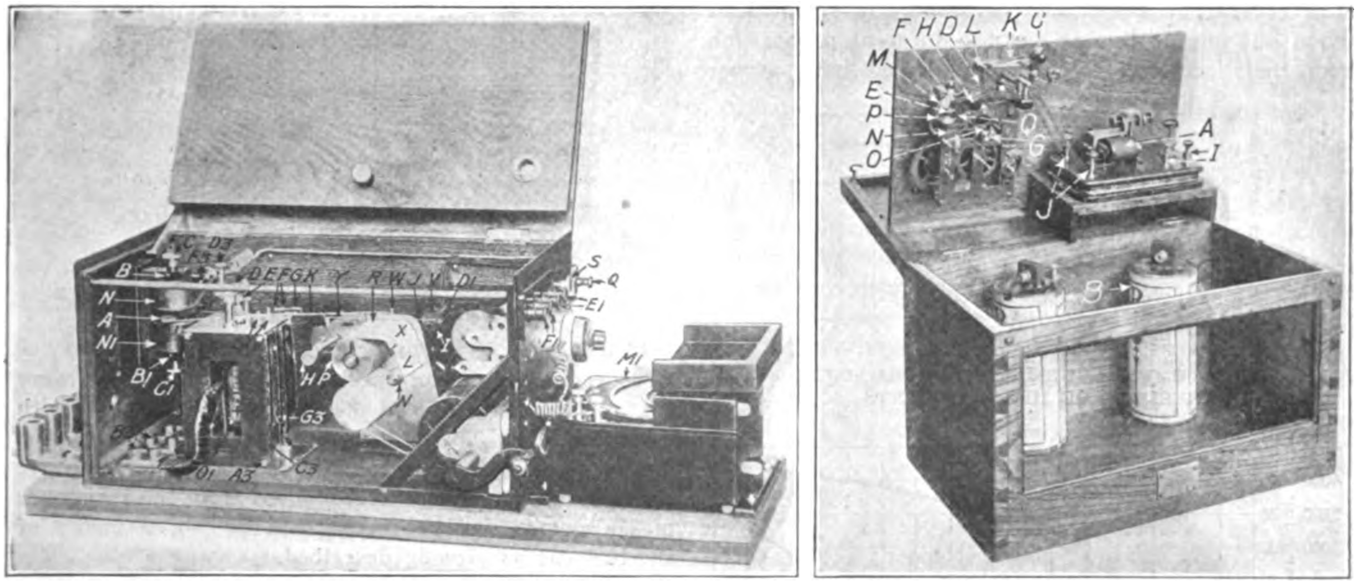
Run No.	Direction	Between Stations	Time at Start	Time at Stop	Schedule Time at Stop	Variation	Length Stop Sec.	Total Time Stops	Schedule Time Stops
		Trip No. 1							
1	West	0 To 2			2 Min 34 Sec				30
2	East	3 – 5			6 " 36 "				60
3	"	5 – 7			8 " 49 "				90
4	West	8 – 1			12 " 54 "				120
5	East	4 – 6			16 " 28 "				150
6	West	9 – 0			19 " 10 "				180
		Trip No. 2							
1	West	0 To 2			2 Min 34 Sec				30
2	East	3 – 5			6 " 36 "				60
3	"	5 – 7			8 " 49 "				90
4	West	8 – 1			12 " 54 "				120
5	East	4 – 6			16 " 28 "				150
6	West	9 – 0			19 " 10 "				180

SCHEDULE SHEET FOR ENTERING OPERATING RESULTS

Previous to starting the tests several trial runs were made to determine the length of time necessary for power to be applied to the main motors to maintain the schedule speed desired. From the results thus obtained tables were made up, showing the time necessary to apply power in order to maintain the schedule as laid out for the various runs. To enable the motorman to maintain the schedule speed as laid out, a schedule man kept record of the running time and length of stop and also gave the signal for starting the train. These results were entered on schedule sheets, a sample of which is illustrated herewith. The schedule sheets contained the correct running time for comparison with the results obtained so that at each stop the amount that the motorman was ahead or behind schedule could be seen at a glance. The information was given to a second man who acted as motorman's coach. The coach had a set of tables, already referred to above, with the time that it was necessary to keep power on to maintain the schedule speed for the various runs. He was thus enabled to tell the motorman when to drop off or to resume power and where the next stop was to be. If the train was behind its schedule time the power was kept on slightly longer and if it was ahead of time power was dropped off sooner than for regular operation.



SPEED INDICATOR



GRAPHIC RECORDING AMMETER AND TIME-MARKER CLOCK

Letters are used to point out the essential parts.

This system worked out exceedingly well so that at no time there was a variation of more than a minute from the schedule. The braking was left entirely to the motorman, his only instructions being to make as smooth a passenger stop as possible at the point designated. He was also permitted entire freedom of operation in case of emergency.

The recorder of "power-on," coasting and braking time used a stop-watch and recorded the length of time that power was kept on and the amount of time used in coasting and braking. On the runs, line and motor voltages were read and recorded every five seconds, and the time that the compressor was operating was recorded. At the end of each trip the following readings were taken and records made: Readings of the wattmeters in the motor, compressor and battery circuits; resistance of the full field of No. 2 motor to check the temperature rise and determine when this had become constant; temperature readings inside the cars, underneath each end of the cars and on the station platform. On certain runs records were taken every five seconds of the speed of the train, the motor current, the compressor current, the battery current and the battery voltage. At each stop the doors and signal system were operated as they would have been in regular passenger operation. All parts of the equipment were thus subjected to operating tests representing the most severe conditions.

In making the temperature tests the various runs were continued for at least an hour after the resistance readings indicated that a constant temperature of the windings had been reached. When it was certain that no higher temperature would be obtained the runs were stopped and temperatures were taken by thermometer as follows: Air inside cars; air underneath each end of the car; air on station platform; and, armature coil, field core, commutator, main field and interpole field, for each motor of the train. All runs were made with the covers on all motors, and in taking motor temperatures at the ends of the runs the motor covers were removed and the thermometers placed as rapidly as possible.

These cars were each equipped with a 32-volt storage battery which was of great assistance in providing light for reading the various thermometers. A separate 32-volt droplight, with a long flexible cord, was provided for each motor. These lamps were small so that they could be readily inserted in the various spaces inside the motors and temperatures were thus able to be read without disturbing the thermometers. While such readings are being taken it is very important that all danger of shock from coming in contact with live parts be eliminated. The use of an auxiliary battery for the drop lights has a great advantage in this connection as all potential can thus be removed from all car equipment.

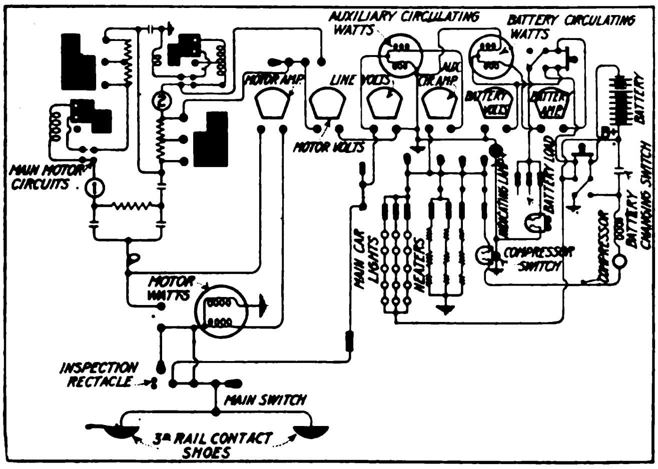
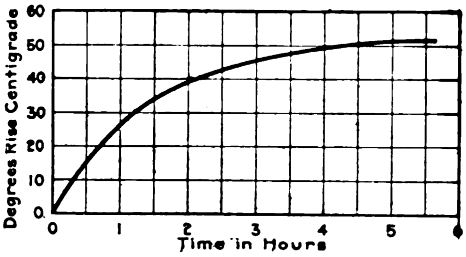
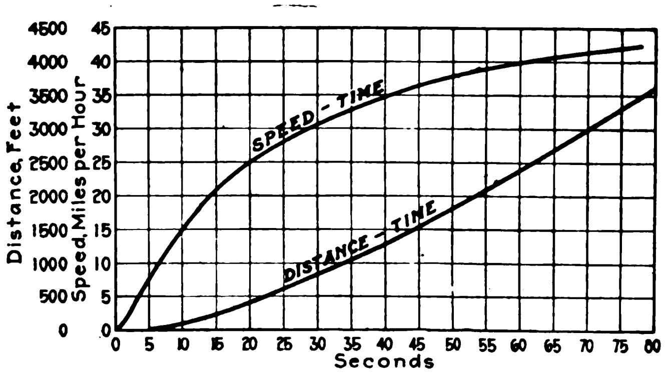


DIAGRAM CONNECTIONS FOR TESTING INSTRUMENTS

Before such a temperature test is started it is advisable to make certain that all covers can be readily removed from apparatus on which temperature readings are to be taken. In the first test of this nature with which I was connected it was almost impossible to remove several of the motor covers. The removal of covers out on the line is quite a different proposition from their removal in a shop provided with proper facilities. Also such tests are usually made with cars loaded and the clearances between the tops of motors and the car body are often very small. In the particular case mentioned it took twenty minutes to remove the covers after the test was discontinued so that there was a considerable drop in temperature of the windings before the thermometers could be placed. This, of course rendered the results worthless.



MAIN-FIELD TEMPERATURE RISE AS COMPUTED FROM RESISTANCE MEASUREMENTS



ACCELERATION AND DISTANCE GRAPH FOR TEST TRAIN

SOME RESULTS OF A SERVICE TEST

In the service heat runs which I have been considering in this article, runs corresponding to local service, express service and mixed local and express service were made on successive days. Constant temperature was reached in the main field winding of the motors in local service after six hours' operation, in express service after five and one-half hours and in mixed local and express service after five and one-half hours. The maximum temperature rise as taken by thermometers at the completion of the runs was 59 deg. Cent. above the surrounding air. This was found in the interpole field windings after runs corresponding to local service were completed. The specification requirements were for a rise not to exceed 65 deg. when measured with thermometers. The motors thus met the requirements. An accompanying graph shows the temperature rise for express service as computed from the resistance measurements for the main field of No. 2 motor of the test car as already described.

TABLE II—OPERATING DATA FROM TEST RUNS

	Local Service	Express Service	Mixed Local and Express Services
Average line voltage	537.6	550.0	551.6
Per cent of total time of "power on"	26.4	14.0	37.4
Per cent of total time coasting	44.1	53.6	34.6
Per cent of total time braking	11.3	17.9	11.6
Per cent of total time used by stops	18.2	14.5	16.4
Average rate of acceleration	1.5	1.5	1.5

TABLE III—COMPRESSOR PERFORMANCE, EXPRESS SERVICE

Trip No.	Total Time of Run, Min.	Total Time of Run, Sec.	Time Compressor Operated, Min.	Time Compressor Operated, Sec.	Per Cent of Total Time Comp. Operated	Av. Line Voltage	Kw.-Hrs. Used
1	38	56	15	28	39.72	529.3	1.0
2	38	11	15	42	41.11	547.3	1.3
3	38	27	16	37	43.21	533.5	1.3
4	38	02	15	38	41.10	543.9	1.0
5	38	16	13	35	35.50	547.4	1.2
6	38	43	13	30	34.86	546.0	1.0
7	38	30	16	16	42.23	557.2	1.2
8	38	36	15	16	39.55	557.6	1.2
9	38	50	15	05	38.84	564.9	1.4
10	38	44	14	22	37.10	556.3	1.0
11	38	52	16	08	41.51	556.7	1.2
12	38	21	15	32	40.50	552.7	1.2
13	38	39	15	12	39.32	552.7	1.2
14	38	42	16	00	41.34	555.0	1.3
Total,	539	49	214	21	39.39	550.0	16.5

Length of each run = 16.41 miles

Length of fourteen runs = 229.74 miles

Weight of car loaded = 120,000 lb. = 60 tons

$$\text{Compressor watt-hours per car-mile} = \frac{16,500}{229.74} = 71.82$$

$$\text{Compressor watt-hours per ton-mile} = \frac{71.82}{60} = 1.197$$

OPERATING RESULTS CORRESPONDING TO DIFFERENT SERVICE CONDITIONS

In order to compare the operation of the test train with that of actual service the records obtained were averaged for the various runs. Table II gives the percentages of the various lengths of time that were consumed in coasting, braking and stops. Information is also tabulated for the percentage of total time that power was used and the average line voltage. The percentage of time taken by "power on" coasting and braking represent ideal conditions, as there were no extra stops or slow-downs for signals such as is encountered in regular service. Another accompanying graph shows the acceleration of the test train on level tangent track up to a speed of 42.5 m.p.h.

The performance of the compressors on the cars in the test train, while operating in express service, is shown by the results given in Table III. This table will serve as an illustration of the type of data that are most desirable for comparing the performances of the various pieces of auxiliary apparatus comprising a complete car equipment. Similar data were compiled for other pieces of auxiliary apparatus making up the complete car equipment, such as heaters, door engines, signal equipment and lights, this latter being divided into head, tail, marker, emergency and main car lights.

TABLE IV—POWER CONSUMPTION MAIN MOTORS FOR TEST RUNS IN EXPRESS SERVICE

When Taken	Wattmeter Reading	Kilowatt-Hours
Start	2,174.2	....
After run No. 1	2,240.6	66.4
After run No. 2	2,300.8	60.2
After run No. 3	2,362.7	61.9
After run No. 12	2,970.0	66.4
After run No. 13	3,037.2	67.2
After run No. 14	3,104.4	67.2

Total kilowatt-hours, fourteen trips, 930.2; multiplier, 1.047. Corrected total, kilowatt-hours, fourteen trips, 973.9194. Length each run, 86,760 ft. = 16.430 miles; length, fourteen runs, 230,020 miles; weight of car loaded = 120,000 lb.; kilowatt-hours per car-mile = $\frac{973.92}{230.02}$ = 4.234; watt-hours per ton-mile $\frac{4234}{60}$ = 70.567.

The power consumed by the main motors in propelling the car in express service is shown by Table IV. Similar results were worked out for all the different classes of service. These values were used to check the results obtained with theoretical values previously computed and later with tests made in actual service when passengers were carried in regular operation.

Costs of Maintaining Differential Gear Drive at Huddersfield

IN THE issue of the ELECTRIC RAILWAY JOURNAL for July 3, 1915, page 26, there was described a differential drive for electric railway cars which had been installed on a number of cars in Huddersfield, England. This has now been in use long enough to render data of maintenance costs both reliable and interesting. In response to a request for such data, R. H. Wilkinson, manager of the Bradford Corporation Tramways, has furnished Tables I and II. In each case ten cars are included and the tables cover two successive years, up to the end of September, 1918. The differentially geared cars operated on the Honley route, where the track is in very poor condition, but the other cars are running on good track.

Mr. Wilkinson calls attention to the fact that the comparison is hardly fair to the differential gears on account of the difference in track condition. The Honley route track is mostly single line with loops, whereas the cars with the ordinary gears were run on a double-track line with newer rails in first-class condition.

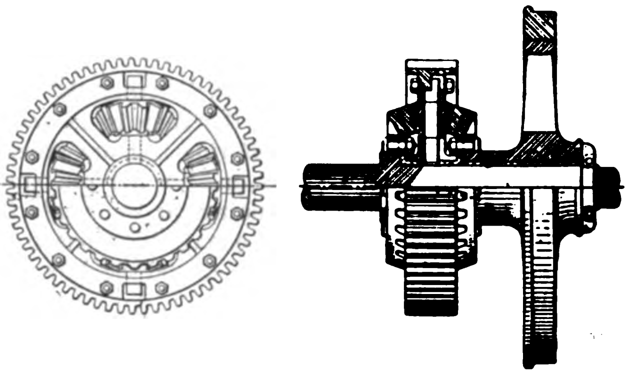
TABLE I—REPAIR COSTS OF TEN CARS EQUIPPED WITH DIFFERENTIAL AND ORDINARY GEARS, YEAR ENDED SEPTEMBER, 1917

	Differential Gears		Ordinary Gears	
	Labor	Material	Labor	Material
Gears	$110	$78	$66	$70
Axles and bearings	289	691	151	582
Car wheels, bushings and tires	184	935	113	848
Totals	$583	$1,704	$330	$1,500
Grand total:				
Differential gears				$2,287
Ordinary gears				1,830
Difference				457

TABLE II—REPAIR COSTS OF TEN CARS EQUIPPED WITH DIFFERENTIAL AND ORDINARY GEARS, YEAR ENDED SEPTEMBER, 1918

	Differential Gears		Ordinary Gears	
	Labor	Material	Labor	Material
Gears	$179	$507	$168	$317
Axles and bearings	447	655	271	594
Car wheels, bushings and tires	181	538	138	200
Totals	$807	$1,700	$577	$1,111
Grand total:				
Differential gears				$2,507
Ordinary gears				1,688
Difference				$819

He states further that the differential gears were introduced to eliminate rail corrugation trouble. Prior to the introduction of the new type gears on the Honley section the corrugations were ground out as far as possible by means of emery blocks attached to a car truck.



DIFFERENTIAL GEAR USED ON HUDDERSFIELD TRAMWAYS CARS

This work was done at night and it is possible that in a few places where the track was loose and uneven the grinding was not so effectively done as where the track was in good condition. Since October, 1914, this section has been worked entirely with the differentially-geared cars, and with a few slight exceptions corrugations have not reappeared. The exceptions are in places where the track is very loose on its foundation. Mr. Wilkinson is in doubt as to whether the corrugation is in consequence of the looseness of the track or vice versa.

The experience on the Honley section is significant in that one of the theories of corrugation is that it is due to the slipping and skidding of the wheels. These are, of course, absent with the differentially-geared cars. There is no difference in energy consumption between the cars equipped with the two types of drive.

The Chicago, Milwaukee & St. Paul Railway is making a total annual saving due to reclamation work estimated at more than $7,000,000. A special committee has recently been at work studying this matter with a view to determining whether the procedure could be improved. Discarded material is reclaimed for remanufacture, reclaimed for salvage or reclaimed for similar use. The principal items in the reclamation work are rubber hose, babbitt and lead, brass, bolts and nuts, waste paper, metal roofing, springs, hammered scrap iron, car wheels and lumber. The committee report states that materials are commonly reclaimed by means of oxy-acetylene welding, electric welding, forging equipment, rolling mills and miscellaneous means.

Collecting Zone Fares in Boston

Professor Richey Shows That Two-Zone Plan for Boston Elevated Railway Is Best First Step Toward the Ideal—Proposes a Concrete Plan for Getting the Fares

THAT a two-zone system of fares is practicable for the Boston (Mass.) Elevated Railway is the opinion of Prof. Albert S. Richey. The general conclusions of his report on this subject to the public trustees of the company were published in the ELECTRIC RAILWAY JOURNAL of Dec. 28, page 1141, but additional material from the full report now available will be presented below. The new material relates chiefly to the reasons for recommending a two-zone plan for Boston and the method suggested for handling the collection of fares.

REMOVING OBJECTIONS TO THE ZONE IDEA

According to Professor Richey, it is generally conceded that a rate scheme where the fare is in some way dependent upon the length of ride is more nearly equitable both to the passenger and to the company than the flat-rate system. Continuing, he comments in part as follows upon the most frequent objections to a zone system, *i.e.*, its sociological defects and the difficulty of collection:

The most frequently cited "proof" that a zone system produces congestion is the great congestion of European cities where the zone system of fares is commonly used. While it is true, in general, that most of the European cities are more densely populated than most of the large American cities, this statement is not specifically true, for although it is impossible to make accurate comparisons, there is nevertheless great congestion in some American cities. Boston has been shown to have a larger population per square mile than Vienna or Paris, and New York, Philadelphia and Chicago have been shown to have a greater population per square mile than London or Manchester. As to maximum density of population, Boston has been shown to equal London, and New York to be greater than either Paris, Vienna or London. The surface lines in Berlin and Hamburg have a flat fare, and both of these cities are as congested as Cologne or any other city where a zone system is used. The argument that the zone system has caused congestion in European cities disappears when it is realized that these old European cities had their congested areas long before the first electric railways were built and that the operation of these railways under the zone system has helped to relieve congestion.

Among the factors which tend to influence the place of residence, in addition to the amount of car fare required between place of residence and place of work, are (1) time of journey between home and work; (2) amount of rent in various localities; and (3) gregariousness, or the hesitancy of individuals and single families to separate themselves from those with whom they have been associated. The latter is especially to be noted in those communities where several races are living.

R. C. Chapin, in his report on *Standards of Living in New York City* to the Russell Sage Foundation in 1909, shows that the average expenditure for car fare of families in Greater New York having incomes ranging from $400 to $1,600 is from 1.1 per cent to 2.6 per cent. The rate of fare is only one of a number of factors which may affect congestion of population, and from such data as are available, it does not appear to be one of major importance. Furthermore, the objections which may be raised to the European zone system of small zones with constantly increasing rates of fare are not equally applicable to a system which divides a city such as Boston into two or three relatively large zones with a flat rate of fare in each.

The chief objections raised by the American electric railway operator to any sort of zone system of rates are the difficulties of fare collection. Many of these objections, however, disappear when instead of a series of short zones of a half mile to a mile in length, a modified system consisting of a fairly large inner zone and one or two outer zones is applied to a city such as Boston.

As to actual experience with the collection of zone fares, the following is quoted from a letter dated Oct. 17, 1918, from P. N. Jones, general manager Pittsburgh Railways:

"The only thing wrong with the new system of fares in Pittsburgh is that it does not bring in revenue enough. We think it is correct theoretically, and we believe it is the only practical scheme by means of which fares may be collected on large cars, approximately on the basis of the distance ridden. The pay-as-you-leave scheme . . . has not added to the congestion appreciably in the outer districts because the people do not leave the cars more than one-half dozen or so at each stop. There has been no confusion in the minds of the passengers as to which end of the car to board."

A zone system is also in use on one of the lines of the Northern Ohio Traction & Light Company, Akron, Ohio. Although this is a much smaller city than Boston, the ordinary type of pay-enter car, having a seating capacity of fifty-four passengers, is in use, and during rush hours loads of 100 per cent in excess of this number are not uncommon—"the average maximum number of passengers during rush hours is ninety." A combination of pay-enter-pay-leave system is in use, and F. I. Hardy, general superintendent of railways, states in a letter dated Oct. 18, 1918, that there has been no difficulty relative to confusion in the passengers' minds as to whether they should pay their fare in boarding or alighting, or as to whether they should enter or leave the car at the front or rear end. Further, in this connection, Mr. Hardy states:

"Replying to the question, 'To what extent does this system of fare collection slow up operation, especially in rush hours with heavy loads,' wish to advise that it does not slow our operation at all. This system is in effect on lines which have the fastest schedules that we operate. We have operated this system for many months and are very much pleased with its operation. In fact, we have devised a system whereby we believe it is perfectly feasible to operate a zone system of two to five zones without confusion or without the passengers being able to beat the company out of its revenue."

A similar zone system, with a combination of pay-enter and pay-leave fare collection, is in use between East Liverpool, Ohio and Chester, W. Va., located on opposite banks of the Ohio River. The total length of the line is 3.4 miles, divided into two 5-cent zones. The cars have a seating capacity of sixty and carry maximum loads of 100 to 135 people. C. A. Smith, general manager, states that no trouble is being experienced with the pay-leave system.

If a decision be made that a zone system of fares is desirable from other standpoints, I am firmly convinced that the fares can be collected and audited properly by a method closely approximating that recommended herein, provided the proper spirit of endeavor and co-operation prevails throughout the organization.

THE IDEAL RATE SYSTEM

In Professor Richey's opinion, the ideal rate system should, as nearly as it is possible to approach theory with practice, provide for each passenger paying his proportionate part of the "readiness-to-serve" cost, as well as his proportion of the "movement" cost, based on the distance traveled. As the "readiness-to-serve" charge varies as between the rush and non-rush hours, this ideal system should also make a variation in the initial charge as between those times. This would result in a unit initial fare, varying as between hours of the day, and increased by smaller increments for each mile or fraction of a mile traveled. The further requirements of the ideal rate system are that it should not unduly delay traffic, that it should not be unduly expensive in its operation, and that it must be adaptable to the proper collection of fares. The latter qualification involves the collection of fares so as to avoid both error and dishonesty on the part of the passengers and the employees.

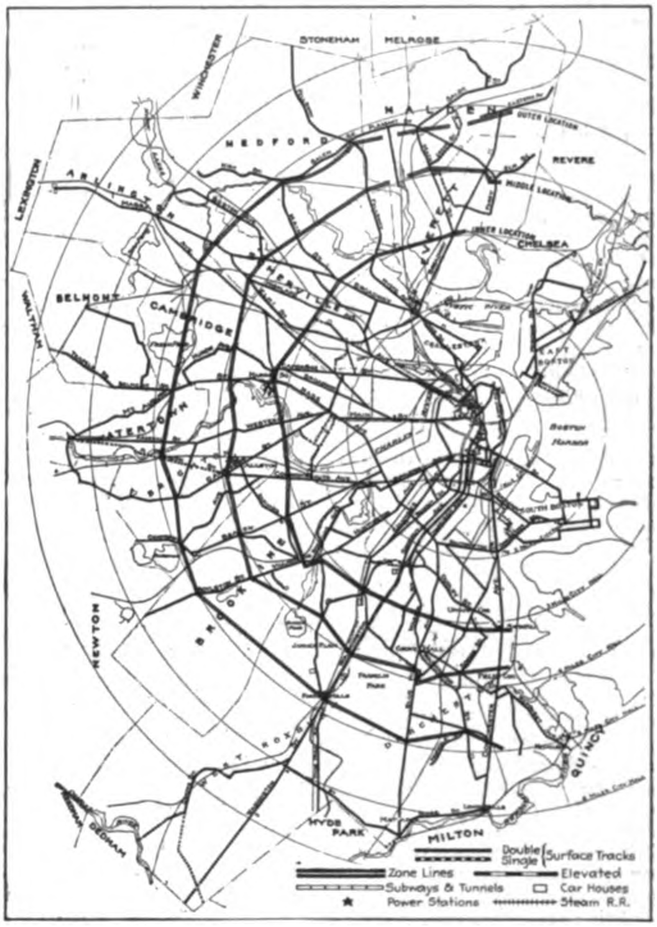
Various modifications of the ideal system have been used or proposed, each approaching more nearly to an equitable charge for the service rendered than the flat fare. They include (1) the transfer charge; (2) no transfer between surface and rapid transit lines; (3) an increased fare for passengers using rapid transit lines; (4) a zone system of fares on a strictly distance basis; (5) a zone system on a modified distance basis; and (6) a two or three-zone system. In regard to these Professor Richey says in part:

1. *Transfer Charge:* The principal and practically the only advantage of the transfer charge, as applied to Boston, would be the ease with which it might be effected from the fare collection standpoint, if it were applied universally. Its universal application would, however, work a substantial injustice on a large number of passengers. If it were applied only at such points and between such routes as to make it in effect an additional charge for a ride longer than the average, the effect would be: first, to reduce the number of transfers for which a charge would be made to a very small proportion of the total passengers; and second, to involve a segregation between free and charge transfer passengers at such points as Park Square as to make its actual application almost impossible.

2. *No Transfer Between Surface and Rapid Transit Lines:* The great disadvantage of a segregation of the two systems in Boston would be the tendency of such a plan to divert traffic from the rapid transit to the surface lines. As the company is at present committed to the large fixed charges incident to the ownership of the rapid transit lines, and as the operating costs (aside from fixed charges) per passenger are so much less on the rapid transit lines than on the surface, every endeavor should be made to increase the relative use of the rapid transit lines rather than to diminish it. The collection of two fares for a journey combining rides on both surface and rapid transit lines would induce a great number of people to make their entire journey, where possible, by surface cars. This would involve additional service on the surface lines which would be accompanied by no increase in revenue, and it is quite probable that the net result of the change would be a loss unless it was the desire and within the power of the company so to route its surface cars as to compel passengers from the outlying districts to transfer to the rapid transit lines.

3. *An Increased Fare for Passengers Using Rapid Transit Lines:* This plan, which merely would involve the collection of an additional increment of fare from passengers leaving all rapid transit stations, probably could be effected without involving any great practical difficulties, and it probably would be more fair to the passenger than a complete segregation of the surface and rapid transit lines. It is, however, open to the objection that it would impose an additional fare on the passenger who made his whole journey, however short, by rapid transit line, even though the actual cost to the company was less than that involved in carrying him the same distance and over practically the same route in a surface car. The objections relative to the tendency to divert traffic from rapid transit to surface lines, mentioned in connection with the previous plan, also apply to this.

4. *Zone System of Fares on Strictly Distance Basis:* This is the European system where (in English cities) fares are collected in penny or half penny units for zones varying from one-half to 1 mile in length. The cars in use there are much smaller than in this country and operate at much slower speeds and with much less crowding than is the case in rush hours here. The system is not used in any American city, and its only serious proponent among men with electric railway experience in this country is Peter Witt, formerly Street Railroad Commissioner of Cleveland. Fielder Sanders, the present Street Railroad Commissioner, has recently been doing some checking to determine the length of haul on some of the lines, but at present he has arrived at no definite conclusion as to the merits of such a zone system. Mr. Sanders says in a letter of Oct. 8, 1918: "The trend of our investigation leads me to suppose that no zone system, the maximum fare of which is 5 cents, would bring in for Cleveland as much revenue as we are now getting on the straight 5-cent fare." In other words, Mr. Sanders' investigation does not yet indicate to him that the loss in revenue on account of reduction in fare to a large number of passengers will be offset by new patrons drawn by the extremely low fares. While I am in accord with Mr. Witt in believing that a low rate of fare in some districts and under some conditions may attract some additional business, I am not willing to agree that the initial fare should be as low as he suggests [on a 1-cent zone basis], for the reason that this does not at all recognize the substantial "readiness-to-serve" cost. Furthermore, it is extremely doubtful whether it would be possible to apply such a system of fare collection in Boston as is proposed by Mr. Witt, especially as an initial change from the present flat-fare system.



LOCATION OF PROPOSED ZONE LINES, 3, 4 OR 5 MILES FROM BOSTON CITY HALL

5. *Zone System on Modified Distance Basis:* Practically, the collection of a fare consisting of a flat initial charge plus an increment for each unit of distance traveled would be surrounded by as many difficulties as that of the strictly zone system as practiced in English cities. When it is considered, however, that a great proportion of the whole number of passengers begin or end their journey in the central portion of the city, something of the same order may be attained by the introduction of a central flat-fare area, with the lines radiating therefrom on a mileage fare basis. [Professor Richey's comments upon the use of such a system for the Bay State Street Railway and the Rhode Island Company were published in the ELECTRIC RAILWAY JOURNAL of Dec. 28, page 1142.—Eds.] Based on the experience of these companies, it is not considered advisable to recommend such a system for use in Boston, at least at present. Should the two or three-zone system be adopted and found to be practicable, it is entirely possible that the experience thus gained may result in the development of a fare collection scheme under which the plan mentioned above may be practically worked out for the

city of Boston. If this can be accomplished, it would be most desirable and probably the nearest approach to the strictly equitable fare system that can be hoped for.

6. *Two or Three-Zone System:* The two-zone plan has recently been adopted in a number of cities. In Holyoke, early in 1918, a large 5-cent flat fare area was considerably reduced, with a 5-cent fare for local rides in both the inner and the outer area, and a fare by means of tickets of either 6⅔ cents or 7½ cents for a ride extending through both inner and outer areas.

In Springfield a similar system was made effective on May 1, 1918. The 5-cent flat fare, with universal transfer, was retained in the inner area, with a similar 5-cent flat fare in the remaining or outer area. Reduced rate tickets at the rate of 6⅔ cents were good for a ride between any point in the inner area and points in the outer area within about 5 miles of the City Hall. Other reduced rate tickets at 8⅓ cents were good between any point in the inner area and any point in the outer area. The cash fare was 10 cents between any point in the inner area and any point in the outer area. The only difficulty which has been experienced in the collection of fares in Springfield has been that due to the complications introduced by the reduced rate tickets. The system as a whole has worked out satisfactorily and produced nearly the predicted amount of revenue. On account of greatly increased wages later awarded to the employees by arbitration, it was necessary to increase the rates, and in September the unit rates were increased from 5 to 6 cents and the ticket rates were increased about 1 cent in each case. No change was made in the general principle or in the zone limits. By use of the reduced rate tickets, Springfield practically is a three-zone system, while nominally, and on the cash fare basis, it is two-zone.

Through the changes at present proposed in the Bay State cities and recently made in Providence, these companies are proceeding toward this same plan, together with a number of outside zones varying with the length of line. In only the thickly settled portions of the cities, their new systems amount to either the two-zone or three-zone plan.

It is believed that it will be entirely feasible to establish either one or two concentric fare zone limits in the city of Boston, thus establishing either two or three zones; that a flat initial fare may be charged in any one zone which will include transfer privilege within that zone; that an additional fare (either the same or smaller than the initial fare) may be charged for a ride extending across a zone limit line. This is a zone system considerably modified by the flat fare idea in concession to the practicability of fare collection. While it is open to a great many of the same objections as may be urged against the universal flat fare, nevertheless this is a matter of degree, and the proposed system goes a long way toward making the charge proportionate to the distance traveled. It is flexible in that zone limits may be moved from time to time, the number of zones increased or diminished, and either the flat initial fare or the additional zone limit fare increased or diminished as necessity requires.

HOW TO HANDLE THE FARES

Professor Richey's first recommendation is for a two-zone system for Boston. To fix the zone boundary he considered the distribution of population and of traffic, the cost of service, the relation between initial and zone-line fares, competition and the method of fare collection. A complete check was made of all passengers on board and boarding and alighting in the section between circles with a 3-mile and a 5-mile radius from the City Hall. The map on page 135 shows three possible locations for the zone boundary line, at 3, 4 and 5 miles from the City Hall.

The tabulation on page 137 indicates the amount of the zone-line fare which will be required with initial fares of various amounts in order to produce approximately the same total revenue as various flat fares. Three such tabulations are shown, corresponding to the three possible locations of zone boundary lines. The flat fare which would be equivalent to any initial fare combined with a zone-line fare not shown in the tabulations may be obtained by interpolation, 1 cent of zone-line fare being equivalent to ½ cent flat fare if the boundary be established at the "inner" location, to ⅓ cent if at the "middle" location, or to ⅕ cent if at the "outer" location.

If it should be agreed, Professor Richey says, that it is necessary to include the terminals of the rapid transit lines within the interior zone on account of the difficulty of the collection of an additional fare from passengers on these lines after passing a zone limit, the outer zone boundary may be adopted. However, as only about 13 per cent of the population served reside outside of such boundary, and only about 18 per cent of the total number of passengers ride across such boundary, it appears more equitable to establish the zone boundary line somewhat nearer to the center. He believes that the method of fare collection proposed will make it possible, at no prohibitive expense, to collect a zone-line fare from rapid transit passengers, as well as from those on surface cars, at points much nearer the center—about 3 miles from the City Hall.

The proposed fare-collection plan follows in outline:

Through Surface Car with Fare Box

Such cars to be equipped with fare box and one overhead register.

Outbound: In inner zone passengers prepay or pay-enter the initial fare, with free exit as at present. At zone line, conductor announces zone limit. In outer zone, passengers boarding pay-enter initial fare and receive identification check. All passengers pay-leave either zone-line fare or identification check.

Inbound: In outer zone, passengers pay-enter initial or total fare, according to destination as stated; if total fare is paid, conductor issues identification check. At zone line, conductor announces zone limit and makes inside collection of identification checks or zone-line fares from passengers without identification checks. Zone-line cash and tokens from inside collection are rung up on overhead register. On light routes and during non-rush hours, with loads such that conductor can remember the few local passengers, issuance and collection of identification checks might be omitted. On some heavy inbound trips, it will be necessary to have an extra collector board the car at the zone line and make the inside collection as the car proceeds. The extra collector should return the identification checks to the regular conductor; he should ring up zone-line cash or token collections on the overhead register, and turn over to the regular conductor the amount collected, as evidenced by the register; or, by an alternative plan, he should ring up such fares on a portable cash register, in which case he would retain the amount collected until the close of his day's work. In inner zone, passengers prepay initial fare, as at present.

Through Surface Cars Without Fare Box

Such cars to be equipped with two overhead registers, one for initial and one for zone-line fares.

Outbound: In inner zone, initial fare collection as at present—either in prepayment station or on car, in the latter case the fares being rung up on initial-fare register. At zone line, conductor announces zone limit and collects zone-line fare from all passengers then on car, using zone-line fare register. In outer zone, he collects initial fare from each passenger boarding car, as at present.

INITIAL AND ZONE-LINE FARES EQUIVALENT TO VARIOUS FLAT FARES UNDER PROPOSED BOSTON PLAN

Zone Boundary 3 Miles from City Hall
(51 per cent of total passengers subject to zone line fare)

Equivalent to flat fare (cents)	5	6	7	8	9	10	11	12
Initial fare (cents)				Zone-Line Fare				
4	2	4	....	....	....	....	....	....
5	0	2	4	....	....	....	....	....
6	....	0	2	4	6	....	....	....
7	....	....	0	2	4	6	....	....
8	....	....	....	0	2	4	6	8
9	....	....	....	....	0	2	4	6
10	....	....	....	....	....	0	2	4
11	....	....	....	....	....	....	0	2
12	....	....	....	....	....	....	....	0

Zone Boundary 4 Miles from City Hall
(35 per cent of total passengers subject to zone-line fare)

Equivalent to flat fare (cents)	5	6	7	8	9	10	11	12
Initial fare (cents)				Zone-line Fare				
4	3	....	....	....	....	....	....	....
5	0	3	5	....	....	....	....	....
6	....	0	3	6	....	....	....	....
7	....	....	0	3	6	....	....	....
8	....	....	....	0	3	6	....	....
9	....	....	....	....	0	3	6	9
10	....	....	....	....	....	0	3	6
11	....	....	....	....	....	....	0	3
12	....	....	....	....	....	....	....	0

Zone Boundary 5 Miles from City Hall
(18 per cent of total passengers subject to zone-line fare)

Equivalent to flat fare (cents)	5	6	7	8	9	10	11	12
Initial fare (cents)				Zone-line Fare				
4	....	....	....	....	....	....	....	....
5	0	5	....	....	....	....	....	....
6	....	0	5	....	....	....	....	....
7	....	....	0	5	....	....	....	....
8	....	....	....	0	5	....	....	....
9	....	....	....	....	0	5	....	....
10	....	....	....	....	....	0	5	....
11	....	....	....	....	....	....	0	5
12	....	....	....	....	....	....	....	0

NOTE.—An initial fare, as listed in first column, together with a zone-line fare as listed opposite, will produce practically (variation between 1.6 per cent less and 1.4 per cent greater) the same total revenue as the flat fare shown at top of column, if volume of traffic remains unchanged.

Inbound: In outer zone, conductor collects initial fare and rings up on initial-fare register. At zone line, conductor announces zone limit and collects zone-line fare from all passengers then on car, using zone-line fare register. (See above for possible necessity for extra collectors on heavy inbound trips.) In inner zone, conductor collects initial fare from each passenger boarding car, as at present.

As an alternative, the fare collection on cars without fare box may be by the same method as proposed for cars with fare box, except for the use of the two overhead registers, as described herein.

Rapid Transit Terminals or Other Prepayment Areas at Zone Line

Street Entrance and Exit: Collect initial fare from entering passengers, with free exit, as at present.

Bodily Transfer Between Surface and Rapid Transit and Vice Versa: Passengers in either direction pay zone-line fare in passageway between rapid transit and surface car platforms.

Through Rapid Transit Trains

Stations Inside Zone Boundary: Prepay initial fare, with free exit, as at present.

Stations Outside Zone Boundary: Inbound boarding passengers prepay total fare, or zone-line fare if from surface car by bodily transfer. Outbound boarding passengers prepay initial fare. Outbound alighting passengers pay zone-line fare at exit or at passageway to surface cars. Where paper transfers are used, boarding passengers may present surface car transfer as initial fare, and pay zone-line fare in addition. Alighting passengers may receive surface car transfer on payment of zone-line fare.

Paper Transfers at Zone Line

Transfers from routes in inner zone to routes in outer zone, and vice versa, should be printed on paper of a distinctive color and sold to passengers for the zone-line fare. Such cash would not be registered but accounted for by difference in serial numbers of such transfers issued to and returned by conductor daily.

General Recommendations for Fare Collection

In order to simplify and safeguard fare collection, it is recommended that two forms of metal tokens, representing the initial and the zone-line fare, be sold at all prepayment stations and also at other convenient distributing points. These tokens should not be sold by conductors on cars. Obviously, the zone-line fare token should be larger in diameter than the initial fare token.

It is further recommended that if the nominal initial fare is some amount between 5 and 10 cents, it should be paid either by a metal token or by 10 cents in cash, and that if the nominal zone-line fare is something less than 5 cents, it should be paid by a metal token or by 5 cents in cash, the intent being that conductors shall not be required to make penny change on the cars. This can be accomplished by a proper wording of the published fare schedule, as was done in Cleveland during the period when the nominal fare was less than 5 cents; 5 cents cash was collected from those passengers not provided with tickets.

It is earnestly recommended that all of the present non-prepayment cars be equipped with fare boxes, so as to make them suitable for pay-enter or pay-leave operation. As a temporary measure, proper fixtures may be installed on both the inside and the outside of the bulkhead door post, and a fare box can be hung in either of those positions, the outer position being used in mild weather, and the inner in extremely cold weather when it is necessary to operate with the bulkhead door closed. A short section of the longitudinal seat can be arranged on hinges to fold back to allow space for the conductor's position when necessary to use the fare box inside the bulkhead. It would also be desirable to install mechanical operation for the vestibule doors, so that these can be operated from either position of the conductor. Such changes are entirely practical, it is said, and have been made as emergency measures to convert non-prepayment cars for prepayment operation in a number of cities. The expense of such changes is small compared with the evident advantages of fare box operation.

While at the present time the fare box manufacturing situation is not normal, and one of the two manufacturers of registering fare boxes is at present engaged almost wholly in government work, Professor Richey states: "I have been informed by the other manufacturer that he is prepared to furnish a registering fare box capable of taking dimes, nickels and pennies, registering the total cash amount, as well as two sizes of metal tokens, and registering the total number of each separately. He has recently equipped the Kansas City Railways with such boxes, and he states that he could make delivery of such boxes in any quantity in Boston within about ninety days." The foregoing description of the proposed method of fare collection for the two-zone plan, however, includes a method for use on surface cars which are not equipped with fare boxes, which may be used until such time as all cars can be so equipped.

The total added cost a year from such a method of fare collection, according to Professor Richey, will be $200,000 for a 3-mile inner zone, $135,000 for a 4-mile inner zone and $72,000 for a 5-mile inner zone. To balance this cost would require an increase of considerably less than 1 per cent in the total number of passengers carried. The difference in the total number of passengers carried as between a flat fare and an equivalent two-zone system would, it is said, be without much question nearer 5 per cent. Thus the net gain may be as great as $1,000,000 per year. While it possibly may be greater than that amount, the great uncertainty of such estimates is said to lead to the more conservative prediction of a traffic gain of about 3 per cent, or a net gain of about $500,000 a year.

As the first step toward the ideal system, therefore, Professor Richey recommends that the Boston Elevated Railway territory be divided into two zones by an arbitrary line drawn at a radius of about 3 miles from the City Hall. At the present time, about half the total passengers cross this zone line. It is estimated that an initial fare of 7 cents, with a zone-line fare of 5 cents, making a total fare of 12 cents for a ride extending across the line, will produce nearly the same revenue as a flat fare of 10 cents, which latter appears to be necessary to meet the present cost of service.

Central Traffic Association

Experience with 2000-Penny Book as Substitute for 1000-Mile Book Described—Other Important Actions of Year

THE principal work of the Central Electric Railway Traffic Association during the past year was summed up in the annual report of Chairman A. L. Neereamer, presented at the meeting which was held in Fort Wayne, Ind., on Jan. 14. After speaking of the five regular meetings held during the year and the two extra meetings in June, Mr. Neereamer said, in part:

During 1917 we had a membership of fifty-one lines representing 4334 miles, and for the year just ended fifty-four lines representing 4432 miles, making an increase of three lines and 98 miles. During that period one line was dismantled, another partially dismantled and one of the larger lines divided into two systems.

Joint and Local Baggage Tariff No. 9, I. C. C. 26, is still in force, although two supplements have been issued during the past year, effective July 25 and Oct. 25. One of these supplements contains the advance in excess baggage rates as allowed by the commission in Indiana. This tariff will have to be reissued in a short time in order to line it up with that of the steam lines.

Joint Passenger Tariff No. 17, I. C. C. 27, covering the interchangeable 1000-mile ticket, was canceled on June 15, by Joint Passenger Tariff No. 19, I. C. C. 29, which covers the interchangeable 2000-penny coupon ticket. This new publication started with nineteen lines, representing 1896 miles. Supplements have added four lines and 551 miles. During the first year of the interchangeable 1000-mile ticket, 5600 tickets were ordered and placed in the hands of the agents. From June 15 to Dec. 31, six and one-half months of the interchangeable 2000-penny coupon ticket, 8000 have been ordered and placed in the hands of the agents, a little more than 1200 per month which, to the writer's mind, demonstrates the popularity of this form of transportation.

Official Classification No. 43 has finally been canceled and its reissue and supplements are being filed for our member companies by R. N. Collyer. Joint Freight Tariff No. 13, I.C.C. 18, covering exceptions to official classification was canceled on June 1 by I.C.C. 22, Joint and Local Freight Tariff No. 14. This publication is participated in by thirty-five lines. Application covering a supplement is now pending with the Interstate Commerce Commission. Official Interurban Equipment Register No. 4, I.C.C. 21, was canceled on Nov. 1 by Official Interurban Equipment Register No. 5, I.C.C. 24, and is participated in by thirty-seven lines. Although a number of lines dropped out of this issue, enough other carriers became party to it to make it a larger publication than before.

Joint Passenger Tariff 18, I.C.C. 28, has been canceled for intrastate traffic in Indiana and Ohio. Application for cancelation interstate has been pending with the Interstate Commerce Commission for a long time and present indications are that this will soon be done and the extremely low rates eliminated. The association will then be in position to start anew and your chairman recommends that the committee having this in charge go over the old publication and eliminate as much as possible unnecessary headline points and stations to which tickets never have been sold. In this way the size of the publication can be reduced without detracting from its value and the expense would be kept down to the minimum.

Several changes have been made in the demurrage rules. Joint and Local Demurrage Tariff No. 3 I.C.C. 19 was canceled by No. 4, I.C.C. 23 on March 27, and the latter publication was canceled by No. 5, I.C.C. 25, on Nov. 4. This publication is participated in by thirty-eight lines. Joint and Local Storage Tariff No. 1, I.C.C. 20, is still in force, although the committee in charge is contemplating a reissue of this tariff.

At the meeting held in November the committee in charge of the official interurban map was instructed to make arrangements for all corrections to be made on the map plates, and at a meeting of the Central Electric Railway Association held in November provision was made for the expense of these corrections. It is expected that this committee will make a full report at this meeting.

For the first time during the history of this organization, death has entered our ranks and called to "That bourne from which no traveler e'er returns" one of our active members, L. W. Henry. Resolutions regarding his death have been presented before this meeting and acted upon, but the chairman is of the opinion that in addition to these resolutions mention should be made of his death in the annual report.

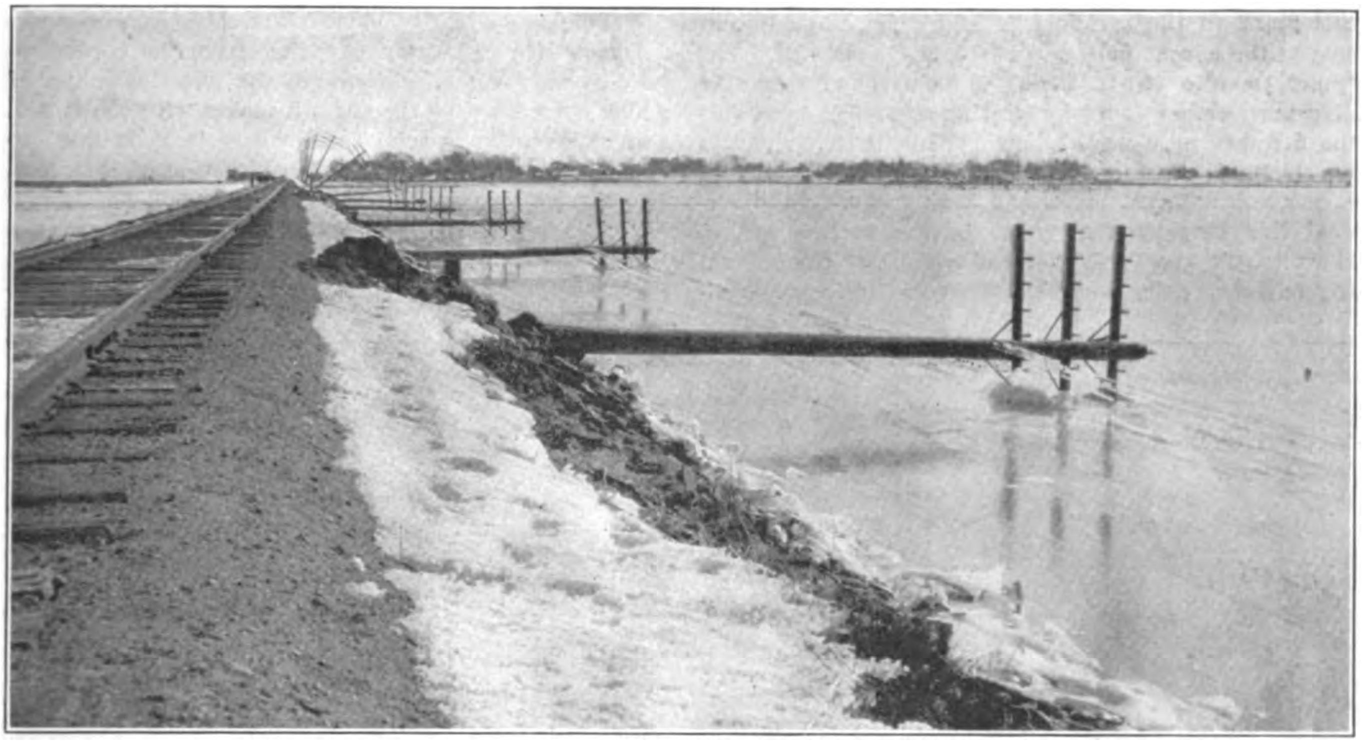
Bureau of Standards Issues Revised Circular on Electrolysis Mitigation

SINCE the now well-known Circular No. 52 of the United States Bureau of Standards on "Electrolysis and Its Mitigation" was published much progress has been made in this field. Consequently a new edition was found necessary and copies of this may be had by addressing the bureau at Washington, D. C. In the revision a rather full discussion of the three-wire method of railway power distribution has been added and the section on pipe drainage has been modified to conform to the latest investigations and observations. On the subject of automatic substations the circular points out that these have now been developed to such a point that they are entirely practicable and dependable for railway use. By making it possible materially to increase the number of feeding points they incidentally produce better electroylsis conditions.

There was no tramway service on Christmas day in a number of cities in Great Britain, and in other cities, including London, the service was very greatly reduced. This was in conformity with the desire of the men to spend as much time with their families on Christmas day as possible.

When a Line Pole Needs a Guy

BY CHARLES R. HARTE
Construction Engineer, The Connecticut Company, New Haven, Conn.



A DIFFICULT LOCATION FOR SUITABLE GUYING

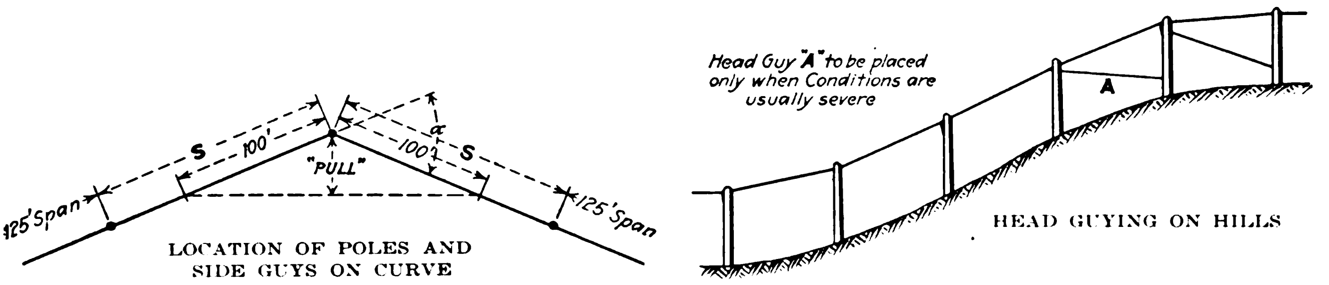
Practice in Line Guying Has Been Standardized by the Telephone, Telegraph and Power Companies, Hence the Author Summarizes Their Experience as a Guide on Electric Railway Transmission Line Construction—The Desideratum is to Keep the Line "Put" Without Using Unnecessary Material in the Guys and Anchors

IN THE issue of the ELECTRIC RAILWAY JOURNAL for Nov. 16, 1918, we examined in detail the subject of pole-line guys. A logical sequel to this is an attempt to answer the question: "When should guys be used?" From the first the Bell Telephone Companies realized the importance, from every point of view, of standard practice in line work, and early developed a scheme of guying. The Western Union Telegraph Company, prior to its brief control by the American Telephone & Telegraph Company, had been somewhat less thorough, but as a result of that control went into more detail than the "A. T. & T.," varying from that company's practice in some respects but not radically. In 1914 the National Electric Light Association received from its sub-committee on overhead construction its monumental report which established similar standards in its field.

Obviously a guy, or some equivalent if conditions bar the guy, should be placed on every pole which may be subject to strains approaching its strength. Such strains may result from the nature of the line, as the pulls at horizontal and vertical angles, or from storms, or from both in combination. Those due to the nature of the line can be calculated readily, but the storm strains are not so easy to determine, since they depend upon the kind and severity of the storms to be anticipated, their direction relative to the line, and the extent to which the line is sheltered—all of which can only be guessed at in the light of previous occurrences—in addition to the known facts of the details of the line itself. The long experience, however, with the signal lines, using this term in the sense in which it is employed in the National Electrical Safety Code, has given a good basis to work on, both as to the lines themselves, and as to the relation between these lines and those of companies using different sizes of conductor.

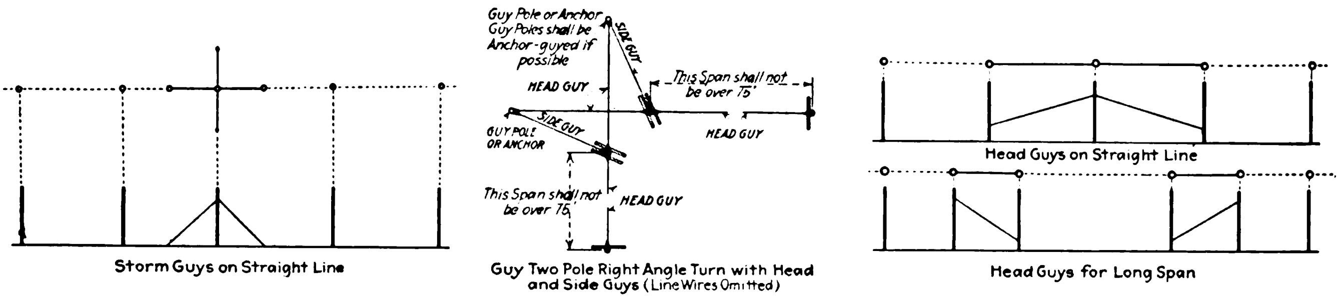
Considering first the strains due to corners, it is customary to measure the angles in terms of the "pull," so-called, which is the distance from the corner pole to a line drawn between points on the two branches of the line. The Bell companies and the N. E. L. A. measure out 100 ft. on each side, but the Western Union employs 130 ft., which is the standard length of span for their seven to sixty-wire lines. As a result, for a given angle, the Western Union "pull" is three-tenths greater than the value the others use, and conversely, the others find for a given angle a "pull" which is practically three-fourths (actually ten-thirteenths) of the Western Union.

On a paper layout it is a very simple matter to lay off the exact line from which to measure. In the field, unless the adjacent poles happen to be each 130 ft. away, it is not so convenient although there is nothing complicated about the process. It is easy, however, to make a diagram which permits the use of the poles adjacent to the corner pole. If they are approximately equal distances from it one can, by sighting from one of these poles to the other, instantly find a point on their line and opposite the corner pole, and the distances from this point to the corner pole and from the adjacent pole to the corner pole, can be readily measured. The "pull" (on the 100-ft. basis) is then found from the diagram (see page 142) by locating at the left-hand side the distance measured, following this to the right to the inclined line marked with the distance between corner and adjacent poles, and then following the vertical line through that point to the bottom of the chart where the "pull" is read off. For example, if the adjacent poles were 70 ft. from the corner pole and the latter was 30 ft. from the line between the adjacent poles, we find 30 at the left, follow it to the inclined 70, and drop down vertically at 43 which is the "pull."


125' Span
S
100'
"PULL"
a
100'
S
125' Span
Head Guy "A" to be placed only when Conditions are usually severe
A

LOCATION OF POLES AND SIDE GUYS ON CURVE

HEAD GUYING ON HILLS


Guy Pole or Anchor Guy Poles shall be Anchor-guyed if possible
Side Guy
HEAD GUY
This Span shall not be over 75'
Side Guy
GUY POLE OR ANCHOR
HEAD GUY
This Span shall not be over 75
HEAD GUY

Storm Guys on Straight Line

Guy Two Pole Right Angle Turn with Head and Side Guys (Line Wires Omitted)

Head Guys on Straight Line

Head Guys for Long Span

SPECIAL PROBLEMS IN LINE GUYING

If the two adjacent poles are not equally distant from the corner pole the correct value for the pull is found by measuring from the middle of the line between them to the corner, and using the average of their distances for the value of the inclined line.

A similar diagram for the Western Union basis of 130 ft. is readily made by remembering that the distance from corner pole to line for any given angle is proportional to the distance from the corner pole to the point through which the line goes. If a diagram is laid off, except as to inclined lines, just like the one shown, the line at an angle of 45 deg., as is the 100-ft. line here, would then be the 130-ft. line. If we start where the horizontal 39-ft. line cuts this and lay off 3-ft. points on each side on the vertical 39 line, the inclined lines through these points will be respectively the 140-ft., 150-ft., etc., lines upward, and the 120-ft., 110-ft., etc., lines downward. By taking the pull 39 ft. on the 130-ft. basis we get the ratio of 3 to 10 between the distance from corner to line and from corner to point fixing the line, and the offsets for that angle will be 36 for 120 ft., 33 for 110 ft., etc.

STRAIN MUST BE OPPOSED BY AN ANCHORAGE OF SOME SORT

Opposed to the strain resulting from the corner we need some form of anchorage, the effective value of which is modified by the angle it makes with the strain, which, except in special cases where it is inclined to an extent which necessitates consideration of that fact, is taken as horizontal. This angle, it will be remembered, is measured by the relation of the "lead," the horizontal distance from the base of the pole to a point on the guy at that level, to the "height," the distance from the base of the pole vertically to the point of guy attachment.

Coming down to "brass tacks" and business, the National Electric Light Association deals with a corner on the basis of its "pull" and the size of the line, cutting down the strain as the pull increases by shortening the adjacent spans, as shown in middle lower diagram above. This is reproduced from the N. E. L. A. Handbook on Overhead Line Construction. The N. E. L. A. rule is to head guy and side guy all corner poles, whether the turn is made on one or more, the side guys on curved lines being installed in line with the radius of the curve at that point.

SIDE GUYING HAS BEEN FAIRLY WELL STANDARDIZED

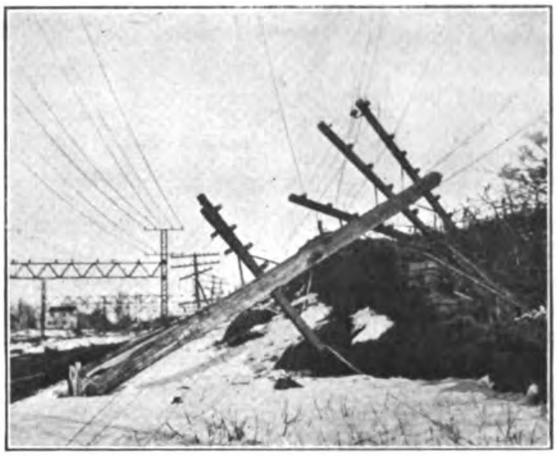
The particular specifications are characterized as covering "construction methods for distributing systems as follows: Mechanically, for spans up to and including 130 ft.; electrically, for street lighting circuits and for constant potential circuits up to and including 6600 volts between adjacent wires on the same crossarm." While such circuits are sometimes of much heavier section, the average line would be of about No. 4 weatherproof wire.

The American Telephone & Telegraph Company calls for side guying in accordance with Table I.

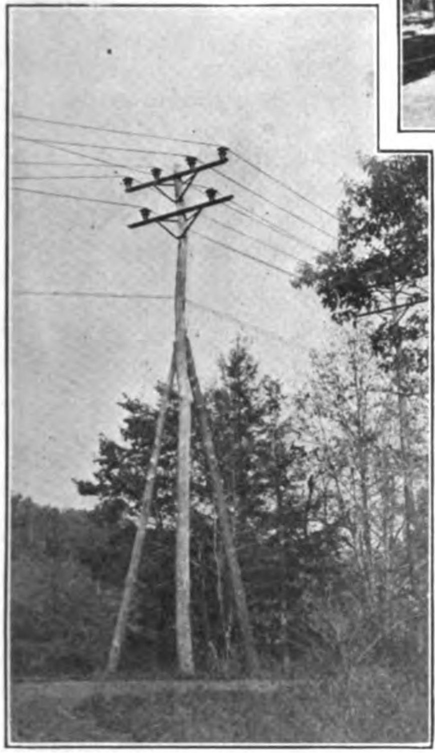
Where the line carries cable as well as open wires an additional 6000-lb.-strand side guy is to be placed, under the conditions shown in Table II.

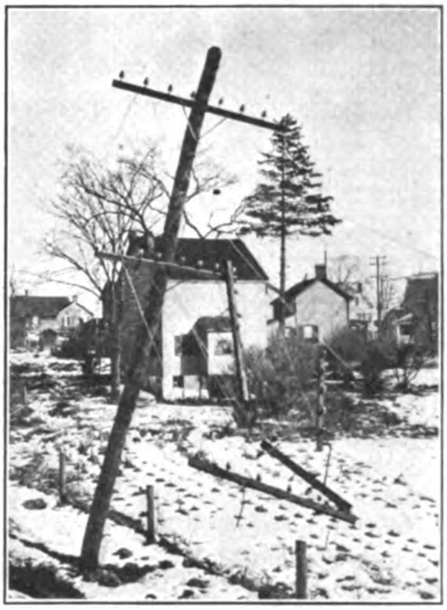
This in turn calls for the open-wire equivalents of telephone cables given in Table III, on page 142, in which details of ordinary telephone cable are included. The equivalence is for wind of an indicated velocity of 50 m.p.h. and ⅜-in. of ice on the open wires in one case, and on the cable and messenger in the other, the cable being at the same height on the pole as the open wires, and both weight and wind pressure being taken into account. These values are somewhat lower than those often used, the more usual figures being an indicated velocity of wind of 70 m.p.h. (giving a pressure of 8 lb. per square foot of projected area of conductor and covering) and ice ½ in. thick all around. However, since the same wind and ice values are used on both open wires and cables, the equivalence is substantially as true for the higher values as for the lower ones.

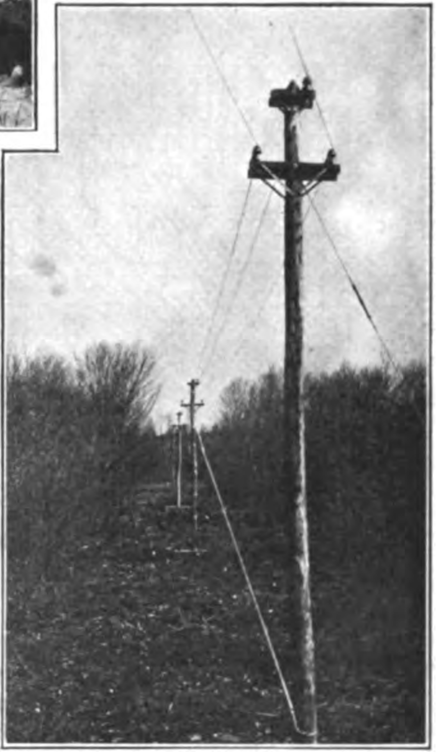
At bottom, left, push brace on a corner pole where a guy could not be installed.
At top, center, a long tangent on which failure resulted from lack of side guys.
At bottom, center, a case where failure resulted from lack of side and head guys. Note the dragging off of crossarms by the pull along the line.



Below, construction involving several forms of guy. Note side guy for corner and head guy from adjacent pole and, on the long tangent, side guy to anchor and head guy to base of pole. As line is on private right-of-way clearance under guy is unnecessary.







The odd pairs which are listed in the "actual" cables are the tracer pairs which are used for testing and are not counted in giving the "nominal" cable capacity.

As a further guide, for use on joint lines, the American Telephone & Telegraph Company uses these approximate equivalents: A No. 2, 4, or 6 B. & S. gage weatherproof wire is equivalent to two open wires; a No. 0 or 00 wire to three open wires, and a No. 0000 wire to four open wires.

As an example of the application of the tables, if we take the case of a pole which carries forty telephone open wires, one 150-pair nineteen-gage cable and six

TABLE I—SIDE GUYING, A. T. & T. CO. STANDARD

Number of Wires	Amount of Pull	Kind of Guy or Reinforcement
Ten	Less than 5 ft.	None
Ten	5 to 10 ft.	Ground brace or 6000-lb. strand
Ten	10 ft. or more	6000-lb. strand
Twenty or more	Less than 18 in.	None
Twenty to sixty	18 in. or more	6000-lb. strand
Sixty or more	18 in. or more	10,000-lb. strand
Forty or more	18 in. or more, and lead of guy less than one-fifth height..................	10,000-lb. strand
Forty or more	10 ft. or more and lead of guy less than one-quarter height.................	10,000-lb. strand

TABLE II—SIDE GUYING FOR POLE LINE CARRYING CABLES

Equivalent Number of Wires	Pull	Distance From Cable Guy to Lowest Crossarm Is More Than
10	18 in. to 10 ft.	9 ft.
10	10 ft. to 15 ft.	4 ft.
10	15 ft. or over	2 ft.
20	18 in. to 10 ft.	4 ft.
20	10 ft. or over	0 ft.
30 or more	18 in. or over	0 ft.

No. 00 weatherproofed lighting wires, we have, for the equivalent load in open wires:

Forty open wires	equals 40 open wires
One 150-pair nineteen-gage cable	equals 20 open wires
Six No. 00 weatherproof wires	equals 18 open wires
Total	78 open wires

This is practically an eighty-wire line.

The above is on the assumption that the several groups are at approximately the same level. If there was a considerable separation between some of the elements, as would doubtless be the case here because of the lighting circuits, allowance should be made for that fact, and the equivalent value increased or decreased according as the distant member was above or below the position which would be occupied by its equivalent in telephone wires.

It is in the matter of storm guying that, up to comparatively recently, there has been so little of definite rule that one large company, in a confidential letter of instruction to its employees, advised that the location of guys be left to the judgment of the line foreman! The telephone companies, however, go into the matter in considerable detail. They do this because the question is of much importance, both before construction, to insure the integrity of the line, and after trouble, either to prove the sufficiency of the protection against reasonable contingency, or, by showing to the company its insufficiency, to lead to a settlement of any claims out of court rather than after a costly suit has established that fact. Obviously it is no less the engineer's duty to keep his company from fighting a case in which they are bound "to be licked," than to see that such conditions do not arise. It will therefore pay to consider the telephone practice in some detail.

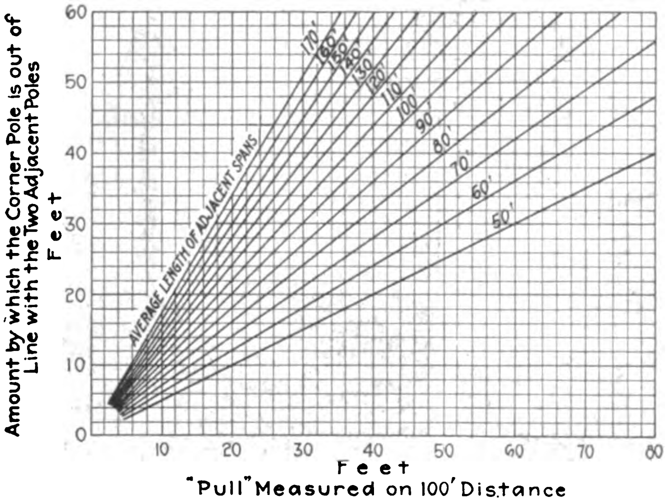


CHART FOR USE IN FINDING CORNER PULL OF POLE LINE

The Western Union practice for angle guys is as given in Table IV.

For lines having an ultimate capacity of more than 12 wires Table V is used.

It should be remembered that the Western Union uses 130 ft. as the basis of measurement of pull, and that the values of 1½, 10, 20, 30, 40 and 50 as given above correspond to the A. T. & T. and N. E. L. A. values of 1.17, 7.8, 15.6, 23.4, 31.2, and 39.0 respectively.

TABLE III—TELEPHONE CABLE EQUIVALENTS IN OPEN WIRES

Number of Pairs Table	Number of Pairs Actual	Maximum Outside Diameter, Inches	Weight per Foot Pounds	Messenger, Pounds Capacity	Rings, Inside Diameter	Equivalent Number of Open Wires
		22 Gage Cable				
25						6
	26	¾	0.97	6,000	2	
30						7
50						8
	51	15/16	1.33	6,000	2	
60						9
	76	1 3/32	1.65	6,000	2	
90						10
100						10
	101	1¼	2.13	6,000	2	
120						12
150						13
	152	1½	2.74	10,000	2½	
180						14
200						16
	202	1¾	4.07	10,000	2½	
240						18
300						20
	303	2 1/16	5.17	16,000	3	
360						22
400						23
	404	2 11/32	6.21	16,000	3	
	505	2 21/32	7.34	16,000	3½	
600						29
		19 Gage Cable				
10						6
	11	21/32	0.81	6,000	2	
15						7
	16	¾	0.98	6,000	2	
25						8
	26	⅞	1.23	6,000	2	
30						9
50						10
	51	1 3/16	2.01	6,000	2	
60						12
75						13
	76	1⅜		(C		
90						14
100						16
	101	1⅝	3.76	10,000	2½	
120						18
150						20
	152	1 29/32	4.78	10,000	2½	
180						22
200						23
	202	2 5/32	5.72	16,000	3	
300						29
	303	2 9/16	7.45	16,000	3½	

TABLE IV—STANDARD GUYING PRACTICE OF WESTERN UNION TELEGRAPH COMPANY

Ultimate Capacity of Pole	Existing Load	Pull	Size and Number of Side Guys
2 wires	2 wires	Less than 25 feet	No guying required
2 wires	2 wires	25 feet or more	1—No. 6 B. W. G. Steel
6 wires	6 wires	Less than 10 feet	No guying required
6 wires	6 wires	10 feet or more	1—4000-lb. strand
12 wires	6 or less	Less than 10 feet	No guying required
12 wires	6 or less	10 feet to 25 feet	1—4000-lb. strand
12 wires	6 or less	26 feet to 50 feet	1—6000—lb. strand
12 wires	7 to 12	Less than 5 feet	No guying required
12 wires	7 to 12	5 to 25 feet	1—4000-lb. strand
12 wires	7 to 12	26 to 50 feet	—6000-lb. strand

TABLE V—WESTERN UNION GUYING FOR HEAVY POLE LINE

Existing Load	Pull in Feet	Ratio of Lead of Guy to Its Height From ¼ to ⅓	⅓ to ½	½ to ¾	¾ or more
10 or less	Less than 5 ft.	None	None	None	None
10 or less	5 to 50	1— 6,000	1— 6,000	1— 6,000	1— 6,000
11 to 20	Less than 1½	None	None	None	None
11 to 20	1½ to 30	1— 6,000	1— 6,000	1— 6,000	1— 6,000
11 to 20	31 to 40	1—10,000	1—10,000	1— 6,000	1— 6,000
11 to 20	41 to 50	1—10,000	1—10,000	1—10,000	1— 6,000
21 to 20	Less than 1½	None	None	None	None
21 to 30	1½ to 20	1— 6,000	1— 6,000	1— 6,000	1— 6,000
21 to 30	21 to 30	1—10,000	1—10,000	1— 6,000	1— 6,000
21 to 30	31 to 40	1—10,000	1—10,000	1—10,000	1— 6,000
21 to 30	41 to 50	2—10,000	2—10,000	1—10,000	1— 10,000
31 to 40	Less than 1½	None	None	None	None
31 to 40	1½ to 10	1— 6,000	1— 6,000	1— 6,000	1— 6,000
31 to 40	11 to 20	1—10,000	1— 6,000	1— 6,000	1— 6,000
31 to 40	21 to 30	1—10,000	1—10,000	1—10,000	1— 6,000
31 to 40	31 to 40	2—10,000	2—10,000	1—10,000	1—10,000
31 to 40	41 to 50	2—10,000	2—10,000	2—10,000	1—10,000
41 to 50	Less than 1½	None	None	None	None
41 to 50	1½ to 10	1— 6,000	1— 6,000	1— 6,000	1— 6,000
41 to 50	11 to 20	1—10,000	1—10 000	1— 6,000	1— 6,000
41 to 50	21 to 30	2—10,000	2—10,000	1—10,000	1— 6,000
41 to 50	31 to 40	2—10,000	2—10,000	2—10,000	1—10,000
41 to 50	41 to 50	3—10,000	2—10,000	2—10,000	1—10,000
51 to 60	Less than 1	None	None	None	None
51 to 60	1 to 20		1—10,000	1—10,000	1—10,000
51 to 60	21 to 30		2—10,000	2—10,000	1—10,000
51 to 60	31 to 40		2—10,000	2—10,000	1—10,000
51 to 60	41 to 50		3—10,000	3—10,000	2—10,000
61 to 80	Less than 1		None	None	None
61 to 80	1 to 20		1—10,000	1—10,000	1—10,000
61 to 80	21 to 30		2—10,000	2—10,000	1—10,000
61 to 80	31 to 40		3—10,000	2—10,000	2—10,000
61 to 80	41 to 50		3—10,000	3—10,000	2—10,000

Some Mysterious Car Ailments

Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD

Another Remedy for Ice on Control Contacts

IN THE Nov. 16 issue of the JOURNAL there was printed in this department the experience of one railway company with automatic control operated on a storage-battery circuit in extremely cold weather. In the case described the formation of ice on the control contacts insulated them enough to prevent the current at a battery potential of 14 volts from flowing from fingers to segments, making the control inoperative. The trouble was remedied by prick-punching the contact segments so as to raise sharp points on them. The pressure of the fingers caused the ice to break away at these points and allow the fingers to make contact.

On a large Eastern property similar troubles were experienced last winter with automatic control operating on a 24-volt battery and, as a different remedy was used, it will no doubt be of interest now as we are just beginning to experience severe winter weather.

The operating conditions were similar to those in the case mentioned in the previous article. That is, cars in making their regular trip, spent about one-third of the time in the subway and the remainder of the time on the surface, and to make matters worse most of the cars were out of doors all night. On cold days cars, after having been started from the barn without trouble, would frequently be reported "dead" or "losing power" and when they were brought into the carhouse for inspection nothing could be found. At the company's carhouse some of the pits were outside and this afforded the opportunity of examining the controllers reported "dead" without bringing them into the warmer atmosphere of the carhouse.

It had been the practice to use a small amount of grease on the control segments to prevent excessive wear and it was found that the grease mixed with dust and dirt, had formed a black, sticky film on the segments. This in extremely cold weather would harden and insulate the fingers from the segments and make the control inoperative. It was also found in many cases that the segments were coated with a thin film of ice due to the condensation of moisture when the warmer air of the subway came in contact with the cold metal parts.

For awhile attempts were made to improve the operation of the control by running it without grease on the segments, and all contact parts were cleaned at every inspection, but there was little, if any, improvement. It was then decided to try oiling the segments with a thinner oil, and the results were very gratifying. A thin engine oil with a good "cold test" was obtained and, after the segments were thoroughly cleaned of the sticky substance, the oil was applied freely to them with a brush. Although this did not prevent the black film from accumulating it kept the film soft so that the finger plowed through and maintained contact, instead of riding up on the hard black film as was the case before the thin oil was used. The oil also lessened the trouble due to the formation of ice on the segments. Ice will not adhere to a greasy surface as it will to a clean, dry one, and although it may have been formed on the segments, it is easily pushed off by the fingers. This point will be appreciated by automobilists who grease their windshields before driving in a sleet storm, as ice forming on a clean glass is difficult to remove, while that forming on a greasy glass can be easily knocked off with a stick. The use of the oil had a further advantage in making it very easy to clean the contact segments. Where it was usually necessary to use gasoline in cleaning them, the black substance can now be easily wiped off with a cloth. It should be borne in mind that if line potential is used on the control circuits, such free use of oil would probably cause short-circuits due to the collection of dust and dirt on insulating parts. On the other hand, however, very little control circuit trouble is caused by cold weather conditions when line potential is used, and the use of oil as described is for circuits of low potential only.

Sympathetic Behavior of Motors Had a Reason

ON A CERTAIN large property equipped with third-rail and operating trains with cars equipped with line-operated, non-automatic, multiple-unit control, considerable trouble was experienced with motors flashing over. A large percentage of the cars were equipped with non-interpole motors, and a common bus line ran throughout the trains. The third-rails were connected in parallel so that a voltage disturbance on one rail would be communicated to the others. The flashing would frequently occur without any apparent reason and often when one motor of a train flashed over others in the same train would also flash. This led the engineers of the equipment manufacturer, who were co-operating with the company's representatives, to believe that the trouble might be due to voltage fluctuations on the line.

Tests to determine the cause were begun and it was found that sudden voltage variations were occurring. These were due primarily to grounding of motors, flashing of motors and more particularly to intermittent application of current to the motors due to sleet on the third-rail. Further tests on the trains in operation showed that if the voltage was suddenly reduced from 600 to about 400 and restored with the train running at high speed (motors in parallel), the motors would flash over. Other cars in the train and other trains in that particular third-rail zone would sympathetically flash over and blow the main motor fuses.

The engineers decided that the trouble could best be overcome by installing a line switch in the main motor circuit set to drop out promptly whenever an excessive drop in voltage occurred. Accordingly a train was equipped with pneumatically-operated line switches, with their operating coils connected to line through an external resistance. The resistance was so proportioned as to give the coil a range in voltage of from 600 to 400, corresponding to the minimum drop that would cause a flash-over. The pneumatic details of the switch were enlarged so as to provide an especially quick action, as it was, of course, imperative that the switch should be fully opened before the voltage was restored to normal. Results proved that the quick-break switch with large air ports was sufficient to take care of the trouble experienced and accordingly the additional switch was added to each equipment.

Preventing Flashing of Reversers on Multiple-Unit Control Equipments

A CONSIDERABLE number of multiple-unit cars on a well-known railway system were wired up in such a manner that when the master controller was moved entirely to the off position the reverser would break the circuit. There was a point on the controller which would hold the reverser in and allow the motor current to be broken in the controller, but occasionally a motorman would return his controller rapidly to the off position, and if the motors were drawing a heavy current the reverser would flash over. As these reversers were located under a seat in the interior of the car these flashovers caused a flash and flame in the inside of the car and generally the passengers sitting in the seat over the reverser would have their clothing scorched or otherwise damaged.

This condition had existed for some time and the company was seriously considering the installation of a circuit breaker to break the motor circuit and reduce the duty on the reversers. A careful study of the connection of the leads on the reverser, however, showed that the positive finger and the negative finger were adjacent to each other, with only a fraction of an inch clearance between the two fingers. There was thus a difference in potential of 600 volts between two adjacent fingers with but a very small insulating space. It was found that the connections on the reverser could be changed so that the voltage between adjacent fingers would be very materially reduced. This change in the wiring was made and since then the flashing over of the reversers has been entirely eliminated.

An Emergency Stop That Was Not on the Schedule

A CERTAIN large railway system operates multiple-unit trains in elevated service. On one occasion one of its motormen, on arriving at the terminal, reported his train as acting very erratically. He said that while running along with everything apparently working "O.K." the train would suddenly make an emergency stop and force all the passengers to the front end of the cars. On examining the equipment of his train immediately after such a stop, he found the brakes had not been applied but the emergency stop appeared to be due to a sudden reversal of the motors.

The electrician stationed at the terminal rode on the train the next trip but nothing unusual happened. He continued to stay on the train, however, for he said he had a premonition that if he stuck long enough the trouble would occur again. Sure enough, while leaving the opposite terminal of the line and ascending a slight grade there was a sudden flash from the reverser on the head car and all motors on the train were reversed.

A rapid examination was made by the electrician and he found that all the reversers had been thrown to the reverse position with the multiple-unit control switches closed for multiple operation. A thorough examination was impossible at that time and in order to avoid a long detention to passenger service he pulled out the jumper connecting the first and second cars, then with the motorman operating from the first car and himself operating from the second the train completed the remainder of its trip and was then taken out of service for a more careful examination.

At the inspection shop all of the equipment of the train was carefully inspected and tested, but other than that the reversers were burned and smoked up no defects were found that would properly explain the trouble. The jumpers were removed and were given a breakdown test, which consisted in passing a large current through the various wires and connections. This test was also met satisfactorily. The electrician who had helped bring the train in off the road insisted on making another inspection of the equipment, as he felt there must be some obvious cause for the trouble. A small black spot was found on the insulation in the head of the jumper which had been removed from between the first and second cars. This jumper was then entirely dismantled and it was found that the insulating compound inside the jumper head was cracked and that a strand from the positive battery train line wire had broken and was projecting through this crack and touching the reverser operating wire. The twisting of the jumper as the train passed around a curve had caused the contact to be made and the throwing of the reversers had caused the trouble.

While trouble of this particular nature was somewhat uncommon, some precautions in filling the jumper heads with the insulating compound were considered advisable. It was found that by forcing the compound into the heads under considerable pressure small interstices were more properly filled and there was less danger of the compound cracking away from the insulating head. To prevent air bubbles from forming in the compound inside the head, two holes were drilled in the casting. One was used for filling and the other allowed the air to escape readily.

Some Emergency Special Work Construction

Indianapolis Company Utilizes Acetylene Cutting and Thermit Welding in Building Up Curve Crosses

By THOMAS B. McMATH
Engineer of Maintenance of Way, Indianapolis Traction & Terminal Company,
Indianapolis, Ind.

THE maintenance-of-way department of this company has found it necessary to make emergency renewals of girder rail curve crosses and frogs, and has been very successful in making a fairly good-looking and serviceable job without any machine-shop work. The only tools used were an acetylene cutting torch, a thermit welding outfit and an Atlas track grinder.

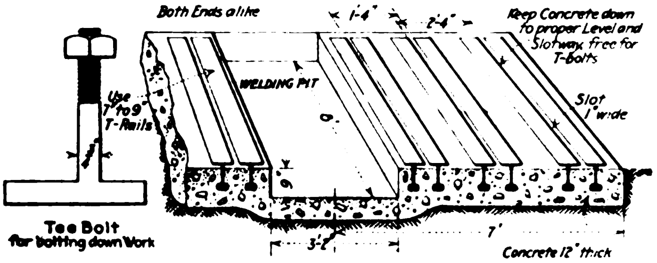

Both Ends alike
1'-4"
2'-4"
Keep Concrete down to proper Level and Slotway free for T-Bolts
WELDING PIT
Use 7" to 9" T-Rails
Slot 1" wide
Tee Bolt for bolting down Work
3'-2"
7'
Concrete 12" thick

FIG. 1—THERMIT WELDING BED, 14 FT. LONG, 8 FT. WIDE

Made of concrete flush with ground. Old rails set with bases projecting 1½ in. above concrete. All rail bases set to perfectly level plane surface. Holding-down bolts used to bolt parts to be welded.

After making a few welds and finding the operation a success, we built a concrete bed for doing such work. This proved to be very convenient and insured the making of curve crosses true to angle and surface. Fig. 1 shows the welding bed. As we use thermit for all combination joints we do all such work on this same bed.

In fabricating a curve cross, we first make a template to correspond with the ball of the rail of the desired cross. The edges of the template that correspond with the gage line are painted red. In laying out the template we take as the through rail the one having the maximum traffic. This is bent to the proper curvature and bolted to the welding bed with the point of intersection over the pit. The rail for the intersecting arms is first bent accurately to the proper radius and then the pieces are cut of ample length to make the arms.

The abutting ends of the arm rails are coped as accurately as possible by means of an acetylene cutter, but this coping is at best a rough approximation. The guard of the through rail is next cut by means of the torch to permit the arm on the guard side to come within about an inch of the gage of the through rail. The through rail is then cut away for a length of 2 in. through the base and web up as far as the bottom of the guard. The photograph reproduced in Fig. 2 shows the job at this stage. One of the coped arms is shown lying on its side to indicate the general shape after coping. The other arm is in its final position. It will be noted that the webs are not in contact, but the weld will include all webs, although they are separated by not less than a half inch. The coped arms are adjusted to the template and are firmly bolted to the bed by U-washers and T-bolts as shown.

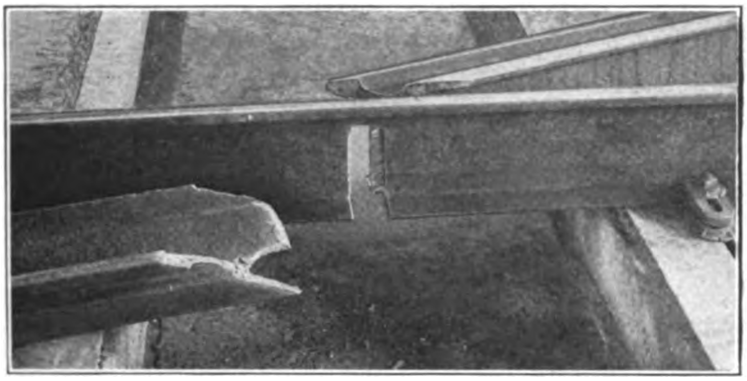


FIG. 2—THROUGH RAIL AND ABUTTING ENDS OF ARM RAILS CUT READY FOR WELDING.

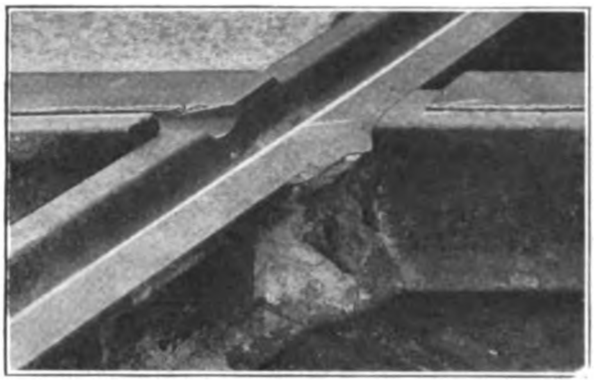


FIG. 3—"JUMP" INTERSECTION WELD COMPLETE

The openings are now all filled with wax and the wax is molded to the shape of the desired weld. The wax mold must be extended under the bearing parts of the intersecting rails to provide support for the load, and the weld must extend under the acute-angled points so as to support them. The wax when worked slightly warm is not at all difficult to handle or to work to the required shape.

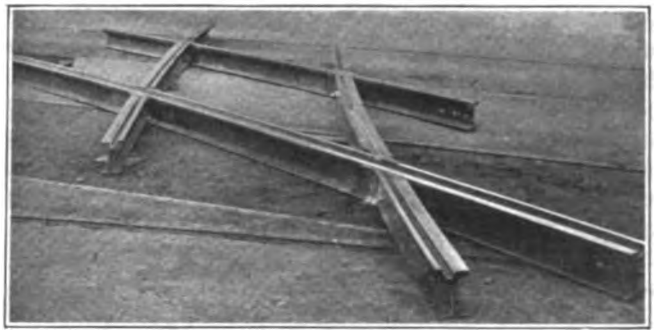


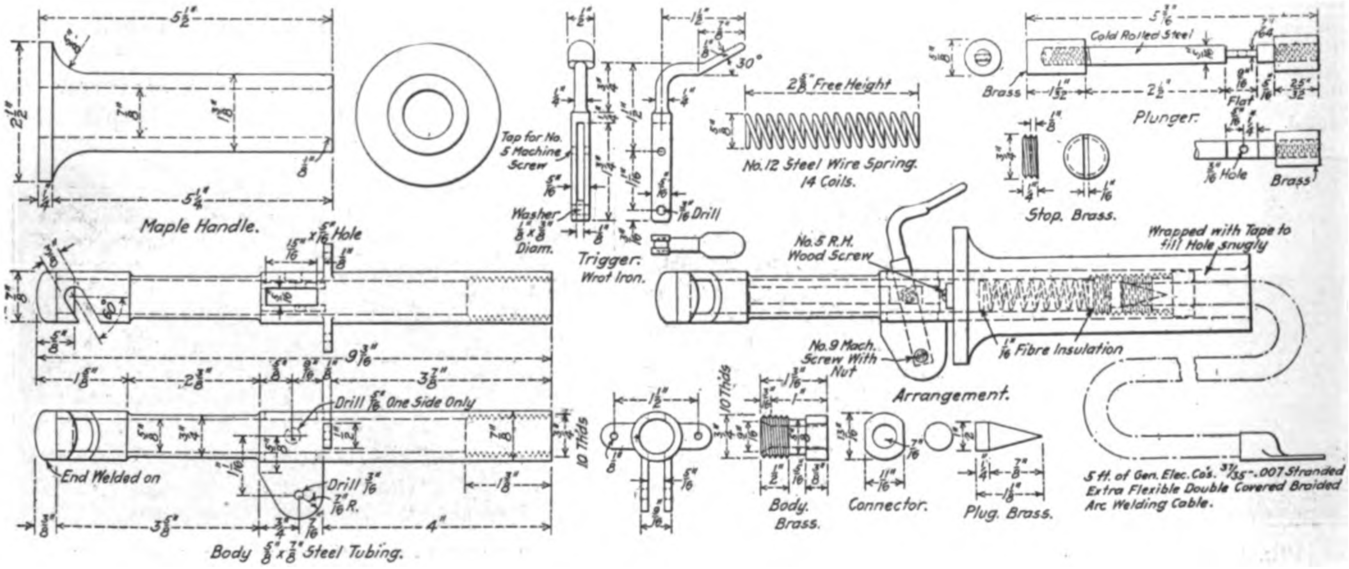
FIG. 4—VIEW OF A COMPLETED CURVE CROSS

We have found a small trowel and a farrier's knife to be the best tools for working the wax pattern into final shape. By knowing how much the wax weighs before starting and how much it weighs after the pattern is finished, it is easy to determine just how much thermit is required.

The flask is made up of four pieces of sheet iron cut at the ends to the shape of the rail. This flask must extend down 4 in. below the base of the rail and must permit 4 in. of sand to intervene between the flask and the weld. The sand used must be silica sand with sufficient fire clay added to make it tamp to a solid mass. It is not necessary to give any details of the thermit welding process here as these are so well known. After the pouring operation the frog should be allowed several hours to cool before removing the sand.

Most of our frogs take about 36 lb. of thermit and we find it most desirable to use two small crucibles rather than one big one. The frog is finished by grinding the tread of the rails if necessary and by grinding out the flangeway crossing.

Fig. 3 shows a close-up view of a finished intersection. The cross shown here, however, is for a "jump" or unbroken main line, with wheel opening for 4½-in. tread wheels. Such a weld will cost some $30 or $40 excluding the rail cost. We have had to make some thirty of these frogs, and we have had only two that we considered "missed," and even these were usable. A frog of this kind can be turned out in two days, or even more rapidly if conditions are such that a more rapid construction is required. Fig. 4 shows a view of a finished crossing.


Maple Handle.
Tap for No. 5 Machine Screw
Washer 1/8" x 3/8" Diam.
Trigger. Wrot Iron.
3/16" Drill
5/16" x 5/16" Hole
Drill 5/16" One Side Only
End Welded on
Drill 3/16"
7/16" R.
10 Thds
Body 5/8" x 7/8" Steel Tubing.
2 3/8" Free Height
No. 12 Steel Wire Spring. 14 Coils.
Cold Rolled Steel
Brass
Flat
Plunger.
5/16" Hole
Brass
Stop. Brass.
No. 5 R.H. Wood Screw
Wrapped with Tape to fill Hole snugly
No. 9 Mach. Screw With Nut
1/16" Fibre Insulation
Arrangement.
10 Thds
Body. Brass.
Connector.
Plug. Brass.
5 ft. of Gen. Elec. Co's. 37/35-.007 Stranded Extra Flexible Double Covered Braided Arc Welding Cable.

CONSTRUCTION DETAILS OF ONE TYPE OF ELECTRODE HOLDER

Our men are intelligent laborers educated on our own work. With about three days' instruction from the manufacturers of the thermit, these men have gradually acquired their education with the acetylene cutter. They had had some experience with it and with the grinder before they began making frogs.

During these strenuous times when it is difficult to obtain special work, and when the cost is so great, we find this home manufacture to be advisable to enable us to tide over till normal conditions return. If the maintenance-of-way department were to order repair renewals sufficiently in advance to have them on hand when needed there would be too much money tied up in the storage yard.

Home manufacture permits one to hold on to the old job until it is gone and still be able to supply only the pieces wanted without tying large amounts of money in the supply yard. We do not know how long this kind of work will last, but we have had it in use for several months and have had no indications of failure.

Selecting Electrodes and Holders for Electric Arc Welding*

Definite Characteristics for Electrodes Are Being Studied and Marked Improvement Is Expected

AT PRESENT the question of electrodes for arc welding is in such a state of development that it is very difficult to set forth any definite data. Various treatments are being applied to electrodes of many kinds. Special electrodes with varying compositions are being made up and their welding characteristics are being studied. No doubt in the near future some definite information will be available as to the proper compositions of electrodes for various operations.

Wire for metallic arc welding must be of uniform homogeneous structure, free from segregation, oxides, pipes, seams, etc. The commercial "weldability" of electrodes should be determined by means of tests by an experienced operator, to demonstrate that the wire flows smoothly and evenly through the arc.

The following list indicates the maximum range of the chemical composition of bare electrodes for electric welding in connection with mild steel: Carbon, trace up to 0.25 per cent; manganese, trace up to 0.99 per cent; phosphorus, not to exceed 0.05 per cent; sulphur, not to exceed 0.05 per cent; silicon, not to exceed 0.08 per cent. The composition of the mild steel electrodes, commonly used, is around 0.8 per cent carbon, manganese not exceeding 0.05 per cent, and only a trace of phosphorus, sulphur and silicon.

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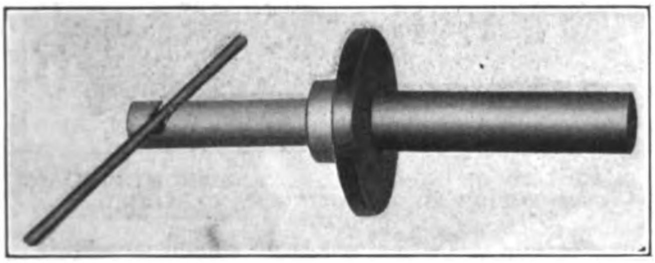
*From 1918 report of committee of Association of Railway Electrical Engineers.

The ordinary sizes required are $\frac{3}{32}$ in., $\frac{1}{8}$ in., $\frac{5}{32}$ in. and $\frac{3}{16}$ in., with only a small demand for the $\frac{3}{32}$ in.

The following table will serve to estimate the amount of wire in pounds required per operator:

Size of Bare Mild-Steel Electrode, In.	Actual Size, Inch	Length, Inches	Current Used, Amp.	Thickness of Work	Time to Deposit Seconds	Weight Deposited Pounds per Hour
$\frac{3}{32}$	0.0925	12	55	[illegible] in. min.	63	1.3
$\frac{3}{32}$	0.0925	12	65	[illegible] in. max.	53	1.5
$\frac{1}{8}$	0.1259	12	80	[illegible] in. min.	67	1.9
$\frac{1}{8}$	0.1259	12	125	[illegible] in. max.	60	2.5
$\frac{5}{32}$	0.1621	12	100	[illegible] in. min.	98	2.5
$\frac{5}{32}$	0.1621	12	135	[illegible] in. min.	87	2.9
$\frac{5}{32}$	0.1621	12	155	6x6-in. frame	75	3.3
$\frac{3}{16}$	0.1865	12	165	[illegible] in. min.	82	4.0
$\frac{3}{16}$	0.1865	12	175	6x6-in. frame	71	4.6
$\frac{3}{16}$	0.1865	12	200	6x6-in. frame	64	4.8

The weight deposited for pound per hour is the amount of metal that could be deposited in one hour if it was possible to maintain the arc continuously without interruption for this period. In actual practice, however, it has been found that an operator will keep the arc going approximately 50 per cent of the time on average work, the remainder of the time being used in cleaning the metal, changing electrodes and preparing and handling the work.



SIMPLE, LIGHT TYPE OF ELECTRODE HOLDER

COATED ELECTRODES PREVENT OXIDIZATION

A coated electrode is an electrode which has had a coating of some kind applied to its surface for the purpose of improving the metal in the weld by totally or partially excluding the atmosphere from the metal while in a molten state when passing through the arc and after it has been deposited. By the employment of such a coating the use of electrodes of special alloy steel has been made possible. For example, manganese steel, carbon steel, nickel steel, vanadium steel and tungsten tool steel have all been deposited successfully with the metallic arc.

Until recently there was only one kind of a coated electrode in commercial use, which is commonly known as the "quasi-arc" electrode. This electrode gives some wonderful results, but owing to its cost its use has been limited in most cases to special high-grade steels. A cheap simple coating not only for the special steels but also for the commoner mild steel electrodes as well has always been needed, not only to improve the metal in welds made with the present grade of welding wire but also to make possible the use of a better grade of welding wire for some of the more important operations. Progress in this direction is being made.

An electrode holder should be designed to hold the electrode firmly in order that a good contact will be provided for the flow of the current between itself and electrode.

The holder for metallic electrode welding should be designed to permit the changing of electrodes with the least possible delay. It is also important that at least 5 ft. of the cable extending from the electrode holder be extra flexible, in order that an operator can readily change the angle of the electrode (with relation to the work) without having to twist a stiff cable. An operator's hand should be as free to move as that of a painter, if he is to accomplish his work properly.

There are many designs of holders on the market which are satisfactory, one of which is shown in an accompanying illustration. Holders for carbon arc welding where a heavy current is used are necessarily much larger than those used for metallic arc welding. Another simple, light and easily operated holder is shown in another illustration. This consists of a clamp designed to avoid overheating and to protect the operator's hand.

Holders for carbon arc welding should be designed to grip carbons of various sizes. The holder for carbon arc welding is two or three times as long as that required for metallic arc welding to permit the operator to be sufficiently far from the work. A fiber disk is provided also between the carbon and the handle to keep the heat of the arc away from the operator's hand.

1918 Fires Have Their Lessons for 1919

DURING the year just closed many fires were caused by carelessness in burning leaves, brush and general trash. Electric railways were not free from loss due to this cause. The following information regarding 1918 fires is given by the Fire Underwriters Electrical Bureau and is cited as proof of the reality of this hazard.

Fire occurred on April 7, 1918, at 6.30 p.m., at the plant of the Elevated Railway, Somerville, Mass. The cause of the fire as given in a statement of the general adjustment bureau and the sworn statement of the assured was the burning of grass in close proximity to a wooden building. The loss amounted to $300,000. Fire occurred on April 6, 1918, at 1.10 p.m., in the frame carhouse occupied as a storage house for out-of-season cars by the Ithaca (N. Y.) Traction Corporation. This carhouse was located outside the city limits. The fire was caused supposedly from burning grass, as fires had been noticed near by on the day of the damage. The loss paid was $27,000. On Nov. 8, 1918, a fire is reported to have occurred on the property of the street railways of Augusta, Ga. The possible insurance loss was $100,000. The fire is said to have been caused by a spark from burning trash which ignited some combustible material near by.

Park properties and outlying carhouses and shops are particularly exposed to the hazards of fire from the burning of grass, leaves, brush, etc., and from the flying sparks due to the careless burning of trash. The remedy, of course, is to keep leaves, high grass and brush well away from buildings, to burn trash only in wire-mesh covered receptacles, and to store all trash which cannot be immediately removed in covered bins well away from buildings.

Snow Sweepers Made from Open Cars

Emergency Conditions Made Unusual Procedure Necessary—Cost Was Less than $900 Per Sweeper

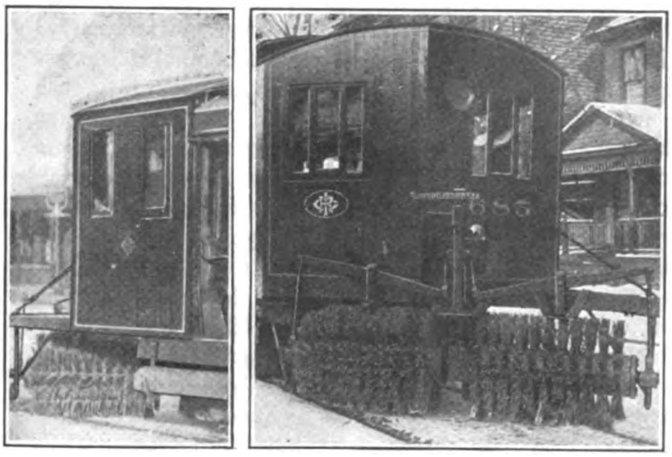
By J. W. Hulme
Superintendent of Equipment International Railway Company, Buffalo, N. Y.

THE loss of four snow sweepers in a carhouse fire which occurred on this property early last spring made it necessary to provide the same number of equipments before the present winter set in. As the car builders could not give absolute assurance that they could make deliveries of new sweepers early in the fall, on account of the scarcity of labor and the difficulty in securing material, the company decided to equip some open cars as snow sweepers. The writer has always felt that a scheme of this kind could be worked out practically and would enable the rolling stock to be used to better advantage than otherwise.

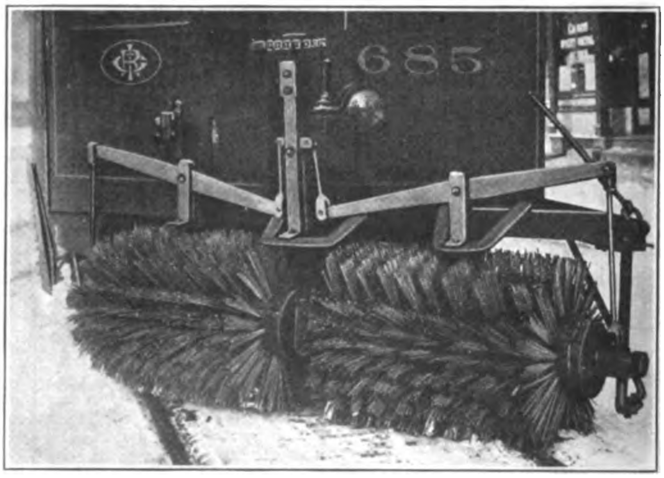
It was decided to use four fourteen-bench cars which operate on the belt lines of the Niagara Falls division of the International Railway. These open cars are of double-truck type and are equipped with four GE-57 three-turn motors each. The cars weigh enough to insure good tractive effort, a necessary condition in any snow sweeper. The overhang of the platform on this type of open car is very small, making it possible to install the sweeper on the front end and still leave ample clearance on all curves.

In order to minimize the cost of converting the car from open car service to a snow-fighting unit and back again it was decided not to alter the bulkhead or bonnet of the open car, but merely to remove the vestibule and dasher. Of course the location of the controller and engineer's valve had to be changed.

The construction decided upon is shown in the accompanying photographs. The cab is portable and is built up in five sections, as follows: The roof, which fits over the open car bonnet, the two sides and the two sections of which the front is composed. The broom is supported by a triangular frame made of ⅜-in. x 5 in. x 5 in. angle iron, and it is bolted on top of the two side sills. In order to stiffen the apparatus and eliminate vibration a 1-in. truss rod was run from the front end of the framework supporting the broom and extended back to the center of the car.


DEVIL-STRIP SIDE OF VESTIBULE AND SWEEPER, AND FRONT OF OPEN CAR EQUIPPED WITH BROOM FOR SNOW SWEEPING

The broom is driven by a modern-type ventilated 60-hp. motor, being direct connected with it by means of shafts and bevel gears. This drive was used to obviate the chain troubles which so frequently occur with chain-driven brooms. A first-class motor was selected for the drive because experience has shown that delays and tie-ups are often due to the use of obsolete types of motors for the broom drive. To permit lowering of the broom as the rattan wears out, a set of levers is provided with control from the cab through an adjusting screw. This is turned by means of a hand wheel with gear and chain connections. The controller and engineer's valve for the use of the motorman who operates the car is located back of the front window on the devil-strip side of the car. This location insures that the motorman will have a clear view of the track ahead when the broom is in operation and will not be blinded by the snow. At the same time the man who operates the broom is able to look out of the other front window to see where he is delivering the snow.


CLOSE-UP VIEW OF BROOM AND LEVERS, SHOWING CHAIN CONNECTION TO ADJUSTING HAND WHEEL

The cost of equipping the car exclusive of the motor and controller for operating the broom was less than $900. Since the cabs are built in portable sections the cost of converting at the end of each season will be less than $30 per car. Up to date we have not experienced any severe snowstorms but we have had sufficient opportunity to assure us that the use of an open car as a snow sweeper is entirely practicable. The motormen, conductors and broom operators are greatly pleased with this reconstructed equipment. Heaters are installed in both the front and the rear end cabs for the comfort of the crews.

In paying a tribute to the service of women conductors in Leeds, England, J. B. Hamilton of the tramways committee said that the employment of women had enabled the committee to maintain a service which, if not altogether adequate, had met the convenience of the public fairly well. It had been found, however, that with women the same standard of regularity cannot be obtained as with men and this increased the possibility of interruptions to service above what they otherwise would have been.

Supreme Court Decides D.U.R. Case

Says City Could Have Ordered Tracks From Street After Franchises Expired But Cannot Compel Company to Continue Business at Loss

A DECISION of importance as bearing on the right of public service corporations to a reasonable return on their investments was handed down by the United States Supreme Court on Jan. 13 by a 6 to 3 vote, in the case of the Detroit United Railway against the City of Detroit.

The case came up on appeal from the District Court for the Eastern District of Michigan, which had dismissed proceedings instituted by the railway company to restrain the enforcement of a city ordinance which sought to fix the rate of street car fares in Detroit. This ordinance (see footnote*) was passed by the City Council after it had turned down petitions from the company for permission to increase its fares.

It was contended by the company that the rates sought to be established were confiscatory and prevented the company from earning a fair return on its investment. The city authorities challenged this contention. The district court in dismissing the proceedings held that the remedy of the company was to abandon its service and take its property from the streets, and that the exception of the fifth section of the ordinance saved the company's contract rights from impairment.

In its decision rendered by Justice Day, the United States Supreme Court reversed the decree of the district court with costs and ordered a new trial. Justices Clarke, Holmes, and Brandeis dissented.

The Court holds that: "There can be no question that it was within the city's power to compel the company as to its non-franchise lines to remove its tracks from the streets of the city. This was settled in *Detroit United Railway Company* vs. *Detroit*, 229 U. S. 39. The city did not do so. Instead of taking such action it passed the ordinance in controversy, providing for the continued operation of the company's system." Where, however, it required certain duties of the company the latter was entitled to make a reasonable return upon its investment. Hence the District Court should have heard the case on its merits.

COMPANY ENTITLED TO A REASONABLE RETURN

On this point the Court said:

"The allegations of the bill, which for the present purposes must be taken as true, are ample to the effect that the enforcement of this ordinance will result in a deficit to the company. We cannot construe the exception of section five, having reference to existing franchise contracts, in such way as to modify the requirements of section four which in explicit terms fixes the fares for trips over two or more lines whether franchise lines or not, and limits the maximum fare without charge for transfers. This must be read in view of the definition of a continuous trip in section five as meaning a journey from one point to another point in the city whether the same is made on one car line or by means of transfers from car to car or from line to line. The exception in section five can have no further effect consistently with the other provisions of the ordinance, particularly section four, than to regulate fares where trips are wholly upon franchise lines.

"A principal ground upon which the bill was dismissed by the District Court was the view of the learned judge that the power to compel the company to remove its tracks from the streets involving the non-franchise roads included the right to fix terms of continued operation upon such lines, whether remunerative or not. We cannot agree with this view. In our opinion the case in this respect is ruled in principle by *Denver* v. *Denver Union Water Company*, 246 U. S. 178. In that case the franchise of a water company had expired, and the city might have refused the further use of the streets to the company. Instead of doing this it passed an ordinance fixing rates and requiring certain duties of the company. We held that in that situation the company was entitled to make a reasonable return upon its investment. So here, the city might have required the company to cease its service and remove its tracks from the non-franchise lines within the city. Instead of taking this course the city enacted an ordinance for the continued operation of the company's system, with fares and transfers for continuous trips over lines composing the system whether the same had a franchise or not. This action contemplated the further operation of the system, and fixed penalties for violations of the ordinance.

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*An Ordinance to fix and establish maximum rates of fares and charges which may be exacted and received by persons, corporations, or partnerships operating street railways for the carriage of passengers within the City of Detroit, and to fix a penalty for the violation thereof.

It is Hereby Ordained by the People of the City of Detroit:

Section 1. No person, partnership or corporation operating a street railway on the streets of the City of Detroit, for the carriage of passengers for hire, shall charge more than five cents for a single ride, or six tickets for 25 cents, per person for one continuous trip within the city over any line which is now operated or shall hereafter be operated without a franchise fixing the rate of fare.

Section 2. No such person, partnership or corporation shall charge a higher rate of fare upon any line now or hereafter operated under a franchise contract than is fixed by such franchise.

Section 3. Between the hours of five and six-thirty a. m. and four forty-five and five forty-five p. m. tickets in strips of eight for twenty-five cents shall be sold on all cars on all lines except where such sale would be contrary to the terms of a franchise contract, which tickets shall entitle the holder to the same rights between said hours as the payment of a five cent fare would.

Section 4. Where a trip is over two or more lines, whether franchise lines or not, the maximum fare shall be five cents, and no transfer fee shall be exacted which raises the total charge to more than five cents or six for 25 cents.

Section 5. A continuous trip means one journey from point to point within the city, whether the same is made upon one car or one line or by means of transferring from car to car or from line to line. Each such person, partnership or corporation, and the officers, agents, servants and employes thereof, shall, upon demand, furnish proper transfers to carry into effect the provisions of this section. The provisions of this Ordinance shall not be construed as an attempt to impair the obligation of any valid contract, but shall apply to and givern all such street railway passenger traffic in the city, except where the same is governed by the provisions of such contract.

Section 6. Any such person, partnership or corporation which shall violate the provisions of this Ordinance, or shall attempt to do so, and any officer, agent, servant or employe who shall order or direct any such violation or attempted violation of the provisions of this Ordinance, shall be guilty of an offense, and upon conviction shall be fined not to exceed five hundred dollars, or imprisoned in the Detroit House of Correction for not to exceed ninety days, or shall be both fined and imprisoned in the discretion of the court, for each violation.

Section 7. This Ordinance is passed for the public welfare in the case of an emergency involving the peace, health and safety of the people of the city, and it is ordered to take immdiate effect. It may be amended or repealed at any time by the Common Council of the City of Detroit. Unless so amended or repealed it shall remain in force for one year from August 9, 1918.

"By its terms the ordinance is to continue in force for the period of one year, unless sooner amended or repealed. This was a clear recognition that until the city repealed the ordinance the public service should continue, with the use of the streets essential to carry on further service. Within the principles of the *Denver* case this service could not be required without giving to the company, thus affording it, a reasonable return upon its investment. In the *Denver* case we said: 'The very act of regulating the company's rate was a recognition that its plant must continue, as before, to serve the public needs. The fact that no term was specified is, under the existing circumstances, as significant of an intent that the service should continue while the need existed as of an intent that it should not be perpetual.'

"In the present case the service upon the terms fixed in the ordinance is continued for a year, the city reserving the right to repeal the ordinance at any time.

"It is clear that the city might have taken a different course by requiring the company to remove its tracks from the non-franchise lines, it elected to require continued maintenance of the public service; doubtless because it was believed that it was necessary in the existing conditions in the city to continue for a time at least the right of the railway company to operate its lines. This amounted to a grant to the company for further operation of the system, during the life of the ordinance. For this public service it was entitled to a fair return upon its investment. Elements to be taken into consideration in valuing the property of the company in estimating a fair return are not involved in this case. If the allegations of the bill are true, and for present purposes they must be so regarded, the continued operation of the railroad system of the company upon the fares fixed in the ordinance will result in a deficit, and deny to the company due process of law within the meaning of the Federal Constitution.

"As rates of fare are fixed on some of the existing franchise lines at 5 cents without transfers, it would follow as to continuous trips over such franchise and non-franchise lines, such trips comprehending much of the transportation required, the latter lines would be without compensation for the service rendered. Furthermore, when a continuous trip begins on a non-franchise line and is over a franchise line and a non-franchise line, the former having the right to charge five cents for a trip over it, the effect would be to impair the obligation of the franchise contract. *Detroit United Railway* v. *Michigan*, 242 U. S. 252.

"In our view the allegations of this bill for the purposes of the demurrer sufficiently alleged violations of the Constitution of the United States in the action of the city in passing and enforcing the ordinance in controversy. The District Court should have entertained the bill, heard the application for a temporary injunction, and proceeded to a hearing and determination of the case in due course."

DISSENTING OPINION

In the dissenting opinion, presented by Justice Clarke, it was held that the ordinance did not require the company to operate its franchise lines at a loss, but it was an offer to the company of a right to operate its lines in the non-franchise streets, in which it had no rights, in conjunction with its other lines at what was alleged to be a non-compensatory rate for the entire system. The opinion of Justice Clarke also quoted, as applicable to the case, the language which Justice Holmes used in a dissenting opinion in the *Denver* case, already mentioned, as follows: "In view of that right of the city, which, if exercised, would make the company's whole plant valueless as such, the question recurs whether the fixing of any rate by the city could be said to confiscate property on the ground that the return was too low. . . . The ordinance of the city could mean no more than that the company must accept the city's rates or stop—and as it could be stopped by the city out and out, the general principle is that it could be stopped unless a certain price should be paid."

Some Additional Track Statistics

SINCE the publication of the statistics on new track constructed and track rebuilt in the statistical issue of January 4, reports have been received from seven additional railways as follows:

		New Single Track Mileage			Miles of Track Rebuilt	
Name of Railway	State	City Track	Interurban Track	Electrified Steam Road	City Track	Interurban Track
Bay State Street Ry.	Mass.	1.80	....	....	4.14	....
Galveston-Houston Electric Ry.	Texas		0.76	....	....	....
Houston Electric Co.	Texas	0.30	....	....	....	....
Illinois Light & Traction Co.	Ill.	....	....	....	0.76	....
New York Connecting R. R.	N. Y.	....	....	10.6	....	....
Philadelphia Rapid Transit Co.	Pa.	1.49	7.16	....	14.77	0.12
St. Paul Southern Electric Ry Co.	Minn.	....	....	....	....	9.00
Total		3.59	7.92	10.6	19.67	9.12

With these figures added to those previously published the total mileage for new electric railway track built in 1918 becomes 325.33, the electrified steam line mileage 286.3 and the total new electric mileage 611.63. The revised mileage of track rebuilt is 184.22.

Report on Tramways in Chosen, Corea

For the fiscal year ended March 31, 1917, according to the latest report of the Railway Bureau of the Government General of Chosen (Corea), the light railways and tramways opened to traffic totaled 84.4 miles, while those not yet open totaled 134.6 miles. The result of traffic on the operating lines was said to be very good. Private lines already in operation amount to 32.6 miles, while those not yet worked cover 34.7 miles. Since 1914 an annual subsidy sufficient to insure the payment of 6 per cent on the paid up capital, in case the net profit does not reach this amount, has been allowed to companies planning to lay down and work light railways, so as to encourage the development of the work.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

St. Louis Tax Adjusted

Agreement Reached Between City and United Railways for Payments Since Recent Court Decision

An adjustment of the United Railways mill tax suits, amounting to $2,300,000, was reached on Jan. 11 at a meeting of the Board of Estimate and Apportionment of St. Louis, Mo., composed of Mayor Kiel, City Comptroller Louis Nolte and Louis P. Aloe, president of the Board of Aldermen. Charles H. Daues, city counselor, represented the city, and Thomas H. Francis the United Railways.

Payments in Installments

The United Railways agreed that it would pay every dollar that it owes the city in mill taxes, including both principal and interest, and, also, a judgment against the St. Louis Transit Company for about $250,000. The obligations are to be paid in ten installments, with interest, amounting to approximately $250,000 a year. The company also binds itself to pay the mill tax in the future without contest as it falls due.

The company, it was stated, would go before the Circuit Court and contest judgment.

On April 4, 1903, a measure known as the mill tax ordinance became effective. This ordinance provided for a license tax of 1 mill per passenger on street railways doing business in St. Louis. The United Railways from the very beginning contested the validity of this tax, and litigation between the city and the company ensued, which ended, in so far as the original cases were concerned, by a decision of the Supreme Court of the United States in 1916 in favor of the city. As the result of this thirteen years' litigation the United Railways Company paid into the treasury of the city approximately $1,800,000. No tax has since been paid under the ordinance.

Another Suit Was Proposed

Immediately upon the final determination of the 6-cent fare case by the Supreme Court the Mayor instructed the law department to proceed to collect, if possible, the balance of the mill tax, not in judgment, and which amounts, in round figures, with interest, to $2,500,000. Suit for the major portion of this amount has been pending awaiting the fate of the rate case and was also passed awaiting the result of franchise compromise ordinances and settlements which were being suggested and proposed from time to time. Accordingly, the city counselor a few days ago made demand upon the company to file its answer in these cases so that steps could be taken by the city to force the tax claims under this ordinance to a judgment.

Seattle Wants Authority Established

A complaint has been filed in the Superior Court of the State of Washington, by F. A. Twichell, against the city of Seattle and the Puget Sound Traction, Light & Power Company, in which it is alleged that under present conditions the purchase of the railway property by the city from the traction company would be illegal. The plaintiff asks that the city and company be restrained by the court from proceeding with negotiations now under way to complete the purchase, and that a court injunction be issued forthwith. It is further alleged that the city, in making a part of the purchase contract a provision permitting the company to furnish power for the operation of the railway, has gone outside its jurisdiction. These actions are in final proceedings to establish the authority of the city to conclude the municipal ownership negotiations which have been under way for some months past.

Louisville Wages Again a Problem

The Louisville (Ky.) Railway and Amalgamated Association have been unable to agree on demands made by the men for a further increase of 7 cents an hour, with the result that the union has taken the matter up with the War Labor Board.

On Dec. 12 an ultimatum was sent to the company. The latter announced that the question would be discussed, and an answer returned by Dec. 23. The directors met on Dec. 20, but no report was made of the proceedings.

President Minary in a letter to the union stated that when the former labor schedule was arranged it was to have held until Jan. 1, when the union could reopen the question.

Mr. Minary calls attention to the fact that the company has been hoping to secure an increase in fares, but has been unable to secure any advance. Another increase in wages of 7 cents, or to a maximum of 45 cents an hour, is impossible under a 5-cent fare, with the present operating expenses. It is said that the company, aside from the considerations just mentioned, feels that the demands of the men are unjustified, particularly in the light of the lessened demand for labor in the war industries.

Service-at-Cost Now

Buffalo Veers Around from Municipal Ownership Talk to Cleveland Service Plan—Valuation Arbitration

An agreement has been reached between the International Railway and the municipal authorities of Buffalo, N. Y., whereby both parties will arbitrate the question of the valuation of the company's properties within the city of Buffalo. The valuation figures will be used in reaching an agreement between the company and the city modeled after the so-called Cleveland service-at-cost plan.

Valuation Board of Three

In an opinion issued by the city law department, it is held that one man should be selected by the company; one selected by the city and these two should agree upon a third man. There will be nothing to prevent any member of the board, on behalf of the party represented, from engaging experts to help in determining what is a just and reasonable valuation.

It is proposed that the company and the city shall be bound by the valuation made by the arbitration commissioners only to the extent that the award is to be used if an agreement is made. If the city decides the award is too high, it can reject the finding, and if the company believes the award is too low, it can reject the return. If an agreement is made, however, the award shall be the basis of it.

Attention is called by the city law department to the appraisal made for the city by John C. Brackenridge, New York, as of June 30, 1915, which fixes the physical value of the company's properties within the city at $18,013,808. The items entering this total, it is said, have been approved by H. E. Riexinger, the company's chief engineer, except that he claims the figures do not include contractor's profits. To this total Mr. Brackenridge has added for intangibles the sum of $2,620,925, making the total reproduction cost as of June 30, 1915, $20,634,733.

Control Plan Expected to Pass

It is generally believed that a resolution will be enacted by the City Council placing the International Railway under city control on a plan modeled after the so-called Cleveland service-at-cost plan, which has the approval of E. G. Connette, president of the railway. This resolution would also be subject to a referendum. It is proposed that the two resolutions be submitted to the electors at the same time at a special referendum.

Regulative Matters Discussed

New York Commission Points Out Limitations of Authority Under Existing Laws and Asks for Broader Powers

The Public Service Commission for the Second District of New York, in its annual report to the Legislature on Jan. 13 urged consideration by the Legislature of certain defects in the public service commissions law and recommended amendments to give the commission broader powers over questions of rates and service by public service corporation.

ADEQUATE RATES A MATTER OF NECESSITY

In this connection the commission says:

> It was undoubtedly the intention of the Legislature to provide in the Public Service Commissions Law for tribunals having the character, the ability and the facilities to determine the complaints, not only of consumers and patrons of the various public service corporations as to inadequacy and insufficiency of service, or undue profiteering in the rendition of service, or discrimination between individuals and the like, but recognizing that the public service corporations have legal and business rights, to afford them also a tribunal which should impartially inquire and if necessary give relief by way of increased rates.
>
> It is true that to a certain extent the incomplete and defective jurisdiction of the commission has been supplied by the waiver by certain cities and villages of franchise conditions, and by voluntary submission to the arbitration of the commission. These, however, are but temporary and makeshift devices and, in the judgment of the commission, neither it, nor the municipalities, nor the public service corporations, ought to be left to any such expedients. To carry a passenger, to transport property, to furnish a householder with light or heat, or with the means of communication by telegraph or telephone, is to render a useful and legitimate, in fact an indispensable service. To be able to receive an adequate compensation therefor is not only a matter of justice and fair play, but a matter of necessity. Unduly to profiteer in the rendering of any such service is an evil which should be prevented, and the Legislature has adequately provided for such prevention. But the Legislature has not provided reciprocally for needs which must arise for increased compensation.

The commission says that still another subject for legislative consideration is presented by a recent decision of the Court of Appeals to the effect that the commissions are without authority to require a corporation subject to their control to set aside from its operating revenues a specified amount to be credited to an account called "Accrued Amortization of Capital," which includes depreciation reserve.

ADEQUATE RESERVES ESSENTIAL

In this connection the commission says:

> It is scarcely open to argument that the commission cannot perform its duty of requiring public service corporations constantly to maintain facilities safe and adequate for the public service unless it may require, certainly before the payment of dividends and probably before the payment of interest, the setting up of an adequate reserve for replacements. Legislation which may confer upon the commission such power is urgently recommended.

The report states that abnormal economic conditions, precipitated by the war, affected the public utility corporations. At the same time, the acid test imposed has, according to the commission, brought into strong relief what is regarded as certain defects in the public service commissions law which should receive the immediate attention of the Legislature.

Reference is made to the action of the Federal War Labor Board in granting increases in wages to employees of public service corporations, advances in costs of fuel and structural materials and requests for approval of increased rates. The commission responded as well as lay within its power to the latter requests where the actual need was demonstrated by evidence after a hearing. Great confusion resulted, the commission reports, in a large number of cases from the fact that the Legislature had not conferred upon the commission the requisite power to give relief. It became plain that while adequate power over service had been conferred, together with plenary power to reduce rates, there was lacking a power to increase rates.

ROCHESTER AND BUFFALO CASES

The report says nothing is clearer than that a public service corporation, in order to render an adequate and satisfactory service, must receive a compensation which will enable it so to do. The commission is vested with adequate power to require adequate service and to reduce rates if it finds after investigation that they are excessive. But in the case of street railroads, whose maximum fare is fixed by franchise agreement or condition, it was held by the Court of Appeals in the Quinby or Rochester case that the commission is without power to increase a rate so fixed, no matter how great the need therefor may be in justice and in fact.

A similar ruling has been made by the Court of Appeals in the matter of the International Railway versus Rann where the maximum fares in Buffalo are fixed at 5 cents by the terms of the so-called Millburn agreement. The commission has never made any investigation as to the insufficiency of the 5-cent fare in Rochester or in Buffalo, having been prevented from doing so by the issue of a writ of prohibition in the Rochester case and by the knowledge of the decision of the Court of Appeals in the Buffalo case. The commission continues:

> Perhaps an investigation would disclose that the existing fares are sufficient; on the contrary it might show that they are insufficient. In the case of the International Railway, which operates in Buffalo and vicinity, the company claims that it is on the verge of bankruptcy by reason of insufficient fare, and there has been much local agitation concerning this claim. By reason of the decision in the Quinby case, however, there is apparently no authority or tribunal possessed of power to fix and determine a just rate of fare.
>
> It is immaterial whether a public service corporation is prevented from charging an adequate rate by statute, by a franchise condition, or by an independent agreement between the corporation and the municipal authorities. The public service commission law ought to be sufficiently broad to cover all questions, both of rates and service.

The Public Service Commission for the First District of New York, the activities of which cover Greater New York, confines its report to the Legislature very largely to a review of its construction and regulatory activities during the previous year. Any suggestions that it has in regard to legislation are embodied in bills which are presented direct at Albany. In its present summary to the Legislature the commission says that in point of value of transit lines placed in operation, 1918 was the banner year since the dual subway contracts were entered into in 1913. The cost to construct these lines was $103,000,000, exclusive of the cost of the equipment used on them. All the work for the coming year, however, is dependent upon such action as may be taken by the Board of Estimate & Apportionment, the report points out.

Dayton Wants Consolidation and New Franchise

In a letter to J. Sprigg McMahon, representing the electric railway at Dayton, Ohio, the City Commission has made known its desire that the various companies operating in that city be consolidated within six months, in order that more economical operation may be secured. Failure to comply will be taken as sufficient reason for taking over the properties by the city, the letter stated.

It was also announced on Jan. 8 that the city will ask the companies to accept an ordinance, providing for a straight 5-cent fare. This ordinance was to have been presented at a meeting of the commissioners on that date, but it was withheld because of the absence of the Mayor and City Attorney.

In connection with the desired consolidation, the city proposes that the roads give up their present franchises and accept one that will give the municipality greater regulatory power.

Service Control Rights a Problem

The Cleveland (Ohio) Railway ordinance must be extended by May 1, 1919, or the city will lose its right to control operation and the company will be free to put into operation the maximum rate of fare in order to accumulate a fund to insure its safety at the expiration of the franchise on May 1, 1934. The only right the city would have left during the intervening period would be police power to require adequate service.

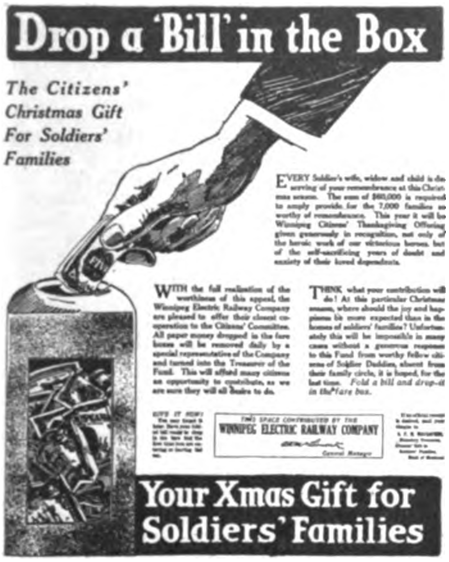
President Harry C. Gahn has suggested that in extending the franchise the grant be so amended that the rate of dividend to stockholders shall depend upon the rate of fare. If the rate of fare is low then the dividend shall be high and vice versa.

The city may, of course, exercise its right to purchase the property. The agreed price is the face value of the stock and bonds of the company plus 10 per cent. This would amount to approximately $37,400,000.

A Good-Will Message

General Manager McLimont of Winnipeg Boosts Christmas Offering for Soldiers' Families

A committee consisting of leading citizens of the city of Winnipeg, Man., on Dec. 9 started a campaign to obtain contributions to a fund to provide a "Citizen's Christmas Gift to Soldiers' Families" in Winnipeg. The committee wished to raise $60,000 by voluntary contribution, this sum to be divided among the soldiers' families in the city in accordance with the number of persons in each family, to provide Christmas presents for the children and Christmas cheer generally.


Drop a 'Bill' in the Box
The Citizens' Christmas Gift For Soldiers' Families
THIS SPACE CONTRIBUTED BY THE WINNIPEG ELECTRIC RAILWAY COMPANY
General Manager
Your Xmas Gift for Soldiers' Families

WINNIPEG RAILWAY'S APPEAL

A. W. McLimont, general manager of the Winnipeg Electric Railway, took an active interest in the campaign from its inception. The company's donation to the fund took the form of an expenditure amounting to $1,000 in advertising for donations. Mr. McLimont originated the plan of asking the public to "drop a bill in the fare box" for the Christmas fund. One of the ads run in the daily newspaper is shown herewith.

PLACARDS PLACED IN CARS

Placards similar to the ad were also posted in the company's cars. One of these posters was signed jointly by the Mayor of Winnipeg and Mr. McLimont. The company issues a paper each fortnight, 40,000 copies of which are distributed free on the cars, and the leading article of Dec. 16 issue was devoted to the campaign.

All members of the general committee comprising 200 leading citizens received copies of this issue of the *Public Service News* sent by the secretary of the committee.

The street cars in Winnipeg are equipped with protruding fenders, and a large banner requesting citizens to "drop a bill in the fare box" was placed on each fender. A full sized billboard was also erected on each side of a car and this car was operated during the rush hours through the principal streets of the city.

It was not expected that any substantial amount would be realized from the fare box collections, owing to the fact that the principal source of revenue for the fund was big contributions from the businessmen of the city. The rank and file of the general public, however, responded very generously to the appeal to place their money in the fare box and more than $1,000 was realized from this source, in addition to an order for a load of wood, Victory Bond coupons, etc. The employees of the company contributed $400 to the fund.

The newspapers of the city and the thousands of soldiers' families commented very favorably on Mr. McLimont's action in getting behind the Christmas gift fund. Mr. McLimont feels that the employees of the company have greatly benefited from being privileged to participate in the campaign and that working with other citizens in this way has been in mutual interest.

B. R. T. Message to Ex-Soldiers

The Brooklyn (N. Y.) Rapid Transit Company has established two bureaus where information and guidance may be obtained by men now in the military service with respect to employment opportunities available to them in all its departments.

One of these bureaus, known as the Borough Hall branch, has been established at 185 Montague Street, in the heart of the business district of Brooklyn. The other is at 438 Fulton Street, Jamaica, two minutes' walk from the Long Island Railroad. The Jamaica bureau was opened on Dec. 16. This bureau especially is handy of access by men in the camps on Long Island and a large number of soldiers from Camp Upton and Camp Mills who had either just been discharged or were about to receive discharges have already applied there for information concerning opportunities in the company.

The Montague Street branch and the regular employment bureau at 40 State Street have also received calls from many sturdy and intelligent ex-soldiers and ex-sailors.

An attractive little leaflet entitled "A Greeting and an Opportunity for the Men of Our Victorious Armies Returning From Overseas, From the Brooklyn Rapid Transit System" has been widely distributed where it will be most apt to reach discharged soldiers and sailors.

This leaflet briefly tells of the opportunities of employment with the company and gives the necessary directions to reach the information bureaus from Camp Dix, Camp Merritt, from the New York City Hall, from Camp Mills, Camp Upton and from the Long Island station at Flatbush and Atlantic Avenues.

The leaflet is 4 in. wide by 6 in. high. It contains four pages very artistically displayed typographically.

New Commission Bill Introduced

The bill outlined by Governor Smith of New York in his message to provide for the reconstruction of the Public Service Commission in New York City was introduced in the Senate on Jan. 9 by James A. Foley, minority leader, and in the Assembly by Charles B. Donahue.

The measure follows closely the Governor's recommendation that the present commission be abolished. It provides for the repeal of the present section of the public service commission law fixing the number of commissioners for the First District at five, and substituting a new section which provides that there shall be one commissioner, whose term shall be five years, and a transit construction commissioner to be appointed by the Governor with the consent of the Senate, for a like period.

Under the terms of the bill the single commissioner is to be concerned only with the regulation of public service matters, while the transit commissioner is to confine his entire time to construction work. This commissioner is to receive $15,000 a year and have the appointment of not more than four deputies at $7,500 a year each, one of whom may exercise the powers of the commissioner. The transit construction commissioner must be a resident of New York City, is to receive $15,000 a year, and is to have all the powers of the old Rapid Transit Commission.

The new Governor of New York is a democrat. There is naturally much speculation as to what attitude the republican Legislature will assume toward the measure.

Short Milwaukee Strike

A strike of the employees of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., which went into effect at 6 a.m., on Jan. 1, was declared off the evening of the same day, pending an effort by a committee of business men to have the Wisconsin Railroad Commission settle the controversy over the matter of an increase in fares. The company has maintained that it could not increase the pay of its employees out of its present earnings.

The employees' association had the books of the company examined by their accountants, who reported that the company was unable to pay increased wages without an increase in fares. The employees' association presented these facts to the Railroad Commission and the Governor, both of whom promised action before Jan. 1. The commission and the Governor declined to intervene and the strike went into effect as scheduled by the employees' association. The commission promised the Association of Commerce that it would make a prompt investigation of the allegations of the company and the employees and make the finding of the facts at the earliest practicable date. The findings in the report made for the employees' association were referred to in this paper for Jan. 11, page 117.

Meeting an Emergency

Publicity Plays Prominent Part in Putting Patrons in Possession of Plans Made for Their Benefit

The interurban cars of the Indianapolis & Cincinnati Traction Company were recently cut off from reaching the terminal station and business section of Indianapolis because of the collapse of the Virginia Avenue viaduct. Arrangements were quickly made for meeting the emergency thus presented, and the public was informed of the changes made in an advertisement, set across three columns, published in all the papers in the territory served by the railway. This ad the company reprinted in dodger form and hung copies of it in the cars on strings so they would be readily available to the public. The ad tells its own story. It is reproduced herewith.

QUICK WORK

INDIANAPOLIS & CINCINNATI TRACTION COMPANY

On January 6 the Virginia Avenue Viaduct in Indianapolis, a very old structure, gave way completely, cutting off our interurban cars from the Terminal Station and the main business part of the city. A temporary arrangement for handling passengers on both sides of the viaduct, carrying them on city cars to and from Keystone Avenue, was at once inaugurated. The freight was handled by us on auto trucks between the city freight house and our junction on Southeastern Avenue, at which point our freight cars were loaded and unloaded.

Much quicker than seemed at all possible the Indianapolis Traction & Terminal Company constructed a temporary loop at Louisiana Street, near the viaduct, and had it ready for use the morning of Jan. 9, and our passenger cars then began operating up to and around that loop.

In conjunction with the Interstate Public Service Company we secured from the Indianapolis Board of Public Works authority for the Traction & Terminal Company to construct a temporary track from Virginia Avenue over Louisiana Street to Alabama Street, thence on Alabama Street to South Street, thence on South Street to Delaware Street, there connecting with tracks already laid on South Street, over which to operate our cars to Kentucky Avenue and thence by Kentucky Avenue and Capitol Avenue to the Terminal Station. The city company, with wonderful management and energy, notwithstanding it was mid-winter, pushed this work with such speed that on Monday morning, Jan. 13, we commenced operating our cars, both freight and passenger, over it and into the Terminal Station.

We are pleased to call the attention of the public to this highly commendable handling of a very difficult situation. It was all done in a week's time.

Patrons of our road can now travel from any point on our lines to the Terminal Station in Indianapolis and can ship freight and express without transfer or delay of any kind.

We are proud of our people, and those of the other companies co-operating, for what they have done and what they have accomplished.

Until the steam road track elevations are completed over Virginia Avenue, our cars, both passenger and freight, are to operate into Indianapolis from Virginia Avenue over the South Street and Kentucky Avenue route, occupying only a few minutes longer than by the old route. When the track elevation is completed we will again run in by the old route on Virginia Avenue to Delaware Street.

We want to thank our patrons for their kind co-operation and good natured patience during these few days of troublesome and inconvenient operation.

RAILWAYS EXPLANATION TO ITS PATRONS

News Notes

Detroit Hearing Again Postponed.—The session of the War Labor Board in Washington to take testimony in the case of the women conductors on the lines of the Detroit (Mich.) United Railway, set for Jan. 14, has again been postponed. The new date is fixed at Jan. 18 at Washington.

Commission Refuses to Approve Lease.—The Public Service Commission of Pennsylvania on Jan. 15 announced that it had decided not to sanction the agreement entered into by the Philadelphia Rapid Transit Company for the joint operation of the municipal lines in Philadelphia and those now operated by the company.

Tacoma Again Operates Its Municipal Lines.—On Jan. 1 the city of Tacoma, Wash., through the Department of Public Works, took over the operation of the municipal tideflats car line, which has been operated by the Tacoma Railway, Light & Power Company under contract. There is now a deficit of $20,000 accumulated against the line, which Commissioner H. Roy Harrison believes can be turned into a surplus. The saving, it is said, will come in the operation of the line with a reduction in overhead expense; by more thorough methods of fare collection and by economy in management in other directions.

Votes to Revoke Railway Grants.—The City Commission of Jersey City, N. J., has adopted an ordinance revoking fifteen franchises granted by the muncipality to subsidiaries of the Public Service Railway on the ground that they were granted originally upon condition that not more than 5 cents should be charged for a continuous ride. The 7-cent fare case is now pending in the Court of Errors and Appeals. It is expected that an appeal will be taken by the railways in certiorari proceedings. In the meantime cars will run as usual and 7-cent fares will continue to be collected of the subway.

Bursting Water Main Ties Up Subway.—The Broadway subway in New York city operated by the New York Municipal Railway (B. R. T.) was flooded from 5 a. m. on Jan. 12 to 2.30 p. m. on Jan. 13. A torrent of water estimated at 3,000,000 gal. rushed into the subway at Fourteenth Street from a bursted 36-in. Catskill Aqueduct main. When completed this main will pass over the subway at that point, but due to the unfinished work the subway was open for the water to rush in. The water first entered a 60 ft. cut in the unfinished "Fourteenth Street" crosstown line which passes under the Broadway subway at that point. This was completely flooded and in the Broadway subway the water extended as far north as Twenty-eighth Street. At some places the water was 4 ft. over the tracks. Powerful machine pumps, fire department engines and a newly constructed pump car of the Brooklyn Rapid Transit Company were rushed into use. It took three hours to locate the break and shut off the water

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Programs of Meetings

A. S. M. E.

The American Society of Mechanical Engineers has selected tentatively the dates June 17 to 20 for the spring meeting which will be held at Detroit, Mich.

M. C. B. and M. M. Convention

The Master Car Builders' Association and the American Railway Master Mechanics' Association will hold their convention this year in Atlantic City, N. J., June 18-25. This will be the first convention of these associations since 1916, meetings having been abandoned during the war. This year the associations expect to have a convention of the old-fashioned kind with a full exhibit. An invitation will be extended to all foreign trade bodies now represented in this country, and through the embassies at Washington all foreign nations (exclusive of the Central Powers) will be invited to send representatives. The railroad administration at Washington has approved the meeting.

American Wood Preservers' Association

The fifteenth annual meeting of the American Wood Preservers' Association will be held in St. Louis, Mo., on Jan. 28 and 29, with headquarters at Hotel Statler. Among other topics treated will be the zinc chloride and creosote oil situations, and a paper will be presented: "The Transition from Creosote Oil to Zinc Chloride in the Treatment of Cross Ties." Another paper will be one on "Developments of Uniform Practices in Procuring and Preserving Cross Ties," by John Foley of the Forest Products Section of the United States Railroad Administration. A number of committee reports will be presented, including those on preservatives, purchase and preservation of treatable timber and non-pressure treatments.

Financial and Corporate

Chicago Elevated Noses Out

Revenue Gains Beat Rise in Operating Expenses and Taxes by a Small Margin

Despite higher operating costs, due to wartime conditions and other causes, the elevated lines in Chicago were able in the fiscal year ended June 30, 1918, to increase their net income by the slight amount of $9,798, or about 0.7 per cent. Such is the showing indicated in the latest annual report of the Chicago Elevated Railways Collateral Trust, which controls the South Side Elevated Railroad, the Northwestern Elevated Railroad and the Metropolitan West Side Elevated Railway.

The gain in net was due to the increase in gross operating revenues by $487,251 or 5.2 per cent, this gain not being completely offset by the rise in operating expenses and taxes. Operating expenses jumped up $403,491 or 8.3 per cent, and taxes, etc., $69,074 or 8 per cent.

COMPARATIVE INCOME STATEMENT OF CHICAGO ELEVATED RAILWAYS FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Gross operating revenue	$9,777,164	100.0	$9,289,913	100.0
Operating expenses:				
Way and structures	$284,458	2.9	$212,692	2.3
Equipment	593,113	6.1	523,156	5.6
Power	1,133,841	11.6	1,155,093	12.4
Conducting transportation	2,806,136	28.7	2,407,088	25.9
Traffic	21,185	0.2	27,677	0.3
General and miscellaneous	389,244	3.9	498,777	5.4
Total operating expense	$5,227,977	53.5	$4,824,486	51.9
Net operating revenue	$4,549,187	46.5	$4,465,427	48.1
Taxes, city compensation and other items	932,408	9.5	863,334	9.3
Operating income	$3,616,779	37.0	$3,602,093	38.8
Non-operating income	*150,490	1.5	* 151,589	1.6
Gross income	$3,767,269	38.5	$3,753,682	40.4
Deductions—interest and rents	*2,390,451	24.4	*2,386,662	25.7
Net income	$1,376,819	14.1	$1,367,020	14.7
Dividends	1,198,394	12.3	1,176,345	12.6
Surplus	$178,423	1.8	$190,675	2.1

*Inter-company rentals deducted.

It should be noted, however, that the foregoing figures are applicable to the period when wages were considerably lower than at present, for the increases granted by the War Labor Board dated from Aug. 1, 1918. Moreover, the gain in net income during 1918 was less than that during the preceding fiscal year, for in the year ended June 30, 1917, the net income was $100,902 or 7.9 per cent higher than in the year before.

The annual report of the Chicago Elevated Railways Collateral Trust, which is for the calendar year 1917, shows gross income of $1,387,682, compared with $1,372,475 in 1916. Total disbursements, chiefly for interest, amounted to $1,362,178, leaving a surplus for dividends of only $25,503, compared with $123,801 the preceding year. All the year's surplus and slightly more was absorbed by a charge of $26,100 for expenses incidental to extension of the $7,000,000 of secured gold notes, dated July 1, 1914, and miscellaneous debits.

Receiver for Spokane & Inland Empire

On petition of the First Trust & Savings Bank, Chicago, Ill., Federal Judge Cushman at Tacoma has named F. E. Connors, Chicago, receiver for the Spokane & Inland Empire Railroad, Spokane, Wash. Losses of the company for the last six months have averaged $10,000 monthly. Waldo G. Paine, vice-president of the company, said:

"Decreasing revenue made it impossible to pay interest on our bonds any longer. The influenza ban hit us hard. Where ordinarily the income reaches $1,400 daily it has gone down to $700 to $800 daily. The bondholders have demanded their money and say it is their intention to get it if they have to junk the system."

A writ of subpena in chancery was served on Mr. Paine. The company has twenty days in which to appear and answer allegations in an original bill of foreclosure. The issue on which the court action is based is the $15,000,000 authorized first and refunding mortgage 5 per cent bonds of the Spokane & Inland Empire Railroad, of which $2,699,500 are outstanding. This issue was dated May 1, 1906, is due May 1, 1926, and the trustee is the First Trust & Savings Bank, Chicago, Ill. Preceding this issue there are outstanding $422,000 of first mortgage 5 per cent bonds of the Coeur d'Alene & Spokane Railway, $96,000 of first mortgage 5 per cent bonds of the Spokane Traction Company and $201,500 of first mortgage 5 per cent bonds of the Spokane Traction Company.

The railway system includes city and suburban lines of more than 290 miles.

Mr. Connors as receiver has issued a circular announcing that the former executive officers of the company will be retained in their present positions while he is in charge.

Higher Fares Help Lexington

Company Reports Steady Improvement in Traffic with No Complaint at Increased Rates

The gross earnings of the railway department of the Kentucky Securities Corporation, Lexington, Ky., during the fiscal year ended June 30, 1918, showed an increase of $22,236 or 4.1 per cent. This gain reflected in part the generally satisfactory business conditions in the company's territory but in the main the higher average rates of fares. Because of the advance in operating costs, however, the net earnings of the railway department fell off $15,789.

The number of passengers carried, including transfers, was as follows:

	Year Ended June 30		
	1918	1917	1916
Lexington city lines	3,959,734	4,507,286	4,389,905
Interurban lines	1,660,133	1,599,197	1,482,881
Other cities	426,624	438,324	497,054

In comparing the number of passengers carried, as shown above, the decrease on the Lexington and city lines and the small increase on the interurban lines were mainly due to the restricted movement of cars during December and January, when there was unprecedented weather throughout the entire country. It is said that conditions for some time have been normal and indicate a steady improvement in the number of passengers carried with practically no complaint at the higher fares.

INCOME STATEMENT OF KENTUCKY TRACTION & TERMINAL COMPANY AND AFFILIATED COMPANIES FOR YEAR ENDED JUNE 30

	1918	1917
Operating revenue	$1,021,448	$912,540
Operating expenses	605,274	480,265
Net operating revenue	$416,174	$432,275
Miscellaneous income	45,180	39,289
Gross income	$461,354	$471,564
Taxes, rentals, etc.	73,449	46,462
Net income	$387,905	$425,102
Interest on bonds	229,006	218,034
Surplus for dividends	$158,899	$207,068

The fixed charges of the companies in the system have increased $43,546 during the last year. This is accounted for by a 30 per cent increase in taxes, a 5 per cent increase in interest, and twelve-months' rental of leased property in comparison with only two-months' rental in the preceding year. A comparative income statement of the Kentucky Securities Corporation, exclusive of inter-company charges, is shown in the accompanying table.

During the year just ended the operating companies spent $240,270 on new construction. Additions to the railway department required $16,694 of this amount, and paving for the railway department $21,188. Of the total expenditures 97 per cent was spent up to Jan. 1, 1918, and the remainder during the last six months of the fiscal year.

B. R. T. Receiver Confirmed

Federal Judge Denies Present Advisablity or Necessity for Co-Receiver for City or Commission

Judge J. M. Mayer in the United States District Court on Jan. 15 denied the applications of the Board of Estimate and Apportionment of New York City and of the Public Service Commission for the First District of New York for additional receivers to administer the affairs of the Brooklyn Rapid Transit Company. He made permanent, however, the appointment of Lindley M. Garrison as sole receiver. Mr. Garrison's temporary appointment was made on the last day of 1918.

CO-RECEIVER NOW MIGHT DESTROY EFFICIENCY

Counsel for the city and the commission urged that the city's investment in the rapid transit system warranted the appointment of a co-receiver, but there were evidences of dissension between them as to which body should be allowed to represent the public and who should be appointed as receiver. Judge Mayer stated that a time might come in working out the financial future of the company when the aid of a receiver representing at that time the "united view of the public authorities" might be of great service, but he thought that any co-receivers at present would destroy the efficiency of the receivership.

In this connection Judge Mayer indicated pointedly that a receiver is simply a representative of the court; that private owners in the case of a receivership cannot settle affairs outside without submitting their settlement to the judgment of the court, and that the duty of the court is to conserve and operate the property under existing contracts without favoring any faction or interest. He added that the court is entitled to a singularity of purpose in a receivership, and that a co-receivership now in the B. R. T. case "might transfer from a forum outside the receivership and the court the controversies which might properly be settled at some place and time other than by court."

Judge Mayer added that Mr. Garrison, besides being personally acceptable to all parties in the present case, is peculiarly fitted by training and experience to act as receiver. From 1904 to 1913 he was vice-chancellor of New Jersey, being in that capacity connected with a court of equity second to none in the country.

RECEIVER REVIEWS COMPANY'S AFFAIRS

Mr. Garrison presented to Judge Mayer a preliminary report on his receivership covering a survey of the finances, general resources and obligations of the company, its rapid transit lines in operation and their equipment; and lines under construction by the city. The report also discussed the organization of the various departments of the company, the functions of each, the salaries paid to officials and department heads, and the cost of conducting each department. The receiver summarized the terms of the contract between the New York Municipal Railway Corporation and the city of New York, and discussed the present status of the contract obligations on both sides, and those items of the contract already fulfilled.

Obligations yet to be fulfilled were given as follows:

There are yet to be furnished and supplied by the New York Municipal Railway Corporation the following things, which it is estimated will cost approximately $10,000,000 exclusive of taxes, discount and interest during construction, the amount of which is chargeable to cost under the subway contracts, but cannot be determined definitely in advance. Neither do the figures include possible purchases of real estate or abutting property owners' damages on account of elevated railroad obstruction.

Completion of equipment of city railroads for "initial operation" (includes 100 additional cars not yet delivered)	$5,500,000
Completion of additional tracks on extensions of existing railroads	2,500,000
Reconstruction of existing railroads (includes yard at Coney Island and Thirty-sixth Street inspection shed if not furnished by city)	2,000,000
	$10,000,000

In respect to the above, obligations outstanding on account of work now under way or contracted for will call for approximately $5,000,000, which will be payable at monthly intervals within the next ten months in amounts of approximately $500,000 a month.

Included in the above total of $10,000,000 are items aggregating approximately $3,000,000, the expenditure of which will probably not be required until after July 1, 1920.

The report recommended that provision be made as soon as possible for 400 or 500 new steel motor cars, to cost approximately $20,000 each.

CHIEF DIFFICULTY IS LACK OF CASH

Work that remains to be done by the city, including the extension and construction of rapid transit lines, includes 47 miles of track out of a total of 115, and 19 miles of road out of a total of 41, of the lines which the city assumed to construct and which the company agreed to equip and operate.

The chief difficulty of the Brooklyn Rapid Transit Company at present was described as "lack of cash." Dividends on stocks of companies owned have been reduced or entirely suspended, the constituent companies are in arrears in payment of interest on their certificates of indebtedness, and the New York Municipal Railway Corporation has failed to pay the interest due Jan. 1 last on its bonds, most of which are owned by the Brooklyn Rapid Transit Company.

Under the heading "Increased Costs of Labor, Material and Supplies" it was stated that the receivership companies have suffered greatly from these causes. Taking the month of November, 1918, as a basis for the entire year, the increase for the fiscal year ending June 30, 1919, as compared with the fiscal year ending June 30, 1916, would be:

	1919	1916	Increase
For labor	$15,498,229	$11,324,998	$4,173,232
For fuel	3,190,874	1,422,606	1,768,068

Marked increase in the cost of material was also noted.

The effects of higher costs generally throughout the system were graphically set forth in a statement for the five months ended Nov. 30, 1918, compared with the same months of 1917, which shows that in these months the system earned only $318,729 over all charges, whereas in the corresponding period of 1917 it earned $2,395,750—a falling off of $2,077,021 or 86 per cent.

The financial requirements for the immediate future for the three receivership companies were given as follows:

NEW YORK MUNICIPAL RAILWAY CORPORATION	
For construction and equipment work now under way pursuant to city contracts, and payable at intervals during the next ten months	$5,000,000
Interest chargeable to construction to Jan. 1, 1919, and unpaid	809,500
Sinking fund due Jan. 1, 1919	190,500
BROOKLYN RAPID TRANSIT COMPANY	
Bills payable to banks and trust companies	3,350,000
Additions to power facilities (mostly under contract and payable within the next six months)	1,453,000
(Most of this work is being done by the B. R. T. as agent for the Broklyn Heights Railroad, and the cost will eventually be repaid by the latter company, but the facilities are needed to enable the B. R. T. to carry out its contract for furnishing power.)	
Purchase of fifty trailer cars with appurtenances (as agent for surface railroad companies)	417,000
NEW YORK CONSOLIDATED RAILROAD COMPANY	
Interest due Feb. 1, 1919, on underlying bonds	540,000
Conversion of surface cars for trailer operation (as agent for surface railroad companies)	200,000
Replacement of storage and dock facilities required by government's requisition of existing facilities, about	50,000
(Partly chargeable to constituent companies)	
Interest on 7 per cent notes due Jan. 1, 1919 and unpaid	2,020,725
Principal on 5 per cent notes due July 1, 1918	505,000

Financial requirements for the more remote future of the New York Municipal and the B. R. T., totalling $6,208,000 were also given.

In regard to the claims arising from the accident on the Brighton Beach line, Mr. Garrison said that provision will have to be made for raising money to meet these claims if they are to be paid. Damages still accruing on account of this disaster will probably total $1,100,000.

Mr. Garrison went into the matter of the welfare activities of the company. The amount for this work charged to the companies of which he is receiver was $52,604 last year. He recommended the continuation of the work.

Receiver for New Orleans Company

Abnormal Operating Cost and Persistent Public Attacks Destroyed Credit of Railway, Says President Curran

The United States District Court at New Orleans, La., has appointed J. B. O'Keefe receiver of the affairs of the New Orleans Railway & Light Company. The action was taken at the instance of the board of directors through a creditor company.

PRESIDENT CURRAN EXPLAINS

In explaining this action on the part of the directors D. D. Curran, president of the company, issued the following statement:

> This action was taken by the board of directors because of the fact that it has been found impossible to meet operating costs, taxes and fixed charges with the present inadequate revenues. During the year 1918 this company fell short of earning operating expenses, taxes, and fixed charges by approximately $1,000,000, by reason whereof the company was unable to meet the interest due on Jan. 1, 1919, on its bonds, and therefore had to avail itself of the days of grace provided by its mortgages.
>
> The company's present condition has been brought about by abnormal increases in operating costs, resulting in part from the excessive wage scale imposed upon it by the National War Labor Board and in part from the increased cost of supplies and materials used in and necessary for its operation. Furthermore, by reason of the persistent public attacks upon the company, its credit has been destroyed to such an extent that the continued operation of the properties was threatened and the interest of the public, as well as of the security holders of the company, could best be safeguarded by placing the property in the hands of the court, to be readministered and conserved in the interest of all parties.

The troubles of the company began to multiply early in 1918. Having certain maturities coming due on June 1 it applied to the War Finance Corporation for a loan. In its appeal the company was backed up by the Mayor and other city officials, who said that such an advance as the company had requested was necessary to prevent interruption of railway service. The War Finance Corporation refused, however, to make the loan unless the city agreed to put a fare increase into effect at once. To this the city assented and in the belief that the city would carry out its promise the corporation advanced $1,000,000 to the railway.

After two months had elapsed the War Finance Corporation called upon the city to act in the matter. Labor started to protest against the fare advance. Thereupon the National War Labor Board, which had passed upon wages in New Orleans, announced that where organized labor opposed advanced fares recommended by the board in connection with increased wage awards to employees of public utility companies, the entire award would be suspended.

FARES FINALLY ADVANCED

Meanwhile the Commission Council of the city passed the ordinance advancing fares. Labor then carried its case to Judge Cage in the Civil District Court of Louisiana in New Orleans and sought an injunction. He ordered the officers of the company to appear in court on Oct. 16 and show cause why the plea of labor to restrain the advance should not be granted. After several postponements the case finally came up for trial on Nov. 14. On Nov. 24 Judge Cage declared the 6-cent fare ordinance enacted by the Commission Council and put into effect by the company was legal and refused the injunction to prevent collection of the increased fare. The decision of the court in this case was reviewed in the ELECTRIC RAILWAY JOURNAL for Dec. 7, page 1027.

This did not still the opposition to the company, however, and late in December the Board of Public Utilities, acting upon the advice of Attorney General Coco, laid the foundation for a test suit to determine the power and authority of the board to regulate the public service corporations of the city by adopting a resolution abrogating and annuling the increase in fare and the advance in rates for gas and electricity and ordering the restoration of the old rates.

CITY MAKES SURVEY

Shortly after the appeal of the company to the War Finance Corporation for financial assistance Mayor Behrman directed E. E. Lafaye, commissioner of public property, to proceed at once to make a full survey of the property and affairs of the company and to employ such assistance as he might deem necessary. Mr. Lafaye's report was made public on Jan. 1. His recommendations have been summarized as follows:

> That the New Orleans Railway & Light Company be completely reorganized and recapitalized.
>
> That the Cleveland plan be adopted of adjusting rates charged by the company on a sliding scale, according to the company's earnings.
>
> That the Commission Council be given authority to fix these rates.
>
> That Mayor Behrman, Commissioner Glenny and Mr. Lafaye withdraw from the directorate of the New Orleans Railway & Light Company.
>
> That $38,000,000 be accepted as the present valuation of the company and that this figure be the one on which future earnings of the company shall be based.
>
> That on this valuation the company be permitted to earn 5 per cent in 1919, 6 per cent in 1920, and 7 per cent in 1921, the latter figure thereafter being the maximum earning power of the company.
>
> That the highest total recapitalization allowed when the company is reorganized should not exceed $45,710,400, thus eliminating entirely the existing preferred and common stocks of the company, which amount to $29,816,600.

Neither Mr. Lafaye's recommendations nor the report of E. W. Ballard & Company, retained by Mr. Lafaye as appraisal engineers and advisers to assist Mr. Lafaye in formulating his conclusions hold out any hope for relief from 6-cent carfares and the recent 30 per cent increase in electricity and gas rates.

Under Mr. Lafaye's plan of supervision of the New Orleans Railway & Light Company, the Commission Council would fix the service rates to be charged by the company. The rates would be on a sliding scale, to be lowered automatically when the earnings of the company reached a certain mark, or to be raised automatically when the company's earnings fell off.

For this purpose the Commission Council would receive weekly reports on the conditions and earnings of the company from the city government's own auditors. This adjustment of rates, so far as gas and electricity are concerned, would be made monthly. Changes in fares would be made from time to time as justified.

EXPERTS DISAGREE

Mr. Lafaye's report to the Council showed there was considerable difference of opinion between the company, Mr. Ballard, and himself as to the value of the company's properties.

Mr. Ballard fixed the actual cost value of all physical properties of the company at $36,294,413. The company accepted this figure as a base and from it built up a valuation of $52,188,205. Mr. Ballard, on the other hand, due to depreciation, maintained that the value of the property was $32,739,193.

Mr. Lafaye believed Mr. Ballard's figure to be too low and called in General George W. Goethals as referee. General Goethals valued the property at $44,816,000. Thus Mr. Lafaye's valuation of $38,000,000 is higher than Mr. Ballard's and lower than that of the company or General Goethals.

COMPANY'S FIGURE $50,000,000

George H. Davis of Ford, Bacon & Davis, in a communication to the New Orleans Railway & Light Company, dated Aug. 16, 1918, stated that in his judgment the physical value of the properties of the company was in the year 1914 about $40,000,000 and that the physical value represented only about 75 per cent of the total actual value. Thus the full value, according to Mr. Davis, would be $50,000,000.

In commenting on this figure Mr. Lafaye said:

> While it is true that the interests of the firm of Ford, Bacon & Davis have been identified with these and other similar properties in this country, both the firm, as a firm, and Mr. Davis, personally, are among the eminent engineers of this country, and such statements are not made without some basis in fact.

Trustees for Bay State

The Bay State Street Railway, Boston, Mass., has accepted the service-at-cost act, passed by the Legislature of 1918, and on Jan. 15 filed with the Secretary of the Commonwealth, as required by that act, a notice of its reorganization under the name of the Eastern Massachusetts Street Railway.

Immediately after being informed of the action of the company, Governor Coolidge sent to the Council the names of the following men to serve as trustees for a period of five years: Homer Loring, Boston; Isaac Sprague, Wellesley; Frederick J. Crowley, Lowell; Earl P. Charlton, Fall River and Arthur G. Wadleigh, Lynn.

The trustees will take office on Feb. 1.

Changes in Columbus

New Officers and Directors Elected for Columbus Railway, Power & Light Company Following Recent Contest for Control

The contest between the stockholders' protective committee and the Clark interests in the Columbus Railway, Power & Light Company, Columbus, Ohio, came to an end on Jan. 10, when five of the representatives and supporters of the E. W. Clark Management Company resigned as directors.

SIX NEW DIRECTORS

The new directors are R. H. Platt, A. S. Hammond, Walter B. Beebe, Emil Kiesewetter, Samuel Ungerleider and F. R. Huntington. Mr. Huntington was chosen to succeed Adolph Theobold, whose death occurred recently. The retiring directors are Clarence M. Clark, R. S. Warner, Samuel G. McMeen, E. R. Pomerene and Carl J. Hoster. Those who held over are Charles L. Kurtz, D. Meade Massie, Norman McD. Crawford, W. C. Willard, W. A. Gill and E. K. Stewart. There was no desire to prevent Mr. Crawford and Mr. Stewart from being represented.

On motion of C. M. Clark at the directors' meeting on that date the contract with the Clark Management Company was abrogated, so far as it pertains to management and the fiscal agency, although its connection as engineer and builder of the Walnut Creek power house, is still in force.

On the previous day the company resumed its franchise and the old rate of fare of eight tickets for a quarter. It had been rumored that the company would go back to this rate of fare, but nothing was actually known about it until this action was taken.

REORGANIZATION ON JAN. 9

The reorganization was brought about on the evening of Jan. 9, after a long conference between the members of the stockholders' protective committee and the representatives of the Clark interests. This committee made the fight apparently to protect the company and put it in a position where it can have the needed relief, which did not seem to be forthcoming, because of the character of the contest that had arisen between the management and the City Council. To a large extent this condition may rest upon the shoulders of the City Council, but it existed, and the reorganization seemed to be the only way out.

Charles L. Kurtz was chosen president to succeed Samuel G. McMeen. Samuel Ungerleider was chosen vice-president, and Harold W. Clapp was retained as general manager.

The hearing in the receivership case, which was begun during the previous week before Common Pleas Judge Kinkead, is regarded to have hastened the reorganization. During the proceedings on Jan. 9 Judge Kinkead said: "The railway, having broken its contract, was a trespasser in the city streets and subject to an action by the city to forfeit its franchise and the use of the streets. The only way in which the company can extricate itself is for it to go back and voluntarily perform its contract."

In reality this is what has been done and at the same time the management has been localized. It is the hope of the present officials that this change will meet with the approval of the city officials and the City Council and that some step will now be taken to provide a rate of fare sufficient to take care of the increased expenses, due to the exigencies of war, until some permanent settlement plan is reached.

The old management endeavored to secure a new contract with the city that would provide for operation at cost. The City Council gave no heed to this plea, and twice refused a request for a temporary increase that would take care of growing expenses until some definite plan could be made. When it appeared that an increase must be had or let the company go into the hands of a receiver, the management in August, 1918, renounced its franchise and advanced fares from eight tickets for a quarter to straight 5 cents.

Many people refused to pay the fare increase and were allowed to ride for nothing. Slips were issued to those who paid the increased rate, entitling them to a rebate in case the rate was declared illegal. Then two suits were brought in the United States District Court, with the idea of testing the legality of the move that had been made. In the first one the court declared itself without jurisdiction. The other one went a little further, but both were in reality against the company. The first case was argued before the United States Supreme Court on Jan. 10.

As produced in the receivership case before Judge Kinkead, the contract with the Clark Management Company to act as fiscal agent was in the form of a letter to the railway company, dated Jan. 31, 1914, stating that the management company had acted in that capacity since May 1, 1912, for which it had received 1½ per cent of the gross revenues, and offering to continue the service on that basis. This was later ratified by the board of directors. The salaries of President McMeen and Vice-President Clark were paid by the Clark Management Company. The contract with the Clark Company for general engineering in connection with the Big Walnut Creek power plant was at cost plus 7 per cent. Judge Kinkead ruled that the two contracts should be considered together and that if it appeared that the Clark company was dominating the railway as against the company's own interests it would be illegal.

Financial News Notes

Dividend Deferred.—The payment of the dividend on the preferred stock of the Virginia Railway & Power Company, Richmond Va., due on Jan. 20 has been deferred to a later date.

Receiver for Montgomery Company.—Ray Rushton, president of the Montgomery Light & Traction Company, Montgomery, Ala., was appointed receiver of that company on Jan. 10 by Judge Henry D. Clayton of the United States District Court. The application for the appointment was made by the Commercial Bank & Savings Company, New Orleans, La.

Yonkers Abandonment Hearing Continued.—The hearing before the Public Service Commission for the Second District of New York on Jan. 9 upon the petition of the Yonkers Railroad for the abandonment of certain lines was adjourned until Jan. 30 when the city and any individuals who desire to be heard may appear in opposition. The hearing on Jan. 9 lasted from 9.30 a. m. until 3.15 p. m. Practically the entire time was taken up in the submission of the railroad's case.

Angola Line Faces End.—The Indiana Utilities Company on Jan. 7, 1919, received permission from the Indiana Public Service Commission to sell or dismantle the Lake James Railroad, the subsidiary 3.75-mile line between Angola and Lake James. This line is a summer road to the lake resort. The commission's engineers valued the road at $92,000, reproduction costs. The remaining property of the company, which is devoted to light and power service, is not affected. The headquarters of the company are at Angola.

Added Expenses Offset Fare Increase.—The Trenton & Mercer County Traction Corporation Trenton, N. J., has filed with the Board of Public Utility Commissioners its monthly statement for November as suggested in an order when the board allowed an increase of from 5 cents to 6 cents for fares. The report shows that the company carried 257,799 fewer passengers during November this year than were carried in November of last year. Despite this, however, the revenue from passengers in November of this year was $13,954 more than in November of last year, but this gain was practically offset by an increase of $12,404 in operating expenses for the comparative periods.

Company Upheld in Receivership Case.—Federal Judge Martin J. Wade has sustained the motion of the Des Moines (Iowa) City Railway to strike out certain allegations of the petition of intervention filed by the city of Des Moines against the company in the receivership case. The motion declares that the action brought by the city is a prearranged plan to oust the jurisdiction of the State. According to Judge W. H. McHenry, counsel for the company, the ruling of Judge Wade establishes the legality of the receivership beyond a doubt. Judge McHenry announces that the next move by the company will be to file an application for an order of court to determine the rights of the company under the franchise.

Dismantlement Blocked by Injunction.—On Dec. 20 a temporary injunction continuing into 1919 was granted to restrain the dismantlement of the Southwestern Traction Company, Temple, Tex. This property, as previously noted in this journal, was sold at foreclosure sale late in 1917 to a committee of bondholders. The majority of the purchasers were desirous of dismantling the property and negotiated for the sale of the material. The operation of the line, however, has never ceased, and now the writ of injunction has been served. The plaintiff in the writ consists of many citizens of Temple and Belton, the terminal cities of the line, and citizens residing along the line. The writ was also joined in by the cities of Temple and Belton and the Commissioners court of Bell County.

Authorized to Defray Reorganization Expenses.—The California Railroad Commission has authorized the Sacramento Northern Railroad, successor to the Northern Electric Railway, Chico, Cal., to use $653,750 realized from the class "A" bonds to pay reorganization and foreclosure expenses and to satisfy a mortgage indebtedness of the Northern Realty Company. The bulk of the money, or $440,000 will be used for reorganization and foreclosure expenses, $137,500 to effect a settlement with the Sloss Securities Company and $76,250 to pay the mortgage indebtedness for the Northern Realty Company. The Sloss company has agreed to assume payment of the incumbrances on the property and cause the Union Trust Company, San Francisco, to dismiss its foreclosure action.

Dallas Gross Earnings Improve.—The elimination of the jitneys in Dallas, Tex., has resulted in greatly increased gross earnings for the Dallas Railway, according to the report for November. The gross earnings in this month amounted to $161,047, an increase of $50,716 or 45.97 per cent over the corresponding month of the preceding year, and an increase of $15,373 or 10.55 per cent over October, 1918. The November operating expenses plus appropriations to the reserve accounts totaled $133,623, an increase of $43,715 or 48.58 per cent over November, 1917, and an increase of $10,053 or 6.99 per cent over October, 1918. The amount available for the payment of the 6 per cent authorized return in November, 1918, was at the rate of 4.73 per cent per annum on the property value. Jitney competition was eliminated in July, but the increase in gross earnings resulting therefrom has been largely offset by higher wages and the like.

Sells Notes Direct to Public.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is offering direct through advertisements in its home papers $3,600,000 of 7 per cent five-year bond-secured gold notes to finance the growth of greater Milwaukee's electric service system. The notes are being offered at par for cash. It is explained to the subscribers that there is no accrued interest to pay. Interest is payable May 1 and Nov. 1. The notes are due on Nov. 1, 1923. The sales office is at the securities department on the ground floor of the company's building in Milwaukee. Out of town buyers are advised to order through their home banks or direct from the company. The notes are in denominations of $50, $100, $500 and $1,000. The company says that to Dec. 31 more than 1000 Milwaukee and Wisconsin investors bought 126 of the $50 notes, 587 of the $100 notes, 204 of the $500 notes and 540 of the $1,000 notes, or a total of $707,000. Of the two weeks' total $645,000 was bought by Milwaukee people.

Hamilton Radial Line Suspended.—The Hamilton (Ont.) Radial Electric Railway, a 29.1-mile subsidiary of the Dominion Power & Transmission Company, has suspended its service. It is reported that proceedings are being taken in the Exchequer Court to declare the company insolvent and that this will probably result in operation being abandoned and the rails taken up. The company was confronted by an order from the Dominion Railway Commission to furnish the service designated by the by-laws of the municipalities through which it operated. It had failed to secure increased fares, notwithstanding the fact that it furnished proofs that it had been operating at a heavy loss and had attempted to curtail service. Although the commission ordered service to be given in accordance with the city regulations, it announced that the scope of its authority is not sufficient to compel a company to operate at a loss if it chooses to discontinue entirely. The municipalities are now considering acting upon the commission's advice to attempt purchase and public operation.

Electric Railway Monthly Earnings

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$80,930	*$53,243	$27,687	$20,223	$7,464
1m., Nov., '17	76,081	*38,838	37,243	19,667	17,586
12m., Nov., '18	923,978	*584,563	339,415	238,490	100,925
12m., Nov., '17	876,070	*498,516	377,554	227,430	150,124

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$167,118	*$130,580	$36,538	$29,470	$7,068
1m., Nov., '17	111,216	*112,519	†1,303	30,866	†32,169
12m., Nov., '18	1,799,071	*1,439,428	359,643	374,599	†14,956
12m., Nov., '17	1,335,115	*1,096,202	238,913	358,507	†119,594

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$370,981	*$281,923	$89,058	$64,189	$24,869
1m., Nov., '17	359,990	*286,827	73,163	45,919	27,244
12m., Nov., '18	4,232,018	*3,117,986	1,114,032	681,840	432,192
12m., Nov., '17	3,975,871	*2,853,469	1,122,402	552,618	569,784

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov , '18	$2,022,847	*$1,322,140	$700,707	$526,397	$174,310
1m., Nov., '17	1,822,283	*1,186,101	636,182	466,230	169,952
12m , Nov., '18	21,735,128	*14,862,014	6,873,114	5,951,761	921,353
12m., Nov., '17	19,460,726	*11,919,695	7,541,031	5,255,160	2,285,871

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$276,504	*$198,562	$77,942	$71,147	$6,795
1m., Nov., '17	243,036	*170,398	72,638	69,843	2,795
12m., Nov., '18	3,190,106	*2,302,101	888,005	826,461	61,544
12m., Nov., '17	3,078,224	*2,036,623	1,041,601	816,409	225,192

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$366,551	*$282,373	$84,178	$70,563	$13,615
1m., Nov., '17	329,267	*223,856	105,411	66,944	38,467
12m., Nov., '18	4,167,018	*3,217,484	949,534	812,237	137,297
12m., Nov., '17	3,630,797	*2,422,740	1,208,057	779,247	428,810

GRAND RAPIDS (MICH.) RAILWAY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$105,622	*$92,143	$13,479	$19,656	†$6,177
1m., Nov., '17	100,702	*77,401	23,301	18,619	4,682
12m., Nov., '18	1,277,930	*1,016,375	261,555	234,120	27,435
12m., Nov., '17	1,305,807	*884,788	421,019	216,010	205,009

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$76,707	*$66,897	$9,810	$19,824	†$10,014
1m., Nov., '17	71,307	*57,327	13,980	15,457	†1,477
12m., Nov., '18	877,491	*783,452	94,039	223,540	†129,501
12m., Nov., '17	899,313	*672,771	226,542	186,425	40,117

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$271,939	*$184,351	$87,588	$38,631	$48,957
1m., Nov., '17	212,264	*134,094	78,170	40,628	37,542
12m., Nov., '18	2,812,103	*1,834,609	977,494	483,411	494,083
12m., Nov., '17	2,452,118	*1,577,178	874,940	492,061	382,879

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$636,539	*††$409,714	$226,825	$185,657	$41,168
1m., Nov., '17	525,811	*324,600	201,211	177,512	23,699
12m., Nov., '18	7,519,407	*††4,890,451	2,628,956	2,208,330	420,626
12m., Nov., '17	5,942,084	*3,354,411	2,587,673	2,156,100	431,573

* Includes taxes. † Deficit. †† For the month, $19,020; and for twelve months, $358,468, included for depreciation.

Traffic and Transportation

Baltimore Fare Confirmed

Maryland Commission Sustains Six-Cent Emergency Rate Which Has Been in Effect Since October

The Public Service Commission of Maryland has ratified the 6-cent fare of the United Railways & Electric Company, Baltimore, put into effect by the company on Oct. 1.

The commission has likewise ratified the increase to 6 cents in the fare charged on the buses of the Baltimore Transit Company, a subsidiary of the United Railways & Electric Company.

NEW RATE UNTIL DECEMBER

In ratifying the increase in car fare the commission stipulated that this action permitted the larger fare until Dec. 31, 1919, and that the continuance of a 6-cent fare after that date depended upon circumstances.

In its opinion the commission said:

"The company will be required by the commission's order to make regular monthly reports of its operating results under the new rates, and if it appears at any time that a reduction of less than the full 1-cent increase can be properly required, such reduction will be made in the sale of tickets in small quantities at such prices as may be deemed expedient from time to time. This commission has decided from the facts before it in this case that the fair worth of reasonably adequate street railway service to the community served by the respondent company and under existing conditions is 6 cents as the basic rate for adults, and 4 cents as the basic rate for children between four and twelve years of age."

I. T. S. Express Service

Plans for an exclusive express service on the Illinois Traction System electric railway lines are being made by H. E. Chubbuck, vice-president executive. Although the details of the new service have not yet been worked out it is understood that the traction lines will announce a complete express service on all of its several divisions within the next few weeks.

For several years the Adams and American Express Company service was offered on the traction lines and with the taking over of the express companies by the American Railway Express Company this service has been continued. It has been the policy of the government-operated express company, however, to divert most of the express business to the government-operated steam roads, with the result that practically all of this express business has been taken away from the electric carriers.

The territory served by the traction lines is said to be sadly in need of express service and it is with the idea of offering such service that the Illinois Traction System is now planning the innovation. The direct supervision of the new express department will be in charge of C. F. Handshy, assistant general manager of the interurban properties of the company.

Jersey Sounds Warning

A warning has been sounded by the Board of Public Utility Commissioners of New Jersey in its annual report, against the tendency to have legislation enacted amending the powers of the commissioners to abrogate contracts between municipalities and railway, gas and electric companies in questions involving rates and fares to be charged. The report says that such an amendment might work a hardship upon the patrons and customers of these public utilities. In this connection the report says:

"The larger utilities, in order that the number of their customers might be increased, or to preserve uniform rates throughout territories served by them, voluntarily fixed rates much lower than those specified in the franchises of many of the municipalities in which they operate. The rates so fixed by them cannot now be increased against the prohibition of the Board of Public Utility Commissioners. If, however, the Legislature should declare that these grants must be regarded as contracts with which orders of the Public Utility Commission shall not interfere the public utilities would be free to exercise their own judgment as to what rates they would impose provided they kept within the limits set forth in the franchises.

"It seems to us that with such a condition existing the utilities in many cases could so increase their existing rates as to impose a decided burden upon those who have adapted themselves to the use of their services. Having, to use a commercial expression, their trade established they would be, if not subject to regulation, in a position, while acting within franchise limitation, to make increases that would be neither necessary nor reasonable, but which their customers would pay rather than suffer the loss and inconvenience resulting from discontinuance of the service."

If the companies do not improve service voluntarily now that the war is over a warning is sounded by the Utility Commissioners that the companies will be required to do so. The same is said in connection with the making of improvements and needed extensions to give proper facilities for service.

Inter-company Transfers

Washington Railways Ordered to Exchange Transfers at Thirteen Important Points

An order was issued by the Public Utilities Commission of the District of Columbia on Jan. 15 providing for free intercompany transfers at thirteen important intersections of the lines of the Capital Traction Company and the Washington Railway & Electric Company. Reciprocal transfers were also ordered at Twelfth Street and Pennsylvania Avenue between the lines of the Washington-Virginia Railway and the Capital Traction Company.

Except at three points, where it was feared that the congestion difficulties would offset transfer advantages, the recommendations of John A. Beeler, traffic expert of the commission, were followed. The order becomes effective on Feb. 1.

There are certain limitations on the transfers to be granted, to prevent round-trip riding on one fare. A general limitation imposed for the same reason is that no transfer can be obtained on an intercompany transfer except on a cash fare. This does not prevail where transfers are now granted on transfers between the various lines of any one company.

The Washington, Baltimore & Annapolis Railroad is not mentioned in the order and there is considerable speculation as to whether it will be required under the order to issue transfers to Capital Traction lines at points where the Washington Railway & Electric Company is compelled to do so. This suburban line has no District franchise, operates on the lines of the Washington Railway & Electric and now grants transfers to the lines of that company. What attitude the Washington-Virginia Railway will assume also is a matter of speculation. The other companies agreed at the hearing that they would oppose no legal objection to whatever action the commission might take. The Washington-Virginia Company does not do much business in the District and did not ask for an increase to the 5-cent fare, although it willingly accepted the advance when it was granted.

The order provides for the discontinuance of 2-cent transfers and "duplex" tickets being issued at points where free transfers are to be granted.

Express Rates Advanced

The Galveston-Houston Interurban Company announced that on Jan. 1 an increased baggage and express rate would be charged on shipments between Galveston and Houston and intermediate points. The rate for first-class interurban express between Galveston and Houston was formerly 45 cents per 100 lb. The new rate on the same shipment is 60 cents per 100 lb. There was also a rate of 25 cents per 100 lb. on shipments of 1000 lb. or over, and this rate was increased to 35 cents per 100 lb.

New Bay State Fares in Effect

Details Are Given of the Instructions to Conductors in Regard to the Zone Rates Effective from Jan. 8

The new fare tariff of the Bay State Street Railway, Boston, Mass., went into effect on Jan. 8 on the entire 950 miles of line. In every car and in every transfer station on the company's lines, tickets were placed on sale at 7 cents each, in strips of five. Passengers who prefer the cash arrangement pay 10 cents. The new city zones extend in general to the limits of the former 8-cent fare. Outside the city zones two of the former interurban mileage zones are in general coupled together to form the new interurban zone. The statement of fares made by the company in its general instructions for fare collection is as follows:

FARES

The rate of fare in the city zones is 10 cents cash or a 7-cent zone ticket (Form 1198), both with transfer privilege to the new city zone limits.

The rate of fare in the interurban zones is 5 cents cash for each zone with a minimum fare of 10 cents cash, good for any part of two zones, or a 7-cent zone ticket, good for one zone only.

The cash fare between a city zone and the first interurban zone is 15 cents, or using a 7-cent zone ticket in the city, is 12 cents.

The following other new tickets are good for fare:

(a) Limited commutation tickets (Form No. 1200) supersede the present workingmen's tickets and are good only in the hours formerly established for workingmen's tickets. This ticket has a city zone coupon and an interurban zone coupon, the later notched to show the number of zones for which it is good beyond the city zone limit.

(b) Pupils' tickets. Forms No. 1135, 1175 for day school pupils in city zones and No. 1173 for evening school pupils in city zones.

For interurban zones No. 1202 for one zone, No. 1179 for two zones, No. 1180 for three zones and No. 1181 for four zones, all being for day school pupils unless stamped for evening school.

Form No. 1178 is for a ride between the city zone and interurban zone and is notched to shew the number of interurban zones.

(c) Complimentary tickets, police and employees' tickets the same as heretofore.

All workingmen's tickets, reduced rate tickets and other forms of city and suburban tickets heretofore in effect are no longer good for fare, and passengers presenting such forms must be so advised. Old tickets will be redeemed at their pro-rata value upon presentation at the offices of the company or other designated points.

In each carhouse are posted samples of tickets that are good for fare and no other forms must be accepted. Coupons from any new ticket with the exception of the 7-cent zone ticket (3 for 35 cents) to be good for fare must be presented with ticket or cover of same number. *All tickets when collected by hand MUST be cancelled with the hand punch in the presence of the passenger.*

Passengers in the city zone are in all cases to board by rear door. At transfer or other busy points, conductors announce "Please leave by forward door." On cars with folding doors passengers may leave by either door but it is the desire of the company to encourage the use of the front door. On cars without folding doors passengers leave by the rear door except that front door may be used when more convenient on a crowded car.

The instructions of the company in regard to fare collection follow:

FARE COLLECTION

Conductors are required by law to sell 7-cent tickets but only in strips of 5 for 35 cents—single tickets will not be sold. Transfers will be issued only at time fare is paid and will be collected by hand but not registered, and will be deposited in trip turn-in envelope at the end of each half-trip.

LINES ENTIRELY WITHIN CITY ZONE

Plan I. *Prepayment operation of cars equipped with fare boxes.*

Cars will be equipped with a fare box having two compartments, one for cash and the other for all revenue and free tickets.

Conductors will stand by the fare box and see that all passengers pay fare on entering. Cash and ticket fares will be deposited by passenger in proper compartment of fare box. Conductors are not permitted to handle fares but will issue change when requested.

Fares deposited in fare box will not be registered.

When cars are equipped with *ticket box only* passengers will deposit all revenue and free tickets in box as they board car and conductor will collect cash fares by hand and register them on "10-cent cash register."

Plan II. *Closed and open cars when operated without fare boxes.*

Cars will be equipped with two overhead registers—one for 10-*cent cash fares* and the other for *revenue tickets only.*

Conductors must collect fares from passengers as soon after they board car as possible. All cash fare collected must be rung up on "10-cent cash register." Revenue tickets must be cancelled with the hand punch in the presence of the passenger and rung up on "ticket register." Free tickets and transfers will not be registered but must be deposited in trip turn-in-envelope at the end of each half-trip.

FARE COLLECTION—ROUTES EXTENDING BEYOND CITY ZONE LIMIT

Plan III. *Prepayment operation of cars equipped with fare boxes.*

Cars will be equipped with a fare box having two compartments—one for cash and the other for all revenue and free tickets for use in connection with initial fares, also one overhead register for revenue tickets only collected on inside collections, and a *Rooke register* for inside cash fare collections in interurban territory. See special rules governing use of Rooke register.

CITY ZONE COLLECTIONS—OUT BOUND

City zone collections will be handled in the same manner as on cars that operate on routes entirely within the city zone.

On reaching city zone limit conductor must post day card.

INTERURBAN COLLECTIONS

After passing city zone limit conductor must enter car and collect zone fares zone by zones. Each zone must be collected separately, starting from the front of cars with folding doors and from the rear of others. Five-cent cash fares *must be deposited by passenger in Rooke register* and revenue tickets collected by hand, cancelled in the presence of the passenger and rung up on ticket register. Free tickets and transfers will not be registered but will go in trip turn-in envelope.

Revenue tickets that entitle passengers to ride beyond the limit of the first outer zone must be picked up and an identification check (Form 1042) issued to such passenger punched for the number of zones the passenger is entitled to ride, i. e. if a limited commutation ticket notched for three interurban zones is collected in the first interurban zone, conductor will pick up ticket, cancel it and ring it up on ticket register and issue identification check with three punch marks in it as a means of identification for the next two zones through which passenger is entitled to ride.

As soon as collection is completed conductor must return to rear platform and collect fares from passengers boarding car in the following manner:

PASSENGERS BOARDING CAR IN INTERURBAN ZONE

Conductor will see that passengers deposit initial cash fare of 10 cents, or 7-cent ticket, in proper compartment of fare box. To passengers depositing 10 cents cash, issue an identification check without punch marks except for conductor's own identification so that he will know when he picks it up that it is one he has issued.

All forms of tickets, whether revenue or free must be deposited in ticket box and if ticket so deposited entitles passenger to ride beyond the next interurban zone limit conductor must issue identification check properly punched so that he will know the limit to which fare has been paid.

Interurban transfers will be collected by hand and put in trip turn-in envelope together with other city zone transfers heretofore collected.

Passengers boarding car in first interurban zone outside of approaching city zone must declare themselves as to destination. If going into city zone passengers will deposit 15 cents or 5 cents and 7-cent ticket in fare box and receive identification checks, otherwise 10 cents cash fare or 7-cent ticket must be deposited in fare box.

Interurban transfers will be issued at time of payment of fare for one of two purposes:

1. As a free transfer to permit passengers to reach point on connecting route to which free transfers are issued as provided for in general order No. 118.
2. To so collect fares that passengers will not be required to pay the minimum fare for only one zone when their whole ride will be more than one zone, but part of the trip involves riding one zone of the routes. In such a case the first conductor will collect, in addition to the fare on his own route, fare for one zone on connecting route (through Rooke register) and issue transfer punched for one zone.

At change-off points in interurban territory designated by local division orders conductors will issue to passengers on last collection an interurban transfer punched only as to time and direction which will indicate to conductor taking car that passenger is entitled to pay only a single zone fare. Fares of passengers boarding car at such points will not be collected prepayment but by conductor when making first zone collection.

On reaching city zone limit conductor must post day card for register readings of fare box, Rooke register and ticket register, and also note in proper column his best judgment of the number of 7-cent tickets deposited in ticket box in interurban territory.

CITY ZONE COLLECTION—IN BOUND

Having posted these readings conductor will enter car and collect city zone fare starting from the front of cars with folding doors and from the rear of others. Ten-cent cash fares must be collected through the Rooke register and tickets by hand. Revenue tickets must be rung up on ticket register and cancelled in the presence of the passenger from whom they are collected.

Passengers boarding car after passing city zone limit will board by rear door and collections must be handled in same manner as on any route entirely within city zone.

On reaching end of route conductor must post day card for reading of fare box register, Rooke register and ticket register and fill out trip turn-in envelope for free tickets and transfers collected enroutes, entering these on day card in proper column.

Plan IV. *Closed and open cars without fare boxes.*

Cars are equipped with two overhead registers, one for 10-cent cash fares and the other for revenue tickets, and a Rooke register for all cash fares collected in interurban zones and on in-bound trips to city zone and the city zone fare of passengers on car crossing the city zone limit.

CITY ZONE COLLECTIONS—OUTBOUND

City zone collections will be handled in the same manner as on cars that operate on routes entirely within the city zone as shown under Plan II.

On reaching city zone limit conductor must post day card for ticket register and for Rooke register.

INTERURBAN COLLECTIONS

Follow the same plan as outlined previously for prepayment cars with the following exceptions—i. e. all cash collected from passengers boarding cars must be deposited in Rooke register and all revenue tickets collected must be rung up on ticket register.

Approaching city zone limit conductor must post day card for ticket register and Rooke register.

CITY ZONE COLLECTIONS—IN BOUND

City zone collections will be handled in same manner as on prepayment cars and passengers boarding in city zone will have their fare collected as already outlined for closed and open cars without fare boxes operating on routes entirely within city zone.

> On reaching end of route conductor must post day card for reading of 10-cent cash register, ticket register, Rooke register and fill out trip turn-in envelope for all free tickets and transfers collected enroute, entering these on day card in proper column.

In a statement to the public the company said that every effort was being made to make the system of fare collection and registration as simple as possible so that the conductors would be able to adhere to the rules and passengers be certain that their fares were properly accounted for. Cars are being provided with prepayment devices as rapidly as possible and the co-operation of the car riders was asked in making their use a success.

New York Request Refused

Board of Estimate Rejects Plea for Increased Fares on Rapid Transit and Surface Lines

The Board of Estimate of New York City on Jan. 10 formally denied the application of the Interborough Rapid Transit Company to be permitted to charge an 8-cent fare on the subways and elevated, and that of the New York Railways for the right to charge 8-cent fares with 3 cents for transfers on the "green car" surface lines. A lengthy resolution, unanimously adopted by the board, in regard to the Interborugh, said in part:

> The contract with the city is the foundation upon which the Interborough's securities rest. It is proposed, however, that the compensation of the Interborough be increased 60 per cent; that is, that it be permitted to receive an 8-cent fare instead of a 5-cent fare, as provided in the contract. In other words, the municipal authorities are asked to sanction an arrangement whereby every fare payer is taxed 3 cents to prevent any loss whatever falling upon Interborough security holders by reason of deficiency of income due to the war or other causes.
>
> There appears to be no reason why the burdens caused by the war, or otherwise, should thus be shifted from the holders of the Interborough securities to the traveling public. There is no pretense that the income from a 5-cent fare is not sufficient to meet all operating or other current expenses. It is merely the question of whether the Interborough's security holders shall receive income not earned, or whether they shall wait for it according to the terms of their investment.
>
> If the Interborough desires to cancel the present contract, terms can doubtless be agreed upon that will take into consideration the actual cash investment of the Interborough in the property, and avoid the necessity of the complete wiping out of the equities of its security holders, which otherwise must inevitably result if the present claims of the Interborough are true.
>
> When the City of New York made the contract with the Interborough, it was upon the assumption that the Interborough was of sufficient financial responsibility to perform its obligations and would do so in good faith, giving to the public the benefit of the 5-cent fare for the forty-nine year period of the contract. It would be a matter of very serious concern to the members of the Board of Estimate and Apportionment, if the Interborough, either from unwillingness to perform its contract obligations, or lack of financial responsibility, should, as has been threatened by its representatives, seek the advantages of a receivership.

After the resolution had been read, Mayor Hylan remarked:

"In other words, if the Interborough is unable to comply with all of the terms of its contract with the city, all they have to do is to turn the lines back to the city and the city will operate them."

Atlanta Appeal Renewed

The Georgia Railway & Power Company, Atlanta, Ga., on Jan. 6 presented to the Council a petition asking for an increase in fares from 5 cents to 7 cents. The filing of this request was the most important feature of the last business session held by the City Council of 1918. This paper, together with communications from the National War Labor Board and from ex-Governor Joseph Brown, both dealing with the railway situation in Atlanta, were ordered filed, and Council then adjourned to again meet on the evening of the same day for the last time, at which time Mayor James L. Key was inaugurated and the Council of 1919 took charge of the affairs of the city.

The petition of the railway company, which asked for an increase of 7 cents instead of 6 cents as sought for formerly, as well as the other papers on the subject from Governor Brown and the War Labor Board, were not even read to the Council but were ordered filed.

The petition declares that the company must have immediate relief from its financial burdens if it is to maintain efficient service, and that because of the added burden that has been placed upon it by the increased pay awarded its employees by the War Labor Board, and because of the other greatly enhanced expenses, the company must have an increase in fares to 7 cents, as 6 cents will not be sufficient to bring the needed revenue. The increase asked for, the company says, is to continue only until normal conditions are restored.

Status of Kansas City Fare Case

The favorable decision of Dec. 31 by the Supreme Court of Missouri in the 6-cent fare case of the Kansas City Railways will probably not be effective for several weeks. The city is expected to file a petition for a rehearing by the Supreme Court. If it should fail in this, the city will file an appeal to the United States Supreme Court.

Should the State Supreme Court decide that the matter is not a federal one, the State Supreme Court may then order the conclusion of the matter. This will involve the disbursement of the excess 1 cent fare collected and impounded in Missouri, a sum which on Jan. 7 amounted to about $300,000. It is possible that even if an appeal is granted to the United States Supreme Court, the state court may order the disbursement of the money so far accumulated, and require the company to give a bond, instead.

There was temporary confusion in Kansas City because on some of its lines the railways was not giving the transfers bearing coupons, the day or so following the decision. It was explained that the lack of rebate coupons was an oversight. Coupons are now attached to all transfers.

The action of the Public Service Commission of Missouri in the 6-cent fare case of the Kansas City Railways was upheld in a decision written by Judge Blair and concurred in by other members of the Supreme Court of Missouri. Judge Blair pointed out that it was a matter of common knowledge that franchise street-railway rates existed generally, and that the Legislature passed the utilities act in view of this situation. For this reason Judge Blair held it would be absurd to accept the city's contention that the commission did not have rate regulatory power. Shortly after the decision was rendered the company said that "the court's ruling would appear to settle for all time the question of whether the Public Service Commission has the power to fix public utility rates."

Autos and Railways Co-operate

The Public-Service Commission of Illinois has issued an order granting a certificate of convenience and necessity for the transportation by motor trucks of freight, baggage and express between the freight terminal station of the Aurora, Elgin & Chicago Railroad at Laramie Avenue, in Chicago, and the Chicago, North Shore & Milwaukee Railroad at its terminal station in the city of Evanston, and the freight terminal of the Chicago & Interurban Traction Company at Eighty-eighth and Vincennes Avenue, Chicago, and between the freight station of the Chicago & Joliet Electric Railway at Archer and Cicero Avenues, Chicago, and the central freight station to be established by petitioner in the city of Chicago. The order authorized the issuance of capital stock in the amount of $10,000.

Objection was filed by the officers of the Chicago, Waukegan & Hammond Transportation Company because that company was granted a certificate of convenience and necessity to operate motor trucks for the transportation of freight and express between Chicago, Waukegan and Hammond and had ample facilities to haul all the goods offered for transportation between the points the Interurban Motor Despatch Company desired to operate. The commission overruled the objection on the ground that the character of the business to be conducted by the petitioner was different from that being carried on by the objector.

Old Fare Resumed in Columbus

On Jan. 9 the Columbus Railway, Power & Light Company, Columbus, Ohio, resumed the old rate of fare of eight tickets for 25 cents. Some few months ago the company put into effect a flat 5-cent rate, announcing at that time that it proposed to surrender its franchise as imposing conditions considered too onerous. This matter of the policy of the management with respect to rates has recently been injected into the contest for control of the company and is referred to in connection with the changes in the management of the company noted elsewhere in this issue.

Transportation News Notes

Wants Two Men Per Car.—The City Commission of Waco, Tex., has instructed the city attorney to draft an ordinance requiring the Texas Electric Railway, which operates in Waco, to maintain two men, a motorman and a conductor, on all cars in that city.

Akron Increase Up Soon.—The question of an increase in fare for the Northern Ohio Traction & Light Company in Akron, Ohio, will shortly come before Council on the report of Hagenah & Erickson, Chicago, Ill., who made an investigation of the need of an increased income from the local service.

Rhode Island Hearing Postponed.—The hearing in the Supreme Court of Rhode Island on the appeals of the towns of East Providence, North Providence, Johnston and Warwick from the Public Utilities Commission's authorization for the Rhode Island Company to increase fares, which was to have been held on Jan. 19, was again postponed to Jan. 27, because of the illness of the Rhode Island Company's attorney, G. Frederick Frost.

School Commutation Books.—The Syracuse (N. Y.) Northern Electric Railway, under special permission of the Public Service Commission for the Second District, will sell school commutation books, each book good for fifty single trips and limited as to use to thirty-five days from and including the date of purchase, on a basis of 1½ cents per mile, minimum $3 per book. No school commutation books have heretofore been issued.

Seven-Cent Zones on Northampton Line.—Announcement was made on Jan. 3 of the authorization by the Public Service Commission of Massachusetts of an increase in fares from 5 cents to 7 cents on the Northampton Street Railway. The advance will go into effect on Jan. 30 without changes in the present fare zones. The lines between Northampton and Easthampton and Williamsburg are affected as well as those in the city itself.

66 Per Cent Fare Increase Reasonable.—The Public Service Commission of Washington holds to be justified an increase of fare on the North Coast Power Company's railway from Vancouver to Sifton. The new rate is held not unreasonable, in comparison with the company's earnings and expense. The commission has dismissed complaints. The new schedule increases the through fare from 15 cents to 25 cents and allows graduated increases for way points.

Amends Its Fare Appeal.—The Arkansas Valley Railway, Light & Power Company, Pueblo, Col., which has had an application before the Public Utilities Commission of Colorado for permission to raise fares from 5 cents to 6 cents, has filed an amended application asking for a 7-cent fare. The company says a 6-cent fare will not prove sufficient to meet increased costs of operation inasmuch as the War Labor Board advanced the wages of trainmen effective as of Jan. 1.

I. T. S. Changes Traffic Headquarters.—Effective shortly after the first of the new year the headquarters of the traffic department of the Illinois Traction System will be moved from Springfield, Ill., to Peoria, Ill. For several years both the freight and passenger traffic departments have been located in Springfield, but under the new order the heads of these divisions and their assistants will be located in Peoria. Arrangements are now being made for their removal.

Shuttle as an Economy.—With the statement that it is making every effort to reduce operating expenses so that it will not be necessary to ask for an increase in passenger rates, the Los Angeles (Cal.) Railway Corporation recently announced that a new schedule would be used on a number of the more congested lines. On nine of the principal lines half of the cars will be run to certain designated points and will then be turned back and shuttle cars will operate from those points to the end of the lines.

Six Cents in Rome and Athens.—Increases in fares in Rome and Athens, Ga., in gas rates in Macon, and in electric light and power rates in Athens, Rome, Conyers and Lithonia have been authorized by the State Railroad Commission. In both the instances where the commission increased the rate a straight fare of 6 cents was substituted for the prevailing 5-cent fare to offset an increase in operation cost. The companies affected by the fare increase are the Athens Railway & Electric Company and the Rome Railway & Light Company.

Three Fives for Two Sixes.—The Public Service Commission for the Second District of New York on Dec. 20 ordered suspended for thirty days or until and including Feb. 4, the rates which the Fishkill Electric Railway proposed to put into effect on Jan. 6. Commissioner Cheney planned to hold a hearing in Beacon on Jan. 8. The suspended tariff, to which reference was made in the ELECTRIC RAILWAY JOURNAL for Dec. 14, page 1071, divided the railway into three fare zones, two with a 5-cent fare and one 6 cents, instead of two 6-cent zones.

Press Comments Reprinted.—Theodore P. Shonts, president of the Interborough Rapid Transit Company and the New York (N. Y.) Railways, has reprinted in a pamphlet of forty pages public opinion on the traction problem as represented in leading editorials in the daily papers and has included as part of the record three letters to the Board of Estimate, Public Service Commission and civic organizations with respect to transit matters. In concluding his appeal to the public, Mr. Shonts says that the situation was presented in detail in the letters to the public authorities reprinted in the pamphlet and "of them we bespeak your careful reading."

Rome Fare Case Started.—Upon the request of the New York State Railways the Public Service Commission for the Second District fixed upon Jan. 15 for an investigation of the company's petition for a 6-cent fare in Rome. The proceeding will be under the company's original petition for permission to increase its fare to 6 cents in Rochester, Syracuse, Utica, Rome, Oneida and Little Falls. Under the Court of Appeals decision in the Quinby case the company has been denied a 6-cent fare in Rochester, while in Utica and Syracuse the 6-cent fare is in effect. The company's petition relating to Rome, Oneida and Little Falls is pending before the commission.

Six-Cent Fare Remains.—The City Council of Beaumont, Texas., has adopted a resolution killing all proposed ordinances to repeal the 6-cent fare and to restore the fare of 5 cents. This action was taken by the Council after thorough investigation of the Beaumont Traction Company's earnings, the kind of service furnished, and complaints against service. The City Council some time ago, on petition of the company, enacted an ordinance authorizing a fare of 6 cents. This was immediately attacked by the traveling public, who charged that the promise of the company to improve its service had not been carried out. These complaints were investigated. An agreement was then reached whereby the company will make specific extensions and improvements on condition that the 6-cent fare ordinance would not be repealed.

Worcester Wants Seven Cents.—Officials of the Worcester (Mass.) Consolidated Street Railway have thrown their books open to Francis L. Blacker, an accountant employed by the Mayor to investigate the justice of the petition to the Public Service Commission for a 7-cent fare on the forty-six routes in Worcester and its suburban districts. Mr. Blacker has made a first report, showing that from what he has learned from the examination made by him to date and the information received from the officials of the railway the 7-cent fare will just permit the company to meet its expenses of operation and upkeep. He has been directed to make still further inquiry into the matter and to submit a written report to the Mayor as soon as possible. On the final report of Mr. Blacker, Mayor Holmes will make his decision on the question of the advisability of making official protest to the Public Service Commission against the proposed increase to 7 cents. The tariff of the company increasing the fare from 6 cents to 7 cents was filed with the Commission on Jan. 11 to become effective on Feb. 1.

Personal Mention

W. J. McCoy has been appointed treasurer of the Union Traction Company, Sistersville, W. Va., to succeed H. W. McCoy.

Samuel Ungerleider has been elected vice-president of the Columbus Railway, Power & Light Company, Columbus, Ohio.

Henry M. Brooks has been appointed secretary of the Seattle & Rainier Valley Railway, with headquarters at Chicago, Ill., to succeed M. Murphy.

Walter N. Munroe, general manager of the Paris (Tex.) Transit Company, has also been elected vice-president of the company to succeed C. E. Calder.

E. H. Adams has been appointed comptroller of the British Columbia Electric Railway Company, Ltd., Vancouver, B. C., to succeed W. Saville.

G. W. Smith has been appointed superintendent of maintenance of way of the San Antonio (Tex.) Public Service Company to succeed A. M. Courtney.

William Perdue has been appointed superintendent of the Montgomery Light & Traction Company, Montgomery, Ala. Mr. Perdue has been connected with the company for many years.

H. C. Onwald has been appointed secretary of the Lake Erie & Northern Railway, Brantford, Ont., to succeed Lloyd Harris, who last spring was appointed chairman of the Canadian War Mission to the United States.

Roy G. Smock, city railway supervisor since the Des Moines (Iowa) City Railway secured its new franchise three years ago, has resigned effective on March 1 and will go to Waterloo, Iowa, where he is president of the Cedar Falls Sand & Gravel Company.

Charles L. Kurtz, who has had long experience in the light and power business and in electric railway matters, has been elected president of the Columbus Railway, Power & Light Company, Columbus, Ohio, to succeed Samuel G. McMeen, resigned, who has also retired as a director as noted elsewhere in this issue.

J. S. Goodrell has been named by the City Council of Des Moines, Iowa, as successor to Roy G. Smock, who will retire on March 1 as city railway supervisor. Mr. Goodrell was for a number of years master mechanic for the Des Moines City Railway, but for the last year or more has been an inspector on government work.

J. P. Lake has recently entered the employ of the Bay State Street Railway, Boston Mass. He will have charge of the power saving department, which has been organized in connection with the installation and operation of approximately 1500 Economy railway meters. Mr. Lake formerly was with the Pacific Electric Railway, Los Angeles, Cal., as engineer in the efficiency bureau.

C. A. HALL

C. A. Hall has been promoted from assistant general manager to general manager of the Eastern Pennsylvania Railways and the Eastern Pennsylvania Light, Heat & Power Company, Pottsville, Pa., by the J. G. White Management Corporation, New York, N. Y., the operating managers of the Pottsville properties. Mr. Hall succeeds L. S. Cairns, deceased. In June, 1918, Mr. Hall entered the service of the two Eastern Pennsylvania Companies as manager of the electric light and power department and shortly thereafter was advanced to the position of assistant general manager. After leaving school in 1904, Mr. Hall entered the employ of the Consolidated Light Company, Huntington, W. Va. In 1907 he joined the organization of the Ohio Valley Electric Railway, Huntington, W. Va. He became superintendent of the Canonsburg Electric Light, Heat & Power Company, Canonsburg, Pa., in 1909, and following the purchase of this utility in 1911 by the West Penn Power Company, Pittsburgh, Pa., he was appointed local manager of that company in charge of the Canonsburg territory. Under Mr. Hall's management this property was entirely rebuilt and many improvements were made to the service.

William Clough has resigned his position as manager and engineer of Bury (England) Corporation Tramways in order to take up an important post with a large firm of paper makers. He has been manager since the municipality took over the tramways about sixteen years ago. In recognition of his work in connection with the production of munitions of war he was made a member of the Order of the British Empire. He also earned the commendations of the Admiralty for his work in the Shipyard Labor Department.

Joseph L. Tulley has been appointed division superintendent of the Worcester division of the Worcester (Mass.) Consolidated Street Railway. His new title will not alter the scope of his work, as he has been acting as superintendent for the last two years, during the illness of the late John B. Gorman. Mr. Tulley has been in the employ of the company for fifteen years, serving first as clerk and rising through the various grades to his present position.

Harry H. Lindley, chief clerk to the auditor of the Union Traction Company of Indiana, Indianapolis, Ind., has resigned to accept a position as office manager of the Lindley Box & Paper Company, Marion, Ind. Mr. Lindley entered the service of the railway in September, 1906, as bookkeeper, which position he held about three years, succeeding A. C. Moore as chief clerk late in the year 1907. Mr. Lindley's friends in the accounting department presented a leather traveling bag to him to speed him on his way.

Brig.-Gen. George H. Harries, head of the American commission for the repatriation of war prisoners, is reported in a dispatch from Amsterdam to have been narrowly missed by a bullet as he sat in his room at the Hotel Adion, Berlin, during the street fighting there on Jan. 11. General Harries, who in civilian life was a vice-president of H. M. Byllesby & Company and a former president of the American Electric Railway Association, was the ranking member of the three American officers first to reach Berlin after the signing of the armistice.

Major Samuel W. Greenland has received his honorable discharge from the chemical warfare section of the United States Army and has returned to take up his duties as general manager of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind. During his absence from the railway, Major Greenland has been supervising the erection of a 20,000-kw. steam-driven generating station and a rotary station of the same capacity, at Edgewood (Md.) Arsenal. He also looked after the operation of the utilities at Edgewood.

Charles B. Stiffler, formerly traveling auditor of the Union Traction Company of Indiana, Indianapolis, Ind., but for the past sixteen months in the United States Army service, has accepted the position made vacant by the resignation of Harry H. Lindley as chief clerk to the auditor. Mr. Stiffler has had considerable experience in accounting work, having been connected with the accounting department of the Indianapolis & Cincinnati Traction Company for a period of seven years and with the Union Traction Company about eighteen months prior to entering the army.

Homer C. Bender has been appointed Superintendent of Public Utilities of Spokane, Wash., by Mayor C. M. Fassett. This is a new position provided for in the 1919 budget. Mr. Bender will be employed in making personal investigations, gathering data, inspecting utility work under way and in preparing for rate and other hearings before the Public Service Commission. Mr. Bender is a graduate of the Massachusetts Institute of Technology and has had four years' experience with the Stone & Webster interests in hydroelectric work. He has also had general engineering experience and has worked in the natural gas fields in Alberta.

Emil G. Schmidt, president of the Des Moines (Iowa) City Railway and the Inter Urban Railway, Des Moines, has announced that when the receivership of the Des Moines City Railway is lifted he will retire from active work in the electric railway field. Mr. Schmidt has been engaged in public utility work for more than thirty years. He went to Des Moines about five years ago from Springfield, Ill. He has served with the so-called Harris interest for many years. While he has made no definite statements as to his plans after retiring from companies at Des Moines Mr. Schmidt intimated that he would associate himself with his son, who is an engineer.

Capt. George F. Daggett has been appointed chief of the transit bureau of the Public Service Commission for the First District of New York. Captain Daggett succeeds J. P. H. DeWindt, who resigned several months ago to undertake the management of a munitions plant. The chief of the transit bureau is the officer upon whom the Public Service Commission relies to supervise the operations of the several transportation lines in the city, to investigate complaints and to inaugurate improvements in service where needed. Captain Daggett, who has recently returned to the commission after a year in military service, is well qualified for the position, as he is thoroughly familiar with all phases of street surface railroad and subway and elevated operation. He entered the employ of the commission shortly after its organization in 1907, and latterly has filled the posts of chief clerk and assistant secretary.

Col. Alexander R. Piper has been appointed superintendent of employment for the Brooklyn (N. Y.) Rapid Transit Company. Colonel Piper has instructions from Lindley M. Garrison, the receiver of the company, to employ 1500 additional men for work as motormen, conductors, guards and repair yard employees. Early in 1918, Colonel Piper, who was formerly general freight agent of the Brooklyn Rapid Transit Company, was appointed lieutenant-colonel of the Quartermaster's Corps of the National Army and Depot Quartermaster in command of the New York depot, being advanced from the rank of captain with which in April, 1917, he was called back into active army service by the President. He skipped entirely the intermediate rank of major. Colonel Piper was born at Fort Wadsworth, Staten Island, in 1865. He was graduated from West Point and served ten years in the regular army. He retired from active service in June, 1899, and between that time and his re-entry into the national service during the present war he was employed in civilian pursuits. In March, 1904, he was made general superintendent of the American Railway Traffic Company, a subsidiary of the Brooklyn Rapid Transit Company.

Obituary

H. L. Wales, who resigned recently as manager of the lines of the Connecticut Company at Waterbury on account of ill health, is dead.

Thomas D. Milne, formerly trainmaster of the Northwestern Elevated Railroad, Chicago, Ill., died in Boston recently. Mr. Milne went to Boston to accept a position with the Bay State Street Railway. There he contracted influenza and pneumonia, which resulted in his death. Mr. Milne is survived by his widow and four children.

Private Karl A. Schaller died on Jan. 9 from pneumonia at Jackson, Mich. Private Schaller was a former student of the University of Minnesota and finished his education at the Carnegie Institute of Technology, Pittsburgh. At one time he was superintendent of the St. Paul (Minn.) Southern Railway and was special sales agent for the General Electric Company at Jackson. He was thirty-one years old. He is survived by his widow and two children.

R. J. Thompson, junior superintendent of railways of the Toledo Railways & Light Company, Toledo, Ohio, died of pneumonia on Dec. 5. He was regarded as one of the brightest of the "cadet" engineers and had seen considerable service with Henry L. Doherty & Company, who operate the Columbus property. He was graduated from Ohio State University in 1910 with the degree of electrical engineer. His first work in the Doherty organization was as a "cadet" with the Denver Gas & Electric Light Company. Subsequently he was with the Cumberland & Westernport Electric Railway and at the New York office.

Daniel Wilkin McWilliams, prominent railroad man and banker and since 1881 secretary and treasurer of the Manhattan Railway, New York, N. Y., controlled by the Interborough Rapid Transit Company, is dead. Mr. McWilliams was born in Hamptonburg, N. Y., and at the age of eighteen he entered the employ of the New York & Erie Railroad. After devoting five years in the banking business, he was elected secretary and treasurer of the Toledo, Peoria & Warsaw Railroad. From there he went to the banking house of Henry Q. Marquand, becoming a partner in the firm. In 1904 he became treasurer of the Interborough Rapid Transit Company, holding that position for four years.

Harlan P. Cairns, long an employee of the Twin City Rapid Transit Company, Minneapolis, Minn., formerly in the operating department and for the past four years in the claim department, is dead. Mr. Cairns was born in Janesville, Wis., on May 26, 1883. With the exception of being in the railway business for a short time on the Pacific coast, most of his business career was with the Twin City company. Mr. Cairns is survived by his widow and one child. This is the third bereavement in the Cairns family within six months, Mrs. Ralph H. Cairns having died last June and Leonard S. Cairns, general manager of the Eastern Pennsylvania Railways, Pottsville, Pa., brother of Harlan P. Cairns, having died of influenza on Oct. 10.

George R. Sheldon, former treasurer of the National Republican Committee and a member of the brokerage firm of William C. Sheldon & Company, New York, N. Y., died at Carbondale, Ill., on Jan. 14, of injuries received in an accident at a mine there. Mr. Sheldon had long been one of the well-known business men and financiers of New York and his name had been connected with many of the country's largest industrial enterprises. He was born in Brooklyn, on April 16, 1857, and after an early training at the hands of private tutors was sent to St. Paul's School at Concord, N. H. He then entered Harvard from which he was graduated with the degree of A. B. with the class of 1879. Immediately upon leaving college he engaged in the banking business. Gradually he branched out into various enterprises and became closely associated with J. Pierpont Morgan in many of Mr. Morgan's transactions. Mr. Sheldon's business affairs were of wide range. He was treasurer and chairman of the board of the North American Company; chairman of the executive committee and treasurer of the Milwaukee Electric Railway & Light Company; president of the Electric Securities Company, treasurer and director of the Detroit Edison Company, director of the American Locomotive Company, the Bethlehem Steel Corporation, the Union Electric Light Company, St. Louis, the West Kentucky Coal Company, the Wisconsin Edison Company and other companies. He was a delegate to the Republican National Convention of 1900, treasurer of the New York county committee from 1899 to 1903, treasurer of the New York State committee in the campaign of 1906, and of the Republican National Committee from 1908 to 1916.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Physical Needs of Electric Railways

Cars and Rolling Stock Need Rehabilitation—Increased Rates Should Provide the Means

In 1907, in a letter to the Governor of Minnesota, the late James J. Hill once gave expression to the estimate that $1,100,000,000 a year in additional capital ought to be put into the steam railroads of the country to enable them to keep pace with the demands of the country for trunk line transportation. No statistics are available as to the amount of capital which would be required to keep the electric railways to their normal development, because it is difficult to tell at the present time what their normal development should be. But even if the question of new construction is disregarded in determining the extent of the expenditures which will have to be made during the next few years by the electric railways, the matter of deferred maintenance is a most pressing one.

For a number of years, even before the outbreak of the war, the inadequacy of the 5-cent fare had compelled many companies to economize in all directions, and during the war, this condition has not only been more severe but it has been difficult for the companies to get many kinds of materials, even when they had the money to pay for what they required.

What this situation may be in some cases was indicated at a hearing recently in a large city by a commission to determine the condition of rolling stock of the company operating there. The regular schedule on this property calls for the use of about a thousand cars, or forty-five less than the number a year ago, and the company has about 1400 cars available for use. According to the testimony presented by the officer in charge of equipment, more than a third of these cars were purchased more than fifteen years ago, and in a recent valuation report received a valuation of from 10 per cent to 40 per cent. An even larger ratio of the electrical equipment received the same valuation, showing its age. Other testimony was presented to the effect that 45 per cent of the track ought to be replaced.

The rehabilitation of the electric railways of the country cannot be postponed indefinitely, and when it is undertaken, worn out equipment of the kind described will have to be replaced. The longer such work is put off the more necessary it becomes. Some of it must be undertaken soon, whether the roads "can afford it" or not. The very extent of the economy which has been forced on the electric roads has compelled the attention of the public and authoriities. No one can plead ignorance now of the economic state of the electric lines. They are recognized now as needing relief because of causes beyond their control, and provision is generally being made through higher rates at least for operating expenses and fixed charges. From this to a more liberal treatment by which some sort of rehabilitation program can be begun is the next step.

Some Nice Business for 1919 Already Indicated

Pneumatic Door and Step Control and Automatic Substation Equipment More Popular

Even when conditions look blackest the electric railways are laying plans for the purchase of new equipment and of materials for extension during the year. Reports received by the ELECTRIC RAILWAY JOURNAL, while they do not indicate that any great number of electric railways are going to make extensive purchases, do show that not all of the roads are afraid to buy equipment.

Prominent in the replies received is the intention of railways to purchase. where they have not already done so, pneumatic door and step control. From seven roads which indicated the number of such equipments that they were going to purchase, a total of 162 is recorded. Many other companies stated their intention of going into this market during the current year.

Another field that should be busy during 1919, if such early reports are to be taken as any indication of later buying, is the railway substation field. The automatic substation appears to be growing more popular.

At the present writing traction companies do not appear anxious to either build new or reconstruct old track. Some work, of course, is contemplated.

Whatever is contemplated being done in this connection so far as the reports show, is for short distances, the largest reported being 4 miles. One company in Ohio expects to regrade and reballast 12 miles of track, and a Canadian company reports its intention of replacing 10,000 ties.

On overhead work there are also some reports of business to be placed during the year. All of these, however, are for Canada. In fact, there seems to be more activity, relatively, in the Canadian field than in the United States.

The Labor Factor in Price Revision

Lines in Which Labor Is a Large Percentage of Cost Are Not Expected to Drop

The downward trend of prices is receiving considerable attention at the present time. It seems to be pretty generally felt by producers that prices in the immediate future will depend largely on the labor factor. Thus if labor represents a very large percentage of the cost of the finished product, the chances for prices coming down are not good. If, on the other hand, raw materials represent the predominant cost, prices will drop as raw materials drop. Dependent again upon the labor cost will be the extent to which the latter class of commodities follow the raw material downward.

Thus wire has followed copper down. The drop has not been the same percentage as the drop in copper. Rather has the same differential been kept between refined copper and copper wire base. Even here some of the wire producers were reluctant to lower prices.

On materials where labor plays a much larger part in the cost, such as motors, generators, transformers, etc., producers have not lowered prices, nor do they seem inclined to do so at the present time.

Current Electrical Market Conditions Good

While Sales Have Fallen Off from War Peak, They Are Not Poor for a January Market

Conditions in the electrical field are by no means so bad as some would have people believe. In fact, now that the excitement of the closing down of war activities is virtually over and people are again settling down, men prominent in the sale of electrical goods are becoming a lot more cheerful.

Business, in electrical lines at least, is not bad. In fact, in many places it is rather good for this time of the year. Generally speaking, the months of December, January and February are not particularly active. Sales begin to open up as a rule in March. These conditions, therefore, must be taken into consideration when speaking of current business.

To be sure, sales have dropped off from what they were prior to the signing of the armistice. Furthermore, it is probably true that sales would have been much larger had war continued. This, however, was a forced demand

and did not represent normal purchases.

With the war over the market again returns to normal purchases and therefore must follow, more or less closely, normal buying customs. Therefore it is reasonable to expect that the current demand for electrical goods will be less than October sales. If the sales, however, were away below those for the same period last year or before the war, there might be some occasion for feeling pessimistic. As a matter of fact, it will probably be found that the January and February sales, particularly those by jobbers, will surpass those for the first two months of 1918 and will be greatly in excess of the sales during pre-war Januaries and Februaries.

Incoming orders to manufacturers are, of course, smaller than they have been, but it is doubtful if they have fallen below what would be good business for this season. Certain it is that the total volume of current sales billed of electrical goods surpassed that of the first two weeks of January, 1914.

Individual incoming orders, it is true, are not large, but this is by comparison with the size of the orders during the war. In the light of normal winter business these orders will probably be seen differently.

More Cars Suggested for Brooklyn

Receiver Recommends that 400 or 500 New Steel Motor Cars Be Provided

The Brooklyn Rapid Transit Company, through Receiver Garrison in his report to the court, recommends that provision be made as soon as possible for 400 or 500 new steel motor cars to cost approximately $20,000 each.

The financial requirements for the immediate future for the three receivership companies, as outlined by the receiver, in addition to cars just mentioned, include for the Brooklyn Rapid Transit Company the purchase of fifty trail cars with appurtenances, as agent for the surface railway companies, at an estimate of $417,000, and under the New York Consolidated Railroad Company the conversion of surface cars for trailer operation, as agent for surface railroad companies, at a cost of $200,000.

Material in Hands of Government

The stock of machinery and engineering materials on hand not in possession of troops as of Dec. 1, 1918, includes a number of items in the electric railway field. Those of particular interest are 166 concrete mixers, 68 road rollers, 942 tons of paint materials, 1030 tons of copper wire, 772 tons of electrical material and the following track material and fastenings: Rails, 42,855 tons; spikes, 3539 tons; bolts, 1875 tons; angle and splice bars, 1908 tons; turnouts and switches, 4374 tons; miscellaneous track material.

Recent Incorporations

Danbury, Conn.—Application has been made by Charles E. Graham, New Haven, one of the bondholders of the Danbury & Bethel Street Railway, to the General Assembly for a charter for street railway lines in Danbury, with the powers and privileges of building, operating and maintaining all the lines that the Danbury & Bethel Street Railway is now authorized to conduct, and with the same powers to manufacture and sell electric current, and also the right to acquire all or a portion of the franchises and property of the Danbury & Bethel Railway and to issue bonds and securities in part payment thereof. This action is understood to be a preliminary step toward the reorganization of the Danbury & Bethel Railway and the taking over of that company by its bondholders for the purpose of restoring the road to proper condition and operating it.

Franchises

New Haven, Conn.—The following petitions have been filed by the Connecticut Company at the office of the secretary of state: To construct and operate a street railway beginning at Occum, in the town of Norwich, along the Norwich and Worcester turnpike, the Versailles road, the Jewett City-Norwich road, Main and North Main Streets in Jewett City and then to the connection with its tracks near Central Village; to extend charter rights in Taftville for the purpose of connecting its tracks through Norwich Avenue from South B to North B Streets; to construct and operate a railway in Hamden from the connection in Dixwell Avenue near Blake's Corner, along Dixwell Avenue to the connection in Whitney Avenue near the town hall. The Connecticut Railway & Lighting Company, a subsidiary of the Connecticut Company, has petitioned for an extension of its charter rights to ratify its action of Aug. 5, in the extension of its tracks from the end of the North Bridgeport line on Trumbull Avenue Road, along Boston Avenue to connect at East Main Street. This extension was carried out on a request from the United States Housing Corporation as a vital necessity to furnish transportation for munition workers, according to the petition.

Kansas City, Mo.—The Kansas City & Leeds Railroad has received a twenty-year franchise from the City Council to construct an electric line from Thirty-first Street and Hardesty Avenue in a southeasterly direction to Leeds. [Nov. 2, '18.]

Fremont, Ohio.—The Lake Shore Electric Railway is preparing to ask the commissioners for a new franchise through Sandusky County. The present grant expires within six years. The county is contemplating paving the Maude pike from Clyde to a point 1 mile west of Fremont and the electric line has offered to contribute toward the cost in exchange for a new franchise or an extension of the present one.

Track and Roadway

Phoenix (Ariz.) Railway.—This company reports that it will construct 1 mile of new track during 1919.

Sacramento Northern Railroad, Sacramento, Cal.—A survey has been begun by engineers of the Sacramento Northern Railroad for a proposed extension through the Sutter Basin. The proposed line will connect with a branch of the Sacramento Northern Railroad to Woodland, about 2½ miles out of Woodland, thence northerly about 6 miles, crossing the Sacramento River at a point about 5 miles below Knights Landing and thence up through the center of reclamation district 1500. The line, if constructed, will ultimately be extended northerly a distance of about 10 miles and connect with the Meridian branch of the Sacramento Northern Railroad. In so doing there will be a completed loop from Sacramento to Woodland, to Meridian and thence back to Sacramento via Marysville.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Trenton & Mercer County Traction Corporation is conducting a series of conferences with the City Commission of Trenton for the purpose of speedily bringing about improvement to the system as ordered by the Board of Public Utility Commissioners of New Jersey. Since the company was given permission to charge a straight 6-cent fare, a total of approximately $80,000 has been expended for new work completed and under way and materials and supplies contracted for. The company has arranged for a large expenditure for track improvement at State and Broad Streets, where new switches and cross pieces will be placed.

New York, N. Y.—The Continuous Transit Securities Company, of which M. Everhart Smith is president, has filed with the Public Service Commission for the First District of New York a plan for the establishment of a moving platform in Forty-second Street in place of the present shuttle subway operation between the East and West Side subway lines. It is proposed to utilize two of the four tracks and to construct three moving platforms, the fastest of which will operate at a speed of 9 m.p.h., and its seating capacity be 31,680 passengers per hour. The cost is estimated at less than $1,000,000. The commission has taken the plan under consideration.

Interborough Rapid Transit Company, New York, N. Y.—Operation has been begun by the Interborough Rapid Transit Company on the Pelham Bay Park branch of the Lexington Avenue subway from 138th Street to Hunts Point Avenue.

South Fork-Portage Railway, Johnstown, Pa.—A report from the South Fork-Portage Railway states that during 1919 the company will complete and equip the remaining 3½ miles of its line connecting South Fork and Portage if the Capital Issues Committee approves the issuance of stocks and bonds.

Beaumont (Tex.) Traction Company.—The Beaumont Traction Company plans within the next couple of months to spend $87,000 for double-tracking certain streets, putting in new switches and extending the signal block system in order to better maintain its schedules.

Seattle (Wash.) Municipal Railway.—The City Council of Seattle has adopted a resolution providing for the sale of sufficient bonds to provide finances for the immediate construction of the west end of the municipal elevated railway. City Engineer Dimock believes that the road will be ready for operation of cars by Feb. 1. The government plans to discontinue the steam train service to the shipyards, and the city will make every effort to have the street car line ready by the time the steam service is abandoned.

Power Houses, Shops and Buildings

Western Light & Power Company, Boulder, Col.—It is reported that improvements and extensions will be made by the Western Light & Power Company to its plant and system to cost about $1,000,000.

Kansas City, Mo.—C. C. Peters, president of the Interurban Central Station Company, has announced that Hughes Bryant has been employed to push the project of the construction of the proposed interurban passenger terminal at the corner of Tenth and McGee Streets to be used by all interurban railways entering Kansas City. Architects will be employed during the coming month and the construction contracts let as soon as final plans are drafted.

Cleveland, Alliance & Mahoning Valley Railroad, Ravenna, Ohio.—This company reports that during 1919 it expects to purchase an engine lathe, wheel press, boring mill and three 200-kva. transformers for its substation.

Pacific Northwest Traction Company, Seattle, Wash.—Plans are being made by the Pacific Northwest Traction Company for the immediate erection of a building at Sixth Avenue and Olive Street to be used as a permanent station for the Everett interurban line. The structure will cost about $100,000.

Ashland Light, Power & Railway Company, Ashland, Wis.—It is reported that the Ashland Light, Power & Railway Company plans to begin work on a hydro-electric project on the Flambeau River, 14 miles north of Ladysmith, early in the spring, to cost about $1,750,000. L. E. Myers & Company, engineers, 53 West Jackson Boulevard, Chicago, will supervise the work.

Trade Notes

Harry De Steese, 30 Church Street, New York, N. Y., has reopened his office which has been closed during the period of the war. Here he will deal in tapes and compounds, line material, shop and track tools, armature and field coils and other railway supplies. Mr. De Steese has been in the business for twenty-four years.

Frederick A. Scheffler, formerly with the Babcock & Wilcox Company, has become associated with the Fuller Engineering Company of Allentown, Pa., as manager of the department devoted to the application and introduction of pulverized coal equipment for steam power plants in the United States. Mr. Scheffler's headquarters will be 50 Church Street, New York.

W. Jerry Stanton has resigned as sales manager of the Railway Improvement Company to become special representative of the National Railway Appliance Company, 50 East Forty-second Street, New York. Mr. Stanton is a native of Schenectady and for a period covering eighteen years was employed by the General Electric Company in its testing, engineering and sales departments.

Roller-Smith Company, manufacturer of electrical instruments and circuit breakers, New York City, announces the opening of a Detroit office in the New Telegraph Building in charge of C. H. Nicholson, formerly connected with the Chicago office of the company, who just returned from service with the Signal Corps. The company also announces the appointment of James E. Wood as manager of its Cleveland office at 711 Williamson Building, succeeding C. S. Ripley.

W. C. Lincoln has been appointed engineer for the National Railway Appliance Company, 50 East Forty-second Street, New York, effective Jan. 1. Mr. Lincoln was originally employed by the American Locomotive Company, Schenectady, leaving that company's service to enter Union University. After graduation and the completion of the General Electric Company's test course, he was assigned to special railway work by that company. Subsequently, he took up and completed the company's engineering extension course, after which he was connected for some time with the consulting engineering department. Later Mr. Lincoln entered the railway engineering department and in 1913 transferred to the General Electric Company's Philadelphia district as commercial engineer, railway department, after which he entered the service of the Railway Improvement Company, New York, as electrical engineer.

Edwin Besuden, for the past sixteen years sales manager for the Jewett Car Company, Newark, Ohio, which recently went into receivers' hands, has resigned from this company and is now temporarily located at the offices of the Ellcon Company, 50 Church St., New York City. Mr. Besuden expects to enter the electric railway supplies field as representative for a number of manufacturers supplying this market, but has made no definite plans yet in this regard.

Edward D. Hillman, for the past twelve years secretary and engineer of the National Railway Appliance Company, New York, has resigned from that company and has accepted a position with the new Consolidated Steel Corporation, 165 Broadway, New York. This company has just been organized and will handle the export trade of the following independent steel mills. Bethlehem Steel Company, Brier Hill Steel Company, Lackawanna Steel Company, Lukens Steel Company, Midvale Steel Ordnance Company, Republic Iron & Steel Company, Sharon Steel Hoop Company, Trumbull Steel Company, Whitaker Glessner Company and Youngstown Sheet & Tube Company.

Economy Electric Devices Company, Chicago, Ill., reports recent sales of Vulcan One-Man Kersosen Torches, for use in thawing frozen tracks and equipment and for shop work including preheating, to the following roads: Rockford & Interurban Railway; Dayton. Springfield & Xenia Southern Railway; Illinois Traction System; Grand Rapids, Grand Haven & Muskegon Railway; Keokuk Electric Company; Joliet & Eastern Traction Company; Fort Wayne & Northern Indiana Traction Company; United Railways & Electric Company; Capital Traction Company; Terre Haute, Indianapolis & Eastern Traction Company; Inter-Urban Railway Company; Chicago Surface Lines; Milwaukee Electric Railway & Light Company; Chicago Elevated Railways; Chicago, North Shore & Milwaukee Railroad; Philadelphia Rapid Transit Company; Atlantic City & Shore Railroad; Dubuque Electric Company and York Railways Company.

Capt. H. Fort Flowers, head Trench Warfare Materials Section of the Ordnance Department, Philadelphia zone, has recently been relieved from the service by the War Department. He has returned to New York to take up his work as president and general manager of the Differential Car Company, which was organized by him four years ago. The Differential Electric Dumping Car invented and designed by Captain Flowers and built under his direction is well known to electric railway track engineers. A large number of these cars are now in service in various parts of the United States. With the personal attention which Captain Flowers will be able now to give to his business interests an active business campaign may be expected. Major Leon Fraser, vice-president of the company, and S. G. Hughes, first lieutenant of field artillery, are still in France in active service. F. E. Scott, secretary of the company and first lieutenant in the gas warfare service, has also been relieved from military duty to take up his work with the company.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 53 New York, Saturday, January 25, 1919 *Number* 4

Has the Time Come for the Taxpayer to Step In?

COURAGE of a high order in stating conditions, a fine enthusiasm and a keen desire to find the best solution for an admittedly difficult problem—such are the qualities which one must ascribe to the Massachusetts Public Service Commission after reading its latest annual report to the legislature. An abstract of this remarkable document is published in subsequent pages. We say "remarkable," for rarely if ever has any regulatory body discussed the general electric railway situation with such candor.

But, as the commission itself remarks, "it is much less difficult to know what ought to be done than how to do it," and from this phase of the case will arise the dissent which many will undoubtedly express in regard to some of the commissioners' suggestions. It is manifestly true that the credit of electric railways stands impaired, that the properties are deteriorating, that the service needs improvement and that withal the public is paying what it considers high prices. It is equally true that the welfare of communities demands the restoration of credit or the provision of some other means which will enable railways to render first-class service, and also a system of fares which will make the service as useful as possible and help rather than restrict community development. But how is all this to be brought about?

A solution worth most serious consideration, the commission feels, is that of public ownership of practically all the electric railways in Massachusetts. The commission's reasoning is simple. It believes it to be not impossible that, as the public becomes inured to a policy of higher fares, this may produce better financial results than have yet been realized. On the other hand, the commission feels that the chance of higher fares curing the present financial ills is small and that at any rate there is no immediate prospect of cure. Rather than have the communities suffer from a further extended trial of a method whose success is not certain, the commission argues in favor of the taxpayer bearing part of the cost of transportation, and says it is difficult to escape the conclusion that the only effective remedy is outright public purchase or taking over of the properties.

Here we have a definite challenge to the proponents of higher fares to show not only the presence of beneficial results but also the absence of injurious ones. It also constitutes a definite opportunity for the opponents of public purchase to show that a venture into the controversial and complicated fields of public ownership and taxation would, to say the least, be unlikely to produce favorable results before the coming of those normal times when higher fares would certainly handle the situation adequately.

In our opinion the Massachusetts commission depreciates a little too much the possibility of ultimate success from higher fares. Financial aid from taxation may be necessary in the meantime, but this can be accomplished in a temporary manner better than in connection with permanent acquisition. The placing of any transportation cost upon the taxpayer would involve a radical change in public policy, and where adequate public control exists this change would give no reason for adopting another radical upheaval in public policy, from private to public ownership.

The Massachusetts commission sees the issue clearly and states it frankly as the basis for discussion. It is wise in postponing the formulation of any definite plan until the subject has been considered by many minds from many angles and until the public has expressed its opinion.

Higher Wages Do Not Always Increase Production

WITH every increase in wages goes the hope that it may be offset by some form of increase in production which will tend to keep the net cost at or below the level obtaining before the increase. Apropos of the platform for reconstruction which has been presented to the Senate committee on labor by the American Federation of Labor is the conviction that greater production or improved service should figure more prominently in discussion of labor problems than it does at present. In a recent editorial one of our leading technical journals indicated that conditions are not what they ought to be by noting that in the steel workers' trade the leaders were co-operating with the government to bring about the desired increase in production. In this case the unit of production, the number of rivets driven or tons of steel erected per dollar-hour, can readily be measured. In other trades it is difficult to measure production on a unit basis, but even here the situation is essentially the same.

Capital would much prefer to pay high wages rather than low if it could get corresponding high prices for its products, but operative in this connection is the economic law that wages and prices can be no higher than the traffic will bear. Attention is directed also to a report of the National Industrial Conference Board to the effect that the adoption of a fifty-four-hour week reduced production in every factory employing more than 750 hands, with moderate and various results only in the case of small and relatively inefficient factories. As reduction in working hours is another form of increased wages, this statement by a high authority would seem to bear out the previous contention.

It is unfortunate that many wage earners seem to think that it is not necessary really to earn more when paid more. On the contrary, common labor has tended to adopt the attitude of doing as little work as possible for the pay received, and advantage has been taken of the reluctance of employers to release men on account of slack habits in work or general laziness, because of the difficulty in securing men to replace them. It has been the experience of electric railways generally that the amount of work done per day by track laborers, for instance, has steadily declined for the past two years, and we are inclined to the belief that this decline is quite general in other industries employing common labor. The problem of how to increase the production of common labor in proportion to increases in wages is far from a satisfactory solution. To our minds it is really a problem in the realm of "human engineering," which involves ceaseless study of methods of getting together with the men; teaching them to understand that the employer's interest and theirs are one, employing incentives which will attract steady men, and displaying a spirit of justice and fair dealing.

How Can I as an Individual Help the Engineering Association?

THE minutes of the recent meeting of the executive committee of the American Electric Railway Engineering Association, printed elsewhere in this issue, indicate a desire on the part of the men composing it to get committee work started again, and started promptly. This will be necessary if anything really worth while is to be done in time for discussion at the fall meeting. Like a trolley car, an association possesses mass and hence requires force to accelerate it after it has been at rest for a time. The Engineering Association lost its momentum when it slowed up during the war period. That momentum must be restored by means of a strong and steady pull by everyone interested in the association's success between now and convention time. One practical way in which this can be done is for committeemen to take their responsibilities seriously and for all to co-operate in furnishing promptly whatever data the committees may require to enable them to produce good reports. Another thing that is needed is a careful study by the individual members of the association records so that constructive criticism can be furnished the committees.

The Engineering Association has a creditable record. It has been of great value to the companies because its standards and recommended practices have assisted the companies in securing reliable supplies at reasonable prices and in furnishing the auspices under which their engineers could get together to exchange the fruits of experience. It has a promising future because better engineering than ever will be needed in the coming years. It needs to digest the work done previously and discard that which time has proved to be useless, to lay plans for doing work for the industry which no other agency can do, and to arouse among its members a feeling that it is really worth while from every standpoint.

The Increases Asked Are Only Reasonable

THE Denver Tramway Company is asking its patrons to suggest the best remedy for solving the local traction problem. In a recent issue of its little pamphlet *Tram-O-Grams* the company presents a statement of increased expenses and says it is entirely willing to accept any fair and equitable plan that the sound judgment of the community as a whole may consider better and more satisfactory than the one now being pursued. Its comments on possible alternative measures contain some items worthy of discussion.

The Denver situation was brought to a climax—as in many other cities—by the award of the War Labor Board granting increased wages to the employees. It has been suggested by some persons that the matter of increased wages can be taken care of by reducing "other expenses." The Denver company has been known as an advocate of economy measures consistent with good service. We doubt, therefore, if any considerable saving could be made by a pruning knife judiciously handled by a capable critic.

Another suggestion to the effect that the company should "carry its own burden by borrowing money," is easily answered by an invitation for anyone to go out and attempt to borrow money on the afflicted company's credit. It must be remembered that credit only comes from prosperity, and the people as a whole have it in their power to give the corporation better borrowing ability by fair treatment which will restore its earning capacity.

A good point is made in the company's statement to the effect that the men who led the crowds in the recent rioting were those whose wages had been enormously increased and who by their actions were trying to erect a barrier against the payment of higher wages to the car employees. Happily, these measures did not prevail, and the company has been proceeding with the collection of a higher fare. It seems, however, that the people of Denver have great expectations of the value of their additional payment, and some of them are clamoring for new cars, new rails, etc., out of the surplus which they expect will remain after paying operating expenses. The company answers these requests by the statement that the present fare will hardly pay expenses, much less leave an excess for the purchase of much new equipment.

This same expectation has been expressed in other cities where the people who have been obliged to pay a higher fare thought that thereby they have placed the railway company on the high road to prosperity. Actually, we do not understand that the average company is asking for more than an emergency rate which will help tide it over the present crisis until better days bring increased business and lower operating charges. Then and only then will it be fair for the public to insist on reconstruction of the system or additional service. We do not believe, on the other hand, that any management will be so blind as to refuse an extension of facilities where such improvements are likely to bring an increase in revenues. The railway manager knows that his job depends on satisfying the security holders and that their prosperity is contingent on meeting the transportation requirements of a community which is willing to pay for adequate service.

The List of Receiverships Is Lengthening

THE tabulation of electric railway receiverships, foreclosures and abandonments set forth in our Annual Statistical Number has attracted considerable attention in the daily and financial press. The general verdict is that it tells a sorry story, yet if we are to believe the argument of spokesmen for the public in some recent fare hearings, a receivership is nothing for the public to worry about. We wonder if men who utter such sentiments really mean what they say? Glancing at the history of last year's experience in the industry we find that twenty-nine companies—including the extensive properties of Brooklyn and Pittsburgh—were taken over by receivers, and that almost three score companies suspended service in whole or in part. Since Jan. 1 other important properties, including those at New Orleans and Memphis, have joined the increasing number of embarrassed properties, while still others frankly say that they cannot much longer withstand the economic strain to which they are now being subjected. Roads which are thus facing financial embarrassment include properties which before the war were considered among the strongest financially in the country.

There is, of course, a great difference between a receivership and the suspension of service, although the Bay State company experience shows that one sometimes follows the other. Nevertheless, the public does not profit in either case, and if one may regard the thousands of security holders as part of the public there is a distinct loss in every instance. No one gains by destruction of capital.

In this connection we might also consider the suggestion sometimes made in rate cases that service be reduced rather than a fare increase be granted to cover growing expenses. Doubtless there are instances on some properties where an excess of service is given even in normal times and where an elimination of this waste should be the first act of a prudent management. In the great majority of cases, however, a lessening of service would mean inconvenience to the patrons and possibly the development of jitney lines or other competitive agencies. Reduction of service in such circumstances should be made only after mature consideration and for as short a period as possible.

We remember hearing a city attorney in a rate case suggest that in the event of traffic falling off because of a 1-cent increase in fares the company should take advantage of the fact by taking off a corresponding number of cars. While this might be advisable in some cases it is not always practicable because contracts for a minimum day's pay for trainmen would not allow the company to get the full benefit of such a measure. It must be remembered, too, that the welfare of a community depends to a considerable extent on its transportation facilities, and a curtailment of service might result in driving industries to other locations.

There can be no question that the average car rider dislikes a proposal to pay a higher fare. It is necessary, therefore, to make a satisfactory showing for an increased rate and when this is proved the public has its choice of paying the new rate or doing without proper service. In either case the price must be paid, and the public should think well before giving basis for the opinion that that particular community is not the right place for capital to seek investment. A reputation for playing bogey man with capital is not one in which any city can take pride.

A Neglected Element in the Electric Railway Return Circuit

WHEN there is excessive potential drop in the track return circuit of the electric railway, current leaves the track, if the conditions are favorable, and wanders back to the power house by devious and sometimes troublesome routes. It must all get back somehow, for one of nature's inexorable laws requires this to be so. Naturally any pipe lines or cable sheath which lie in the path between track and busbar will tempt the stray currents, for another of nature's laws requires them to follow lines of least resistance. The magnitude of the current leakage from the rails depends upon two, and only two, physical quantities—the fall of potential along the track and the resistance between track and busbar. A great deal of attention has been given to reduction of the voltage gradient along the track (usually referred to in terms of volts per thousand feet), but there is little information available regarding the resistance between rails and surrounding soil, the chief element in the stray path resistance. There are several means available for keeping down the gradient, such as good joint and cross bonding, return feeders, numerous substations and return feeder "boosters," but the increase in resistance from rail to earth by insulation of track is a much more dubious proposition. Nevertheless it is well worth while to study the possibilities of doing this. And it is certainly desirable to know how much the resistance is with different kinds of track construction so that, everything else being equal, a type possessing high-resistance qualities can be selected if there is a possibility that the stray current may be an unwelcome visitor in neighboring pipes.

The readers of this paper have probably known in a general way that the United States Bureau of Standards has been conducting experiments in and around Washington for the purpose of collecting track insulation resistance data. The results have been withheld from publication until sufficient time had elapsed to enable measurements to be made in all kinds of weather and to show the effects of time upon the resistance. The bureau is now satisfied that the results are complete enough to be of value to electric railways generally and have authorized publication under the signature of E. R. Shepard, electrical engineer. He outlines and discusses the methods employed and analyzes the results in a very practical manner in this issue of the JOURNAL leading up to a few crisp and suggestive conclusions. These involve no radical expedients for increasing insulation resistance and they indicate that the types of track which are finding increasing favor are inherently of better resistance qualities than the older ones. This, however, is "more good luck than good management," for the matter of insulation has not figured prominently as a factor in the designs. To every signal engineer, as well as to those who are directly responsible for the mischief which may be caused by stray current, Mr. Shepard's article will be useful and stimulating.

Leakage Resistance of Electric Railway Roadbeds

Results of Tests Covering a Period of More Than Three Years Made Upon Railway Tracks in Washington, D. C., and Upon Short Sections of Experimental Track on the Bureau of Standards Grounds

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MEN FROM BUREAU OF STANDARDS MAKING TESTS

ALTHOUGH much attention has been given to the mitigation of electrolysis of underground structures, electric railway engineers seem to have given little attention to the insulation of roadbeds or their construction in such a manner as to offer high resistance to leakage currents. In the 1914 report of the committee on way matters of the American Electric Railway Engineering Association, "effect on electrolysis" was enumerated as one of the twelve factors influencing the design for "proper foundation for tracks in paved streets," but it does not appear that this factor was considered by the committee in recommending four standard types of construction.

Practically no data on the resistance of different types of roadbeds are available, although the relative resistances of some types are known in a general way. Measurements made in 1911 and 1913 by G. H. Ahlborn[1] on three electric lines, each several miles in length, showed as follows: An open track on high, well-drained gravelly soil had a leakage resistance of 14.57 ohms per 1000 ft. of single track, while a similar track on low, marshy clay and gravel, with the rails in contact with the earth in many places, had a leakage resistance of only 1.76 ohms. A city track in Washington on crushed rock ballast with a Tarvia surface had a resistance of about 1.81 ohms. Only three lines were investigated.

In the present paper leakage resistance data are presented for a number of types of roadbed for different weather and soil conditions. The several factors which influence the resistance of roadbeds are discussed also. With such information available electric railway engineers will be able to give the subject the deserved attention, and to select those types of construction which are consistent with other features and give the highest leakage resistance. The leakage path traversed by stray current from electric railways consists of several elements and varies with different types of roadbed construction. In the case of open track the current leaves the rails and enters the ties through the spikes and the rail base, then passes into the ballast and finally reaches the adjacent earth. In paved streets an additional leakage path is offered through direct contact of rails with the earth, pavement, or other material in which they are imbedded. By far the greatest part of the total leakage path resistance is in the roadbed, particularly in open construction.

In determining the resistance of any type of roadbed an attempt was made to measure the resistance between the rails and a remote ground such as a network of water mains. Such a measurement would include the earth between the roadbed and the remote ground, but this has ordinarily only a very small fraction of the total resistance. The difficulties involved in making resistance measurements on ordinary track systems are considerable in view of the facts that in general such systems are electrically continuous for miles and include many different types of construction, and they are actively employed during the greater part of the twenty-four hours. In order to determine the resistance to earth of any limited section of track it is necessary to isolate that section from the remainder of the track network or else make differential measurements when no cars are in operation.

Investigations discussed in this article were made in the District of Columbia, upon the only three types of open track and the two types of city track which were suitable for the purpose. In order to supplement the information obtained on the city tracks several short sections of experimental roadbeds of different types were constructed and tested for resistance under different weather and soil conditions over a period of many months.

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[1] See Technologic Paper No. 75 of the Bureau of Standards, entitled "Data on Electric Railway Track Leakage."

DIFFERENTIAL METHOD OF TESTING IS ADAPTED TO MEASUREMENTS IN PAVED STREETS

In the tests on roadbeds where a limited section of the track could not be isolated, the method illustrated in Fig. 1 was employed. After car traffic had ceased for the night a portable storage battery was connected as shown between the four rails and a water hydrant, with ammeter and regulating resistance in circuit. A current of from 25 amp. to 35 amp. was maintained in this circuit. A millivoltmeter was used to measure the potential drop on a short section of track at two stations, *A* and *B*, several thousand feet apart, permitting the loss of current to be calculated on the assumption that the rails were of the same weight and resistivity at the two stations and that the battery current was maintained constant. A further measurement of the potential difference between the section of track under test and the earth at some distance away furnished the remaining data necessary for the calculation of leakage resistance. While this test requires great care for accurate results, by making measurements at several slightly different locations at each station and by determining the average potential difference between the track and the earth by means of a number of different underground structures, a fair degree of accuracy was secured. The most reliable and consistent results were obtained by driving a ground rod into the earth not less than 50 ft. from the track and measuring the potential difference between it and the track with a high-resistance voltmeter.

The differential method was employed on the Wisconsin Avenue line in Washington at two different locations designated as *a* and *b* in Table I, on page 174, and on the Chevy Chase line in three locations designated as *c*, *d* and *e* in Table I. The measurements extended over a period of two years and were taken under different moisture conditions of roadbeds.

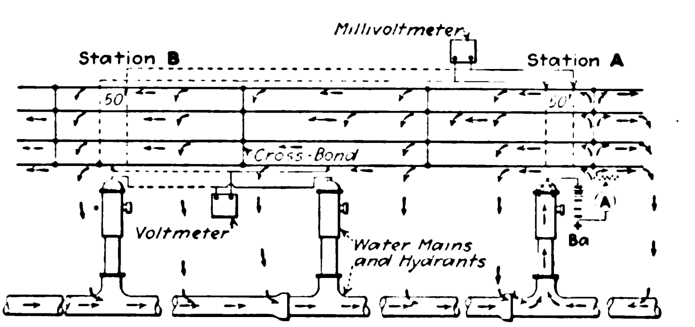

Millivoltmeter
Station B
Station A
50'
50'
Cross-Bond
Voltmeter
Water Mains and Hydrants
A
Ba

FIG. I

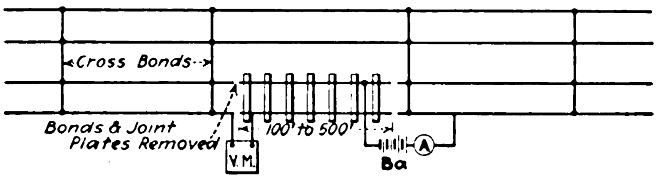
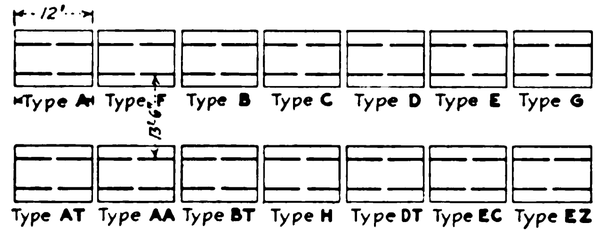

Cross Bonds
Bonds & Joint Plates Removed
100' to 500'
V.M.
A
Ba

FIG. 2


12'
13'6"
Type A
Type F
Type B
Type C
Type D
Type E
Type G
Type AT
Type AA
Type BT
Type H
Type DT
Type EC
Type EZ

Arrangement of Experimental Roadbeds
FIG. 3

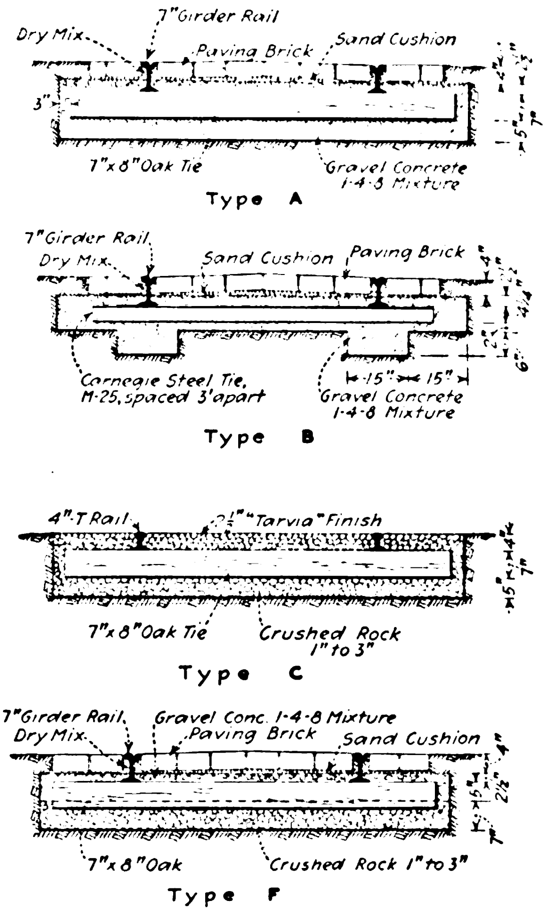

7" Girder Rail
Dry Mix
Paving Brick
Sand Cushion
3"
7"x8" Oak Tie
Gravel Concrete 1-4-8 Mixture
Type A
7" Girder Rail
Dry Mix
Sand Cushion
Paving Brick
Carnegie Steel Tie, M-25, spaced 3' apart
15"
15"
Gravel Concrete 1-4-8 Mixture
Type B
4" T Rail
2½" "Tarvia" Finish
7"x8" Oak Tie
Crushed Rock 1" to 3"
Type C
7" Girder Rail
Gravel Conc. 1-4-8 Mixture
Dry Mix
Paving Brick
Sand Cushion
7"x8" Oak
Crushed Rock 1" to 3"
Type F

FIG. 4

Fig. 1—Diagram of connections for differential method of measuring roadbed resistance.

Fig. 2—Diagram showing method of making roadbed resistance measurements in open-track construction.

Fig. 3—Arrangement of experimental roadbeds on Bureau of Standards' grounds.

Fig. 4—Types of roadbeds employed in Bureau of Standards' experiments.

DIAGRAMS RELATING TO BUREAU OF STANDARDS' EXPERIMENT ON ELECTRICAL RESISTANCE OF TRACK ROADBEDS

IN OPEN TRACK THE ISOLATION METHOD IS AVAILABLE

On open track plates and bonds were removed from four joints, isolating a section of track from 100 ft. to 500 ft. long, the circuit arrangement being as shown in Fig. 2. All cross bonds between the test section and the adjacent track were cut. A battery of three or four dry cells was connected between the test section and the remainder of the track network, and by means

Table I—Electrical Resistance of City and Suburban Roadbeds

Location	Kind of Roadbed	Date of Test	Condition of Roadbed	Average Potential to Earth, Volts	Leakage Current, Amperes	Distance in Feet	Resistance of 1000 Ft. of Track to Earth, Ohms
a	Gravel ballast to head of 70-lb. T-rails. Much sand and earth washed in	2-17-15	Wet	2.2	12.2	2,900	0.522 double track
		2-26-15	Wet	1.3	6.9	2,900	0.547 double track
		8-14-15	Wet	1.5	7.88	2,900	0.552 double track
		4-3-17	Surface dry, ballast moist	2.1	7.66	3,300	0.902 double track
		4-9-15	Moist	1.0	2.85	3,750	1.3 double track
b	Same	4-17-15	Moist, no rain for six days	1.5	3.73	2,750	1.1 double track
c	Crushed rock ballast to head of 80-lb. T-tails, Tarvia finish	4-6-15	Wet	2.4	9.0	3,000	0.8 double track
		8-31-15	Wet	1.8	6.67	2,690	0.72 double track
		4-5-17	Quite dry. No rain for twelve days	3.3	6.31	3,050	1.60 double track
d	Same	4-21-15	Quite dry. No rain for several days	3.2	4.7	1,700	1.16 double track
e	Open track crushed rock to base of 80-lb. T-rails. Frequent crossings with ballast to head of rails	4-2-15	Dry. No rain for weeks. Surface dry, ballast wet	3.8	3.12	4,100	5.07 double track
		4-6-15		3.5	7.5	6,500	3.03 double track
		8-31-15	Surface dry, ballast wet	3.8	4.14	2,360	2.17 double track
		4-5-17	Quite dry. No rain for twelve days	4.9	2.1	1,140	2.66 double track
f	Open track. Cinder ballast from 4 in. below ties to base of 60-lb. T-rails	10-2-15	Surface moist, ballast wet	6.85	0.302	361	8.2 single track
		11-10-15	Dry. No rain for twenty days	9.8	0.197	361	18.0 single track
g	Open track. Deep gravel ballast to base of 80-lb. T-rails	9-25-15	Surface dry, ballast moist	8.2	0.71	462	5.34 single track
		11-12-15	Dry, no rain for twenty-two days	9.5	0.615	462	7.14 single track

of a low-reading ammeter and a voltmeter the data for calculating the resistance were obtained. The resistance so found is for a single-track roadbed but in the open type of construction, as the resistance to earth is concentrated largely in the ties, that of double track can be taken as one-half the resistance of single track. Measurements by this method were made on the Cabin John line in Washington and on the Washington, Baltimore & Annapolis track just outside of the District line, as designated by *f* and *g* respectively in Table I.[*]

The results of the test are given in Table I, showing data for tracks bearing normal traffic. The Wisconsin Avenue tracks were originally ballasted with gravel up to and around the base of the rails; and earth was filled in to the head of the rails. While part of the earth has been washed away the rails are well imbedded in gravel and earth and the roadbed can be considered as having unusually low resistance. The first three tests were made with the roadbed very wet, and the resistance of 0.5 ohm per 1000 ft. of double track as given is about half that found at the same location under dryer conditions.

The Chevy Chase line is well ballasted with crushed rock and a portion has been paved to the head of the rails with a Tarvia finish. The finish has become somewhat porous, and this condition prevails in locations *c* and *d*. At location *e* the pavement has been omitted except at crossings.

The cinder ballast in open construction of the Cabin John line offers a very high resistance to leakage current. Two measurements made under conditions similar to those existing on cinder track were made on the W., B. & A. line which is ballasted with gravel. It will be noted that the gravel-ballasted roadbed has about one-half the resistance of that with cinder ballast. This cannot be attributed primarily to the ballast but is probably due more to the character of the ties.

FOURTEEN SHORT TEST ROADBEDS WERE BUILT

Owing to the difficulties involved in making resistance measurements on city tracks and the limited number of types available it was decided to build short sections of a number of different types of roadbeds on which frequent measurements could be made. While such roadbeds would exhibit different characteristics from similar types subjected to traffic surface drainage and salt which is frequently used to prevent freezing, they would permit of a careful study of the effect of moisture and temperature. They would also enable comparative measurements to be made which could be checked with similar data obtained from city tracks under operation.

Fourteen types of experimental roadbeds were built early in 1915 arranged as shown in Fig. 3. Four cross-sections are shown in Fig. 4. The details were as follows, a condensed description being given in Table II:

DETAILS OF THE SEVERAL TYPES OF EXPERIMENTAL ROADBED

Type A. (See Fig. 4). Ballast, gravel concrete, 1:4:8 mixture; ties, 7-in. x 8-in. x 8-ft. oak, on 2-ft. centers; rails, 7-in., 90-lb. girder, 4-in. base; spikes, 6-in., driven, four per tie; surface, vitrified paving bricks on sand cushion, 1:3 dry mix, between bricks and rails, 1:3 thin grout swept into joints after laying, ¾-in. crown between rails.

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[*] These measurements were made possible through the co-operation of C. S. Kimball, engineer maintenance of way, Washington Railway & Electric Company, and E. W. Weinland, engineer maintenance of way, Washington, Baltimore & Annapolis Electric Railroad.

Table II—Condensed Description of Experimental Roadbeds

Type	Ballast	Ties	Rails	Surface	Special Features
A	Concrete	7-in.x8-in. oak, 2-ft. centers	7-in. girder	Vitrified paving brick	
AT	Concrete	7-in.x8-in. oak, 2-ft. centers	7-in. girder	Vitrified paving brick	Roadbed insulated with tar paper and pitch
AA	Concrete	7-in.x8-in. oak, 2-ft. centers	7-in. girder	Vitrified paving brick	Roadbed insulated with tar paper and asphalt
B	Concrete	Steel, 3-ft. centers	7-in. girder	Vitrified paving brick	
BT	Concrete	Steel, 3-ft. centers	7-in. girder	Vitrified paving brick	Roadbed insulated with tar paper and pitch
C	Crushed rock	7-in.x8-in. oak, 2-ft. centers	4-in. T	Tarvia	
D	Earth to head of rails	7-in.x8-in. oak, 2-ft. centers	4-in. T	Earth	
DT	Earth to head of rails	7-in. x8-in. oak, 2-ft. centers	4-in. T	Earth	Rails insulated with pitch
E	Earth to base of rails	7-in.x8-in. oak, 2-ft. centers	4-in. T	Open construction	
EC	Earth to base of rails	7-in.x8-in. oak, 2-ft. centers	4-in. T	Open construction	Ties treated with 10 lb. creosote per cubic foot
EZ	Earth to base of rails	7-in.x8-in. oak, 2-ft. centers	4-in. T	Open construction	Ties treated with ½ lb. zinc chloride and 2 lb. creosote per cubic foot
F	Crushed rock and concrete	7-in.x8-in. oak, 2-ft. centers	7-in. girder	Vitrified paving brick	
G	Crushed stone to head of rail	7-in x8-in. oak, 2-ft. centers	4-in. T	No surfacing	
H	Cinders	7-in.x8-in. oak, 2-ft. centers	4-in. T	Open construction	

Type AT. Same as Type A in every respect with base insulated as follows: Before laying the concrete a layer of roofing paper was spread over the entire roadbed and at the sides of the roadbed excavation in the street level. This paper was then covered with a mixture of 75 per cent coal-tar pitch and 25 per cent coal tar, applied at a temperature of about 200 deg. Fahr. While this coat was still hot a second layer of paper was applied and then a second coat of tar and pitch. The paper used was a soft tar paper manufactured by the General Roofing & Manufacturing Company and purchased as a 15-lb. felt. The tar was added to the pitch to make it less brittle.

Type AA. Same as Type AT in every respect except that asphalt was used instead of tar and pitch.

Type B. (See Fig. 4). Ballast, gravel concrete, 1:4:8 mixture; ties, Carnegie steel ties—M25, on 3-ft. centers; rails, 7-in., 90-lb. girder, 4-in. base; clips, No. 23 tie clips, four per tie; surface, same as for Type A.

Type BT. Same as Type B with base insulated the same as in Type AT.

Type C. (See Fig. 4). Ballast, crushed rock from 5 in. below ties to within 2½ in. of finished surface, tamped and covered with sand; ties, 7-in. x 8-in. x 8-ft. oak, on 2-ft. centers; rails, 4-in. T; spikes, 6-in., driven, four per tie; surface, Barrett Manufacturing Company specification as follows: Over base spread 2½ in. of crushed stone, 1 in. to 3 in. in size, and dry roll. Tamp. Spread 1.7 gal. of Tarvia X per square yard over this at a temperature of 200 deg. to 300 deg. Fahr. Cover with fine gravel, not larger than ½ in. and roll. Tamp. Spread evenly ½ gal. of Tarvia X per square yard and finally cover with sand for a wearing surfare.

Type D. Earth Roadbed. Ballast, earth to head of rails; ties, 7-in. x 8-in. x 8-ft. oak, on 2-ft. centers; rails, 4-in. T; spikes, 6-in., driven, four per tie; surface, earth.

Type DT. Same as Type D with rails coated with a mixture of 75 per cent coal-tar pitch and 25 per cent coal tar to make the coating less brittle. This coating was applied hot.

Type E. Open Construction. Ballast, earth to base of rails; ties, 7-in. x 8-in. x 8-ft. oak, untreated, on 2-ft. centers; rails, 4-in. T; spikes, 6-in., driven, four per tie; surface, open construction.

Type EC. Same as Type E but with ties treated (October, 1914) by Baltimore & Ohio Railroad by the vacuum-pressure treatment with 10 lb. of coal tar cresote per cubic foot.

Type EZ. Same as Type E but with ties treated (December, 1914) by the Baltimore & Ohio Railroad by the "Card" process with ½ lb. of zinc chloride and 2 lb. of coal tar cresote per cubic foot.

Type F. Ballast, 7 in. of 1-in. to 3-in. crushed rock, supporting 7½ in. of gravel concrete 1:4:8 mixture; ties, 7-in. x 8-in. x 8-ft. oak, on 2-ft. centers; rails, 7-in., 90-lb., girder, 4-in. base; spikes, 6-in., driven, four per tie; surface, same as for Type A. (See Fig. 4.)

Type G. Ballast, 1 in. to 3 in. crushed stone, from 5 in. below ties to head of rails, 9 ft. wide; ties, 7-in. x 8-in. x 8-ft. on 2-ft. centers; rails, 4-in. T; spikes, 6 in., driven, 4 per tie; no surfacing.

Type H. Ballast, cinders from 5 in. below ties to base of rails; ties, 7-in. x 8-in. x 8-ft. oak, on 2-ft. centers; rails, 4-in. T; spikes, 6-in., driven, four per tie; surface, open construction.

TEST ROADBEDS INCLUDED STANDARD TYPES

The types of roadbed experimented upon were made to include those most commonly used as well as to introduce certain modifications in the way of insulating material. Ties treated with several different kinds of preservatives were also used. Type A was built to correspond with Type D, as recommended in 1914 by the Engineering Association way committee; Type AT and AA being of the same construction but with insulating layers laid under the foundations. Type B corresponds closely with Type 3 of the way committee, while Type BT is the same but insulated. Type C is practically a duplicate of the Chevy Chase line. Type F is the same as Type A except that it has crushed stone under the ties. This corresponds to Type B of the committee and is a popular type of construction. The 1915 committee recommended this type for a standard design.

Each type of experimental track was constructed with a 12-ft. continuous section of roadbed and with two 6-ft. sections of rails as shown in Fig. 3. Each piece of rail in the system was wired to a common terminal board where complete switching facilities were provided.

In the tests the positive terminal of a 10 or 12-volt battery of dry cells was connected to any or all of the rail sections and the negative terminal of the battery was connected to a water service pipe. The resistance between the service pipe connections and the general water system of which it was a part was found to be invariably about 1 ohm. A voltmeter was connected across the battery terminals and a milliammeter was arranged for connection in series with a part or all of any track sections, while the remaining sections in either of the two divisions were also being supplied with current from the positive bus. This arrangement was made to prevent end leakage from the section under test.

Observations were made of the polarizing effect of the direct current, and this was found to increase the apparent resistance of the roadbeds about 5 per cent. No attempt was made to find a remedy for this.

TESTS OF EXPERIMENTAL ROADBEDS COVERED WIDE RANGE OF ELEMENTS

The results of the tests on the experimental roadbeds are shown in Table III and Figs. 5 to 7 on pages 176 and 177. The resistance measurements were first made on April 5, 1915, and repeated at irregular intervals thereafter for about three years.

Results of measurements on all types of roadbeds having full concrete ballast are shown in Fig. 5. It is evident that the insulating materials used in Types AT, AA and BT had a pronounced effect in increasing resistance during the first few months, but after three years the effect was so small as not to justify the use of such materials as a mitigative measure.

The resistances of the concrete roadbeds are seen to be very low in comparison with other types and to vary only moderately with the moisture content of the soil. Frozen ground, however, has a very marked effect on all types. The ageing of these roadbeds seems to have increased their resistances slightly, although this is not definitely established. There is practically no difference between the steel and wood tie construction, indicating that most of the resistance is between the concrete roadbed and the ground. Hence in city streets where this type of construction is employed the greater extent of the concrete pavement base might offer even less resistance to leakage current than these experimental roadbeds.

Type F with a crushed stone foundation is seen, from Fig. 6, to have from two to three times the resistance of the full concrete type. This is an additional advantage with this type of construction over the more rigid and more expensive types employing a full concrete foundation.

The effect of insulating the rails with a coal-tar coating is seen in the results with Types D and DT, Fig. 6. While the resistance of the insulated type is about 50 per cent higher than the other, it is doubtful whether such a treatment would prove of practical value. In this case the leakage is practically all through the spikes which, with the uninsulated Type D, carry about two-thirds of the current. If some practicable means of insulating spikes from the rails could be devised the problem of stray current would be solved to a large degree for many types of roadbed construction.

The cinder roadbed, Type H, gave results probably not typical owing to the fact that soon after its completion heavy rains occurred and washed much sand and earth into the ballast and up around the base of the rails. The wide variations which occur in resistance with this type of roadbed are typical of all types of open construction, as is evident in Fig. 7. Owing to the poor drainage provided for Type H roadbed and the presence of much fine sand and earth in the ballast, results on the Cabin John line, Table I, should be accepted as typical of this kind of construction rather than those for the experimental track.

From the results of the measurements on Types E, EC and EZ roadbeds there seems to be but little difference between the untreated ties in Type E and those of Type EC, but the effect of zinc chloride treatment is strikingly shown in the records for Type EZ. For the last named the resistance during the first year was only about one-third that of the other types but it has gradually increased until after three years the effect of the treatment has almost disappeared. This is undoubtedly due to the leaching out of the treating material.

Table III—Resistance to Earth of Experimental Roadbeds

Resistance in Ohms Calculated for 1000 Ft. of Single Track

Date of Test	Condition of Roadbed	Type of Construction													
		A	B	AA	AT	BT	D	DT	F	H	C	E	EC	EZ	G
4-5-15	Roadbed wet, 0.44 in. of snow on April 3	0.343	0.33	0.48	0.42	0.50	0.97	1.44	0.81	4.50	5.86	4.17	....	2.88	....
4-12-15	Surface moist. Roadbed wet. Rain on previous day	0.27	0.32	0.61	0.39	0.41	0.87	1.38	0.83	3.29	4.66	2.72	3.94	0.72	9.67
4-22-15	Surface dry. Roadbed drier than on previous tests	0.29	0.29	0.61	0.42	0.37	1.44	1.87	0.93	4.35	4.67	3.58	6.65	1.04	52.2
6-7-15	Surface dry. Roadbed wet. Heavy rain on June 2	0.27	0.27	0.48	0.39	0.33	0.86	1.43	0.78	1.92	4.15	3.11	3.41	0.92	10.9
6-29-15	Surface dry. Roadbed fairly dry. No rain for several days	0.31	0.30	0.55	0.45	0.34	1.21	1.73	0.98	2.54	4.05	3.60	4.48	1.67	29.6
7-21-15	Roadbed quite wet. Rain on previous day	0.28	0.29	0.45	0.38	0.32	0.55	1.03	0.72	1.00	2.78	2.89	1.93	0.72	6.1
8-19-15	Surface dry. Roadbed moist, not wet	0.31	0.28	0.64	0.38	0.29	0.78	1.09	0.88	1.20	3.40	3.14	3.14	1.26	8.8
9-24-15	Surface dry. Roadbed moist, not wet	0.33	0.34	0.69	0.41	0.30	0.86	1.20	0.92	1.03	3.34	4.08	3.84	1.58	9.4
10-29-15	Surface dry. Roadbed moist, not wet	0.33	0.31	0.69	0.42	0.33	0.84	1.17	0.87	1.16	3.25	3.20	3.25	1.42	6.10
12-4-15	Cold. Roadbed moist. No rain for several days	0.40	0.34	0.95	0.57	0.40	1.32	2.26	1.02	1.87	5.15	5.67	6.00	2.17	11.7
1-21-16	Surface wet. Ground thawing out from 6-in. freeze	0.40	0.38	0.94	0.59	0.41	1.08	1.84	1.35	2.59	4.80	3.82	3.98	1.55	8.21
3-20-16	Cold. Surface dry. Ground moist	0.42	0.37	0.91	0.59	0.41	1.25	2.26	1.23	3.01	5.18	4.21	5.17	2.16	10.8
4-19-16	Warm. Surface dry. Ground moist	0.40	0.35	0.54	0.53	0.39	1.22	1.87	1.16	2.32	4.56	3.86	5.10	2.35	10.5
8-24-16	Surface dry. Ground moist. Rain on previous day	0.35	0.35	0.44	0.46	0.34	0.92	1.39	1.11	1.63	3.42	2.98	3.02	2.29	6.6
1-13-17	Ground frozen 4 or 5 in. deep	0.66	0.46	0.75	0.92	0.51	1.33	2.62	1.50	5.22	8.16	8.21	6.50	3.60	17.3
2-14-17	Ground frozen deep. Surface beginning to thaw	0.89	0.67	1.1	1.24	0.84	2.20	3.58	3.36	7.50	8.37	6.40	7.75	3.73	13.3
3-15-17	Surface dry. Ground very wet	0.45	0.47	0.60	0.61	0.43	0.95	1.58	1.21	2.19	5.24	2.89	3.72	1.62	4.9
10-3-17	Surface and ground very dry. Driest condition	0.44	0.50	0.51	0.61	0.41	1.33	1.64	1.38	2.25	4.38	6.35	4.68	5.58	9.8
3-20-18	Surface dry. Ground wet	0.45	0.41	0.60	0.64	0.45	0.83	1.25	1.16	1.98	4.68	3.89	3.24	2.04	6.4

STONE BALLAST AND NON-POROUS PAVING PRODUCE HIGH RESISTANCE

Type C roadbed is seen from Fig. 7 to offer the highest resistance for leakage current of any kind of roadbed for city streets investigated. The clean stone and non-porous surface are responsible for this, but it is doubtful if such a condition could be maintained long in city streets under traffic conditions. Type G roadbed, made with crushed grout ballast but no paving, has an unusually high resistance, but this has diminished considerably with time due to the washing in of earth and sand. The figures for this piece of roadbed show what might be accomplished by the use of a well-drained and clean crushed rock or gravel ballast.

No direct measurements were made on city tracks to determine the relative resistances of single and double-track roadbeds. From measurements made on the experimental tracks, it appears that the leakage from double-track construction of the very low resistance type is not anything like double that from single track, and may in some cases be not more than 25 per cent greater. It may be safely assumed that where high-resistance roadbeds are involved, the leakage from the double track will be nearly twice that from a single track. With concrete or earth ballast and other types of low-resistance roadbeds, where a large part of the total resistance is encountered at a relatively great distance from the rails, the resistance of a single-track roadbed approaches that of double-track construction.

TIE RESISTANCE DEPENDS LARGELY UPON MOISTURE CONTENT

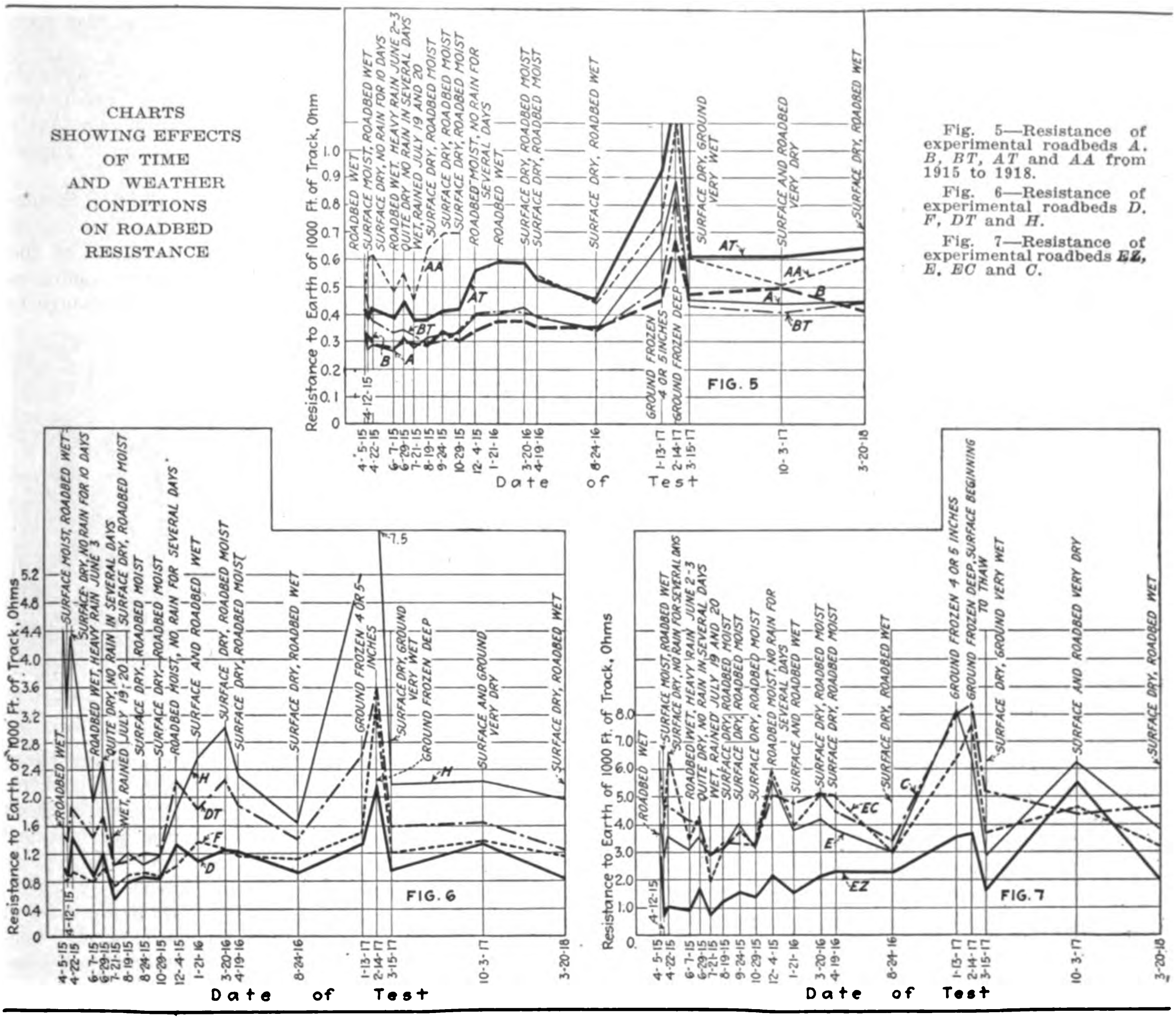
In order to determine the effect of moisture and different preservative treatments on the resistance of wood ties six specimens were selected for investigation, as follows: White oak untreated; red oak untreated; chestnut untreated; red oak treated with 10 lb. of coal-tar creosote per cubic foot by the vacuum process; red oak treated with ½ lb. of zinc chloride and 2 lb. of coal-tar pitch per cubic foot by the "Card" process; red oak treated with ½ lb. of zinc chloride per cubic foot.

The ties were saturated by placing them in shallow vessels filled with water to a depth of about 2 in. They were turned over from time to time and kept covered with burlap which was wet with a hose daily. After two weeks of this treatment they were placed indoors and their weights and resistances measured at intervals covering a period of three years.

Resistance measurements were made over a period of more than three years. They showed a rapid increase in resistance as the ties dried out. For example, the resistances in ohms per foot cube after three and twelve months respectively were as follows: White oak untreated 600 and 6800; chestnut untreated 3000 and 22,000; red oak treated ($ZnCl_2$ and creosote) 60 and 380; red oak untreated 800 and 14,000; red oak treated (creosote) 1000 and 5200; red oak treated ($ZnCl_2$) 1500 and 13,300.

It appears that moisture in excess of 20 to 25 per cent has little effect in reducing electrical resistance of wood, while with less than 10 per cent of moisture the resistance increases rapidly. Chestnut wood dries out in the air more readily than oak but for the same moisture content its electrical properties are about the same. Creosoting tends to retain moisture within the wood but otherwise has little effect upon electrical resistance. The ties treated with creosote and zinc chloride exhibited a very low resistance due undoubtedly to the effect of the creosote in holding the zinc chloride as well as the moisture.

Ties imbedded in the earth or in paved city streets probably retain moisture in excess of 20 per cent throughout the year and should, therefore, not change their resistance materially with seasonal changes. On the other hand, in open construction the moisture content and therefore the resistance would vary through wide limits.



CHARTS SHOWING EFFECTS OF TIME AND WEATHER CONDITIONS ON ROADBED RESISTANCE

Fig. 5—Resistance of experimental roadbeds *A, B, BT, AT* and *AA* from 1915 to 1918.

Fig. 6—Resistance of experimental roadbeds *D, F, DT* and *H*.

Fig. 7—Resistance of experimental roadbeds *EZ, E, EC* and *C*.

THE TESTS BROUGHT OUT CERTAIN FUNDAMENTAL FACTS

While an accurate interpretation of the results of the tests described in this article is not always possible, owing to many questionable elements such as weather and roadbed conditions and the properties of materials, several interesting conclusions can be drawn, as follows:

1. The roadbeds constructed with solid concrete ballast and vitrified brick or other non-porous pavements have a low leakage resistance to earth which is affected only moderately by seasonal and weather changes. There is little difference between wood and steel ties in their effect on the resistance of roadbeds of this kind. Insulation is not of practical value in reducing leakage current from such roadbeds. The resistance of single roadbed of this type is from 0.2 to 0.5 ohm under ordinary conditions, but may be two or three times this when the ballast is frozen to a depth of 1 ft. or more. For double roadbed of this type the resistance is approximately 70 per cent of that for single roadbed, or the leakage from double track would be about 40 to 50 per cent greater than from single track.

2. Roadbeds constructed with a foundation of clean crushed stone under concrete paving base have a much higher resistance than roadbeds with a solid concrete ballast. In the case of the experimental roadbed the ratio was found to be about 3 to 1. Roadbeds with a full crushed stone ballast and a Tarvia finish have a very high leakage resistance which is of the order of 2 to 5 ohms per 1000 ft. of single track. The leakage

from a double roadbed of this type and other high-resistance types is from 80 to 100 per cent greater.

3. The resistance of earth roadbed in which the ties are imbedded and therefore kept in moist condition is much lower than that of open construction roadbed, being from 1 to 1½ ohms per 1000 ft. of single track under normal conditions and considerably more when the ground is frozen.

4. The resistance of roadbeds of open construction is subject to wide variation depending upon the condition of the ties and ballast. In very dry weather with good ballast the resistance will be 10 to 15 ohms or even more per 1000 ft. of single track, but in wet weather it will drop to from 3 to 5 ohms. Cinder, gravel and particularly crushed stone, when used as ballast in open-track construction, produce very high-resistance roadbeds. Earth has a tendency to keep the ties moist and therefore to increase the leakage. Open-construction track is often considered to be insulated from the earth, but this is not strictly true. Assuming a potential difference between the track and the earth of 5 volts and a leakage resistance of 10 ohms per 1000 ft. the total leakage per mile would be 2.64 amp. This small leakage current would not ordinarily be harmful to underground structures in the vicinity of the track.

5. Zinc chloride and other chemical salts used as preservatives render ties highly conducting and greatly increase leakage current from the tracks. Unless combined with some other material such as creosote, these salts gradually leach out, particularly in damp climates, and eventually their influence on the resistance of roadbeds disappears. Creosote has very little effect upon the resistance of wood ties.

SUGGESTIONS FOR REDUCING LEAKAGE CURRENTS

Electric railway companies can do much toward reducing leakage currents from their tracks by observing the following suggestions regarding roadbed construction:

1. Solid concrete ballast should be abandoned and clean crushed stone should be used as a foundation under ties. This type of construction is approved by the American Electric Railway Engineering Association, as it gives greater resiliency to the track and is cheaper than the full concrete ballast.

2. Where crushed stone or gravel is used it should be kept clean by proper coverings or pavements. If earth, sand or street dirt is permitted to filter into ballast of this character its function as an insulating material is greatly impaired.

3. Salt which is often used to prevent frogs and switches from freezing will greatly reduce the resistance of roadbeds and its use should be avoided if possible.

4. In open construction rails should be kept out of contact with the earth. The roadbed should be well drained to prevent fine material from washing into the ballast and to keep the ties as dry as possible. Vegetation should be kept down, as this tends to keep the roadbed moist and fills the ballast with foreign material.

5. The use of zinc chloride and similar chemical preservatives should be avoided in track where the escape of stray currents is objectionable, and in signal blocks.

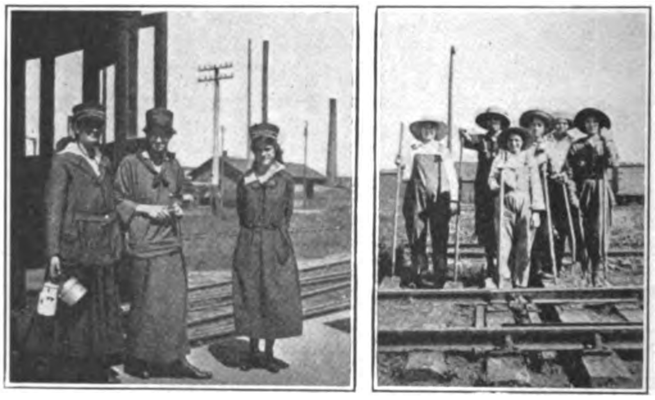
Motorwomen in Charles City

Give Satisfaction on One-Man Cars—Fifteen Applications for One Job—Woman Section Gang Tried Last Summer

MOTORWOMEN have been used exclusively on the Charles City (Ia.) Western Railway street car lines ever since July 1, 1918. The cars are of the one-man type equipped for double-end operation and use Johnson recording fare boxes. Each young woman makes 80 miles a day with an eight-hour shift. As the run is 5 miles in length this means sixteen trips daily. Cars are operated from 6 a.m. to 10 p.m., so that each car has two crews.

The motorwomen are all well educated. Two are college girls and the others are high school graduates. One who served during the summer vacation reluctantly left in the fall to resume her position as music supervisor in a public school.

Miss Marjorie Dodd blazed the trail as the first motorwoman in Iowa. She is a college girl attending one of the largest woman's colleges and the daughter of the Mayor of Charles City. During a prolonged influenza quarantine at the college she returned with pleasure to the Charles City street railway "job." At one time there were fifteen applications for one vacancy. Much comment has been elicited by the universally careful work done by all of the motorwomen. Not one accident nor automobile collision has occurred during the entire six months the cars have been run by women.


AT LEFT, MOTORWOMEN OF ONE-MAN CARS IN CHARLES CITY. AT RIGHT, WOMEN SECTION GANG

The employment of women on the cars has proved so satisfactory that the company employed a woman section gang on its interurban line for a part of last summer.

Women Employees on the Steam Railroads

An extended report on the use of women by the steam railroads is contained in a report on the labor results of the Federalized Railroads, issued Jan. 17. It shows that the number of women employed by the railroads had increased from 60,555 on Jan. 1, 1918, to 101,296 on Oct. 1, 1918. Clerical service, including ticket selling, claimed the largest number, and cleaning came next. About 5000 women were employed in the shops in almost every capacity, from common laborers to skilled mechanics.

A Trilogy of Live Railway Topics

Illinois Electric Railway Association at Annual Meeting Held in Chicago Considers Primarily the Subjects of Public Utility Regulation by Commissions, Development of Freight and Express Traffic, and Safety Work—W. E. Sparks Was Elected President

THE Illinois Electric Railway Association held its annual meeting at the Hotel La Salle, Chicago, on Jan. 17. After addressing the association briefly the president, D. A. Parsons, introduced the recently elected secretary of the association, R. D. Prather, who is also secretary of the Illinois State Electric Association. Mr. Prather called the roll of the members, and read the minutes of the last meeting of the association and the financial report. A vote of thanks was then extended to the former secretary of the association, W. V. Griffin, secretary Chicago Elevated Railways, for his excellent work for the association.

REPORT OF SAFETY COMMITTEE SHOWS LACK OF INTEREST AMONG MEMBER COMPANIES

The only committee report presented was made by H. B. Adams, safety supervisor Aurora, Elgin & Chicago Railroad, chairman of the safety committee of the association. He stated that the committee sent to forty-nine members of the association a letter and questionnaire requesting prompt replies. Sixteen responded, giving the following information: Seven had safety organizations; four had safety supervisors or safety engineers; seven had general safety chairmen with other duties; eight held monthly meetings; two held bi-monthly meetings; one held quarterly meetings, two held occasional meetings, and three held no meetings at all. Fourteen companies would consider having a representative of some member company address a meeting of the employees, and two would not. Four companies had stereopticon or moving picture machines; two had moving picture films; six had stereopticon slides, and six sent out copies of bulletins. Four companies reported that public safety work was being done in their territory, and ten would consider having a speaker from a member company to assist at public meetings during the year. Fourteen companies would advise that one meeting of the association be devoted to the study of accident prevention, but only one company offered a suggestion to aid the safety committee in its work. In closing the report Mr. Adams said: "We believe that there is a great need for mighty effort to conserve life, limb and property, and we hope that each company in this association will resolve to do more and better safety work in the future." Following this report Mr. Adams read a short paper which will be published in a later issue.

H. A. Johnson, chairman of the mechanical committee of the association and master mechanic of the Chicago Elevated Railways, was not present to make a report, but he sent a short paper which also will be published in a later issue.

Following the report and paper by Mr. Adams, chairman of the safety committee, Britton I. Budd, president Chicago Elevated Railways, referred to the safety work being carried on by the Chicago, North Shore & Milwaukee Railroad, of which company he is president also. An article on the safety work of this company will appear in an early issue of the ELECTRIC RAILWAY JOURNAL. Mr. Budd emphasized the importance of every electric railway company maintaining a safety department, and this was further emphasized by President Parsons, who also urged an increased membership in the National Safety Council.

Following the report of these committees, President Parsons appointed a nominating committee consisting of F. E. Fisher, general superintendent Chicago, Ottawa & Peoria Railway; W. H. Heun, superintendent Chicago & Joliet Electric Railway, and Frank E. Johnson, district sales agent the Ohio Brass Company.

PAPER ON REGULATION DEVELOPS MANY INTERESTING POINTS

The first paper on the program was one by Hon. Carl D. Jackson, chairman Wisconsin Railroad Commission, which will appear in a later issue. His topic was "Regulation," and he introduced it by explaining that he had understood the association to be more broadly interested in electrical problems rather than those of the electric railway industry specifically. Hence some of the members might not entirely agree with some of his remarks which were intended to cover public utility regulation in general.

Diverging occasionally from his paper, Mr. Jackson amplified some of his statements. Illustrating the urgency and seriousness of most of the requests received by the commission for increases in fare, he mentioned the case of the Kenosha, Wis., property, where, due to a lack of funds and the serious competition of the jitneys, the company abandoned service for a period of one month. The community soon realized the absolute necessity of proper railway service, and at the end of that time the commission issued an injunction prohibiting jitneys from operating on streets used by electric railways.

Mr. Jackson said that a solution of the present railway problem will be some form of public partnership, but not public ownership. Good street railway service is an absolute necessity, and one of the problems which the commission had to confront was the fact that a fare increase beyond a certain point, in small cities where the average haul is short, might actually reduce the revenue. He said further that a fare increase alone is not enough, but that the railways must have the co-operation and help of the communities served. In line with his remarks on public ownership Mr. Jackson stated that he does not believe government ownership or operation of the steam railroads should continue, now that the war is over. There was a necessity for such operation during the war, and at that time government operation was the only solution, but it should not longer be continued.

In the discussion following the paper by Mr. Jackson, Britton I. Budd emphasized the point that there are very few citizens who, although they may not realize it, are not mightily interested in the welfare of the utility, due to the fact that the banks, insurance companies, etc., in which they have their accounts or are insured, are directly affected by its financial condition. One very important point in Mr. Budd's discussion was that employers must use very wise judgment in any talk or action concerning the reduction of wages when food and other necessities are still commanding high prices. Wages make up a very considerable part of the expenses of the railway companies at present, but no change should be considered, at least under the present conditions.

Referring to Mr. Jackson's paper President Parsons. stated that he had heard some criticism of the commissions to the effect that they should give greater publicity to their investigations and decisions, and that they might hold their hearings in the communities affected rather than at some distant point. He also said that experience had shown that although the public was often in favor of an initial increase in fare, if the same company had to come back later for a second increase, the public, practically without exception, was found to be very antagonistic to this second request.

C. A. LANEY URGES FREIGHT AND EXPRESS PUBLICITY AND REGULATION OF MOTOR TRUCKS

The second paper was by Charles A. Laney, traffic manager Northern Ohio Traction & Light Company, Akron, Ohio, on "Interurban Freight and Motor Truck Competition," which had been previously presented at the Indianapolis meeting of the C. E. R. A. (See ELECTRIC RAILWAY JOURNAL, Nov. 30, 1918.) Mr. Laney added some statements which were in substance as follows: "The situation is one which calls for an earnest organized effort by all departments of an interurban line under the guidance of the traffic department. It is especially important that the men in charge of public relations should be active in spreading interurban freight propaganda. The very widest publicity should be given to the advantages of electric freight transportation, not only in printed advertisements but by word of mouth. Full co-operation would consist in having every official, department head, clerk, stenographer, conductor, motorman, lineman and power-station employee supplied with accurate information, and urged to talk 'freight' to everybody with whom they come in contact. This should be supplemented, of course, with printed publicity.

"We must put behind this department of business all the brains, energy and enthusiasm at our command. It goes without saying that we must equip ourselves to handle the business that will inevitably result from this effort, but with rich prospects at hand that should not be a difficult matter. Through such an organization it will be possible to bring the motor trucks under the regulation of the public utility commissions and require them to meet the expenses and responsibilities of other common carriers, to bring them within the rules of fair competition by eliminating rate discrimination, allowing them a specified sum per ton per mile and limiting them to a certain tonnage per truck for the purpose of protecting the highways.

"The motor truck has created a new factor in freight transportation. It has added the collection and delivery feature. Since our entry into the war so much freight material has been shipped by express that the old-time distinction between freight and express has been eliminated. Shippers have demanded quicker and better service, and looked to the express service as their benefactor. Since the war this custom has become a habit, and if we want to compete with the motor truck we must rearrange our tariffs so that the public can take advantage of the higher rate, including the collection and delivery feature, and a lower rate for station to station service. This is a period of reconstruction. Let us reconstruct our business, enlarge its scope, and add to its usefulness as a public servant."

LIVELY DISCUSSION DEVELOPS ON FREIGHT AND EXPRESS

The discussion which followed the reading of this paper showed that the subject of freight and express is one of vital interest to the railway companies. President Parsons stated that unless wise judgment is used in the $60,000,000 good roads movement in Illinois the results may be injury to, and further competition with the electric railways. Mr. Budd stated that the auto and truck manufacturers are efficiently organized, while the electric railways and the manufacturers of railway equipment are making no co-ordinated effort to develop the use of the railways for the transportation of merchandise. He suggested that the supply men could be of great assistance to the railways in this connection. He said that the Wisconsin State Council of Defense had passed a resolution condemning the activities and propaganda of the truck manufacturers in that State. He said further that 4-ton or 5-ton motor trucks carrying 10 or 12 tons, and often hauling many trailers, are a danger to pedestrians and other vehicles, and that the taxpayers and the communities through which these trucks operate are seriously affected by the destruction of the roads by the trucks.

Mr. Budd suggested the co-ordinated effort of the railways to combat the propaganda of the truck manufacturers and operators by issuing propaganda of their own for the more extensive use of the railways for freight and express.

J. R. Blackhall, general manager Chicago & Joliet Electric Railway, stated that the development of freight and express on a profitable basis is not possible in all communities. He said that his property could not compete with steam railways at steam rates. Mr. Blackhall spoke of the impossibility of getting an ordinance passed to permit the entrance into Chicago of the various interurban lines operating in that vicinity. He said that the interurban lines could get plenty of business, but not at a profit when it had to be trucked 8 miles or 10 miles from the terminals of the interurban lines into the heart of the city. This he said is the vital point which is holding back the extension and rapid development of electric freight service over the entire State of Illinois.

J. B. Tinnon, engineer maintenance of way Chicago

& Joliet Electric Railway, suggested that if such large manufacturing concerns as the General Electric and Westinghouse companies, which have large advertising appropriations, could spread the propaganda, it would be much more effective than would advertisements coming directly from the railway industries, as the public seems to be naturally antagonistic to public utilities.

President Parsons appointed C. Dorticos of the General Electric Company to act as chairman of, and to form, a committee to consider what the commercial men could do to help spread the propaganda for the electric railways. G. T. Seely, assistant general manager Chicago Elevated Railways, stated that it was entirely a question of selling the service of the electric railways, and also said that there was need for full co-operation between the companies themselves, and for the elimination of the fear that such co-operation might give one company more business than another.

Afternoon Session Devoted to Safety Allegory and Discussion

At the afternoon session R. N. Hemming, superintendent of transportation Fort Wayne & Northern Indiana Traction Company, presented the allegory of "The Grim Reaper," as was described in some detail in the issues of this paper for Nov. 23, 1918, page 924, and Nov. 30, page 952. Several changes have been made in the sketch since it was presented at the C. E. R. A. Indianapolis meeting. In addition to the two characters formerly participating in the production there was an additional one known as "Work," and a church choir sang a hymn suitable to a funeral occasion to suggest the funeral services of persons killed by accident. In addition an imaginary collision between a railroad train and an automobile was brought about behind the scene with the realistic whistle of the engine, crash of breaking glass and screams of women. The presentation of the allegory was followed by a talk by Mr. Hemming along lines similar to those which he followed at Indianapolis. Striking points brought out were that more accidents are caused by slipping and falling than on railroads, and that twice as many casualties occurred in the United States from accident during the four years of the great war as were suffered by the combined warring nations on the battlefields during the same period. The railways spare no effort to produce increased riding on their properties, thus resulting in an increased revenue, but then they allow this increase in revenue to slip through their fingers as a result of needless accidents. Extensive publicity for the preservation of humanity is necessary, and the railway companies must endeavor to put across legislation to insure a maximum of safety.

The committee on co-operation headed by C. Dorticos, referred to earlier, recommended that the meeting adopt a resolution addressed to the American Electric Railway Association and affiliated Manufacturers' Association, "requesting immediate action in instituting a campaign of advertising and publicity to stimulate travel and shipments via electric railways, such a campaign to be carried on by the manufacturers and by every member of the American Electric Railway Association by means of a catch phrase or phrases, or any other proper method that will get results; and such a committee to promote better means of co-operation between the manufacturers and the electric railways." This recommendation was referred to the executive committee for further action.

Officers Elected for the New Year

The following were elected as officers of the association for the coming year: President, W. C. Sparks, vice-president and general manager Rockford & Interurban Railway; first vice-president, E. M. Walker, general manager Terre Haute Traction & Light Company; second vice-president, W. L. Arnold, vice-president Elgin & Belvidere Electric Company; secretary, R. V. Prather; executive committee, D. E. Parsons, general manager East St. Louis & Suburban Railway Company; F. J. Baker, president Bloomington, Pontiac & Joliet Electric Railway; H. E. Chubbuck, vice-president-executive, Illinois Traction System; C. F. Handshy, assistant general manager Illinois Traction System; B. I. Budd, president Chicago Elevated Railways; E. C. Faber, vice-president and general manager Aurora, Elgin & Chicago Railroad; J. R. Blackhall, general manager Chicago & Joliet Electric Railway.

After the election a motion was passed referring to the executive committee the question of the financial needs of the association with a view to providing sufficient revenue. The new president and the secretary then briefly addressed the association and the meeting adjourned. Both sessions were well attended, there being some sixty to seventy-five members present.

Skip Stops Save Time in Dallas

THE skip-stop system on the lines of the Dallas (Tex.) Railways, the consolidated street car lines under the Strickland-Hobson management, has resulted in a material lowering of the running schedule on all lines. The time saving amounts to about 20 per cent, according to the accompanying table of comparisons of the schedules maintained now and in 1912, which has been prepared by J. F. Monk, inspector.

	Minutes		
	Schedule		Time saved by skip stop
Line:	1912	1919	
Bryan	48	42	6
North Belt	60	45	15
Junius Heights	60	50	10
Ervay	60	45	15
Oak Lawn	36	32	4
Munger	60	45	15
Akard	30	24	6
San Jacinto	30	24	6

The saving of time has been based on the schedules of 1912, the pre-jitney period, on account of the decreased traffic which jitney competition caused the company. When the cars were carrying fewer passengers the schedules were naturally speeded up. But the traffic is much heavier now than it was in 1912, in fact, the railway is caring for twice as many passengers as it did during the time jitneys were running.

In his recent testimony before the Public Service Commission, President Shonts of the Interborough Rapid Transit Company and New York Railways, New York, said that coal, which cost the companies $3.28 a ton in 1915 now costs $6.07. About 750,000 tons are used a year. Some rails purchased last year cost $120 a ton. Before the war similar rail could be purchased for $30 a ton.

New Type of Electrically-Welded Joint Successful

Process Used at St. Louis Believed to Eliminate Cracking of Rail Around Joint—Applicable to Old and New Track—Rail Chairs and 6-In. Rail Used When 9-In. Was Unobtainable

THE United Railways of St. Louis, Mo., operate 450 miles of track, with various types of rail, from the 132-lb. rail used under heavy traffic in the city; to the 60-lb. rail used on some country lines, furnishing a wide variety of conditions with which to cope. During the past year, more than 2000 joints have been electrically welded on this property by a new process known as the "compression" method. Prior to the use of this process breakages at the joints had amounted to more than 4 per cent, while since it has been used no breakages have occurred. The joint is made with two fishplates and four 1$\frac{3}{16}$-in. fillets, as indicated in Fig. 1. In the group Figs. 2 and 3 show two later stages in the formation of the joint. At present rivets are being used for fillets because they are most easily obtained. The two end fillets extend through the two fishplates and the rail web. While for the center fillets shorter rivets are used with the heads between the fishplates and the rail and butting into the hole in the web. This is to provide plenty of material to fill the holes in the web and the plates when the fillets are heated.

NEW TYPE
OF
WELDED JOINT
USED AT
ST. LOUIS

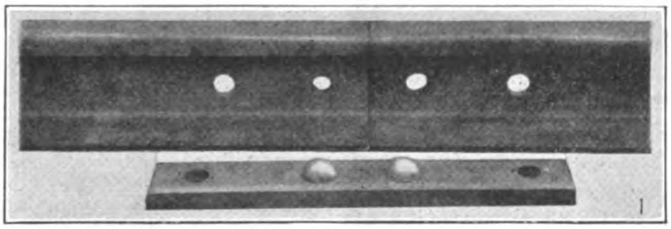


Fig. 1—Fishplate with center fillet ready to assemble on joint.

Fig. 2—Compression joint assembled ready for welding.

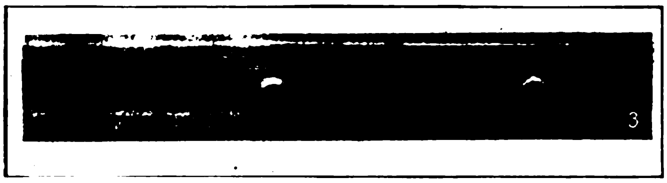


Fig. 3—Completed joint ready for service.

CENTER AND END FILLETS ARE TREATED DIFFERENTLY

An electric welder, shown in Fig. 4, is first placed in position on one of the center fillets, these being nearest the ends of the rail. Pressure is applied hydraulically to the ends of the fillet until 2000 lb. is registered. Then a current of 20,000 amp., requiring 6 volts, is passed through the terminals for one minute.

When the metal begins to melt the pressure causes the fillet to fill the holes in the web and fishplates. With the fillet and surrounding metal at a welding heat the current is turned off and the pressure is increased to 4000 lb. and held there for fifteen seconds. The process is then repeated with the other center fillet. This gives a homogeneous weld of the fillet, fishplates and rail web.

To the two end fillets the initial 2000-lb. pressure is applied as before, but the current is left on for but fifteen seconds. The fillet and the immediately adjacent parts of the fishplates are brought to a welding heat and the hole in the web of the rail is filled, but the web is not heated to a welding temperature. It is believed that this plan will result in reducing the number of breakages which generally occur around the ends of the fishplates. The welding outfit is capable of handling an average of eighty joints per day of ten hours with three men at the welder and one operator.

The welding equipment is followed by a Kleinschmidt grinder, which includes two planer grinders equipped with rotary wheels. The horizontal traveler, which may be adjusted vertically, is supported on the rail by wheels at each end and remains in a level position. The grinding wheel travels back and forth on this support, catching the high spots. The horizontal distance through which the grinder travels may be changed to suit conditions, or the wheel may be held in one position.

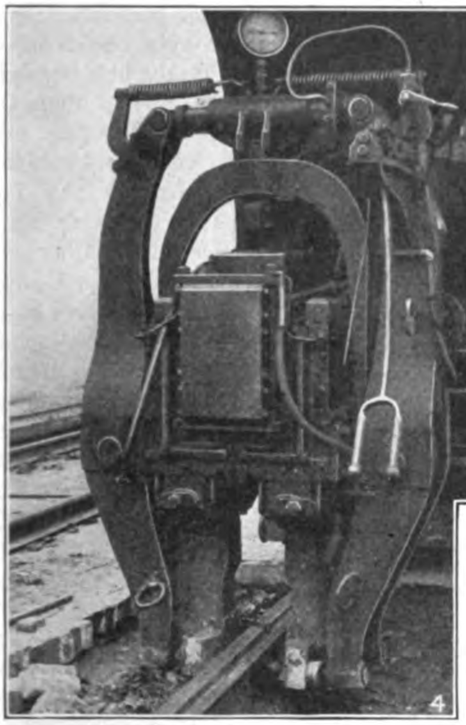
Whenever it becomes necessary to re-lay portions of track, new 9-in. Lorain section is used when obtainable, but recently it has been necessary in many cases to use 6-in. T-rail in replacements. For this purpose use is made of a rail chair of dead soft steel measuring 7 in. x 6 in. across the top. After the old rail has been removed, the chairs are placed in position, one on each tie, and the rail is put down. The four clamps are then hammered down firmly over the base of the rail and the chairs are fastened to the ties with screw bolts, electrically driven. Where the old track had been laid in concrete new concrete is poured to a depth of 3 in. to bring it up to the base of the rail.

A photograph reproduced on page 183 shows an interesting type of work which is being done with the welding equipment. This is a 20-in. insert, or "dutchman," and it has been welded just as with ordinary new track, six fillets being used, however. After this welding was completed, pieces of steel 1 in. thick, 2½ in. long and

3 in. wide were welded to the plate supporting the ends of the rails, to prevent the heads of the old rails from cracking and breaking off, which frequently happens when the supports are not used.

In connection with the welding work, a new type of portable turnout and passing track has been developed in St. Louis to prevent welding on single track from interfering with car schedules. This construction is portable as an assembled unit. Whenever the joints inside the turnout are completed, one car of the welding equipment is attached to each end of the portable track and it is dragged to the next point where welding is to be done. In one instance a mile of temporary trolley wire was strung at one side of the permanent overhead and thus the delay due to shifting of the turnout was minimized and the cost was kept down.

The compression joint described herein was invented by E. S. Clark and patented by him in May, 1918. Mr. Clark is engineer of construction for the contractors for the work being done in St. Louis.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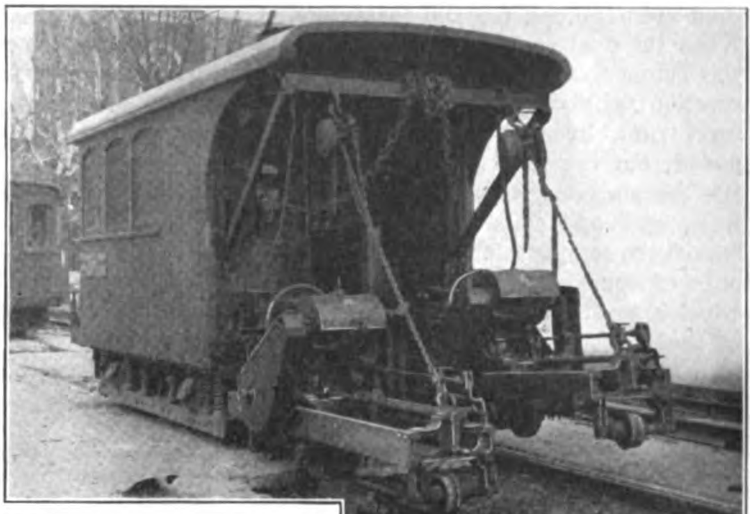
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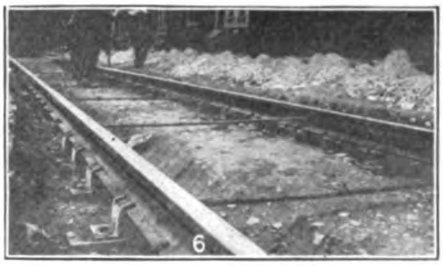
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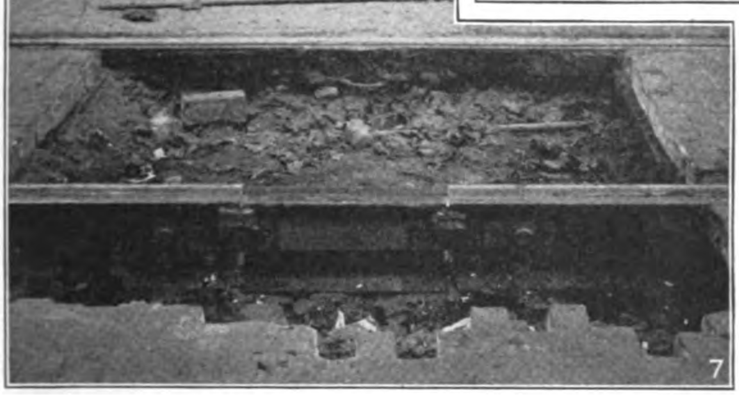
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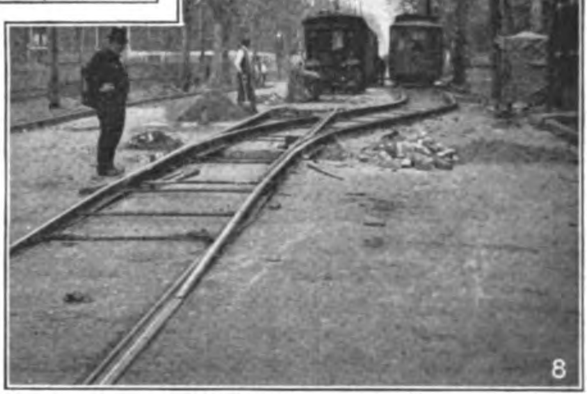
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Fig. 4—Welding machine at work on a compression joint.
Fig. 5—Rail grinder smoothing off a completed joint.
Fig. 6—Rail chair construction with 6-in. rail replacing 9-in. section.

Fig. 7—Welded insert joint or "dutchman" with special support for head of rail.
Fig. 8—Portable turnout and passing track for single-track welding work.

INSTALLING THE NEW-TYPE WELDED JOINTS ON UNITED RAILWAYS TRACKS

New Shop Equipment for D. U. R.

In connection with its extensive shop development at Highland Park, the Detroit (Mich.) United Railway, will install the following equipment: One No. 2 Hilles & Jones single-end power punch with a throat depth of 30 in. and a capacity of punching a 1-in. hole through 1-in. material; one No. 6 Bertsch & Company ¼-in. plate bending roll; one 3-ft. x 9-ft. Ferguson oil-burning furnace for heating material for the bulldozer; one No. 28 Williams-White motor-driven bulldozer; one Buffalo Forge Company No. 9 armor plate bar cutter; one Hilles & Jones Company No. 2 single-end gate shears; one 30-in. No. 444 American Woodwork & Machinery Company wood planer.

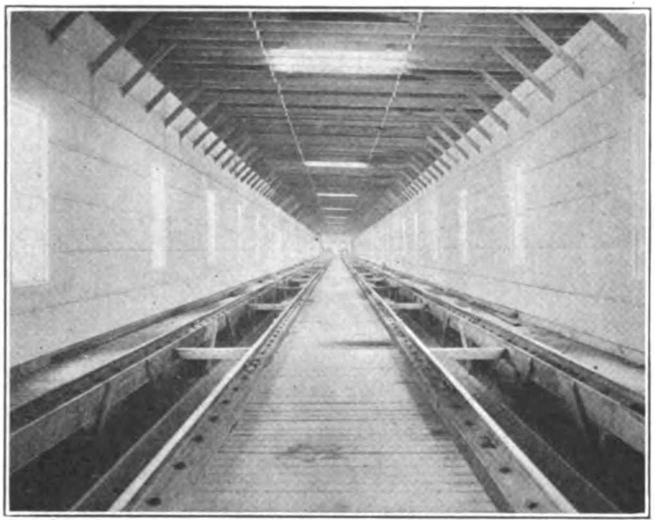
The above-listed equipment, part of which is now being received, will be used in the building of 100 double-end steel cars, the first of which was recently completed. The remaining cars will be built as soon as materials and finances are available.

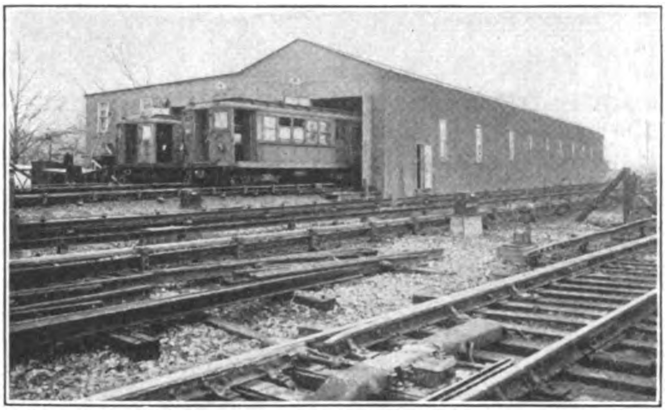
Temporary Inspection Facilities in New York

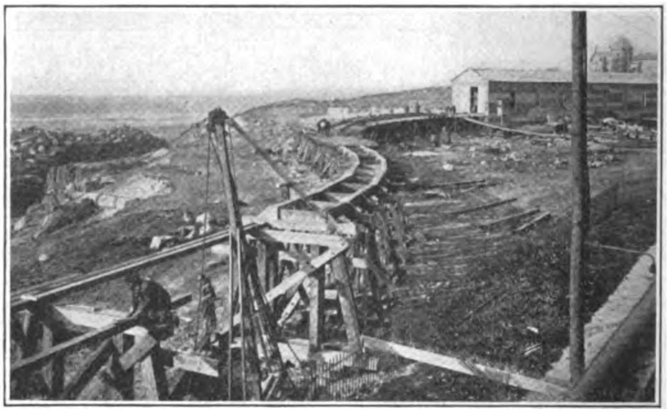
Construction Details of Temporary Inspection Sheds to Meet Emergency on Dual Rapid Transit System in New York City

BY JULIUS GLASER
Designing Engineer Public Service Commission, First District, New York City

AMONG the most important appurtenances in connection with the operation of a rapid transit railroad are facilities for the inspection of rolling stock. When the dual rapid transit system in New York City was planned, it was intended that storage yards and inspection facilities would be ready by the time the subway trunk lines and elevated extensions were completed; but the war, with its demands on capital, labor and material, prevented the completion, not only of some of the elevated extensions but also of the storage yards and inspection facilities. When operation on the "H" system was inaugurated it was seen that something had to be done at once, and since the construction of some of the new facilities, then building, was hampered by the lack of material and labor, and it would have been impossible to contract for the remainder, D. L. Turner, chief engineer of the Public Service Commission, issued orders for the preparation of contracts and drawings for the construction of three temporary inspection sheds; one at 180th Street on the White Plains Road line, one at Whitlock Avenue on the Westchester Avenue line, and one near Mosholu Parkway on the Jerome Avenue line.


INTERIOR OF INSPECTION SHED AT WHITLOCK AVE.


TEMPORARY INSPECTION SHED AT 180TH STREET, NEW YORK CITY


SHED AND TRESTLE IN COURSE OF CONSTRUCTION AT JEROME AVENUE

Emergency inspection pits were also built on the Jerome Avenue elevated structure near 198th Street and at the site of the permanent storage yard at 180th Street. At both these places cars were inspected in the open, with canvas canopies to protect the workmen.

The details of the construction of these temporary facilities are illustrated in the accompanying photographs. Two inspection sheds, each more than 500 ft. long with pits, trestle approach and track work, were built in three months and one inspection shed nearly 600 ft. long by 45 ft. wide and 27 ft. high was built in less than three weeks, while trains were being operated and inspected within a few feet of the builders. This is extraordinary under present conditions, even though it would not attract attention in normal times.

When the specifications and drawings were finished, the invitations to contractors called for bids not only in accordance with them, but also for bids based on alternative schemes with materials which the bidder might have on hand or could procure more quickly than the materials shown on the drawings. That this provision was very valuable was shown by the fact that the facilities could not have been had at such low prices or in such short time, if the bidders could not have availed themselves of it. Six contracts were let to the lowest bidders: One for the track work and inspection pits at Whitlock Avenue for $21,566; another for $21,100 for the shed at the same locality; the third, fourth and fifth at Jerome Avenue near Mosholu Parkway for the trestle approach, for the track and pit work, and for the shed, at $19,490, $23,002 and $17,500, respectively, and the sixth for $21,990 for the shed at 180th Street over the pits already constructed by the Interborough Rapid Transit Company for emergency inspection, as previously stated. The contract time was two months for the trestle at Jerome Avenue, three months for the track work and pits at Jerome and Whitlock Avenues and three months for the completion of the three inspection sheds, with the stipulation that they must be ready for use within ten weeks of delivery of contract.

All of the work proceeded according to schedule, with the exception of the inspection shed at 180th Street, which was required more urgently, because it was difficult to keep men inspecting in the open, especially as this had to be done in all kinds of weather in order to keep the "H" system in operation. Mr. Turner gave the work his personal attention, and, with the co-operation of the contractor, the shed was completed in less than three weeks without injuring a single man, although the work had to be carried on near live electric conductors and while trains were constantly in operation. The total amount expended for this temporary work, in round numbers about $125,000, would appear to be an addition to the cost of the Dual System, but it must be remembered that the permanent facilities would cost much more than they would if built in normal times.

Savings Made by Skip Stops

Tests Conducted Over Test Track in Detroit with Gasoline and Electric Cars Give Definite Figures of Economy Secured

E. J. BURDICK, assistant general manager Detroit United Railway, who contributed an article on the safety of the skip stop in Detroit to the Jan. 11 issue of this paper, has also compiled data relating to the power saving of the skip stop. These data were obtained as the results of tests conducted on the Shore Line division of the Rapid Railway (a part of the D. U. R. system), the test section extending from the Country Club on Lake St. Clair, north a distance of 5.053 miles. These data form part of testimony which the company has presented to the city in favor of the skip stop.

The electric cars used in these tests were the company's standard city equipment. The instruments used were Thomson's integrating wattmeter, and Weston's volt and ampere meter. The crews were from the company's regular service and were only average operators. The tests were made to verify the statement made by the government engineers that a 10 to 16 per cent saving could be obtained by the application of the skip stop.

The stops differed from those in ordinary service in that they were predetermined. Consequently more of them were made than would be the case in actual operation. Mr. Burdick estimates that on a busy line in the city a car would stop at but 65 to 70 per cent of the total number of stops used in the trial trips.

The results are summarized in Table II. Three different types of cars were used and three different kinds of trips were run. Trip No. 1 in each case had no stops or practically none. In Trip No. 2 the stops were made approximately 600 ft. apart, and in Trip No. 3 the stops were approximately 300 ft. apart. The weights of cars are given in the table. Cars 3098 and 1104 were double truck and car 851 single truck. The gear ratio in all three cases was 15:69. The first three columns in Table I show the percentage increase in power consumption of the different runs and the values are derived from the data in Table II.

TABLE I—PERCENTAGE INCREASE IN POWER CONSUMPTION OF COMPARATIVE STOPS

	Car 3098, Per Cent.	Car 1104, Per Cent.	Car 851, Per Cent.	Paige Automobile, Per Cent.
Stops every 600 ft over no stops	89	137	96	24
Stops every 300 ft over no stops	148	213	167	66
Stops every 300 ft. over 600 ft stops ..	31	32	37	33

To translate the saving in energy to saving in fuel Mr. Burdick estimates that during 1918 the Detroit United Railway power stations consumed 106,837 tons of coal, while the Detroit Edison Company, at its reported rate of 2.9 lb. per kilowatt-hour at the direct-current bus, consumed about 92,104 tons during the same period. The total consumption then is equivalent to 545 tons a day. If only 12 per cent of this energy were saved by the skip stop, and the Fuel Administration estimate was from 10 to 16 per cent, the saving in Detroit would be 23,873 tons yearly or 65 tons a day.

To confirm the figures obtained with electric cars the company conducted a similar test with a five-passenger Paige automobile on a road which extended parallel or nearly parallel to the electric test track, the actual length of run in this case being 5.1746 miles. The percentages of consumption are shown in the last columns of Table II and the data in Table III.

TABLE II—ENERGY CONSUMPTION DURING TRIAL RUNS WITH DIFFERENT STOPS

	Weight			Stops			Slow Downs			Total Kilowatt-Hours			Kilowatt-Hours per Car-Mile			Watt-Hours per Ton-Mile			Running Time		
Car Number	Empty, Lb.	With Seven Passengers, Lb.	Trip Number	Outbound	Inbound	Round Trip, Average	Outbound	Inbound	Round Trip, Average	Outbound	Inbound	Round Trip, Average	Outbound	Inbound	Round Trip, Average	Outbound	Inbound	Round Trip, Average	Outbound	Inbound	Round Trip, Average
3,098	47,060	48,250	1	0	2	1	9	7	8	10	10	10	1.97	1.97	1.97	82	82	82	17	16	16.5
3,098	47,060	48,250	2	39	39	39	2	1	1.5	18.6	19.1	18.8	3.68	3.77	3.73	152	156	154	24	24	24
3,098	47,060	48,250	3	76	78	77	0	4	2	24.6	24.7	24.7	4.87	4.89	4.88	202	203	203	32	32	32
1,104	39,520	40,710	1	0	1	0.5	7	5	6	5.5	7.5	6.5	1.09	1.48	1.28	53.5	72.7	63.0	16	17	16.5
1,104	39,520	40,710	2	39	39	39	5	5	5	14.5	16.3	15.4	2.87	3.22	3.04	141.1	158.3	149.7	27	27	27
1,104	39,520	40,710	3	77	77	77	5	5	5	19.6	21	20.3	3.88	4.15	4.01	190.8	204.8	197.8	33	33	33
851	28,740	29,930	1	0	1	0.5	13	18	15.5	5.8	6.1	5.9	1.14	1.20	1.17	76.1	80.2	78.1	16	16	16
851	28,740	29,930	2	39	39	39	7	5	6	11.7	11.5	11.6	2.31	2.27	2.29	154.4	151.7	153.0	23	23	23
851	28,740	29,930	3	77	77	77	5	5	5	15.7	16.	15.8	3.10	3.16	3.13	207.1	211.1	209.1	29	27	28

TABLE III—GASOLINE CONSUMPTION DURING TRIAL RUNS, PAIGE AUTOMOBILE

	Weight				Stops			Gasoline Used, Fluid Ounces			Gas Per Car-Mile, Fluid Ounces			Gas Per Ton-Mile, Fluid Ounces			Running Time		
Car	Empty, Lb.	With Two Passengers, Lb.	Trip No.	Distance Between Stops	Outbound	Inbound	Round Trip, Average	Outbound	Inbound	Round Trip, Average	Outbound	Inbound	Round Trip, Average	Outbound	Inbound	Round Trip, Average	Outbound	Inbound	Round Trip, Average
Automobile	3,320	3,600	1	No. stops	0	0	0	48	55	51½	9.27	10.62	9.94	5.15	5.94	5.54½	14 min.	16 min.	15 min.
Automobile	3,320	3,600	2	600 ft.	40	40	40	64	64	64	12.36	12.36	12.36	6.86	6.86	6.86	25 min.	20 min.	22½ min.
Automobile	3,320	3,680	3	300 ft.	77	79	78	87	84	85½	16.81	16.23	16.52	9.34	9.01	9.17	26 min.	23 min.	24½ min.

Are Higher Fares Getting Results?

Massachusetts Commission Says It Is Difficult to Escape Conclusion That Only Really Effective Plan for Meeting Existing Situation in State is Outright Purchase or Taking Over of Railways by Municipalities or Commonwealth

SHOULD further dependence be placed upon higher fares for the improvement of electric railway finances, credit, property and service? Or should a portion of the cost of service be placed upon the shoulders of the taxpayers, and the credit of the properties restored through public acquisition? These are the questions which have just been raised by the Massachusetts Public Service Commission in its frank and explicit report just submitted to the Legislature for 1918.

In general, the commission avers, the electric railway situation is bad all over the country, and there is little basis for a belief that Massachusetts is specially affected. In this State the situation is critical, and no problem with which the commission has to deal is so serious and at the same time so difficult of solution. The net earnings of the companies have fallen off to such an extent that their credit is impaired, their properties are deteriorating, their service is poor, and for this poor service the public is paying high prices. There is said to be ground for the belief, therefore, that the situation calls for a more radical remedy than has yet been applied.

HAVE HIGHER FARES PROVED SATISFACTORY?

The sole means at present, says the commission, for improving the financial condition, credit, property and service of the railways is to raise fares. Two objections may be made to this method. One is that it does not produce the results which it is intended to accomplish; the other is that it does produce results which are injurious to the community. No one can truthfully say, it is averred, that the raising of rates has not had a fair trial in Massachusetts, and the conclusions derived from the experience are as follows:

> The result has not been what was hoped. With all their raising of fares, our companies seem little nearer financial salvation. To view the matter in the most favorable light, there is a chance that higher fares will, in time, cure the financial ills of our electric railways, but the chance does not seem great, and there is no immediate prospect of such a cure. In the meantime the increased rates are injuring the community in ways which are evident.
>
> When an electric railway by raising fares discourages riding, it becomes at once less useful, less of a public servant; and this effect is cumulative. The tendency of a financially hard-pressed company, when its traffic falls off, is to reduce service, and this leads to still more loss of business. It is a question, indeed, whether some railways have not lost as much traffic from curtailed service as they have from increased fares, and the two go hand in hand. More and more the burden falls upon those who ride from necessity rather than convenience, for the latter form of riding is the vanishing factor. A tariff such as the Bay State company proposes, with a 10-cent minimum fare, starts frankly with the assumption that few will ride who do not have to, and involves practical abandonment of the field of short-haul, convenience traffic.
>
> Nor is this all. As the charges increase, the tendency of those who find it necessary to ride is to change their status, by seeking employment or residence where the necessity will no longer exist. To what extent this has yet been done, it is difficult to say, but no one who has given thought to the situation can doubt that it is a serious danger if fares go higher, or even if they remain at their present level—especially if a period of business depression should set in. It is a danger attaching particularly to the so-called "zone system," which attempts to save the short-haul riding by casting the burden upon the long-haul, and often doubles or trebles the charge from a city center to nearby suburban points. Consistent as it is with cost-of-service principles, this system is inconsistent with the policy which has been followed in the past, and under which our population has been distributed.
>
> The choice in raising fares is therefore between a horizontal increase, which discourages short-haul riding, and a "zone system," which upsets established conditions, invites congestion and stands in the way of the development of the country districts. In the long run, however, the results are equally undesirable and not very different, for a horizontal increase tends to become so high that it has a similar effect upon living conditions, and it is difficult to preserve a low fare in the central area of a "zone system" as further increases in rates become necessary.
>
> Incidental disadvantages of higher fares are the incentive to competition and difficulties in collection. No matter how logical and convincing a case may be made against the largely irresponsible and unreliable operation of jitneys, it is difficult to enlist public opinion in opposition so long as the electric railways charge higher fares and furnish poor service. Experience has also shown that the collection of fares, where pennies are involved or short zones are introduced, is subject to many difficulties and embarrassments which unfavorably affect both revenue and operation.
>
> To sum up the matter, no one can view the present situation with optimism or believe that the policies and methods now pursued are likely, unless general conditions change radically, to bring either good service or good credit, or to further the healthy growth and development of the community.

THE ISSUE INVOLVED

The essential needs, from the standpoint of the future welfare of the state, are as follows:

1. Restoration of credit, or some other means of providing the capital necessary to place the electric railway properties in condition for first-class service.

2. Return to a basis of fares which will enable the electric railways to play their proper part in the life of the community.

The prime necessity is good service, and it cannot be had without rehabilitation and improvement. Next to good service is a system of fares which will make the service as useful as possible, and help rather than hamper the development of the community on healthful and economically sound lines.

As the commission views the matter, present conditions in electric railways transportation, and still more the conditions which are in sight, both as to service and as to rates, are opposed to the best interests of the State. The only alternative, however, is some plan by which a portion of the cost of service will be taken from the shoulders of the car rider and be met by some form of general taxation.

Even if the principle be conceded, however, it is not easy to apply it. Under the Massachusetts State Constitution it would seem that if a portion of the cost of service is to be borne by the community as a whole, or if community credit is to be used in the furnishing of capital, the companies must either be publicly owned or publicly managed, and perhaps both.

To some, the commission remarks, this fact will seem sufficient reason in itself for refusing to consider any departure from the present policy. It proceeds, however, to discuss the matter as follows:

> Realizing that it is exposed to certain dangers, we do not find the arguments commonly urged against public operation entirely convincing. Doubtless illustrations of inefficiency are not hard to find, but certainly it is no more difficult to find similar instances in the case of private management. Under the spur of competition, private initiative probably develops maximum efficiency, but there is little evidence that this is true in the case of natural monopolies. Publicly operated enterprises may be manipulated improperly for political ends, but so may privately managed public utilities.
>
> This country has never hesitated to take over enterprises when private initiative could not be relied upon to produce the results demanded by the public interest. Illustrations are the schools, highways, canals, water ways, water supply, drainage, fire prevention and irrigation. If, then, a similar point has been reached in electric railway transportation, the commonwealth will be following no very novel or radical course if it now turns to public operation.
>
> While the management and operation of electric railways would involve the exercise of administrative functions more complex in some respects than those of other enterprises which have already passed from private to public control, we have little fear that the changed conditions resulting from the assumption of direct public responsibility for this public service would be cause for more regret than in the cases above cited. No doubt the usual amount of human imperfection would be manifested in the case of public operation, but railway service comes so close home to the people that we venture to predict that they would not long tolerate a dishonest or inefficient public management.
>
> But, whatever view may be entertained of the relative merits of private and public operation where conditions permit free choice between the two, the fact that public aid seems to offer the only practicable means of escape from present transportation ills forces us, of necessity if not from choice, to include public operation as an integral part of any plan that may be devised for the solution of our electric railway problems.

The Fork of the Road

If some plan of public ownership is not adopted, the alternative is to continue the present policy and attempt to cure electric railway ills by the raising of fares. It is not impossible that, as the public becomes inured to this policy, it may produce better financial results than have yet been realized. Even if this proves to be the case, however, it will be a long time before the credit of the companies is good, and the higher fares, in our judgment, are certain to lessen the value of the railways to the state, and to cause a gradual shifting of population which will be harmful in its results. If increased rates do not improve financial conditions, a period of receiverships and reorganizations will result, which may finally lead to better conditions, but only at the cost of abandoned lines and still worse service meanwhile.

The people must choose. If they are to have good service, undoubtedly they must pay for it, in one form or another. Public ownership will at once insure a much-needed supply of capital and make lower fares feasible, and we know of no other way of accomplishing these results, other than a permanent guarantee of the outstanding securities of the companies, which would be open to objections. Nor do we think that public management is greatly to be feared. Whether there are other disadvantages which will outweigh the benefits received, we are not prepared at present to say.

MASSACHUSETTS
PUBLIC SERVICE COMMISSION

If one reaches the conclusion, the commission states, that it is wise to reduce fares to a more moderate basis and support the railways in part by general taxation, and that public ownership or public operation is not an insuperable objection, the question of method arises. In this connection, the thought at once suggests itself that it would be well to adopt the new policy in tentative form first. The commission tried to devise a workable plan of this sort, but none seemed wholly satisfactory.

It is possible, it is said, that a plan for temporary relief might be worked out by offering the companies the alternative of continuing under the present system, or of accepting public management and moderate fares, for a comparatively short period of years, coupled with certain annual contributions from the treasuries of the cities and towns in which they operate. If this plan were adopted, this public aid could be limited to a maximum of $2 per $1000 of assessed valuation, with the proviso that it should not otherwise exceed a sum sufficient to enable a company to meet operating expenses, depreciation requirements and fixed charges, and pay dividends of 5 per cent upon stock representing bona fide investment. Public management could be provided through a director-general appointed by the governor and placed in charge of every company accepting the plan, or the governor might be empowered to appoint all or a majority of the directors of each such company. Provisions in regard to fares, supervision and jitney competition would be similar to those set forth below in the discussion of a possible permanent acquisition of the properties. This plan might be criticized as a means of tiding the companies over a period of hard times at public expense, until a return to more favorable conditions should make operation profitable upon the old basis, but such criticism would not be fair, for the public would receive direct compensation for the financial aid granted, in the shape of lower fares than would otherwise prevail. While this plan would, in the commission's opinion, be preferable, from the standpoint of both companies and the public, to the present system of high fares and low earnings, the great defect in any temporary plan is the difficulty of providing the new capital which is necessary for good service and economical operation. This can be obtained only through the restoration of the credit of the companies or the direct use of public credit.

Even if substantial amounts were granted to meet deficiencies in current earnings, no marked improvement of credit would be likely to result if the arrangement were merely temporary without assurance for the future. The only alternative would be the guarantee or purchase by the commonwealth, or by some sub-division thereof, of the particular securities issued to provide new capital. But this also is inconsistent with any temporary plan, as it might necessitate measures for protection against possible receiverships and would be likely to involve the commonwealth quite deeply and for an indefinite time in the affairs of the companies.

The commission believes it difficult, therefore, to escape the conclusion that the only plan which can be really effective in meeting the needs of the existing situation is the outright purchase or taking of the railways by the municipalities or by the commonwealth. Under public ownership there would be no trouble about capital, for the credit of the railways would be the credit of the community. Nor would there be any difficulty as to fares, for the commonwealth could at will continue the present policy of placing the entire burden upon car riders, or shift such portion of this burden as it saw fit to general taxation. It would be entirely possible to place the management by contract in private hands, if such course were deemed advisable.

PRACTICAL QUESTIONS TO BE CONSIDERED

If the choice should be made in favor of public ownership and operation, the commission notes, certain practical questions must be faced. For the present it only indicates the nature of these questions and suggests in a general way possible solutions, as follows:

What Railways Shall Be Taken?—From many points of view, it would be advisable to take all the railways operating within the State. If this were done, certain economies and improvements in operation doubtless could be introduced which would not otherwise be feasible, and the direction of affairs could be placed definitely in the hands of the central government of the State. It might prove, however, that certain sections of the community would be desirous of adopting the new plan, while others would not, in which event it would be possible to provide for the acquisition of particular railways by designated groups of cities and towns, as well as by the commonwealth. Two important exceptions now seem inevitable — the Boston Eelevated Railway, already under public operation for a period of at least ten years, and the Massachusetts Northeastern Street Railway, an interstate road interlacing across the boundary between New Hampshire and Massachusetts.

What Price Shall Be Paid?—As a matter of procedure the taking could be made at once and a special tribunal could be constituted, adequately equipped to assess the damages after full investigation, subject to the right of the company or of the public to have the finding reviewed by the courts. This tribunal could be either the Public Service Commission or a body specially appointed for the purpose.

The commission has allowed the companies, so far as they could do so by the establishment of reasonable rates, to earn a return upon the original investment without deduction for depreciation except when due to mismanagement. This standard, however, has in certain cases proved of little practical value, as many of the companies are apparently unable, under any rates which they may charge, to earn a fair return upon that basis.

If the commonwealth should acquire the properties, there seems no good reason for departing from the general rule by paying more than their present worth or reasonable market value. The special tribunal in assessing the damages to be paid by the commonwealth would undoubtedly give due consideration to all pertinent facts and indicia of value, such as the original investment, the physical condition of the properties, the character of the territory served, the market value of securities, the recent course of net earnings and the extent to which the possibility of additional earnings has been discounted by increases in fare already made.

How Are the Properties to Be Managed and Operated?—

1. Somewhat the same plan of management might be followed as in the case of federal operation of the steam railroads, namely, the appointment by the governor of one man as director general of electric railways for, say, five years. No doubt he would wish to subdivide the system into relatively small districts in charge of responsible managers, so that the advantages of direct local supervision over service might be secured, but to handle certain other matters, such as the purchase of supplies or plans for rehabilitation, through a central department. In our judgment a single-headed direction of this kind is preferable to a board of trustees, there being less division of responsibility, quicker action and less liability to change.

2. The director general could have full power to fix rates in accordance with certain general principles laid down by the Legislature. There should be a minimum fare, of not more than 5 cents, but with this exception he could have discretion to establish such schedules as would, in his judgment, produce the maximum revenue consistent with the free movement of traffic, the prevention of congestion in the city centers, and the proper development of the country districts. Very likely this would result in a return to fares not widely different from those which were in force four or five years ago, although higher in certain instances.

3. The roads should continue, for the present at least, under the supervision of the Public Service Commission with respect to accounting, service and accommodations, and it is by no means certain that there should not be an appeal to the commission on rates as well. The director general would be primarily an executive officer, and experience with federal operation of the railroads has shown the need of some independent, semi-judicial and public tribunal with authority to act, in effect, as an arbiter of disputes. The presence of an independent commission with powers of investigation would also help the governor in appraising the quality of the management, and would tend to prevent certain abuses which might otherwise gradually creep in.

4. If the electric railways should be publicly operated at low rates of fare, the commonwealth would be entirely justified in protecting itself against destructive and unnecessary competition. If any other common carriers except taxicabs are desirable upon the public highways, the commonwealth should itself operate them, through the medium of the director general.

5. The present excise tax should be abolished, and some working agreement substituted between the municipalities and the commonwealth with respect to the maintenance and renewal of the street surface between the tracks. Undoubtedly the presence of railway tracks to some extent increases the expense of caring for the streets.

6. Direct acquisition of electric railway properties would enable the commonwealth to provide the capital necessary for rehabilitation and improvement by the issuance of State bonds. It would, of course, be proper to issue such bonds to cover the cost of additions and betterments. It would also be justifiable to spread the cost of extraordinary renewals necessitated by past neglect, beyond those which would normally be made from year to year, over a period of years by issuing serial bonds payable in annual installments.

7. Under the system proposed, a portion of the cost of electric railway service would be met by the car rider, while a further portion, unless conditions radically change, would fall upon the community as a whole, being paid in the first instance at least out of the State treasury. This latter portion could be levied upon the cities and towns served by the railways, in proportion to trackage or population or both, or it could be met directly by the commonwealth through an increase of certain special forms of taxation, such as the inheritance tax, the income tax or the tax upon automobiles. This would be purely a question of public policy and of obtaining the best average results for all concerned. Any general increase in real estate taxes would be met, no doubt, by an increase of rents or prices, and it might prove that the burden could be carried more easily and to greater public advantage in other ways.

It is practically impossible, in the commission's opinion, to give any accurate estimate of the burden which might fall upon the public treasury, if the properties were so acquired, for no one can foretell the purchase price which would be necessary. The best that can be said is that the amount would probably be substantially less than the original investment. Likewise no one can foretell what the revenues or the expenses would be.

There are, to the commission's mind, certain grounds for optimism in regard to the future of electric railways, especially if credit can be restored and an adequate supply of capital insured. The necessities of the situation have stimulated invention, and during the last two or three years new ideas in regard to operation have been developing and gaining ground which seem likely to have an important influence upon the industry. For a long time the tendency was continually toward larger and heavier cars, but it is now in the opposite direction. The experience to date with one-man cars, if reports may be relied upon, has been full of promise. Clearly they represent a labor-saving, power-saving, track-saving device which deserves most serious consideration.

Another new idea which is gaining vogue is a different method of dealing with rush-hour traffic through staggering of hours. It may prove that there are disadvantages in this plan which outweigh its benefits, but it seems to have promise as a means of preventing overcrowding and reducing expense of operation, and public management should make it easier to put it to the test.

Moreover, a unified public management with an adequate supply of capital would make it possible to improve power, shop and track conditions which are admittedly adding to the cost of operation on many of the railways. Unified management should also make it feasible to bring about a standardization of equipment and supplies like that which so many industries in this country have found of greater advantage.

All this, the commission states, is merely suggestive of the possibilities of the future for electric railways, if they can once be placed upon their feet and in a position to seize the opportunities which lie before them. The public itself, it is added, can decrease the expense of electric railway operation and increase revenues without raising rates if it will only co-operate in traffic regulation, accident prevention and the collection of fares.

PART PUBLIC OPINION WILL PLAY

In conclusion the commission points out that it has endeavored merely to state the issue and furnish a starting point for discussion. Continuing it says:

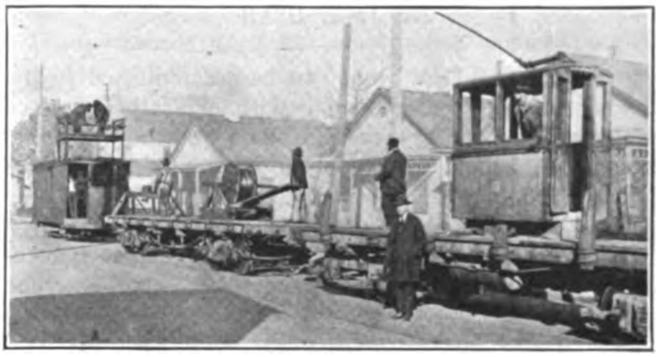
> The new policy which we have suggested is too far-reaching in its consequences and penetrates too far into fields, like taxation, of which we have little special knowledge, to justify us in urging it with confidence or in developing it at this stage with greater particularity. It needs above all things the consideration of many minds from many angles.
>
> Furthermore, evidence of public demand is essential. It is useless to undertake the difficult task of preparing definite and comprehensive legislation upon this subject, unless there is sound reason to believe that it will be in accord with public opinion and receive the whole-hearted support of the community. So strongly do we feel upon this point that we should not favor the adoption of any plan, no matter how great the public demand might seem to be, unless provision were made for final submission to a referendum vote. It is of vital importance that the people of the commonwealth should accept the new policy, if it is to be adopted, and become directly responsible for its success.

In regard to the Boston Elevated Railway situation, the commission added that, as it had feared, the public trustees had not been able to provide good service. They suffered, however, from conditions beyond their control, which had a similar effect upon all the railways of the State. In the commission's opinion, the public will be short-sighted and unfair if it charges against public management these adverse conditions which have caused similar shortcomings in private management. As yet there is no reason for a claim that public management has been a failure.

Tension Blocks Facilitate Replacement of Five Miles of Trolley Wire

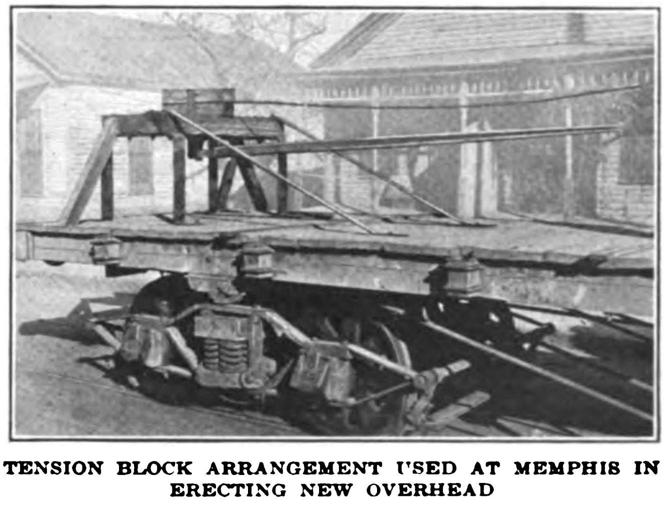
This Simple Device Used in Memphis to Maintain Tension and Straighten Kinks in Trolley Wire Proves Advantageous

THE Memphis (Tenn.) Street Railway recently installed 3.34 miles of No. 0000 Phono-Electric trolley wire on Main Street between St. Paul Avenue and Jackson Avenue, and 4207 ft. of the same on curves leading from Main Street. This is a double-track line in the most congested district on the system, and a section over which all cars pass. The supporting steel poles have 6-in tops and are set in concrete. The span wires are ⅜ in. with porcelain insulation used in spans and guys and wood strain insulators 1 in. x 9 in. used in single and double pull-off ears in special work, through 1800 ft. of which the Main Street trolley was installed.



OVERHEAD ERECTION TRAIN AND CREW

To facilitate the work of stringing the new trolley wire a clamping or tension block was designed and mounted on a flat car at the opposite end from the reel. The purpose of this block was to reduce as much as possible the waves in the wire, and to maintain a constant tension, as the wire was unreeled. The design and arrangement of the block is clearly indicated in an accompanying illustration. The blocks are white oak 4



TENSION BLOCK ARRANGEMENT USED AT MEMPHIS IN ERECTING NEW OVERHEAD in. x 5 in. x 30 in., with a ¼-in. groove cut lengthwise in the center of one 5-in. x 30-in. face on each block. This furnishes a guide for the wire. A downward pressure on the lever maintains a tension on the wire, and tends to straighten out any kinks.

The materials used in the installation of the wire were products of the Ohio Brass Company, and included type N lock hangers, extruded grooved ears, single and double pull-off Detroit trolley clamp ears in curves, and Cleveland wire splicers in straight-line work.

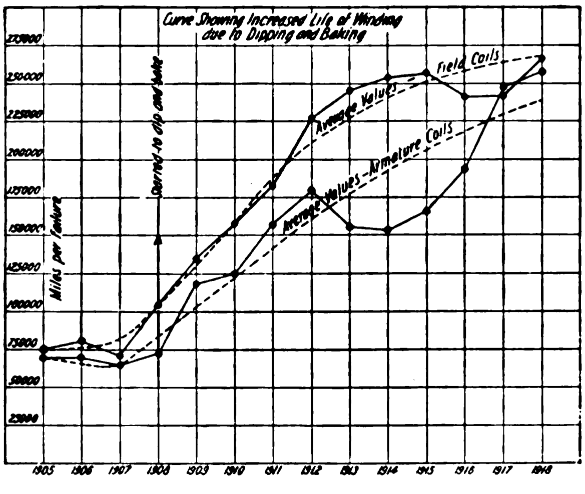
Installation of the new wire and removing the old wire, not including the work on curves, was completed in forty-four working hours with twelve men, including motormen for operating the cars. The total cost for installing the new wire and removing the old was $0.0212 per foot.

It Pays to Dip and Bake Railway Motor Windings

BY J. S. DEAN
Railway Engineer Westinghouse Electric & Manufacturing Co.

AN EXAMPLE of what can be accomplished in the way of decreasing trouble with old railway motor windings by dipping and baking is shown in the accompanying chart. This shows results for a railway during 1905 to 1918. Armature and field failures per car-mile are plotted from each year's record.

Referring to these graphs, it will be noted that in 1918 there was a decided upward trend which was due to the fact that the master mechanic instituted a systematic schedule of dipping and baking motor windings. Every one-and-a-half to two years (approximately 60,000 to 75,000 miles) during the general overhauling period the field coils and armatures were given a dipping and baking. If when motors were in the shop for other repairs the windings appeared dry, even though the motors had not made their allotted mileage, they were given an extra treatment.



INCREASED LIFE OF WINDING DUE TO DIPPING AND BAKING

The graphs show that 265,000 miles (seven years of service) was sometimes secured per failure, with windings dipped and baked, as against 75,000 miles (two years of service) otherwise. With 300 motors in service, and assuming that 35 per cent are completely rewound and 65 per cent repaired each year at a cost of $60 for complete rewinding and $10 for repairs, we have $2,750 as the saving per year. The approximate cost to dip and bake is $2 per motor, and as each motor is treated every one and one-half years, we have $400 as the total cost per year and $2,350 as the saving per year. The estimated cost to install the plant is $1,200, hence there was a net saving of $1,150 the first year and $2,350 for each succeeding year.

Portable Fuse Testers Save Time and Labor

THE accompanying illustrations show two forms of portable fuse-testing outfits that have been found to be practicable. The device shown in Fig. 1 is about 15 in. high and is entirely of pipe construction. Two fuse contactors, one being adjustable, are connected in series with the lamp. In the illustration the wiring is shown on the outside of the device for the sake of clearness but as actually installed it runs through the piping. The movable arm is insulated from the end contact and from the piping running to the base by means of an insulation bushing at *A*. Any size or type of fuse can be tested by making adjustments with the set screw, which permits the movable arm to travel freely on the horizontal cross-pipe. The pipe construction reduces the weight to such an extent that it can be carried readily from place to place.

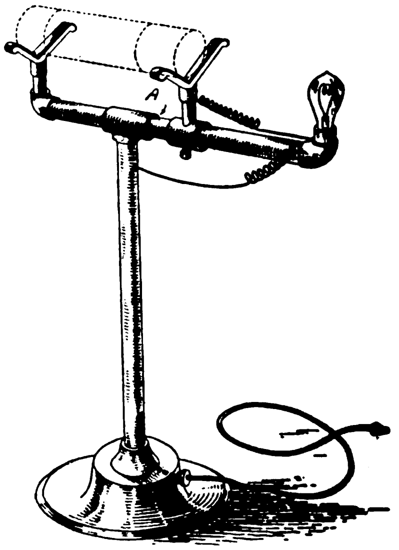


FIG. 1—PORTABLE FUSE TESTER WITH PIPE CONSTRUCTION

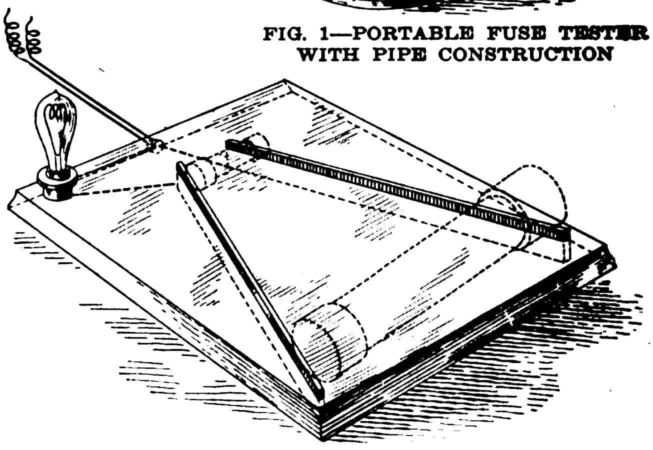


FIG. 2—PORTABLE FUSE TESTER WITH INCLINED CONTACTS

The apparatus shown in Fig. 2 consists of a board with two contacts mounted thereon which approach each other at angle. By this arrangement different lengths of fuses can be tested without the necessity for stopping to adjust the distance apart of the contacts. The illustrations show the main features of the construction so that anyone can make the device.

Operators and Instructors Necessary for Electric Arc Welding*

After Proper Equipment Has Been Provided Skill In Operation Is Most Important and Extreme Care Is Necessary to Prevent the Parts from Springing Out of Shape and Avoid Excessive Strains

THE successful application of the electric arc welding process depends very largely on the skill of the operator. The best equipment on the market may be provided, but unless the operator is the particular, neat and careful type of man, the results will be anything but encouraging.

The best operators come from the skilled crafts, such as boiler-makers, blacksmiths and machinists, or men of equal experience in the mechanical field. Only the best men of the respective crafts should be selected to become welding operators, and under competent direction the skilled and enthusiastic operator will seldom make serious blunders in the application of the process. Also, men of this type will continually find new and profitable fields for its application, and as time goes on a considerable amount of pride and enthusiasm will be observed among the operators. Each operator should be instructed as to the duty of an electric welding equipment, especially where the individual type is used. He should be given careful instruction in starting up the machine in the way of seeing that there is nothing lodged in, or accidentally placed in the way of any of the moving parts. Polarity of the welding circuit should be explained to him so that he will have a perfect understanding of its relation to welding. A good practical way to determine the polarity of a welding circuit is by placing a carbon in the electrode holder in place of a metallic electrode. It will be found more difficult to maintain an arc if the carbon is made the positive than if it is made the negative. The detail instructions of the equipment will of course depend on the type of equipment used.

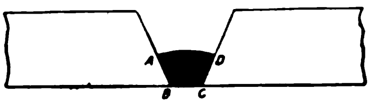


FIG. 1—METHOD OF WELDING TWO PLATES TOGETHER

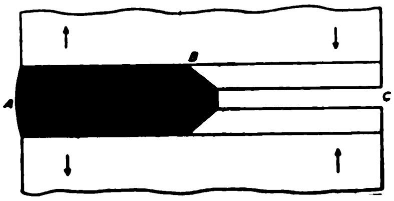


FIG. 2—STRAINS PRODUCED BY COOLING OF THE METAL IN THE WELD

It should be remembered that there will often be welding equipments placed where there is no electrician to look after them, and it will often be necessary for the operators to look after their own equipment, to a large extent. This they can do if their instructions are complete. It is as important for an electric welding operator to understand his equipment as it is for an acetylene operator, not in a technical way but from the standpoint of care necessary and operation desirable.

When an arc is formed a bright incandescence can be observed, accompanied by a reddish ambient flame, which is due to the burning of the metallic vapor in the oxygen of the surrounding air. It is believed that in the interior of the arc little oxidation of the metallic vapor occurs, because the vapor tends to fill this interior space and therefore displace the air. Oxidation is detrimental in that it reduces the ductility of the metal.

It is now coming to be quite generally believed that the effect of nitrates (caused by the nitrogen in the air) in steel welds is also very bad, and in order that the effect of either oxygen or nitrogen may be reduced to a minimum, the most important thing to be done is always to weld with a short uniform arc, as a long arc always increases the foregoing actions. The arc is established by touching the wire electrode to be fused to the work, and drawing it a short distance away, say approximately ⅛ in. This is best done by a dragging touch with the electrode slightly out of vertical. The electrode should always be held approximately at right angles to the surface on which metal is being deposited, so that the heat will go straight from the end of the welding wire or electrode. Hence, when the electrode is held at approximately right angles, fusing of the work is assured, assuming, of course, that the proper heat has been provided and the proper arc length is maintained uniform. Furthermore, the work must be clean.

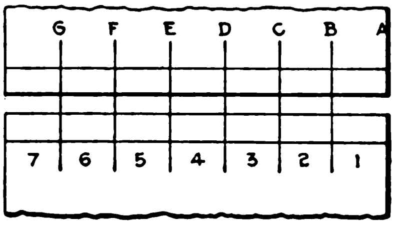


FIG. 3—METHOD OF BACK-STEP WELDING

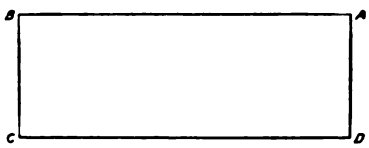


FIG. 4—METHOD FOR WELDING A SQUARE SHEET OR PATCH

A slight half-circular motion of the electrode will tend to float the slag to the top better than if the electrode is moved along a straight line in one continuous direction. The best results are obtained when the welding progresses in an upward direction.

PLATE WELDING REQUIRES EXTREME CARE

When welding together plates which have their edges beveled, the arc should be started at point *A* as in Fig. 1. The welding should then progress to point *B*, and from *B* to *C*, joining the edges together, then from *C* to *D*, from *D* to *A*, and so on in this manner, filling in a space of approximately 6 in. in length, with the first layer, afterward returning for the additional layers necessary to fill the "V." Where this method is used it is not necessary to break the arc until the entire electrode is deposited, and the thin edges are not fused away as would be the case if the operator should try to join these edges by moving the electrode in one direction continuously. Also, when the foregoing method is used the deposited metal will not chill so quickly as to cause local strains to be set up adjacent to the weld. This chilling effect is bad, especially when the mass of the parts being welded is large.

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*From 1918 report of committee of Association of Railway Electrical Engineers. For recent articles on the same subject, see the issues of this paper for Dec. 7, 14, 21 and 28, 1918, also Jan. 11 and 18, 1919.

When preparing work for welding, easy access should be provided first for the depositing of the metal along the entire surfaces to be joined together. At the same time more than is necessary should not be removed as it is not ordinarily possible to replace it with metal of equal quality. Furthermore the surfaces on which metal is to be added must be perfectly clean, and the effects of expansion and contraction should be carefully considered.

METHODS USED TO RESIST EXPANSION AND CONTRACTION STRAINS

If two pieces of metal are allowed to lie loosely, free to move, they warp and distort in their relative positions during the process of welding, unless precautions are taken. Yet if they are clamped rigidly the stresses which are set up are taken up almost entirely by a slight giving-in of the weld, so that when the parts are released there is no tendency for them to spring out of shape, nor is there any apparent lack of strength in the weld itself due to the stresses being absorbed. This point is reassuring in that it indicates that rigid parts may be safely welded together and no serious stresses left in the weld provided the welding is done properly.

It is the general belief that parts left free to move require no consideration as to expansion and contraction. Nothing could be more untrue. Owing to the fact that in the case of metallic arc welding, where the heat is instantly applied and confined to a very small area in comparison to the total weld, it is necessary to consider practically all welds as being rigid, as is the case shortly after the welding has started, as explained in the following example: If welding is started at *A*, as in Fig. 2, progressing in the direction of *C*, over a distance of approximately 3 ft., by the time point *B* is reached, which is half the length of the seam, contraction will have occurred at the point *A*, so that as welding is continued from point *B* to point *C*, the hot expanded metal placed in the "V" will contract in cooling and will tend to draw the edges closer together. This cannot be done without imposing a strain at point *A*, as indicated by the arrows, thus causing the plates to warp.

BACK-STEP METHOD OF WELDING GIVES GOOD RESULTS

A method that has been found to give excellent results is called the "back-step method," for the want of a better name. The object of this method is to avoid stresses which are set up by compelling a slight giving of the weld, as was set forth in a previous paragraph relative to rigid welding.

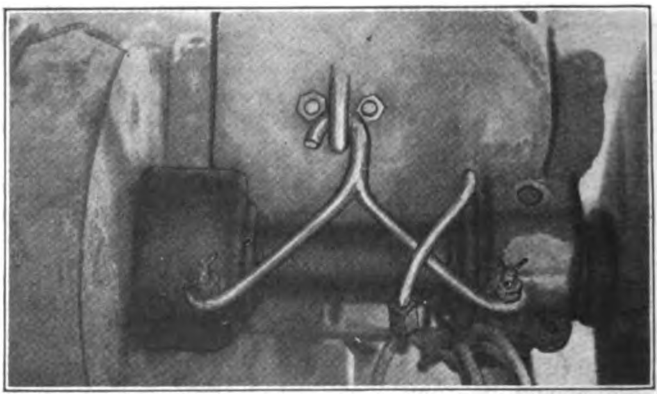
Referring to Fig. 3, the back-step method of welding is performed as follows: The sections from 1 to 7, inclusive, should be welded by starting at *B*, section 1, filling in to point *A*, returning to point *C*, section 2, filling in to point *B*, section 1, starting at point *D*, filling in to point *C*, and so on in this manner until all the sections are completed. Each section should be practically finished before starting the next. The length of each section on any seam should not exceed approximately 6 in., and for short seams should be relatively shorter. The work may be stopped at any time without fear of cracking, provided that the portion of the seam gone over is finished flush.

When a square sheet or patch is to be welded in, as in Fig. 4, the work would be started at *A*, finishing the top seam to *B*, and in order that the welding may next be started at the coolest point, the bottom seam would be welded, starting at *D* and finishing up at *C*. The next seam would be *A* and *D*, starting at *A* and finishing up at *D*. Welding would then be started at *B*, completing the weld at *C*, using the back-step method for all seams, as previously explained. Round patches would be laid off in four sections and welded in the same manner as a square patch.

In welding parts of considerable mass, ordinarily the heating and cooling curve is very steep. Where the foregoing method is used, the cooling curve will be considerably lengthened, and local stresses which are present when welding between heavy chills will be avoided. Where mass of the parts is such that local strains may be large, from great differences in temperature, for example in welding car axles, the chill should be removed from the parts by reheating. The higher the carbon in the steel, the more necessary it is that this be done.

Safety Carrier for GE-58 Motor

TO PREVENT damage to motors and derailing of cars in case of the breaking of motor frame bolts and the consequent falling of the motor to the ground, the Denver (Col.) Tramway has placed safety carriers on all cars equipped with the GE-58 motor. The carrier is made complete from a few feet of ⅞-in. iron rod. The rod is first bent double, the two ends are brought together and then the center which is now an end is bent into the form of a hook to fasten into the chain hold of the motor housing. The free ends are then spread, bending from above the hook and an eye is bent in each end to fit over the axle cap bolt. The support is assembled as shown in the accompanying illustration. Several motors with broken bolts have been found suspended from the hooks at various times.


SAFETY CARRIER APPLIED TO G.E.-58 MOTOR AT DENVER

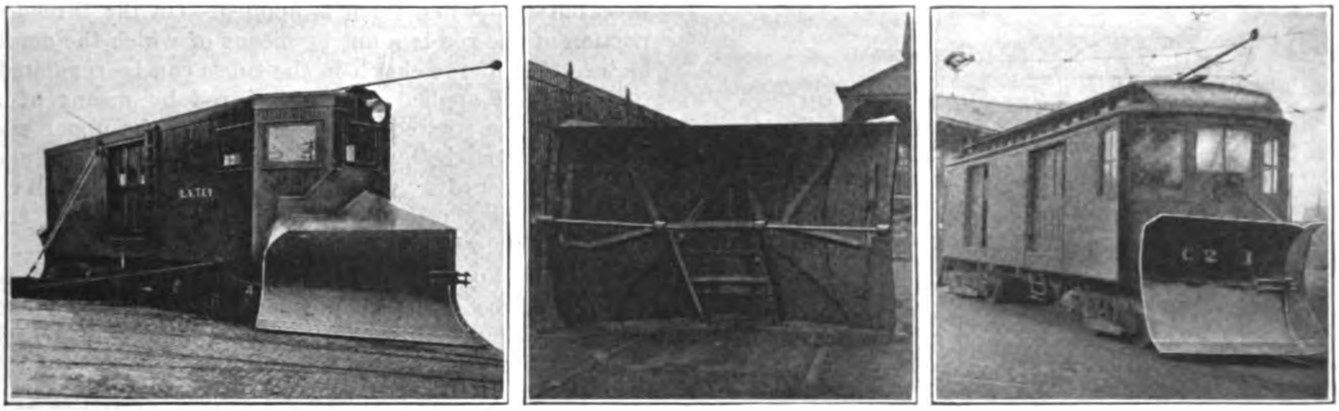
Lehigh Valley Transit Well Prepared for Snow

New Heavy-Duty Double-Truck Plows Have Been Built and Work Cars Have Been Converted into Temporary Plows

By W. C. Klein
Superintendent of Equipment Lehigh Valley Transit Company, Allentown, Pa.

NEVER before have the lines of the Lehigh Valley Transit Company, which comprise 216 miles of track, been safeguarded from delays in operation caused by heavy snowfall as is the case this winter. The company's snow-fighting system is more efficient than ever because there are more tools with which to work. The company has thirteen double-broom sweepers, six single-truck plows, five temporary double-truck plows (of which three were converted from freight cars and two from work cars) and three heavy-duty double-truck plows. This snow-fighting equipment is operated by well-organized crews supplemented by crews furnished by contractors located in the principal communities served by the railway.

The three new heavy-duty double-truck plows are identical in construction except that one plow had to be made 6 in. lower than the others to allow for clearance of bridges on the property of the Easton Transit Company, a Lehigh Valley Transit subsidiary. Photographs of one of these plows are reproduced and the reader can realize the dimensions better from the statement that the length over all is 40 ft., the bolster centers 18 ft., the length of plow body 32 ft., the width of plow body over side sheathing 8 ft., the height from rail to trolley board 12 ft. 5½ in., and the wheelbase 6 ft. 6 in. The plow body is constructed of a heavy underframe of 8-in. x 12-in. long-leaf yellow pine timbers, which add weight and give strength to receive the end shocks from the plow nose. The body has a 5-ft. door on each side, with five drop-sash windows at each end. All apparatus except the brake cylinder is installed inside the car body. In the interior view it will be noted that the rheostats are well guarded to prevent the operator from coming in contact with the bare grids. In this picture the sand and salt boxes can also be seen.



AT LEFT, HEAVY-DUTY SNOWPLOW WITH NOSE IN LOWERED POSITION. IN CENTER, REAR OF TEMPORARY PLOW NOSE SHOWING BRACES AND HINGE POINTS. AT RIGHT, WORK CAR EQUIPPED WITH PLOW NOSE SHOWING NOSE IN RAISED POSITION

A 10-ft. wing is fitted on a bracket extending from the plow body on each side of the car for the purpose of throwing back that portion of the snow which otherwise would be carried back onto the track by passing teams. The wing is controlled by means of a block and fall to hoist at any angle from the interior of the car without opening the door—a novel feature. The body is mounted on Brill No. 50-E-3 arch-bar trucks.

The plow noses are constructed of ¼-in. steel plates, with a binder plate of ¾-in. x 8-in. mild steel stock at the bottom edge of the nose. The noses are braced by two 6-in. I-beam horizontal braces with slide castings attached. The hood of the plow nose is constructed on an angle to allow snow to slide off, preventing accumulation on top. The nose also has a folding canvas strip connected to the plow body and to the top of the snow nose which prevents sleet from interfering with the operation of the nose. The nose is operated by a 12-in. x 12-in. air cylinder, located inside the plow body. A substantial lever attached to the cylinder is used to pull a ¾-in. iron chain from a sheave wheel located on the countershaft underneath the body. The chains from the plow nose are drawn up on sheave wheels simultaneously with the unwinding of the cylinder chain. The guides of the plow nose slide up and down on two 70-lb. rails well braced against the bumper of the body, and these rails receive the end shocks. This scheme of support permits the plow nose to strike heavy obstructions without damaging the plow and at the same time allows for the vertical operation of the plow nose.

INTERIOR OF HEAVY-DUTY PLOW BODY SHOWING APPARATUS AND WIRING

The plows are equipped with Westinghouse No. 121-A motors with GE K-64-A-2 controllers, in conjunction with the contactor boxes of General Electric type. This control makes possible the direct use of current in the motors without air service, the contactor box protecting the controller from burning. All wiring of the plow is exposed on the ceiling, to permit repairmen to locate trouble quickly. This position of the wiring also keeps the cables from salt and snow water, an improvement over the common practice of installing cables on the floor. The plow is equipped with straight air brakes; with a 25-cu.ft. compressor; with aluminum cell lightning arresters, and with 64-watt incandescent headlights having silvered glass reflectors. In the body are carried jacks, bull rope, car replacers, sledge, small tools and blocks.

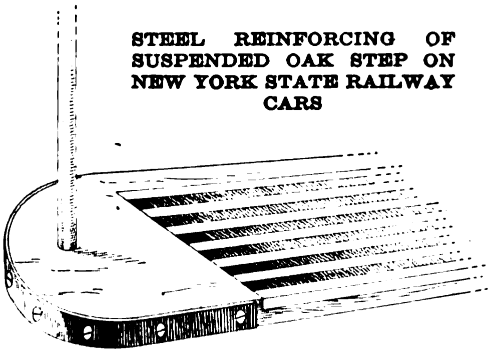
In concluding this brief description of the plow it may be pointed out that its special features are the simple plan for operating the snow nose, the provision for resisting exceptionally strong end shocks and the location of practically all apparatus inside the body

UTILIZING OTHER ROLLING STOCK FOR SNOW FIGHTING

As stated earlier we have converted some freight and work cars into temporary snowplows which, as will be seen in the photographs reproduced, is a very simple process. These pictures were taken to show the nose in the raised position and the braces and hinge points. The temporary snow noses are constructed of ¼-in. steel, well braced to the hinge forgings located at the back of the nose. These forgings fit hinge mates which are located permanently on the work-car body. A top supporting rod is connected from the end of the plow nose to the lever of a countershaft fastened to the cab of the work car. A 12-in. air cylinder, located in the motorman's cab, is used to operate the countershaft. When the plow nose is not lowered for operation the cylinder raises it to clear the ground by 9 in. The cylinder brackets lock the nose in each position and the noses can be removed in twenty minutes.

Increasing the Life of Suspended Car Steps

THE New York State Railways, Syracuse Lines, has a number of cars on which the lower step is of oak, with rounded ends, supported partly by bolt suspension. Much trouble has been experienced with these steps due to their splitting under the effects of weather and use. To prevent this trouble the simple expedient of reinforcing the ends of the step with 1-in. x ⅛-in. steel strap has been adopted and the results have been very satisfactory.


STEEL REINFORCING OF SUSPENDED OAK STEP ON NEW YORK STATE RAILWAY CARS

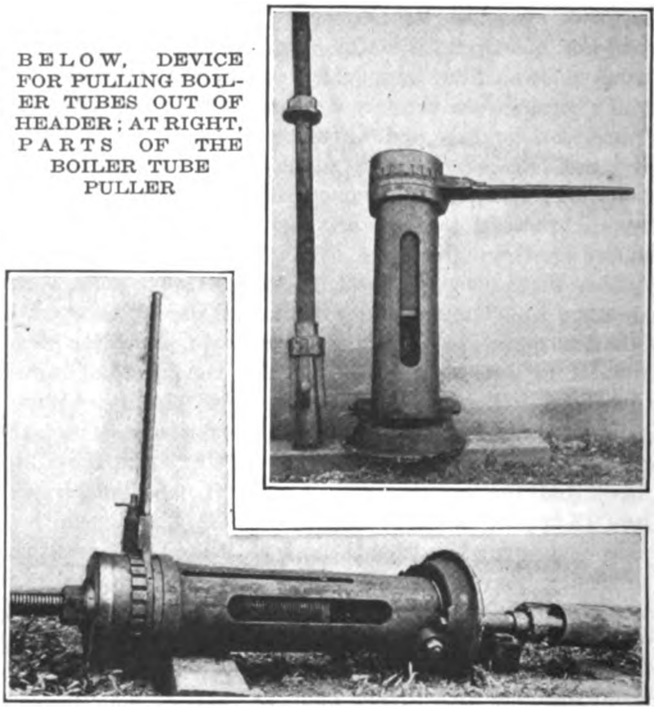
Formerly the composition anti-slip tread was mounted on top of the step. Recently the plan was adopted of sinking it so that the top projects but slightly above the step level for the purpose of removing danger of passengers tripping over the back edge of the tread when they are alighting.

Device for Pulling Out Boiler Tubes

AT THE RUSHVILLE shop of the Indianapolis & Cincinnati Traction Company a device has been built for pulling out the tubes of water-tube boilers from the headers by main force. The details of the device are shown in the accompanying photographs.

It consists of the two essential parts shown, a long threaded rod, about 1¾ in. in diameter, containing at one end an internal expanding clutch, and a ratchet mechanism for applying tension to the rod when it is inserted in the tube to be removed.

The clutch on the pull rod consists of a collar sliding on the rod, to which are hinged four swinging clutch jaws sharply toothed at the lower end. At the extreme lower end of the rod is a conical piece which wedges the jaws outward when force is applied. On the threaded portion of the rod is a nut by means of which the depth of insertion of the clutch in the tubes can be regulated.


BELOW, DEVICE FOR PULLING BOILER TUBES OUT OF HEADER; AT RIGHT, PARTS OF THE BOILER TUBE PULLER

Tension is applied to the pull rod by means of a threaded tube rotated in a nut forming the upper end of a cast-iron shell, by means of a long handle and ratchet. In order to avoid side strain the shell is hinged at the bottom to a circular baseplate in the manner shown.

With this apparatus it is but a few minutes' work to remove a tube entire. This device was designed and built by Samuel Waggoner, chief engineer of power stations of this company.

The Industrial Department of the International Committee of the Young Men's Christian Association has prepared a syllabus on the subject of the human side of engineering. This is suggested as an outline of a college course on the subject. It will, however, be useful as a guide for systematic reading by anyone interested in improving relations between employer and employee. Copies can be obtained from the Industrial Service Movement, 347 Madison Avenue, New York City.

LETTERS TO THE EDITORS

Free Rides and Other Things

SPRECKELS COMPANIES
SAN DIEGO ELECTRIC RAILWAY COMPANY

SAN DIEGO, CAL., Jan. 20, 1919.

To the Editors:

I have been profoundly interested in the plan advocated by Ralph E. Bauer, of Lynn, Massachusetts, which press dispatches say has been endorsed by Peter Witt, of Cleveland, the street railway expert, that all street car lines in cities be operated free of charge to the public, that the public be permitted to ride whenever and wherever they please without the payment of fare, and that all cost of electric railway operation be paid out of taxes.

A little while ago I might have been against such a remarkable innovation as this, but now I am entirely in favor of it, *provided this idea shall not be confined to street car service only.* As long as we are to have free street cars, I think it absolutely essential for the comfort and convenience and satisfaction of the people that we should have free gas, free electric lights, free water, free telephones and free steam heat served from central plants; all of these various public utilities to be operated by the cities and the *entire* cost of same to be raised by taxation.

California is a popular place with tourists. Hundreds of thousands of them visit our State annually. We will naturally be only too glad to carry them free on our street cars, furnish them with free gas, free electric lights, free telephones, free water, etc. Of course, they do not pay any taxes in our state, but what do we care? It will be merely in keeping with the hospitality California has always shown. People in the immediate vicinity of cities who are not served with street car lines will be carried free on city lines, notwithstanding they pay no city taxes. The people of the cities will gladly pay taxes for free rides for the farmer, the storekeeper and the thousand-and-one people who live in little communities outside our cities. When we all travel free on street cars, we will never walk a block if we can help it, and we and our families will use the street cars four times as much as we do today. It will take four times as many street cars to carry us then. It means four times the power, four times as many men and of course will cost four times as much for the street car service as we are paying to-day. But thank God we shall not have to worry about the cost of any of these things because it will be paid for out of taxes.

When we have established this unusual but delightful and thoroughly welcome condition, why stop? What is the matter with free bread, free meat, free milk, free eggs and butter and groceries? I see no reason why our cities should not buy the necessities of life. They can purchase much more cheaply than individuals or wholesale houses and could allow people to draw all they can use, and all cost would be paid by taxes. I do not know whom they would tax or what they would tax, but they could tax somebody or something. These are trifling details, however, that we do not have to consider in these progressive days. And by the way, why stop at street railways? I see no reason why we should not have free freight and free passenger service on steam railroads, and this wonderful Merchant Marine of the United States. Why not free service on that to all American-born citizens? Let us have free passenger service to Europe, China, Japan or any other place on the seven seas. It will enlarge the minds of the people, broaden their education, and all can be paid for out of taxes. Why should the people of the country be oppressed, burdened or limited in their daily life and happiness when everything can be cured by taxation? It rather makes me mad to think of the time we have wasted when all our troubles could have been resolved by that one simple remedy of making everything free and paying for it by taxation.

In conclusion, let me suggest that we have a free Congress and Senate. Why have primaries? Why have elections? Let every man and every woman be a member of Congress or Senate by *birth,* and go there and say what he or she pleases. There would be the advantage of free railroad travel, and one might add, incidentally, free hotels. Why not? Everybody would then have the opportunity of being his own congressman or senator, and while in Washington of addressing his fellowmen and having laws passed of the particular and special kind which each one thinks is needful according to his view of life or which seem to promise to meet his personal needs.

I am beginning to see that under such conditions we would really have a FREE country in the true sense of the word. Everybody can be a czar, an emperor or a president according to his or her desires. Let's go to it! Yours for freedom "'n' everything,"

W. CLAYTON,
Vice-President and Managing Director.

More Data Needed on Carbon Brushes

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

PITTSBURGH, PA., Jan. 21, 1919.

To the Editors:

Among the topics that might profitably be taken up by the appropriate committees of the American Elecsential to make tests to determine how the carbon brushes especially deserves attention. Carbon manufacturers, as well as manufacturers of dynamo-electric machinery, have made numerous tests to determine contact resistances, friction losses, etc., of various carbons. While such tests are of interest, they contribute very little toward the real practical need; namely, a carbon which can stand high current densities and high sparking voltages with small wear.

In order to develop such carbons, it would seem essential to first make tests determining how the carbon wear is affected by current density, sparking voltage and peripheral speed. Present indications are that with many commercial carbons very appreciable densities can be used if there is no sparking voltage, while sparking voltages up to 15 or even 20 volts across the brush cause very little wear at certain speeds, if the current density is low enough. More data along this line should be of great advantage both to the carbon manufacturer and the designing engineer. R. E. HELLMUND, Engineer.

AMERICAN ASSOCIATION NEWS

Engineering Association to Resume Committee Activities

AT A MEETING held in New York on Jan. 10 the executive committee of the Engineering Association decided to resume active committee work, restricting reports this year to topics considered especially vital to the welfare of the industry. After consideration of the status of the work of the several committees at the time activities were suspended, due to the disturbed condition of the country, a resolution was adopted substantially as follows: That committee work be resumed to the extent of the subjects considered vital to the industry at present, and that a committee on subjects be appointed to select topics upon which reports shall be presented at the next convention of the association, this committee to act in co-operation with President F. R. Phillips. In connection with the resolution it was understood that if necessary to carry out its intent the committee shall recommend the appointment of new committees or the abolishing of existing committees so that attention may be concentrated upon those matters which will have most direct relation to the problems of reconstruction. The executive committee considered a few of the possible topics for report but no announcement regarding them will be made until the committee on subjects has formulated a report. This should be very soon.

Among miscellaneous matters of business considered by the executive committee and decisions reached thereon, the following were the most important:

The resignation of J. W. Welsh from the several association committees on which he was a member was accepted in view of the fact that Mr. Welsh is now a member of the association staff.

It was voted to continue the association's representation on the joint committee appointed some years ago to determine costs of generating electric power, but to reduce the representation from three to two members. The association has been represented by L. P. Crecelius, E. H. Scofield and J. W. Welsh.

It was decided to revive interest in the work of the joint committee on underground and overhead line construction and to authorize the president to appoint a new committee of the association to act with similar committees from other organizations.

The work of the committee appointed to consider the National Electrical Safety Code was reviewed and it was considered desirable to continue this committee, the president to appoint a successor to Mr. Welsh.

On the subject of power distribution it was decided to continue the committee on standard threads and insulators and to ask the distribution committee to arrange for representation on a joint committee on standard stranding of cable.

Mr. Welsh was designated to act as secretary of the Engineering Association in the absence of Secretary E. B. Burritt.

The executive committee meeting was attended by E. R. Hill, New York City; C. L. Cadle, Rochester, N. Y.; C. F. Bedwell, Newark, N. J.; J. W. Welsh, New York City, and E. B. Burritt, New York City. In the absence of President Phillips Mr. Hill, third vice-president of the association, presided.

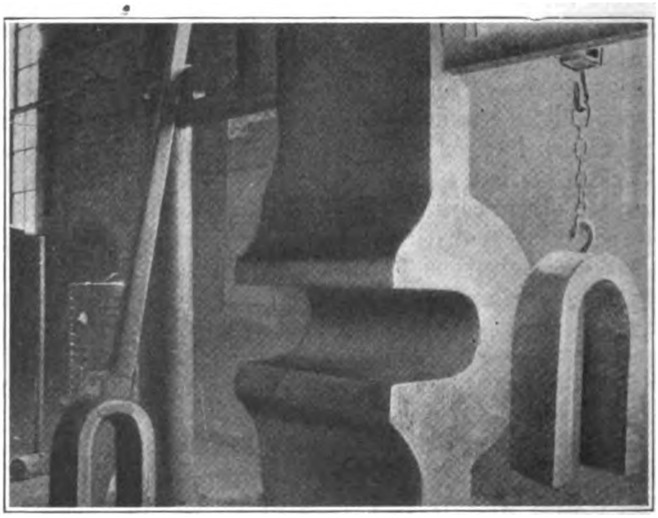
C. H. Van Hoven Elected President of the Manila Section

AFTER a wonderful record of continuity in the holding of meetings, forty-five having been held in the forty-seven months from the date when it was organized until last November, the Manila company section was obliged to postpone its forty-sixth meeting on account of the epidemic of Spanish influenza which was raging in Manila. The meeting, however, was held a month later, on Dec. 10, 1918. The transportation department orchestra furnished the music.

The result of the annual election was the choice of C. H. Van Hoven, claim agent, as president; F. P. Santiago as vice-president; J. G. Hess, jr., as secretary; B. Solano, as treasurer, and F. Castillo as director to serve for four years. Vice-president Chavez announced the receipt of a cable message from America stating that M. Fariñas and P. Castillo had, respectively, received the medal and honorable mention for the best and second-best papers presented before company section during the preceding association year. (See E. R. J., Nov. 2, 1918, page 793.) The "cable" also announced the award of "honorable mention" by the N. E. L. A. to B. H. Blaisdell for his paper on "A Kilowatt-Hour and the Coal Required to Produce It" (printed in the issue of this paper for March 16, 1918, page 525).

Getting More Bearing Surface in the Wheel Press

SOME time ago the shop department of the Lake Shore Electric Railway had the ill fortune to break the tail block or anvil of the wheel press at the Fremont, Ohio, shop. Advantage of the opportunity was taken, however, to increase the bearing surface of the tail block by building out the pattern to form the projections seen in the accompanying illustration. The new casting is not only stronger but the work seats itself much more securely than when the left-hand side of the tail block came straight down.



TAIL BLOCK OF WHEEL PRESS BUILT OUT TO INCREASE BEARING SURFACE

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Mr. Gould Would Sell

Controlling Interest in Richmond and Norfolk Railways Reported Offered to the Cities

Frank J. Gould, principal owner of the Virginia Railway & Power Company, which controls the electric railways in Richmond and Norfolk, Va., was reported on Jan. 21 to have offered to consider the matter of disposing of the properties to the cities.

COMPANY HANDICAPPED

That the company has been greatly handicapped in both cities is a matter of record. Long since it proposed to rehabilitate, extend and modernize its Norfolk properties. To make this possible negotiations were begun several years ago for a new franchise. Many sessions were held between representatives of the company and the city and at one time it seemed as if the prospects were good for an amicable adjustment. Finally, the negotiations were broken off.

After a considerable interval the question of a new grant for the company was taken up again, but in May, 1918, the City Council voted against a combination of the electric light and power and traction franchises in the new franchise proposed by the company. W. H. Venable, counsel for the company, then stated that his company could not consider a franchise which would not include light and power as well as traction. He declared that it was impossible to look upon the two branches of the company's business as other than a whole because securities had been issued covering all of the activities, and the trustees representing the holders would not consent to a separation of the businesses.

Meanwhile, the Chamber of Commerce took up the matter of service in Norfolk. The special traction committee of the chamber made its final report to the board of directors in October. Among other things the report stated that the committee had found itself "powerless to reach any satisfactory understanding and the matter has to be finally settled by the City Council." The committee opposed the City Council granting the company the right to increase its fares to 6 cents "until it first makes improvements in its service to justify the increase."

RICHMOND RELIEF POSTPONED

With respect to the situation in Richmond the company, as long ago as December, 1917, petitioned the City Council to suggest some remedy for meeting the unprecedented increase in operating costs. This request was referred to a committee which was to report the relief that could be granted and upon what conditions.

The matter dragged for many months. Finally in July, 1918, advocates of the proposed increase to a straight 5-cent fare in that city presented their arguments in favor of the measure. Subsequently the committee on streets of the City Council called upon the company for additional data. This the company promptly supplied.

The street committee early in January finally sent to the Council the ordinance for a straight 5-cent fare, with the recommendation that the measure be passed. While the resolution was adopted providing for the advertisements of the ordinance as proposed by Council, the ordinance itself was not considered. At that time the prospects were that Richmond after many months of effort would have a straight 5-cent fare with labor tickets at six for 25 cents instead of at the prevailing 2½-cent rate—if action taken by the street committee is approved by the City Council as a whole.

No More Women

This Applies Only to Detroit—Those In Service of Detroit United Railway Permitted to Remain

As a result of the hearing by the National War Labor Board at Washington to consider testimony and arguments of the Detroit (Mich.) United Railway and women conductors, the joint chairmen, William H. Taft and Basil M. Manly, have rendered a decision which prohibits the employment of women as conductors in the future, but permits those now so employed to remain. The chairmen found that while there had been a necessity for the employment of women as a war emergency in Detroit this condition has ended.

It was also held that the fifteen women who had been denied cards for probationary work by the union were entitled to employment and that such union cards should be issued to them.

The chairmen made it clear that the decision was based entirely upon conditions existing in the city of Detroit and was not to be considered as a precedent for street railways elsewhere.

In touching upon the question of women as conductors generally the chairmen strongly intimated an opposition, stating that while this question in its broad sense was not a part of the case under consideration, it would seem that it was an occupation for men because of the long hours, the crowded cars, a possible rough element of passengers, and the night work which would be required of them.

Settlement Criticised

Agreement of St. Louis and Railway Settling Tax Case Opposed as Validating Franchises Until 1939

A check for $248,962, executed by the United Railways, St. Louis, Mo., in favor of the city of St. Louis, has been turned over to City Counselor Daues as the first payment on the mill tax compromise settlement arranged recently at a conference between Mayor Kiel and representatives of the company, mentioned in the ELECTRIC RAILWAY JOURNAL of Jan. 18, page 151.

SUMMARY OF AGREEMENT

The points set forth in the agreement between the company and the city have been summarized as follows:

1. The railway agrees to pay forthwith to the city $248,962 the amount of the judgment rendered against the St. Louis Transit Company, and interest thereon; to be regarded as an installment payment for the year 1919 on accrued mill tax.

2. Judgment shall be entered in favor of the city and against the railway in the mill tax suits for $2,320,276; and against the St. Louis & Suburban Railway and the St. Louis & Meramec River Railroad in favor of the city; both judgments to bear interest at 6 per cent.

3. Judgments shall be paid in installments of one-thirty-sixth on the fifteenth days of January, April, July and October, each year, beginning 1920, interest to be at the rate of 6 per cent.

4. The city reserves the right to have payment of judgments become immediately due and payable if the company gets into financial difficulties that make it advisable.

5. The United Railways agrees to assume and pay the judgment against the St. Louis & Suburban Railway and the St. Louis & Meramec River Railroad.

6. The United Railways agrees to pay the mill tax as it becomes due in the future.

7. Stipulation may be set aside if either party violates any provision or condition.

8. That the court retain jurisdiction for the sole purpose of entering an order to enforce the provisions of paragraph 4.

9. The United Railways shall pay the costs of the proceedings in the judgments.

10. The city agrees that the Supreme Court shall affirm the decision of the Circuit Court in favor of the United Railways in the Jefferson Avenue line franchise case.

The opponents of the terms of the settlement immediately jumped to the conclusion that the agreement of the city with respect to the Jefferson Avenue line franchise worked to validate all the other grants of the company until March 18, 1939. When asked about this Mayor Kiel is reported to have replied:

> When the question of the Jefferson Avenue franchise came up in the conference, I was under the impression that the court's decision upholding its validity naturally would extend to the other lines. I left that entirely to the city law department.

Mayor Kiel, Comptroller Nolte and President Aloe of the Board of Aldermen were the members of the Estimate Board that arranged the settlement. The storm of disapproval has centered around them and an investigating committee of the Aldermen has been named to inquire into the matter.

In the Jefferson Avenue line litigation the city contended that the franchise on that line expired several years ago and sought to oust the United Railways. The company argued that the Jefferson Avenue franchise and all other franchises operated by the company were extended until 1939 in the old Central Traction blanket ordinance enacted by the old City Council and House of Delegates. The Circuit Court some time ago decided against the city and upheld the company's contention. The city appealed and the case now is pending in the Missouri Supreme Court.

The executive committee of the Citizens' Referendum League, through a sub-committee, has decided to ask the voters of St. Louis to recall Mayor Henry W. Kiel for his approval of the compromise agreement with the railway company.

Transportation the Big Problem

New Mayors of Detroit, Minneapolis, Providence and Atlanta Give Their Railway Views in Inaugural Addresses

Many Mayors in their inaugural addresses referred to the local railway problems confronting their cities, while not a few of them saw this matter as the outstanding problem before them. Through the remarks of even the most outspoken critics among these officials runs an air of toleration and an unmistakable appreciation of the task before the operators. Offenses of the past come in for more censure than those of the present. This is illustrated best perhaps by the reiteration upon the part of public officials from widely separated parts of the country of the need for valuations and for the simplification of intercorporate relations as essential to any new arrangement with the cities.

DETROIT MAYOR FAVORS CITY OWNERSHIP

James Couzens, former business associate of Henry Ford, who took office as Mayor of Detroit, Mich., on Jan. 14, in his inaugural address to the Council, said that an experience of twenty-five years under private ownership was proof that needed service and extensions to the city railway service cannot be compelled. He advocated taking over the lines of the Detroit United Railway, and then tying the system in with a scheme of rapid transit development which will include a short subway in the business district and modern elevated lines elsewhere.

Mr. Couzens has promised, provided the Council consents, to have a purchase plan ready to submit at the April election. This plan will provide for a small initial payment with the remainder to be supplied out of the earnings. He says that the absence of the price in the former purchase agreement was unquestionably the principal reason for its failure to receive adoption. Briefly the program which appears to him to be the only solution of the difficulties of the city is as follows:

> 1. We should begin negotiations for the purchase of the existing surface lines from the Detroit United Railway, and I am informed by the Street Railway Commission that the company is willing to sell on a fair basis. These negotiations will develop rapidly whether or not the company intends to be fair. Should the company display an unfair or unreasonable attitude we will be ready to adopt war measures, but war is wasteful—no matter whose property is wasted, and both the company and ourselves I am sure will realize this.
>
> 2. While these negotiations are under way time will not be lost in planning for some extensions of the surface lines so that work may be done in the spring.
>
> 3. With what plans have already been prepared by Barclay Parsons & Klapp we will, as soon as the present company has been settled with, be ready to submit suggestions for a comprehensive rapid transit system.

Mr. Couzens says that the construction of rapid transit facilities must, of necessity, be considered in conjunction with the surface lines. He said it was difficult at this time to offer in concrete form a program that can be rigidly adhered to. He believes, however, the need for such facilities is urgent in certain sections of the city, particularly through the territory traversed by the present Woodward Avenue line. He says that subway construction to relieve the congestion in the heart of the city must be started first.

J. E. Meyers, the new Mayor of Minneapolis, Minn., considers the local transportation problem to be the outstanding question before the people of that city. He said so in his inaugural address, in which he reviewed railway matters at some length. Mayor Meyers favors an entire new deal with the Twin City Rapid Transit Company. He sees some advantages in service-at-cost operation, and is alive to possible future changes in city transportation. To him motor buses seem to hold certain latent possibilities, particularly as feeders to the railways.

SUBSIDY POSSIBLE

Joseph H. Gainer, inaugurated on Jan. 6 for his fourth term as Mayor of Providence, R. I., advocated in his address a complete reorganization of the Rhode Island Company and consideration of gas and electric light rates. He favors a valuation of the railway with a fair return on the amount so fixed and a subsidy to the company if fares sufficient to provide a proper return on the investment are then found to be too onerous. He reiterated a point that has been made frequently of late by public officials by calling attention to the need for the simplification of the corporate organization of the railway by the elimination of the underlying companies.

James L. Key, who was elected Mayor of Atlanta, Ga., on a municipal ownership platform, delivered his initial message to the members of the new City Council on Jan. 6. He again emphasized his conviction that the city should own its electric railway system and other public utilities. He said, however, that it would be his purpose to see that the Georgia Railway & Power Company, which operates the local railway lines, received fair treatment at the hands of the administration. In this connection he said:

> The utilities have been placed here and dedicated to the public use with the people's consent and these utility owners are entitled to fair profit on the property they have so dedicated. They are not entitled to more than a fair return and they are not entitled to any return on what they have not got. They should not be required, however, to accept less than a fair return.

Mayor Key said in order to compute a fair return it was necessary to obtain the reasonable value of the property dedicated to the service of the public. He advised the Council should insist upon this valuation.

Wage Agreement in Atlanta

H. M. Atkinson, president of the Georgia Railway & Power Company, Atlanta, Ga., has announced the signing of an agreement with the Amalgamated Association covering wages and service until Jan. 1, 1920.

In the contract that was signed the company agrees to allow the employees to wear their union buttons, to meet committees of the association, to reinstate within the next fifteen days thirty-three union men who were discharged in 1916 and eight men who were suspended in 1918, besides agreeing to a number of other demands which the men have been making since 1916.

A definite scale of wages was adopted, allowing the motormen and conductors 35 cents an hour for the first three months' service, 38 cents for the next nine months and 40 cents an hour after the first year of service. The wages of all union employees other than the motormen and conductors were left to be decided by the War Labor Board.

The men agree that for the period of one year there will be no strikes or lockouts. In order that harmonious relations may be advanced by the union, a joint committee, representing the union employees in the different departments of the company, will be formed to meet the first Wednesday in each month and confer with officials of the company. When any disputes arise between the company and the union, three disinterested persons will be appointed to arbitrate the matter, the company selecting one, the union the other, and the arbitrators selecting the third.

All non-union employees of the company who desire to become members of the local union are given the right to join within the next thirty days to secure the same rights as all other members.

In the last few years there have been two strikes of the railway employees of the Georgia Railway & Power Company.

Commission Alive to Conditions

New Hampshire Body Sees State Aid as Probable Factor in Saving Public Utilities Companies

The Public Service Commission of New Hampshire has presented its report for the two years ended Aug. 31, 1918, to the Governor and the Legislature. With respect to the electric railways the commission says in part:

> Street railways in New Hampshire and generally throughout the country are experiencing the same difficulties. They are not prosperous. Some of them have difficulty to get money enough to pay operating expenses, and only one is earning at the present time enough to pay a fair return on the investment.
>
> In many cases, fares have been increased, but the revenue has not been increased proportionately. During the past year, we have had two petitions filed by street railways to be allowed to discontinue operation permanently and to junk the property. One case was very happily settled by having some parties interested in the service buy out the road for the same price the owners could have obtained by selling the property for junk. The other case has not been decided.
>
> It is a public calamity to have an electric railway torn up when it is of service to any considerable part of a community, and the commission will not grant such petitions unless it is proved beyond any reasonable doubt that the roads cannot be made to pay. If the present unfortunate condition of street railroads was peculiar to New Hampshire, it might be argued that there is something wrong with the management. But such conditions prevail throughout the United States, and some people have gone so far as to suggest that if the street railways are to continue they must be relieved from taxes or even receive some assistance by general taxation from the public served.
>
> #### ROADS MUST EXPERIMENT WITH FARES
>
> Whether it is necessary to go to this extreme or not, it may be well to consider the desirability of modifying our existing laws. Statutory provisions some years cost the railways thousands of dollars and are burdens they can ill afford to carry under existing conditions. To say that the increased revenue should be borne by those who enjoy the service is logical but not conclusive. Beyond a certain point, an increase of rates will so decrease the amount of riding that the road will actually get less revenue under the higher rate than under the lower rate. The only thing the road can do is to experiment with its rates until it hits upon a schedule which will give it the largest return and then, if this is not enough to keep going, the general public must contribute toward its support if the service is to continue.
>
> In the meantime, those responsible for the management of the street railways should not relax into quiescent indifference on the theory that all economies are being practiced and the road is being operated in the most efficient manner. They should be alive to the situation and earnestly endeavor to lessen the cost of the service without making it inferior.
>
> It is a striking fact that more than 60 per cent of the railroads and utilities paid no dividends in 1916 or 1917.
>
> #### VALUATIONS NECESSARY
>
> The commission has not had time and money at its disposal to make possible the valuation of all public utility properties in the State, so that it is not known how the stock and bonds already outstanding when the commission was established in June, 1911, compared with the actual investment, except in the comparatively small number of cases in which valuations have been made by the commission. The valuation of utility properties is a very important matter for the protection of the public, as without this it is impossible to determine what is a fair amount of income to be allowed to be collected from the public in the form of rates. The commission is prepared to undertake this work to a considerable extent without great additional expense as soon as times become sufficiently near normal to warrant the necessary outlay of time and money on the part of the utilities and the State.
>
> Ordinarily, the first step in a rate case is to determine the fair value of the property devoted to public use, but in the emergency of the last year or more the public service commissions have dealt with rate questions on the principle that public service companies should not share in the large profits incident to war contracts and emergency prices, and that they should be satisfied with normal profits, and bear their full share of the burden imposed on the public by the war; that, in general, the utilities should be content if they are as prosperous as they were before the war, but that all cases would be carefully considered to determine whether the pre-war conditions were so exceptional as to require departure from the general rule.

Arbitration Plans Made

International Railway and City of Buffalo Working Toward Solution of Their Problems

All questions in dispute between the city of Buffalo, N. Y., and the International Railway involving plans for a final agreement relative to permanent control and operation of the railway lines within the city by the municipality will be submitted to a board of arbitration. This action was decided upon at a meeting of the City Council on Jan. 17.

The valuation of the company's property to be used as a basis of an agreement for municipal control will be one of the main questions for the board to solve. One member of the board will be selected by the municipal authorities; one member by the company; and these two will try and agree upon a third member. If no agreement can be reached it is proposed that the chief judge of the Court of Appeals or some justice of the Supreme Court of Erie County shall designate the umpire.

The names of Peter Witt, Cleveland, and J. C. Brackenridge, New York, have been suggested to the City Council as the representatives of the city upon the board.

Another angle to railway affairs in Buffalo developed on Jan. 17 when the International Railway obtained an order from a Supreme Court justice in Albany directing the Public Service Commission to show cause on Jan. 25 in Albany why it should not receive from the railway an answer to the action started before the commission several years ago by former Mayor Louis P. Fuhrmann asking for an investigation of the fares charged by the company with a view of reducing the fare from 5 cents to 4 or 3 cents.

At the time the action was filed the International Railway obtained an injunction restraining the commission from intervening in the case because of an agreement between the company and the city which allowed the company to charge a 5-cent fare. When war conditions made it apparent that the city could not win the case in view of increased cost of operation, the municipal authorities sought to have the application withdrawn. The railway now seeks to compel the utilities board through a mandamus proceeding to receive the company's answer which it is believed would renew negotiations for an investigation which would result in the company being allowed to charge a higher fare than 5 cents.

Commission Refuses Approval

Pennsylvania Board Rejects Lease Proposal Between City and Philadelphia Rapid Transit Company

The Public Service Commission of Pennsylvania on Jan. 15 refused to approve the agreement between the city of Philadelphia and the Philadelphia Rapid Transit Company for the operation of the present lines and the city's high-speed lines, when built, as a unified system. The matter has been before the commission for ten months.

The refusal of the commission to approve the lease was based in general on the following grounds:

> 1. Sinking fund payments, taxes on subsidiary dividends and payments on account of paving, all being obligations under the 1907 contract between the city and the company, are now being treated as fixed charges, and they should not be postponed in case of a deficit under a lease until any dividends are declared.
> 2. The proposed method for fixing fares is not approved because to do so would in effect be determining that the initial rate of 5 cents is just and reasonable. This the commission refuses to do except in accordance with its regular valuation and rate-making procedure.
> 3. The depreciation reserve funds for the city's facilities and for the facilities furnished by the company for the city are the property of the city, and they should be deposited with the proper city officials and invested in legal securities other than those of the company.
> 4. The contract of 1907, under which a 6 per cent. cumulative dividend is allowed after all fixed charges, including subsidiary rentals, is not before the commission for approval, having been entered into before the commission was formed, but the commission now refuses to approve it in any indirect manner.

In addition to the formal report and order of the commission, two concurring opinions were made public. These were by Commissioners John S. Rilling and Harold McClure. Mr. Rilling's opinion is an expansion of the ideas expressed in the commission's report. He makes several interesting observations, one being that the drafters of the lease appeared to be more concerned in arranging for the payment of dividends than in assuring good service to the public.

He takes issue with the obvious thought of the lease drafters that in case of a deficit the fare should be increased, and in the event of a surplus the fare should be reduced. Mr. Rilling says an increase frequently reduces revenue and vice versa. He favors a 5-cent fare with transfers. The city might make up in whole or in part the difference between the net revenue produced by a 5-cent fare under efficient and economical management and the amount of a fair return to the company. Such a provision should not be made under a long-term agreement, but by means of appropriations to be determined annually.

Mr. McClure's opinion voices an objection against the 1907 contract and the proposed fare system.

Mayor Smith of Philadelphia is reported to have said that he can see no way out of the matter except to renew negotiations to procure a new lease which would overcome the objections of the commission.

Permissive M. O. Bill in New York

The bill drafted by the Mayor's conference on municipal ownership is ready for presentation to the Legislature of New York State. It reserves to the Public Service Commission the same jurisdiction over rates, service, issuance of securities, operation of a utility and keeping of accounts as it now has over municipal and private utilities. It adds one feature not contained in existing laws affecting the regulation of utilities. By means of the initiative and referendum the regulating body—the Public Service Commission—is made amenable to public opinion. The procedure for acquirement, establishment, financing, maintenance, operation and control has been worked out, so its sponsors say, so as to guard against:

1. Hasty or ill-advised action by a municipality and its officials.
2. Unloading on a municipality by a private utility.
3. Collusion between public and utility officials.
4. Inefficient or costly service.
5. Improper management and financing.
6. Unjust attacks on private utilities which give good service at reasonable rates.

The state conference of Mayors has made a public statement signed by the president, Mayor Walter R. Stone of Syracuse, and Mayor Cornelius F. Burns of Troy, chairman of the conference's general legislative committee. This statement, in part, is as follows:

> The permissive municipal ownership bill which will be introduced in the Legislature places a municipal utility on the same basis as a private utility by submitting it to the same regulations and affording it the same protection. After a most careful study of the utility problem we believe that this is the only effective way to guarantee efficient and economical service under either municipal or private ownership. If this bill becomes a law in substantially the same form as it is presented we believe that any city which is not getting proper service from a private utility can either obtain or provide it. On the other hand, as long as a private utility gives good service at reasonable rates, it can enjoy the protection which it must have in order to operate.

Seattle Removing Legal Obstacles

Judge Walter M. French, sitting as judge pro tem in the King County Superior Court, in Seattle, Wash., recently, denied the prayers of the complaint in the case of F. A. Twichell, et al., against the city of Seattle and the Puget Sound Traction, Light & Power Company, and dismissed the action. Notice of appeal to the State Supreme Court was immediately filed.

By dismissing the action, the city of Seattle won the first round in the fight to put through the $15,000,000 deal for the purchase of the railway system of the Puget Sound Traction, Light & Power Company. In a friendly suit, the right of the city to purchase the traction company's holdings was attacked by F. A. Twichell and Charles E. Horton, on the ground that the bonds the city is to issue would become subject to liquidation out of the general fund and therefore on the taxing power.

Mr. Horton, who intervened in the Twichell suit, alleged that the deal would affect the property of every taxpayer in the city.

The way is now clear for an appeal to the State Supreme Court and every effort will be made to facilitate the procedure in order that the city may conclude the deal with the company.

Kansas City Restraining Orders Continued

Violence of a more pronounced character than had been committed for several weeks, occurred in connection with the strike of the employees of the Kansas City, Mo., Railways the week of Jan. 12. On more than one occasion dynamite was placed on tracks. Walter Lambkin, explosives administrator for this district, has undertaken investigation of the source of the bomb-laying.

Both Kansas and Missouri federal courts postponed, on Jan. 11, hearings on application for injunction against strikers and others. Restraining orders were continued in effect.

Judge A. S. Van Valkenburgh in the Federal Court for the Western district of Missouri, on Jan. 18 granted an injunction against the Amalgamated Association, and other persons who might interfere with the operation of the Kansas City Railways. This proceeding was under an original bill. The supplemental bills were dismissed that had been filed by the railway and under which restraining orders had previously been in effect.

The company reopened its repair shops last week, and is now operating them at nearly normal capacity.

California Regulation Stood War Test

"The year 1917-18," covered by the report of the California Railroad Commission forwarded by the commission to Governor William D. Stephens, "was one of intense activity and interest due to war conditions," says the letter of transmittal accompanying the report.

Many utilities made applications for increases of rates, basing their applications mainly upon increased cost of material, oil and labor. Commenting on these, the commission says:

> The commission had no hesitancy in allowing such increases as it deemed proper and reasonable. The commission in its actions believes it fully discharged its duty, not only to the public but to the utilities and national government, by allowing such increases as were necessary to enable the utilities to function efficiently and to prevent financial disaster. This policy is not only just and equitable and consistent with the true spirit of fair public regulations but also responsive to the direct needs of the federal government as expressed in official requests and communications.
>
> That the effect of public regulation was of the greatest possible benefit to the utilities themselves during this period (a period that might well be considered the acid test of the efficiency of regulation) is evidenced by the fact that during that period not a public utility in the State of California went into bankruptcy or receivership. The securities of the California utilities were as well able to withstand the strain of war conditions as were those of any utility in the nation, and better than many similar utilities and other industries in sister states.

Chicago Will Renew Leasing Proposal

No attempt will be made to submit a new traction ordinance to the voters of Chicago, Ill., at the April election. Instead bills will be prepared for the Legislature now in session and while these are being considered the local transportation committee will endeavor to interest the companies in the proposed plan for leasing the properties. This was the program decided on at the meeting of Jan. 15.

The leasing plan has been referred to before in these columns. It involves an arrangement by which the surface and elevated companies might be induced to turn over the properties to the city on a guarantee of an adequate rate of return to be paid out of earnings, the city meanwhile taking majority control of the management through a board of trustees.

One benefit of this arrangement is that it would automatically remove regulation of the lines from the jurisdiction of the State Utilities Commission because the law exempts municipally owned or operated companies from State regulation. This feature of the proposed ordinance appeals to the "home rule" element among the city's voters. The companies in Chicago will be asked to renew negotiations on this basis.

Columbus Would Pay Back Wages

At a meeting of the new board of directors of the Columbus Railway, Power & Light Company, Columbus, Ohio, on Jan. 15, plans were discussed for meeting the city's request for the improvement of a number of streets. Means were also considered for paying the men the back wages allowed by the Federal War Labor Board.

On Jan. 16, after a conference with Arthur Sturgis and M. J. Chelsea, representatives of the War Labor Board, President Charles L. Kurtz announced that the men would be paid. Owing to the very narrow margin upon which the company has been operating for some time, it is impossible to make this payment just now, but he hopes that the gradual increase in business will enable the company to take care of it within a reasonable time.

The company paid into the city treasury $28,671 on Jan. 17, as a franchise tax on the gross earnings of its power and light department for 1918. The tax is levied at the rate of 2 per cent, which indicates that the gross earnings for the department were $1,433,590.

Records show a decrease of 56 per cent in the accidents resulting from persons attempting to board moving cars in 1918, as compared with 1917. An increase of 20 per cent in collisions between cars and automobiles was noted, but there was a decrease of 28 per cent in collisions between cars and wagons. Accidents due to carelessness in leaving cars showed a decrease of 8 per cent.

News Notes

Hearing on Change of Venue.—Arguments on the motion to show cause why a change of venue should not be granted for the trial of the five officers of the Brooklyn (N. Y.) Rapid Transit Company and the motorman indicted for manslaughter in connection with the wreck on the Brighton Beach line on Nov. 1 were heard on Jan. 16 before Justice Stephen Callaghan in the Supreme Court, Brooklyn.

No Commission Appointments Now.—Governor Smith of New York has announced that he will not make any appointments to the two vacant places in the Public Service Commission for the First District until the Legislature indicates what action it intends to take upon his recommendations for a single rapid transit commissioner to finish the subway construction, and for a single commissioner charged with regulation.

Boston Wage Scale Fixed.—Joint Chairmen Taft and Manly of the War Labor Board, acting as arbiters in the wage dispute of the employees of the Boston (Mass.) Elevated Railway, have approved a scale of increased wages. The new scale provides that employees of the first class shall receive 55 cents an hour, of second class 50 cents and third class 45 cents. The company is given until March 1 to make back payments to employees from Nov. 16 last, on this scale.

Review of All Contracts.—The New York State Chamber of Commerce has sent a telegram to the War Department protesting against its opposition to an amendment to the Chamberlain bill, creating a commission to hear cases on appeal from the War Department. The bill relates to the informal placing of orders by the department during the war, and it is said that upward of nearly $3,000,000,000 of war contracts are involved. Under the Chamberlain bill right of review before a court is given to the government or to the contractor.

Engineering Council Establishes Washington Office.—The Engineering Council has recently organized a National Service Committee which has established a Washington office in Room 502, McLachlen Building, Tenth and G Streets. The purpose of the committee, acting always under the direction of the council, is to give unbiased and technical information to committees of Congress and government departments—chiefly when asked, and to supply engineers with information about pending legislation and executive actions of interest to them.

Youngstown Begins Operation Under New Plan.—On Jan. 16 the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, began operation under the new ordinance fashioned after the Tayler grant in use for some time in Cleveland. The initial rate of fare in Youngstown is 5 cents cash with 1 cent for transfers. Operation will be under the direction of William L. Sause, street railway commissioner. Peter Witt will act in an advisory capacity for one year. The terms of the new grant in Youngstown were reviewed in the ELECTRIC RAILWAY JOURNAL for Jan. 11, page 99.

San Francisco Within Its Rights.—In the action brought by the United Railroads, San Francisco, Cal., against the city of San Francisco, claiming $6,870,130 damages for alleged losses sustained by the municipality building and operating railway lines on the same streets with its own, the Superior Court has upheld the city's demurrer, stating that any damage resulting to the value of the franchises of the United Railroads had arisen as a result of rightful competition by the city and that the loss did not constitute a cause of action. The issues involved in this case were reviewed in this paper for Nov. 21, page 1109.

Would Test Boston Act.—A petition to restrain the State of Massachusetts from paying any money to the Boston Elevated Railway or from borrowing money in anticipation of assessments to be levied on cities and towns in connection with Boston Elevated Railway deficit has been presented to the Massachusetts Supreme Court by Charlestown taxpayers. The petition declares there is not the "slightest reasonable probability" the road will earn, if operated for the next ten years under act of the Legislature, any net profits available for dividends. The petitioners state they are informed that Boston Elevated Railway expenditures since July 1, 1918, are $6,000,000 in excess of gross receipts.

Wants Franchise Forfeited.—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has been made defendant in a suit filed in the Circuit Court at St. Joseph by Prosecuting Attorney Stephen K. Owen, charging that the company was not complying with the law with respect to the operation of its railway lines and asking that the company be ousted from its franchise. Mr. Owens is quoted as follows: "It is not the purpose of the petition to seek that the court order the company to give service under penalty of contempt of court if the service is not rendered. It is planned to force the company out of business and to have a concern installed that will give service, not excuses."

City's Share Dwindles.—According to present indications, the check to the city of Chicago, Ill., covering its participation in the earnings of the Chicago Surface Lines will be for about $530,000, compared with $1,959,851 last year, or a shrinkage of 73 per cent. The final figures will not be made up until the end of the fiscal year, but the city's share for the first ten months of the operating year has been at the rate of roundly $530,000 for the full year. The shrinkage follows the wage increase of about $3,500,000 per annum. The increase in the cost of materials has not been specifically figured, but substracting total outgo from income, the net will result as indicated. The city's share of the divisible receipts is 55 per cent and that of the companies 45 per cent, and the city's share in dollars will be 27 per cent of what it was last year.

Programs of Meetings

Central Electric Traffic Association

A meeting of the Central Electric Traffic Association will be held in Akron, Ohio, on March 18.

Central Electric Railway Association

The annual meeting of the Central Electric Railway Association, which was scheduled for Detroit on Feb. 27 and 28, will be held at Cleveland on the same dates.

Master Boilermakers' Association

The 1919 convention of the Master Boilermakers' Association will be held in Chicago on May 26-29 at the Hotel Sherman. This will be the first convention since 1916, the association having suspended activities on account of the war.

National Highway Traffic Association

A conference on "Regulations Covering Speed, Weight and Dimensions of Motor Trucks" will be held under the auspices of the National Highway Traffic Association at the Automobile Club of America, 247 West Fifty-fourth Street, New York City, at 8 p.m. on Friday, Jan. 31.

Midwinter Convention of A. I. E. E.

The American Institute of Electrical Engineers will hold its seventh annual midwinter convention on Feb. 19, 20 and 21 in New York City. The tentative program includes the following items: A joint meeting on Wednesday afternoon with the American Institute of Mining Engineers at which several papers on electric welding will be presented. A popular lecture on Wednesday evening with moving pictures adopted by the government for the instruction of troops in regard to various mechanical and engineering processes. On Thursday morning a technical session opened with an address by President C. A. Adams. A technical session on Friday morning under the auspices of the electrophysics committee, and on Friday afternoon several papers will be presented under the auspices of the telegraphy and telephony committee. Thursday afternoon has been reserved for trips of engineering interest to points in and about New York, and on Thursday evening there will be a reception and dance.

Financial and Corporate

Interborough Consolidated Loses

Receivership, However, Will Be Avoided If Subsidiary I. R. T. Keeps Up Dividends

Receivership for the Interborough Consolidated Corporation will not occur, President Shonts declared at the recent meeting of the stockholders, "as long as Interborough Rapid Transit dividends can be continued. In time, however," he continued, "this problem must be faced unless the situation is remedied."

The main source of income for the Interborough Consolidated Corporation is the dividends from the controlled Interborough Rapid Transit Company, and these dividends form the basis for the return on the holding company's $67,825,000 of collateral trust bonds and $45,740,500 of preferred stock. In June, 1918, the quarterly rate of 5 per cent on the Interborough Rapid Transit common stock paid since 1915 was reduced to 2½ per cent.

The total income of the holding company, therefore, showed a big decline from $6,955,866 in 1917 to $4,402,175 in 1918. The annual report of the Interborough Consolidated Corporation for the year ended Dec. 31, 1918, shows net income of $724,914, equivalent to $1.58 a share earned on the preferred stock. In the previous year, the company reported net income of $3,263,910 which, after deduction of 6 per cent preferred dividends, showed a balance equal to 55 cents a share on the 932,626 outstanding shares of common stock of no par value.

The income account for the years ended Dec. 31, 1916 to 1918, compares as follows:

	1918	1917	1916
Total income.....	$4,402,175	$6,955,866	$6,931,357
Expense, taxes and interest........	3,677,261	3,691,956	3,795,139
Net income.....	$724,914	$3,263,910	$3,136,218
Preferred dividends	686,107	2,744,430	2,744,430
Surplus........	$38,807	$519,480	$391,788
Previous surplus...	1,645,356	1,875,877	1,834,090
Total surplus...	$1,684,163	$2,395,357	$2,225,878
Deduction........	*550,000	750,000	350,000
Profit and loss surplus.......	$1,134,163	$1,645,357	$1,875,878

* Appropriation for reduction of amount advanced by Bankers Trust Company on June 29, 1916.

In his comments on the annual report, President Theodore P. Shonts made the following remarks:

> If the public authorities shall continue to maintain their present position of refusal to increase the rate of fare and the Interborough Rapid Transit Company shall find itself unable to realize upon its accrued deficits an amount sufficient to enable it to carry it through the lean period as extended by the conditions due to the war, they will have violated the spirit of the city's contract with the company. They will have destroyed its credit and by that act shut off all future investment of private capital necessary for the development of the city's transportation, and they will not have advanced by a day the city's right to operate the property itself. Furthermore, the city will then have to meet the interest and sinking fund on its own investment either by borrowing against its own accumulating deficits or by taxation. If it pursues the same course as to its entire dual subway investment of $250,000,000, its annual charges will be at least $13,333,333.

Kansas City-Outer Belt Sale Put Off

Present Status of Terminal Company at Kansas City—In Hands of Receiver Since 1912

The foreclosure sale of the Kansas City, Outer Belt & Electric Railway is being postponed, from time to time, by Judge John B. Pollock of the Federal Court in Kansas City, Kan. Judge Pollock a few days ago declined to agree not to sell the property within a year, his leniency heretofore being due to the fact that the bondholders are largely British, with time otherwise occupied during the last few years on account of war conditions.

The company was organized to build and maintain terminals in Kansas City for the Kansas City, Mexico & Orient Railway. The company went into the hands of the receiver, T. A. Bigger, Kansas City, Kan., in October, 1912. A committee of 95 per cent of the bondholders has prevented liquidation. A reorganization committee, of which John W. Platten, New York, is chairman, has handled receiver's certificates of about $100,000, chiefly to pay taxes of about $10,000 a year. Taxes of about $13,000 are now due, and the court has insisted on payment. There are $1,298,000 of bonds outstanding.

The company has 7 miles of right-of-way from the Missouri River to the Kaw River, half encircling Kansas City, Kan. The Kansas City, Kaw Valley & Western Railway (Bonner Springs Electric Line) leases a small part of this right-of-way, on which it has 1½ miles of track, its physical connection with steam roads.

The Kansas City, Outer Belt & Electric Railway owns the land company that has several hundred acres of factory sites adjoining the right-of-way. This land has been estimated to be worth nearly $500,000, but it is said to be of less value now than a few years ago. A few tracts of the land are leased.

The court at one time put a minimum sale price of $250,000 on the Kansas City, Outer Belt & Electric Railway. The figure was later reduced to $115,000, but this probably would be increased now, in view of the present volume of receivers' certificates and other accumulated indebtedness of comparatively small amounts.

B. R. T. Receiver Wants $16,900,000

Statement Made of Immediate Financial Program to Go Before Court on Jan. 27

Lindley M. Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Company and other Brooklyn properties, made public on Jan. 22 the petition which he will present to Federal Judge Julius M. Mayer on Jan. 27 asking permission to raise almost $16,900,000 through the issuance of receiver's certificates.

HOW FUNDS WILL BE USED

The funds are to be used for the purchase of new cars for both subway and surface lines, for the extension of new power house stations and for important additions in equipment and construction facilities, and to cover current expenses.

Notice of the application was served on all parties interested on Jan. 21 and an opportunity for them to present their cases before the court will be given on Jan. 27.

The sum of $1,100,000 is described as necessary for the payment of damages growing out of the accident on the Brighton line on Nov. 1, with the recommendation that all claims in this connection be paid so far as settlements can be entered into at the earliest possible date.

The application urges immediate provision of approximately $2,300,000 for expenditures up to and including Feb. 20.

To cover outstanding obligations caused by existing formal contracts will require $3,782,812 and additional contracts to be entered into within the next sixty or ninety days for construction and equipment and miscellaneous expenditures will require $1,000,000.

To provide for enlargement of power station facilities the sum of $2,986,321 is needed.

The balance of the funds required is to be used largely to pay interest on mortgage bonds, taxes and loans of the system.

UNDERLYING BOND INTEREST MUST BE MET

The importance of paying the interest on the underlying bonds as well as that on the first mortgage bonds of the Brooklyn Union Elevated Railroad in the amount of $399,175, also due on Feb. 1, is explained by Mr. Garrison as follows:

> Aside from this obligation, failure to pay interest on these underlying bonds would, if the default is not made good, force a foreclosure of these underlying mortgages and the possible separation of practically all of the "existing railroads" from the rapid transit lines constructed by the city of New York or separately of the New York Municipal Railway Corporation. If this should be the result the whole plan of unified operation would be destroyed; the contract with the city of New York might be jeopardized, and the security of both the holders of New York Municipal Railway bonds and of Brooklyn Rapid Transit 7 per cent notes would be imperilled.

Receivership Hearing

In Columbus, Ohio, Case Court Decides to Continue Hearing Despite Changes in Personnel

In opening on Jan. 8 the case in which a receivership is sought for the Columbus Railway, Power & Light Company, Columbus, Ohio, attorneys for both the company and the stockholders' protective committee endeavored to convince Common Pleas Judge Kinkead that the troubles would all be ironed out at the annual meeting, but he stated that the allegations were sufficient to warrant a hearing and he overruled a motion to postpone the trial. He said he was clearly of the opinion that the company had committed a breach of its contract in abrogating its franchise that would injure it and destroy the value of all the stock to the stockholders. He also wished to look into the effect of the contract with the Clark Management Company.

On Jan. 9 John V. Eitel, a stockholder, filed a cross-petition in the receivership in which he not only alleged damages and asked for a receiver, but also asked for an accounting from the Clark interests for the amounts which were alleged to have been received by them from the company. It is proposed by the court to inquire further into the Clark contracts.

A statement of quick assets and of liabilities of the company was prepared by the auditor's office to be considered at a meeting of the new board of directors on Jan. 15. It was stated that no attempt will be made to present the financial condition of the company to Council until all figures have been fully considered and verified.

On Jan. 11 President Charles L. Kurtz requested that holders of rebate slips, received when the 5-cent fare was paid, exchange the slips for tickets at the rate of eight for a quarter, the franchise rate. This will make it unnecessary for the company to return the cash to those who were overcharged for transportation. It is estimated that the rebate slips will aggregate about $75,000.

When the new officials have secured the necessary information it is their intention to request an increase in fare. The new rate to be asked will depend upon the conditions that confront the company.

For the time the Slaymaker receivership case has been closed. While the court refused to appoint a receiver, the case has been left in abeyance for the adjustment of other questions involving the Clark contracts, until they can come up on the regular docket. Two questions of greatest import, the court said, were whether the Clark Management Company used its position of control to further its own interests and whether the stockholders were damaged by the abrogation of the franchise.

On the stand on Jan. 10 Clarence M. Clark stated that during the past year his company had received from the Columbus Railway, Power & Light Company $63,000 as remuneration for acting as fiscal agent. Of this amount $20,000 had been paid as salary to President McMeen, $10,000 to Vice-President Crawford for the same purpose and $5,000 as a portion of the salary of General Superintendent H. W. Clapp. Other expenses brought the expenditures up to $47,000, leaving $16,000 as actual compensation for work done. In the sale of bonds, which his company purchased to an aggregate of $4,500,000 at $90 to $100, he stated that the profit had never been more than 1¼ per cent. The receipts in connection with the construction of the Big Walnut power plant, he said, were $83,000 for services in 1917 and $44,000 for 1918.

Boston & Worcester Declines

Six Per Cent Increase in Revenue Is Outweighed by 18 Per Cent Rise in Operating Expenses

The Boston & Worcester Street Railway, Boston, Mass., was not immune during the year ended Dec. 30, 1918, from the general epidemic of increased operating costs and other ills. Although increased fares caused a gain of $54,098 or 6.7 per cent in revenue, the expenses of operation increased to the greater extent of $102,070 or 18.8 per cent.

INCOME STATEMENT OF BOSTON & WORCESTER STREET RAILWAY FOR YEARS ENDED JUNE 30, 1917 AND 1918

Operating revenue....	$860,277	$806,179
Conducting transportation	$370,342	$303,464
Maintenance	186,681	147,832
General expenses...	86,951	90,609
Total expenses...	$643,975	$541,905
Net operating revenue.	$216,302	$264,274
Interest on debt....	$123,229	$119,758
Taxes	55,414	50,794
Total deductions ..	$178,643	$170,552
Surplus for year......	$37,659	$93,922

Interest and taxes also rose, and the net income in 1918 was $37,659 as compared to $93,722 for the year before. Dividends were reduced from $77,457 to $52,744, and the final result for the year was a deficit of $15,085 as compared to a surplus of $16,264 in 1917. The general surplus of the company on July 1, 1918, amounted to the sum of $11,026.

The company's comparative statement for the last two years is shown in the accompanying table. The total car-miles operated during 1918 were 1,929,616, and the total car-hours operated, 134,357. According to the company's report, it suffered from interference with service and operating delays on account of the unusually severe winter, and this added to the burden of the unusually high cost of materials, fuel and labor that had to be endured in 1918.

Rhode Island Deficit $700,000

Providence Company, Despite Fare Increases, Goes Behind for Eleven Months

A net deficit of practically $700,000 is shown in the report of the Rhode Island Company, Providence, R. I., in its operation of the railway lines of the State for the first eleven months of 1918, filed with the Public Utilities Commission.

Only one month, July, showed a surplus of income over expenses and fixed charges. Every other month showed a deficit which ranged from $1,632 to $160,352.

The gross income for the eleven months was $5,844,731, while operating expenses, fixed charges, taxes, etc., totaled $6,543,759, leaving a deficit of $699,028.

This unfortunate showing was made despite two fare increases put in operation in the same period. The report shows that passenger revenue for the period increased 4.69 per cent, while the operating expenses increased 11 per cent, the increase in the former being $237,055 over the corresponding period of 1917, the total for 1917 being $5,057,775 as against $5,294,830 for 1918. The advance in operating expenses was $474,225, the 1917 figures being $4,170,030 and the 1918 figures $644,255.

Three months of 1918 resulted in decreases in passenger revenue. In February the receipts were $2,309 under 1917, in July they were $12,598 under 1917 and in October $14,121 under 1917. The remaining eight months showed increases ranging from $4,318 in March to $97,806 in November.

The September and October reports reflect the efforts of the company to reduce expenses by a reduction in service, the former month showing a decrease from the same month in 1917 of 111,003 miles, while in October the mileage showed a reduction of 125,327 car-miles. These reductions represented respectively 8 and 9.23 per cent of the 1917 mileage.

Bankers Take Over Control

Through an agreement entered into between the principal creditors of the Connecticut Valley Street Railway, Greenfield, Mass., and its allied companies, the Northern Massachusetts Street Railway and the Concord, Maynard & Hudson Street Railway, the supervising management of the three companies has been placed in charge of three committees of bankers, of which Joseph W. Stevens, president of the First National Bank, Greenfield, is chairman.

It is given out that the reason for the change is mainly because the cash working capital of the companies has been practically exhausted by extraordinary expenses of operation and management due to various unfavorable conditions growing out of the years of world war.

Receiver for Memphis Street Railway

T. H. Tutwiler, president of the Memphis (Tenn.) Street Railway, and F. S. Elgin, former United States marshal, were appointed receivers of the company on Jan. 20 as a result of a petition filed in the Federal Court at Memphis by the American Cities Company, which controls the local Memphis property.

It was claimed that the Memphis Street Railway owed debts amounting to $150,000 and was embarrassed with respect to wages and taxes and that it was involved in a dispute over a bank credit.

Early in December suit was brought to recover on the promissory note of the company to the Bank of Commerce & Trust Company in the sum of $150,000. The appeal stated that the railway was entitled to a credit on the note in the sum of $57,530, which represented the amount on deposit in favor of the bank on Dec. 2, the day on which the note went to protest. T. H. Tutwiler, president of the railway, is reported to have said at that time that while the note was payable on demand, the bank had agreed not to call the note for payment without giving the corporation sufficient time to meet it.

The petition asking the receivership alleged the Memphis company had contracted liabilities totaling $850,000, which it was unable to pay at this time. The National War Labor Board recently awarded employees of the company a 60 per cent increase in wages. Application to increase fares from 5 cents to 6 cents was made to the City Commission, but later was withdrawn after the commission announced it would submit the petition to a referendum.

Wants Abandonment Order Modified

Public Service Commissioner Barhite has reserved decision upon a petition by the Dunkirk (N. Y.) Street Railway for a rehearing on the order of the commission on Dec. 14 which approved the proposed abandonment of the Dunkirk Street Railway, leased to the Buffalo & Lake Erie Traction Company.

The order provided that operation of cars might be abandoned, provided security was furnished to the city for the payment of all taxes and assessments and that the tracks and other apparatus belonging to the road should not be removed until further order of the commission.

The Dunkirk company asked that the order be amended so that it will relate solely to taxes or assessments now due or which have become a lien on the property and that the provision relating to future taxes be stricken from the order except installments on paving assessments now levied. The company also asks that the order be modified so that it can abandon parts of its line, as specified. Unless it abandons its tracks, it says it will be required to maintain them at considerable expense and subject itself to possible liability in negligence actions and future paving assessments on unpaved or partly paved streets, all of which would be obviated if the tracks were removed. The railroad company asks the commission to resettle the order, as indicated in its petition.

Authorizes Bonds for M.O.

The voters of Fort Collins, Col., by an overwhelming majority, have approved a bond issue of $100,000 for the purchase of the local lines of the Denver & Interurban Railroad in Fort Collins, consisting of 7.5 miles of line. On Sept. 6 last the street railway committee of the Commercial Club of Fort Collins held a meeting at which plans were discussed for taking over the property. It was understood then that the railway had made a definite proposition to sell the local system for $75,000, or any part of the line at the invoiced value. The railway is in the hands of William H. Edmunds as receiver.

Financial News Notes

Commission Considering Abandonment Plan.—The case of the Washington Water Power Company, Spokane, Wash., which seeks to abandon some of its city railway lines, has been taken under advisement by the State Public Service Commission. A decision is expected shortly.

Service to Be Resumed.—After lapse of three weeks the Bay State Street Railway, Boston, Mass., will re-establish service from Iron Hill Street, East Weymouth, to Columbia Square, South Weymouth. The Selectmen have promised that the company will be paid $2,500 by popular subscription for immediately needed repairs.

Montreal Tramway Issue Reported.—The Montreal Tramway & Power Company, Montreal, Que., is understood to have sold to a syndicate of Montreal bankers a new issue of $7,300,000 of 6½ per cent five-year gold notes, the proceeds of which will retire the outstanding issue of $5,300,000 and provide additional working capital.

New Brooklyn City Director.—Charles M. Pratt has resigned as a director of the Brooklyn (N. Y.) City Railroad, which is controlled by the Brooklyn Rapid Transit Company, and has been succeeded by Dick S. Ramsey. Mr. Ramsey is president of the East River Savings Institution, New York, and is also a trustee of the Kings County Trust Company, Brooklyn.

Court Winds Up Chicago Suburban Road.—Bondholders of the Chicago & Milwaukee Electric Railway, Highwood, Ill., sold under foreclosure and succeeded by the Chicago & North Shore Electric Railway, have received $2,432,698 as the final proceeds of the sale of the road in an order entered by Federal Judge Landis. The decree means that for each $1,000 par value the bondholders will receive $608.17.

Lake James Sale Feb. 10.—The Lake James Railroad, controlled by the Indiana Utilities Company, Angola, Ind., including the right-of-way, equipment, real estate and amusement property at Lake James, will be sold at public auction at the court house in Angola, Ind., on Feb. 10. Authority to the company from the commission to abandon the line was noted in the ELECTRIC RAILWAY JOURNAL for Jan. 18, page 158.

$3,000,000 of One-Year 6 Per Cent Notes.—The Spokane & Eastern Trust Company, Spokane, Wash., announces an issue of $3,000,000 of one-year notes of the Washington Water Power Company, Spokane, Wash., to be put out as of Feb. 2. They will bear interest at 6 per cent, payable quarterly in Spokane at the office of the Spokane & Eastern Trust Company or in New York at the office of the Central Union Trust Company.

Bonds for Extensions and Improvements.—At the annual meeting of the stockholders of the Toledo Railways & Light Company, Toledo, Ohio, on Jan. 16, a bond issue of $3,200,000 was authorized, the proceeds of which are to be used in making improvements and extensions to the light and power property. Plans for the improvements are being worked out by the engineers, but the officers are not yet ready to make any announcement in regard to them. All of the directors and officers were re-elected.

Foreclosure Sale on Feb. 8.—Robert C. Swing, special master commissioner, will sell at Cincinnati, Ohio, on Feb. 8 at public auction, without regard to a minimum price, in accordance with the decree of foreclosure of the $600,000 of 5 per cent mortgage of 1905 and the $250,000 of 5 per cent mortgage of 1907, all the properties, etc., of the Cincinnati & Columbus Traction Company, consisting of a fully equipped electric railroad extending from Norwood, near Cincinnati, to Hillsboro, Ohio, a distance of 53 miles.

Opposed to Abandonment.—The Real Estate Board of the Chamber of Commerce of Yonkers, N. Y., on Jan. 17 filed with the Public Service Commission, Second District, resolutions adopted on Jan. 14 opposing the discontinuance of lines in Yonkers by the Yonkers Railroad and asking for better service. The resolutions favor increased rates of fare for a reasonable period if it is shown that insufficient revenue is being received by the company to enable it to furnish better service and without the discontinuance of any of its lines and including restoration of all night lines.

Bondholders Buy Evansville Properties.—The Evansville & Mount Vernon Electric Railway, the Evansville & Eastern Electric Railway and the Evansville Terminal Railway, properties of the Evansville (Ind.) Railways, were sold at receiver's sale on Jan. 18 for $335,000 to William H. McCurdy, Albert Karges and Marcus S. Sonntag, Evansville, representing bondholders. The Henderson line was not involved in the transaction. The properties will be reorganized in accordance with the plan outlined in the ELECTRIC RAILWAY JOURNAL for Jan. 4, page 71. Articles of incorporation for the successor company, the Evansville & Ohio Valley Railway, have already been filed with the Secretary of State of Indiana.

Foreclosure Action Threatened.—A delegation of Boston bankers representing holders of bonds of the International Railway and the International Traction Company, Buffalo, N. Y., upon which interest is in arrears, called upon the Mayor of Buffalo recently and asked what the city intended to do in the matter of allowing the company to charge a higher rate of fare. It developed at the conference that if an agreement between the city and company is not reached by Jan. 31, a foreclosure action will be brought against the company by the bondholders. The ninety days of grace for the payment of interest on some of these bonds expires at that time.

Part of Interest in Cash.—Notice is given that in accordance with the reorganization scheme for the Barcelona Traction, Light & Power Company, approved on Dec. 19, 1918, 1 per cent will now be paid in full discharge of the half-year's interest due on Dec. 1, 1918, on the bonds of the company against surrender of coupon No. 14. Last June T. Porter, secretary of the committee of bondholders of the company, addressed a statement to the holders of the bonds to the effect that owing to delay and complications resulting from the continuance of the war, it would be impossible for the company to resume full payment in cash of the interest due on its bonds on Dec. 1. He said then it was hoped to arrange for a payment of part of the due interest in cash, with deferred payments for the rest of the interest.

Lehigh Valley Passes Dividend.—Harrison R. Fehr, president of the Lehigh Valley Transit Company, Allentown, Pa., at the annual meeting of the company on Jan. 13 in submitting his report to the stockholders, said: "Owing to the smaller net earnings your board of directors did not feel justified in continuing dividends on the company's preferred stock." For the fiscal year ended Nov. 30, 1918, the total gross earnings are reported to have increased to $3,320,000, or $445,000 more than the preceding year, while the total operating expenses increased $594,000 to $2,500,000. The total net income (including other income) was $1,029,000 for 1918 as against $1,179,000 for the year before. The gross earnings increased 15 per cent, while the operating expenses increased 32 per cent, and the net divisible income decreased $105,281, or 23 per cent.

Status of Mount Vernon Displacement.—Full information has been received regarding the Mount Vernon (Ohio) Railway, which was reported as facing dismantlement in 1917 and as being confronted with an injunction against dismantlement in 1918. It appears that after the foreclosure sale of this 9-mile property for junk in 1917, it was all dismantled except the rails in pavement inside the city of Mount Vernon. The city secured an injunction against the tearing up of this track until some security was given that the street would be repaired thereafter. Upon a full hearing in the Court of Appeals of Knox County, the city was defeated because the ordinance made no provision for such repair. The city then applied to the State Supreme Court and received late in 1918 leave to file its case. It is now pending therein.

Want Constituent Charters Forfeited.—A petition has been made to Attorney-General Charles D. Newton of New York to take steps to have the charters of the eighty-three constituent companies of the Brooklyn Rapid Transit System declared "legally dead" and forfeited. The petition is made by Leslie J. Tompkins, formerly first assistant district attorney of New York and now a professor of law in New York University, and Edwin M. Otterbourg, a lawyer, acting as citizens. They say they "represent no private or selfish interest nor do they represent any civic, social or business body in making this petition." Mr. Otterbourg is quoted to the effect that "the forfeiture of these corporate charters will make it possible without delay to reorganize this entire system." According to him "the organization of a new company under private or public ownership would be entirely practicable." State Attorney General Newton has referred the application of Messrs. Tompkins and Otterbourg to Deputy Attorney General Cheney, until recently a Public Service Commissioner for the Second District. Attorney General Newton, it was said, will take no action until he has received Judge Cheney's report.

Seattle M. O. Line Now Running Behind.—The annual report of Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., on the municipal railway, recommends the elimination of ticket fares, regulation of jitney traffic, establishment of safety zones on Fourth Avenue, and a ban against parking cars at the curb on business streets. According to the report, the municipal railway system during the last eight months of the year ended Nov. 30, showed a net surplus of $2,277, exclusive of depreciation. The first four months of the year indicated a loss, exclusive of depreciation, of $12,543. The report states that the purchase of the new cars will mean that, as soon as the Ballard substation is completed and new power feeders can be placed on Division C, the municipal lines will be able to give service adequate to the needs of people tributary thereto. Mr. Murphine suggests a number of improvements, and recommends that an ordinance be drafted providing for the sale of $200,000 in utility bonds to cover the improvements. Mr. Murphine has been reappointed to office by Mayor Hanson.

Electric Railway Monthly Earnings

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.					
1m., Nov., '18	$177,453	*$164,179	$13,274	$38,568	†$25,294
1m., Nov., '17	175,788	*133,120	42,668	35,612	7,056
11m., Nov., '18	1,952,758	*1,694,245	258,513	400,407	†141,894
11m., Nov., '17	1,995,776	*1,434,301	561,475	392,892	168,583
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., Sept., '18	$98,293	*$55,051	$43,242	$15,252	‡$28,600
1m., Sept., '17	77,984	*44,016	33,968	12,058	‡24,299
12m., Sept., '18	1,074,683	*597,794	476,889	156,875	‡335,380
12m., Sept., '17	921,734	*504,460	417,274	128,470	‡300,115
EL PASO (TEX.) ELECTRIC COMPANY					
1m., Oct., '18	$95,245	*$74,592	$20,653	$6,818	$13,835
1m., Oct., '17	111,011	*65,970	45,041	6,501	38,540
12m., Oct., '18	1,245,437	*853,740	391,697	80,321	311,376
12m., Oct., '17	1,284,073	*777,855	506,218	64,601	441,617
FEDERAL LIGHT & TRACTION COMPANY, NEW YORK					
1m., Sept., '18	$286,640	*$216,564	$70,076	$50,870	$19,206
1m., Sept., '17	237,357	*179,256	58,101	50,583	7,518
9m., Sept., '18	2,576,526	*1,813,797	762,729	455,109	307,620
9m., Sept., '17	2,036,089	*1,427,568	608,521	442,709	165,812

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.					
1m., Oct., '18	$276,854	*$214,512	$62,342	$53,019	$9,323
1m., Oct., '17	254,713	*184,107	70,606	50,509	20,097
10m., Oct., '18	2,853,380	*2,028,309	825,071	508,129	316,942
10m., Oct., '17	2,290,802	*1,611,674	679,128	493,218	185,910
HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.					
1m., Nov., '18	$569,259	*$385,502	$183,757	$4,883	‡$179,755
1m., Nov., '17	527,250	*278,940	248,310	4,848	‡245,219
11m., Nov., '18	6,032,741	*3,491,315	2,541,426	56,344	‡2,498,042
11m., Nov., '17	5,596,927	*2,814,344	2,782,583	54,080	‡2,739,458
NEW YORK (N. Y.) RAILWAYS					
1m., Nov., '18	$903,152	*$839,765	$63,387	$278,141	†‡$169,062
1m., Nov., '17	998,423	*745,716	252,708	281,139	‡19,691
12m., Nov., '18	4,618,971	*4,055,558	563,413	1,390,580	†‡607,801
12m., Nov., '17	5,387,330	*3,935,109	1,452,221	1,408,747	‡292,486
SAVANNAH (GA.) ELECTRIC COMPANY					
1m., Nov., '18	$107,901	*$90,889	$17,012	$25,532	†$8,520
1m., Nov., '17	88,104	*57,690	30,414	24,451	5,963
12m., Nov., '18	1,165,107	*822,148	342,959	301,458	41,501
12m., Nov., '17	955,658	*636,924	318,734	289,703	29,031

* Includes taxes. † Deficit. ‡ Includes non-operating income.

Traffic and Transportation

Local Board Lacks Authority

New Orleans Body Loses in Suit Seeking to Fix Its Rights Over Fare Rates

Judge King in the Civil District Court at New Orleans, La., has refused the injunction sought by the Board of Public Utilities against the increases in rates of fare for electricity and for gas for the New Orleans Railway & Light Company, provided for by an ordinance of the Commission Council of the city. The court gives three reasons why the act creating the board is unconstitutional. Should the Supreme Court sustain the decision on appeal, the Board of Public Utilities will cease to exist.

Late in December the board, acting upon the advice of Attorney General Coco, laid the foundation for a test suit to determine its power and authority to regulate the public service corporations of New Orleans by adopting a resolution abrogating and annuling the rate increases allowed by the Commission Council and ordering the restoration of the old rates. In order to make the resolution effective the commission sought an injunction through the court.

In its decision denying this injunction the court said in part:

The sole and only question presented to the court in this case is, who has control of the public utilities in the city of New Orleans, the Commission Council of New Orleans or the Board of Public Utilities of the city of New Orleans? It is purely a legal question to be determined under the articles of the constitution, the statutes of the State and the decisions of our courts.

Article No. 319 of the constitution says: "The electors of the city of New Orleans and of any political corporation which may be established within the territory now, or which may hereafter be embraced within the corporate limits of said city, shall have the right to choose the public officers, who shall be charged with the exercise of the police power and with the administration of the affairs of said corporation in whole or in part. This article shall not apply to the board of liquidation of the city debt, nor shall it be construed as prohibiting the establishment of board or commissioners, the members of which are elected by the Council or appointed by the Mayor with the consent of the Council."

It is clear from the act that the functions of the Board of Public Utilities are local in character to be exercised in the city of New Orleans, and they constitute the exercise of police power of the city and an administration in part of its affairs.

The act authorizing the members of the Board of Public Utilities, appointed by the Governor, not elected by the electors of the city of New Orleans, to exercise them in this city controvenes article No. 319 of the constitution and in that respect is null and void. It has been so decided in the case of the State of Louisiana *vs.* the Lafayette Fire Insurance Company, 134 La. P. 79. The same doctrine was held in Watson *vs.* McGrath, 111 La. P. 1097—109 La. P. 838 and 52, La. P. 1604.

The Board of Public Utilities of the city of New Orleans created by the act is not a corporation and cannot sue or be sued. At best, if it were constitutional, it is but another department of the city government, such as the commissioner of the department of public property, commissioner of public finances and commissioner of public safety and city engineer, and they cannot sue or be sued separately.

The act in question also violates Articles Nos. 31 and 32 of the constitution. Article No. 31 says:

"Every law enacted by the General Assembly shall embrace but one object, and that shall be expressed in its title." Article No. 32, says:

"No law shall be revived, or amended by reference to its title, but in such cases the act revived, or section as amended, shall be re-enacted and published at length."

The enacting section of the act in question does not amend or prescribe for the amendment of any scribe, section or provision of the city charter, but declares that the amendment shall be made and effective through the addition of certain provisions without change or amending any section or provision in any respect whatsoever.

There is no amendment or change in the body of the act to sustain the title which declares that the object is to amend the city charter. The act clearly violates these two articles of the constitution. For these reasons the rule *nisi* is dismissed.

Denver Restores Six-Cent Fare

The Denver (Col.) Tramway went back to a 6-cent fare on Jan. 16. This action followed a decision by the Supreme Court of Colorado reversing a ruling made by the Public Utilities Commission for increased charges in favor of the Mountain States Telephone & Telegraph Company. The question of jurisdiction had been raised by officials of the city of Denver and the matter was taken to the Supreme Court on stipulation for the purpose of bringing a test of Sec. 6 of Art. 20 of the Constitution.

F. W. Hild, general manager of the Denver Tramway, in a letter to the Mayor telling of the company's voluntary return to the 6-cent fare, said it was the policy of the company to abide solely by the legal rights as orderly determined. The 6-cent fare will be restored pending a final decision in the telephone rate case. There will be no charge for transfers. The 7-cent fare, with 1 cent additional for transfers in Denver had been granted by the utilities commission, while the 6-cent fare had been authorized by the city and approved by the commission.

The majority opinion of the court in the telephone case held that two agencies entered into the regulation of public utilities companies, namely, the commission and the municipality. It cleared the doubt hanging over the meaning of the twentieth amendment in respect to special charter cities, among which are Denver, Pueblo, Colorado Springs, Grand Junction, Fort Collins and Boulder, setting forth that these municipalities have exclusive right to fix the rates. All other territory comes within the provisions of the commission. It is estimated that the decision deprived the commission of jurisdiction over nearly one-half of the population of the State, the six cities having in excess of 400,000 inhabitants.

The telephone company has announced that it intends to file a petition for a rehearing.

Portland Fare Readjustment

Maine Commission Hopes New Changes Will Solve Rate Question—Recent Increase Disappointing

To aid the Cumberland County Light & Power Company, Portland, Me., toward a new start if the railway service is to be better and the rates not unreasonably increased, the Public Utilities Commission will order changes in the present zone system to cure discriminations from which some patrons suffer, and will authorize an entirely different method of collecting fares. Both are somewhat radical. This will put some additional burdens on the company. The commission believes, however, that if successfully carried out the changes will improve service.

RETURN OF PRE-WAR CONDITIONS MAY HELP

The commission says that the fares on the Island lines must under present conditions be raised to 6 cents like those paid on the rest of the system. It is estimated that this may furnish $45,000 additional revenue, less than one-fifth that now needed. Notwithstanding this need the commission says it will not now authorize any further increases in railway rates. It looks forward to a return to pre-war conditions to help in the final adjustment.

At the time of the original appeal of the company to the commission for relief the State's experts testified, and it was conceded, that the petitioner required additional net revenue of not less than $122,956 a year. It was estimated that the schedule then adopted would provide $110,000, and that the balance might be obtained through economies in operation by rerouting some cars and cancelling some car units.

At the final hearing the experience of August, September and October, under the new schedule was available. October traffic was influenced to such an extent by the influenza epidemic that it was disregarded by mutual consent. August and September showed an increase in gross passenger revenues of eight-tenths of 1 per cent, instead of the 10 per cent necessary to produce $110,000. The gross increased $1,754 over the corresponding two months of the preceding year. At the same time operating expenses increased $20,506.

WHAT THE RESULTS SHOWED

Taking all operations into account the net operating revenue for the two months in 1918 was $17,547 less than in 1917. But the expenses included an additional allowance of $10,460 per month for depreciation, recommended by Mr. Feustel, the street railway expert employed by the State. There was, therefore, an actual gain of $3,372 net for the two months, or $1,686 a month against approximately $10,000 a month agreed to be necessary to maintain the solvency of the railroad operations if conditions remained the same as they were when this petition was filed.

Before the hearing was completed

the War Labor Board ordered an increase in wages amounting to about $150,000 a year. This with the minimum requirement found by Mr. Feustel amounts to $22,500 a month. The net increase indicated by August and September leaves a deficit of more than $20,000 a month or nearly two and one-half times the entire rental charge.

There was no expectation that the increased revenue derivable from a 6-cent fare on the Island lines would provide anywhere near the minimum amount required before this latest increase in wages, and with that increased payroll the company would still be behind twice its rental charge. Faced by this development the petitioner asked the commission to go beyond the prayer of the petition and construct a schedule that would enable it to meet the present demands.

In explanation of the change which the commission proposed now to put into effect it said:

> It is obvious that unless there is an early marked improvement, both the company and the communities which are dependent upon it will be in a serious situation. If the railroad operations were not being supported by the light and power department the crisis already would have been reached, but this department cannot, and will not be permitted to carry such a burden indefinitely. It would result either in unreasonable rates for light and power users, or in crippled service, and both are wrong.

Final Chicago Fare Hearing on Feb. 3

The Chicago (Ill.) Surface Lines must wait several weeks more for an answer to its appeal for a 7-cent fare. This was the outlook when the last evidence was introduced before the State Utility Commission on Jan. 17, at which time an adjournment was taken until Feb. 3 for final arguments. President L. A. Busby was the principal witness during the several hearings.

The city made its fight mainly on the valuation of the property. The purchase price as fixed by the city ordinance is about $156,000,000, but the claim is made that this should not be considered for rate-making purposes. The city contends that the real value is nearer to $70,000,000 if deductions are made for franchise and intangible values, depreciation, renewals charged to capital account and a few other items. The companies contend that all these allowances are provided for in the ordinance and bonds have been issued for the full amount under the terms of the contract.

Some members of the commission have hinted that the entire fare should be devoted to transportation purposes, thus excluding expenditures for maintenance of paving, for the city's 55 per cent and part of the allowance for renewals. Mayor Thompson was a witness at the final hearing. He argued in favor of the sacredness of the present contract which calls for a 5-cent fare, although he admitted having indorsed the plea of the employees for a change in wages, which had been made inadequate because of war conditions.

A Precedent in Pennsylvania?

Review of the Opinion of the Commission There in the First of the Six-Cent Fare Cases to Come Before It

In the first of the 6-cent fare cases to be decided by the Public Service Commission of Pennsylvania, complaints filed against the advance from 5 cents to 6 cents a fare zone by the Conestoga Traction Company, Lancaster, Pa., were dismissed, the commission allowing the increase.

OTHER SIMILAR APPLICATIONS

The decision is regarded as indicating that the commission will allow other fare increases to remain against which complaints have been filed. Included in these are the advances made by the Harrisburg Railways from 5 cents to 6 cents a zone and the Valley Railways, Lemoyne, Pa., from 5 cents to 7 cents a zone.

Although the increase at Lancaster is permitted, the commission recommends that in the future should there be any marked reduction in operating expenses or increase in revenues, the company is to readjust its rates, and if it fails to do so the commission proposes, upon notification, to make such changes as are warranted.

The Conestoga Traction Company operates in Lancaster with ten interurban lines extending into surrounding territory. There are about 164 miles of single track, of which about 20 miles are in Lancaster. The system is operated on a zone basis. The Lancaster city zone includes the entire city and 1 mile beyond. By a schedule of rates filed effective on Aug. 2, 1918, the company increased its regular zone fares from 5 cents to 6 cents. Increases were also made on return-trip and commutation rates.

The complaints were directed against these increases, particularly those on its interurban line between Lancaster and Coatesville and in the city of Lancaster. Complaint was also made that in Lancaster the increase violated the provisions of certain franchise ordinances granted to some of the respondent's constituent companies. In so far as this part of the complaint was concerned, the commission pointed out that it had, in its report in Wilkinsburg vs. Pittsburgh Railways, P. U. R. 1918, F, page 131, held that rate regulating franchise conditions do not preclude it from exercising the supervisory powers delegated to it by the provisions of the public service company law. This part of the complaint was, therefore, dismissed.

BURDEN OF PROOF ON RESPONDENT

As to the reasonableness of the increased rates complained of, the respondent assumed the burden of proof. It appeared to the commission that the increase was made to meet in part increased operating cost resulting from war conditions.

The average interurban rates per mile under the increased rates were as follows: Single fares 2.4 cents per mile; round-trip 1.8 cents per mile; monthly tickets 1.6 cents per mile.

In its opinion, on which is based the order continuing the increased fare, the commission says in part:

> Whether the proceeds of all of its capital stock and bonds were used in acquiring or constructing its system was not definitely shown. Its bonds and preferred stock are worth par. The value of its common stock was not shown.
>
> From the foregoing statements it would appear that respondent will receive, under the increased rates, an annual net revenue to be applied for depreciation and fair return for the year ending Aug. 1, 1919, the sum of $283,526. We should bear in mind that out of this sum it is obligated to pay as rental or dividends on its leased lines the sum of $189,257.
>
> Under these facts, is respondent justified in making the increase in its rates which are complained of? The answer to this inquiry is to be found in ascertaining whether $283,526 annual net revenue is sufficient to allow a proper sum for depreciation and pay a fair return upon the used and useful property needed in the rendering of its service to the public.
>
> PROPERTY NOT VALUED
>
> No valuation of respondent's property was shown. The amount of its capital stock and outstanding bonds and the number of miles of track is practically all the evidence indicating value. The commission will not attempt to make any determination as to the fair value of respondent's used and useful property. It deems it unnecessary so to do. The making of a detailed valuation would impose a burden upon respondent that is not required to meet the exigencies in this case.
>
> It is a matter of almost common knowledge that a street railway system, such as respondent's, may have a value per mile of track of any sum from $20,000 upward. If we use the figures of $30,000 per mile, respondent's system would have a value of approximately $5,000,000. We do not say it is of this value. It may be more or less. What we intend to say is that if we use the evidence we have, with our knowledge of street railway values, we can reach a conclusion as to whether or not the sum of $283,526, respondent's annual net revenue as ascertained above, for the year ended Aug. 1, 1919, will be sufficient for depreciation and a fair return upon its property.
>
> From all the evidence, the commission has reached the conclusion that the increased rates of respondent are not unreasonable. If in the future there should be any material reduction in operating cost or if respondent should receive increased revenues, it should adjust its rates in conformity with its obligation to the public. If it fails to do so the commission, on having its attention directed thereto, will make such adjustment as the public needs demand. The complaint will be dismissed.

A Rookie at Louisville

The Louisville (Ky.) Railway has for some time followed the plan of giving new men accepted for employment their preliminary training on the loop at the Kentucky State Fair Ground, which embraces about 1½ miles of track. This line is idle all year, except during the State Fair in September. It makes an excellent circuit upon which the motormen try out the air and the conductors learn how to handle their gates and bells. After a few days' work with the regular instruction car, under the direction of an inspector, the men are placed under the charge of older men for a few days on the city lines.

Six-Cent Fare Upheld

In Deciding Chicago Elevated Case Court Holds Utilities Commission, Not City, Has Jurisdiction

Circuit Court Judge Jesse A. Baldwin issued a ruling on Jan. 22 denying the application of States Attorney Hoyne for an injunction to restrain the Chicago Elevated Railways from charging the 6-cent fare which was granted recently by the Public Utilities Commission of Illinois.

Judge Baldwin declared that no matter what agreement the municipality had with the elevated roads regarding fares the State commission had sole jurisdiction over the matter. He said:

> Although the city possesses the power to permit or prohibit railroad companies from laying their tracks and operating their roads across, over or upon its streets and highways, neither Chicago nor any other municipality in the State has the power, by prescribing in the ordinances the rates of fare to be charged, to make such contracts with railroad companies concerning such rates as will deprive the General Assembly of Illinois of its rights under the police power to change these rates of fare from time to time.

A formal order of the court was not entered at once due to a request of States Attorney Hoyne for an opportunity for his office and other attorneys representing other objecting parties to confer on the matter and decide what step to take next. Later Mr. Hoyne said:

> The Supreme Court of this State has frequently held that city ordinances limiting the rates of street car and gas companies were valid and binding contracts which could not be broken. The decision of Judge Baldwin is that such contracts must be held to have been made subject to the right of the State to change the rates fixed in such contracts and that therefore when the Public Utilities Commission was created by law in 1913 that this commission can change all such rates and that therefore the city of Chicago and all other cities have been absolutely deprived of home rule over public utilities by the passage of the public utilities act. If Judge Baldwin is right in his construction, the people of Chicago should rise at once and call upon the present Legislature to repeal this legislation.

States Attorney Hoyne immediately filed a petition asking for an injunction restraining the railroad companies from collecting the increased rate on the ground that such a rate was a violation of the contract and franchise of the companies with the city.

The 6-cent fare went into effect on the elevated roads Nov. 19 last with the consent of the commission. The commission decision was outlined in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 23, page 940.

Houston Case to Court

The Houston (Tex.) Electric Company filed suit in the Sixty-first District Court against the Mayor and City Council of the city of Houston, praying for a temporary injunction restraining them from enforcing the 5-cent fare ordinance passed on Nov. 6. The petition also seeks to restrain the city from interfering with the plaintiff in collecting the 6-cent fare provided in the ordinance passed by the Council on Sept. 19, which was defeated in the election held on Nov. 5.

The petition also asks a peremptory writ of mandamus requiring the City Council to exercise its own judgment and discretion as manifest in the ordinance of Sept. 19 and preventing it from delegating its rate-making powers to any other agency.

The basis of the suit is the contention of the company that rate-making is a legislative function which, through the charter granted the city of Houston by the Legislature in 1905, it specifically delegated to the governing body of the city of Houston, which is in fact the Mayor and City Council. It is further contended that the city is without legal authority to redelegate this power and, therefore, the action of the Council in abrogating its functions is null and void.

The case is expected to come to trial this month.

New Jersey Company Explains to Public

The Public Service Railway, Newark, N. J., is securing new data for the arrangement of rate schedules in the preparation of its zone system report to be submitted to the Board of Public Utility Commissioners on March 1. During August and September the company made an investigation of the riding on all its lines in the collection of data for the zone report, but the fare raise which became effective on Oct. 5 made a supplementary census necessary. The company has issued this statement:

> It was a foregone conclusion that the change in rate would cause some diminution in riding, and the actual loss of riders is almost identical with the estimates of the company officials. The investigation is for the purpose of determining just what class of riders was affected by the increase in fare. It is generally taken for granted that those who have ceased to patronize the cars are the so-called short riders, but the entire study which the railway is making of the zone system has been pursued on the basis of leaving nothing to chance. Naturally, under the zone system, the long-distance rider would pay more than the short-distance rider, and to fix equitable charges for service it is essential that there should be knowledge of the volume of riding that would originate in each zone and the length of rides that would be taken by the users of the cars. The company has in its possession the facts when the 5-cent fare was in operation, and it is to determine as nearly as possible what changes have developed since the fare was raised that the count will be made.

Commission to Check Service in Rochester

An immediate check of the present service of the New York State Railways in Rochester was ordered by the Public Service Commission for the Second District of New York on Jan. 13, following a request by Herbert J. Winn, William A. E. Drescher and George Eastman, a committee representing Rochester business interests.

An inspector was sent to Rochester after Commissioner Barhite brought the matter to the commission's attention with instructions to make a complete investigation of the traction service and inform the Rochester public of the results of the checking up. The railroad company, following advertisements that it intended to curtail its service 25 per cent, was cited before the commission on Dec. 11 at which time it was agreed that the company should make certain service reductions during the non-rush hours only, starting on Jan. 2.

The Rochester committee informed the commission that it secured Price, Waterhouse & Company to make an examination of the railway company's books on which to base an intelligent opinion as to the need of increased fare, actuated only by the desire to serve the public interest. As another situation has now arisen the committee respectfully asked, with the same object in view, whether it would not be possible to have an inspector detailed by the commission to check up the service and for the benefit of Rochester give the public the facts as shown by such investigation. The commission, upon receiving the request, took immediate action.

Increase for Lake Erie Line

The Public Service Commission for the Second District of New York at its regular session on Jan. 14, Chairman Charles B. Hill presiding, passed an order authorizing George Bullock, as receiver of the Buffalo & Lake Erie Traction Company, to increase the rate of fare to 3 cents a mile on interurban cars during the war and for six months thereafter. The order granting the increase may be reopened at any time when it appears to the commission that the reasons for permitting the receiver to charge the increased fare no longer exist. The new fare rate goes into effect on Jan. 27.

In granting the increased fare to the company the commission holds that although it may not be of permanent benefit to grant an increased fare on account of desperate financial conditions of an electric railway, such relief may be granted with the hope of preserving the road for the public until a more favorable financial condition of the country may lead to permanent relief.

The road's receiver asked permission to increase interurban rates in New York State from 2 cents to 3 cents per mile. The road runs from Erie, Pa., to Buffalo, about 20 miles within Pennsylvania and 68 miles in New York State. The intrastate service in New York is on a 2-cent-a-mile basis and the receiver applied for a 2½-cent rate, then 2¾ cents and finally 3 cents. Pennsylvania has granted a 3-cent rate and the United States authorities have allowed the same rate for interstate business. The receiver filed a 3-cent-a-mile tariff, effective on Sept. 8, 1918, but its operation was suspended by the commission, pending the investigation concluded on Jan. 14.

Transportation News Notes

Seven Cents in Wausau.—The Wisconsin Valley Electric Company, operating in Wausau, Wis., has been authorized by the Railroad Commission of Wisconsin to increase its fares from 5 cents to 7 cents. The company asked permission to charge a 10-cent cash fare.

Fare Provisions Hold. — Federal Judge Henry T. Reed has ruled against the Dubuque (Iowa) Electric Company in its application for a writ of supercedeas to cancel the provisions of its franchise, which requires a half fare for workingmen during certain hours of the day.

Injunction Proceedings Delay Fare Increase.—Because of an injunction suit filed in the courts of Lake County, Ohio, the Cleveland, Painesville & Eastern Railway has postponed the application of the 25 per cent increase ordered some time ago by the Public Utilities Commission of Ohio.

Another Restraining Order in Illinois.—The DeKalb-Sycamore & Interurban Traction Company, DeKalb, Ill., has filed a bill in the Circuit Court of De Kalb County restraining the State's Attorney of that county and the Public Utilities Commission of Illinois from preventing the company raising its passenger rates, citing that the passenger service is conducted at a loss of $24,000 a year.

New Dayton Ordinance Receives First Reading.—At the regular meeting of the City Commission of Dayton, Ohio, on Jan. 15 the ordinance providing a straight 5-cent fare for all Dayton railways received its first reading. Fares for children under twelve years of age will remain at 3 cents. Representatives of the companies have insisted that they will not be able to pay the wage increases awarded by the Federal War Labor Board unless the fare is fixed at 6 cents.

Rate Hearing Postponed.—The Interstate Commerce Commission has postponed until Feb. 10 the hearing on the petition of the Louisville & Southern Indiana Traction Company and Louisville & Northern Railway & Lighting Company for an increase in fares between Louisville, Jeffersonville and New Albany, the "Falls Cities." The hearing had been set for Jan. 22 at Washington. The companies were granted a rehearing after the petition had been denied following a special examiner's investigation a few months ago.

A Message to Car Riders.—The International Railway, Buffalo, N. Y., is placing "Take One" boxes in all of its cars in Buffalo and will soon start the publication of pamphlets designed to educate the public to the needs of a higher rate of fare and also for keeping the traveling public informed of traction conditions. In this way E. G. Connette, president of the company, hopes to win the good-will and support of the public for the special referendum election in March, at which time the question of higher fares will be voted upon. A prominent Buffalo newspaperman has been engaged to prepare the pamphlets.

Wants Eight-Cent Zones.—Henry H. Crapo, president of the New Bedford & Onset Street Railway, New Bedford, Mass., sought permission of the Public Service Commission to establish a new fare schedule based on a zone rate of 8 cents. The only objection to the petition was offered by the residents of Marion, Mass., who claim that under the zone system as filed they would have to pay a fare of 8 cents in each zone between Marion and New Bedford, although it is the intention of the company to charge a local fare of only 7 cents in the zone nearest New Bedford. The commission took the matter under advisement.

Merchants' Association Asks Fair Play.—The Merchants' Association of New York City has written to the Board of Estimate & Apportionment protesting against the refusal of the board to permit a temporary increase of fare that will enable the transit lines to meet their expenses and protect the city in its liability for its contribution to the cost of the dual subway system. The association also protests against any attempt to commit the city to public ownership and operation of the transit lines without the fullest discussion and consideration. The letter to the Board of Estimate is signed by Lewis E. Pierson, as acting president.

International Wants Interurban Increase.—The International Railway, Buffalo, N. Y., has filed with the Public Service Commission for the Second District, a new passenger tariff applying between points on its interurban lines, the new high-speed line, the Buffalo and Lockport line, the Buffalo, Tonawanda and Gratwick line and the Buffalo and Niagara Falls line which it proposes to put into effect on Feb. 27. Fares between practically all points are increased under the tariff. One-way fares computed on distances shown indicate that they are based on 2½ cents per mile, maximum nearest multiple of 5 with a minimum single fare of 5 cents.

Receivers Ask Court to Increase Fares.—Homer A. Miller and Emil G. Schmidt, receivers for the Des Moines (Iowa) City Railway, have asked Judge Martin J. Wade of the Federal Court to grant an increase in fares over the present rate. The application cites the recommendation of the Iowa Conciliation board that the company is entitled to a 7-cent fare. The receivers also ask the court to construe the terms of the franchise in order that they may be advised as to what course to pursue in the future management of the company. Mr. Miller is a Des Moines banker. He has served notice to the city attorneys that he will serve as receiver without pay.

Two and One-Half Mile Line Wants Increase.—The application of the St. Louis & Jennings Railway, operating in St. Louis, Mo., and St. Louis County, for increased passenger rates, will be heard in St. Louis on Jan. 27, by Commissioner Edward Flad of the Public Service Commission of Missouri. The railway begins at Robin Avenue and runs to Jennings Station Road, a distance of 2½ miles. The application asked for an increase of fare from 2 to 5 cents for adults and 1 to 2 cents for children. A report of an engineer, submitted by Director of Public Utilities Hook sets forth that the revenue in October was $1,297, and the expenses $1,239, showing a profit of $58. The expenses did not, however, include $500 in bond interest.

Seven Cents in Ossining.—The Public Service Commission for the Second District of New York at its regular session on Jan. 16, Chairman Charles B. Hill presiding, authorized the Hudson River & Eastern Traction Company to charge a 7-cent fare in Ossining, the order to remain in force until Jan. 1, 1920, and thereafter until the Ossining trustees revoke the action amending a franchise taken on Dec. 17, and with the further understanding that the order may be reopened when it may appear that the reasons for allowing the increased fares no longer exist. The commission had previously determined that a 7-cent fare was just and reasonable and necessary in order to permit the railroad to have a fair return on the value of the property used in the public service. The village trustees removed the legal obstacle to the installation of the increased fare by providing the necessary consent.

I. C. C. Confirms Fare Increase.—The Interstate Commerce Commission has approved the single-trip fare of 10 cents and the commutation fare of $1 for fourteen rides on the lines of the Steubenville, East Liverpool & Beaver Valley Traction Company between East Liverpool, Ohio, and Chester, W. Va., and has dismissed the complaint against the fares. The cities of East Liverpool, Ohio, and Chester, W. Va., complained in the proceedings of the fares charged by the company for the transportation of passengers between those points. Prior to April 1, 1918, the fare was 5 cents; on that date the single-trip cash fare became 10 cents and a commutation fare of $1 for fourteen trips, or slightly more than 7.1 cents per trip, was established. These fares were alleged to be unjust and unreasonable and, in so far as the city of Chester was concerned, unduly prejudicial to its citizens. With this view the commission disagreed.

Personal Mention

Bay State Trustees Named

New Officials Experienced in Railway Management, Finance, General Business, Labor Affairs and Railway Law

The Bay State Street Railway, Boston, Mass., on Jan. 15 filed with the Secretary of State a certificate that it has been reorganized under the name of the Eastern Massachusetts Street Railway, and that it has otherwise complied with all the provisions of the legislative act of 1918 to bring the company under the service-at-cost law. Brief mention of this was made in the ELECTRIC RAILWAY JOURNAL for Jan. 18, page 157. In less than an hour after the certificate was filed, Governor Coolidge sent to the Executive Council the nominations of five men to act as public trustees of the reorganized company. The Governor's nominees for the board of trustees are:

Homer Loring, Boston; Isaac Sprague, Wellesley; Earle P. Charlton, Fall River; Fred J. Crowley, Lowell, and Arthur G. Wadleigh, Lynn.

The trustees are appointed for terms of five years and are eligible to reappointment. The period of public control, by agreement between the company and the commonwealth, is ten years. Each trustee is to be paid a salary of $5,000 annually. They are to have general charge of the road in the interest of the people, practically as the trustees of the Boston Elevated Railway have charge of that property. They will take control on Feb. 1.

Mr. Loring has been president of the Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa., operating 130 miles of electric railway doing a tremendous freight business. He is director of the Mohawk Hydro-Electric Company, operating water-power and lighting properties in central New York; Western Light & Power Company, operating in northern Colorado, and of Westinghouse, Church, Kerr & Company, New York, construction engineers. He was president of the Association of Massachusetts Street Railway Security Owners, which conducted a successful educational campaign on behalf of the street railways of the State in the early part of 1918. It is generally conceded that the association's activities were largely responsible for securing the passage of remedial legislation last summer. He was one of the speakers at the meeting of the American Electric Railway Association held on Nov. 1, and an abstract of his remarks will be found in the issue of this paper for Nov. 2.

Mr. Sprague has been connected with N. W. Harris & Company since 1886, as clerk, manager, partner and president after incorporation until Dec. 31, 1915. For several years he was president of the Wellesley National Bank. He is now a director of Harris, Forbes & Company; Harris Trust & Savings Bank; Puget Sound Traction, Light & Power Company and Harris Safe Deposit Company.

Mr. Charlton has been a resident of Fall River for many years and has been interested in a chain of 5 and 10-cent stores. He is vice-president and an active member of the F. W. Woolworth Company and on the board of directors and the executive board. He owns the Charlton Mills, Fall River. He is a director of several banks and is very familiar with the needs of transportation.

Mr. Crowley has been employed for twenty years or more as motorman in Lowell and vicinity. He is a prominent member of a street railway labor organization. He is familiar with labor conditions and knows the needs of the public and the demands of street railway operation. He has been a member of one of the local exemption boards.

Mr. Wadleigh has been city solicitor of Lynn for many years and acted for his city and other towns in many of the hearings in relation to the Bay State Street Railway. He is a lawyer and has always practiced in Lynn.

The trustees have full power to manage and operate the new company, and may appoint and remove at their discretion the president, treasurer and clerk of the new company, and all other officers except the board of directors. They have the right to fix and regulate fares, and are to determine the character and extent of the service and the facilities to be furnished. Within sixty days after the new company has acquired the property of the old company, and after a public hearing, they must put into operation rates and fares which, in their judgment, will produce sufficient income to meet the cost of service.

Mr. Stone Resigns as Trustee

Galen L. Stone, one of the original board of public trustees of the Boston (Mass.) Elevated Railway, has resigned from the board. Two of the first appointees now remain—Stanley Miller and John F. Stevens. Former Lieutenant-Governor Frothingham left the board to take a major's commission in the United States army; William M. Butler left the organization with the explanation that the signing of the armistice cancelled his obligation to serve as trustee because of war conditions. Mr. Stone's resignation is said to be because of poor health.

In his letter of resignation, Mr. Stone gave Governor Coolidge no reason for his action. In the Governor's letter of acceptance, however, reference to Mr. Stone's health is made in a way that would seem to establish it as the cause of his retirement.

"It is with great regret," wrote Governor Coolidge, "that I received your resignation as a member of the board of trustees of the Boston Elevated Railway. I wish to take this opportunity to express to you my appreciation of the public service which you have rendered in serving on this board. I appreciate that your health is such that it would be hazardous for you to continue."

Col. Williams Resigns

Will Retire as Head of Brooklyn Rapid Transit Company, But Continue as Officer of Subsidiaries

Col. Timothy S. Williams, president of the Brooklyn (N.Y.) Rapid Transit Company, is to be relieved on Jan. 31, at his own request, of all responsibility for the operation of the Brooklyn Rapid Transit Company and the New York Municipal Railway Corporation, a subsidiary, it was announced on Jan. 23 by Lindley M. Garrison, the receiver. This action will not deprive Colonel Williams of the positions to which he has been elected by the directors of other companies in the system.

In a letter to the receiver, Colonel Williams urged that this action be taken in order that he might have a long rest. His salary of $50,000 a year as president of the Brooklyn Rapid Transit Company will automatically cease. He will continue to receive $25,000, which is paid him annually by subsidiary companies. Mr. Garrison in replying to Colonel Williams expresses his sincere appreciation of the fidelity, ability and energy "with which you have assisted me in the existing complex and difficult situation with which my duties required me to become acquainted."

Colonel Williams has been connected with what is now known as the Brooklyn Rapid Transit System for nearly twenty-five years. After he was graduated from Cornell University in the class of 1884, he came to New York and became a reporter on the old *Commercial Advertiser*. Ultimately he left newspaper work to become private secretary to Governor Hill. Governor Flower retained him. When Governor Flower retired from office and undertook the reorganization of the Long Island Traction Company, out of which grew the Brooklyn Rapid Transit System, Colonel Williams was made secretary of the reorganization committee. This was in the Spring of 1895. A few months later he was made secretary and treasurer of the Brooklyn Heights Railroad and when the Brooklyn Rapid Transit Company was organized he was made a director, and secretary and treasurer. In 1900, he became vice-president of the Brooklyn Rapid Transit Company and its constituent companies, and in 1911 he succeeded Edwin W. Winter as president.

New Elevated Organization Announced

An announcement made under date of Jan. 16 by C. D. Emmons, general manager of the Boston (Mass.) Elevated Railway, to all officials and employees of the company follows:

> The operating organization of this company under the direction of the general manager and as approved by the board of trustees under date of Jan. 10, 1919, will consist of six departments as follows:
>
> Maintenance department, including tie and timber department, under the jurisdiction of H. M. Steward as superintendent of maintenance.
>
> Transportation department under the jurisdiction of Edward Dana as superintendent of transportation.
>
> Power department under the jurisdiction of F. S. Freeman as superintendent of power.
>
> Rolling stock department under the jurisdiction of John Lindall as superintendent of rolling stock.
>
> Inspection department under the jurisdiction of C. E. Learned as superintendent of inspection.
>
> Purchasing department under the jurisdiction of Edward Mahler as purchasing agent.
>
> H. B. Potter is appointed assistant general manager.
>
> E. M. Flint is appointed chief clerk to the general manager.

E. E. Kester, formerly general agent of the Illinois Traction System, Peoria, Ill., has been appointed assistant traffic manager of the system, with headquarters at Peoria.

J. P. Pope has been appointed acting manager of the Kentucky Traction & Terminal Company and Lexington Utilities Company, Lexington, Ky., to succeed S. H. Dailey, resigned. Mr. Pope has been acting as electrical engineer on these properties for a number of years.

Arthur W. Thompson, vice-president of the Baltimore & Ohio Railroad and a federal director of railroads, has been elected president of the Philadelphia Company, Pittsburgh, Pa., to succeed Judge James H. Reed, whose resignation from the company is noted elsewhere on this page.

Walter F. Crossley, former general superintendent of the Cairo Railway & Light System, included in the Illinois Traction System, has been transferred from Cairo, Ill., to Springfield, Ill., and will hereafter be connected with the Illinois Traction System in the capacity of a special representative.

B. F. Fortner, formerly with the Public Service Company of Oklahoma, has accepted a position as superintendent of distribution with the Okmulgee Ice & Light Company, Okmulgee, Okla. Through a typographical error in the issue of this paper for Jan. 4, Mr. Fortner's name was spelled incorrectly.

J. A. Jefferis, general manager of the Kerrens-Donnewald Coal Company, St. Louis, Mo., has been appointed fuel agent for the Illinois Traction System, according to bulletin issued from the office of H. E. Chubbuck, vice-president executive, Peoria, Ill. Mr. Jefferis will retain his connection with the Kerrens-Donnewald Coal Company.

Oscar T. Crosby has resigned as Special Commissioner of Finance for the United States in Europe, but intends to remain in Europe to advise the American peace delegation on financial questions. Mr. Crosby, who was a pioneer in electric railway work and a successful operator, was president of the Inter-Allied Council on Finance and Purchases, which had charge during the war of the allocation of American loans to the Allies and the determination of priorities on purchases in this country. With the cessation of hostilities, he is said to have felt that his work there was finished. Previously he had been Assistant Secretary of the Treasury, but resigned this post some time ago.

J. Bert Forbes has been appointed superintendent of instruction and efficiency of the Puget Sound Traction, Light & Power Company at Tacoma, succeeding E. C. Clarke, resigned. Mr. Forbes will continue the accident-prevention work and will have full charge of the instruction of the Tacoma Railway & Power Company and Pacific Traction Company trainmen, co-operating with the superintendent of transportation and the superintendent of investigation and adjustments. Instructors will be appointed from the transportation department to work under Mr. Forbes' direction. Mr. Forbes will report to George W. Rounds, general superintendent.

Judge James H. Reed on Jan. 16 announced his resignation as president of the Philadelphia Company, Pittsburgh, Pa., which controls the Pittsburgh Railways, the Duquesne Light Company and other properties. Mr. Reed has been striving for some time to induce the directors to relieve him of some of his burdens. He will be succeeded by Arthur W. Thompson, vice-president of the Baltimore & Ohio Railroad and a federal director of railroads, but will remain as chairman of the executive committee and vice-president, and will retain a more or less active connection with the property. James D. Callery, who has been president of the Duquesne Light Company, will become chairman of the board of the Philadelphia Company and Mr. Thompson will succeed him as president of the Duquesne Light Company.

Walter H. Wylie, St. Louis, Mo., has been appointed traffic manager of the Illinois Traction System in charge of both passenger and freight business of the company. Mr. Wylie has represented the Illinois Traction System for several years as general agent at St. Louis and previously had been connected in an official capacity with various of the large railway systems of the West and Southwest. His appointment was made in connection with the reorganization of the passenger and freight department of the Illinois Traction System, removal of traffic headquarters from Springfield to Peoria, and the appointment of new chief traffic officials announced in an official bulletin from the office of H. E. Chubbuck, vice-president executive. The changes were effective from Jan. 20, on which date the passenger and freight traffic departments were merged to be supervised from the main office of the company in Peoria.

Obituary

John Henry O'Neill, inspector and chief instructor of the Union Street Railway, New Bedford, Mass., is dead. Mr. O'Neill was born in Boston on April 9, 1869. Before becoming connected with the Union Street Railway in 1890 he was employed by the Boston (Mass.) Consolidated Railway and the Edison Electric Light Company, Boston.

Earl G. Nichols, master mechanic of the Bangor Railway & Electric Company, Bangor, Me., died recently of pneumonia. Mr. Nichols entered the service of the company as a motorman. Later he was transferred to repair work at one of the carhouses. He was then promoted to foreman and after serving in this capacity for some time he was made master mechanic. He is survived by his widow and one son.

George Sherwood Hodgins, editor of *Railway and Locomotive Engineering*, with which he had been connected for fifteen years, died of pneumonia on Jan. 18. Born in Toronto, Canada, Mr. Hodgins was for a number of years mechanical engineer for the Canadian Pacific Railway. Coming to New York City about twenty years ago, he had since been engaged in editorial work, and also spent much time in scientific research work. He was first with *The Gas Age*, later with *The Railway Age*, and then with *Railway and Locomotive Engineering*.

Capt. Howard W. Irwin, Co. H, 118th Engineers, A.E.F., died on Jan. 6 of pneumonia at Camp de Grasse, France. Captain Irwin was well known in the New England electric railway field, having recently resigned from the post of superintendent of car repairs of the Bay State Street Railway, Boston, to enter the army. He was educated at Purdue University. After gaining experience in an electric utility plant in Minnesota, he came to the Bay State Street Railway about eight years ago as superintendent of instruction. His first important work was the general design of the instruction cars used by this road. These marked a distinct advance over previous equipment of the kind. They have been fully described in the ELECTRIC RAILWAY JOURNAL. For a time Captain Irwin was detailed for special work in the equipment department of the Bay State company. He was keenly interested in electric railway engineering, a regular attendant at New England Street Railway Club meetings, and had a future full of promise. He is survived by his widow and two daughters.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Soft Coal Rules Rescinded

Fuel Administration Expects Decrease in Price of Coal to Follow New Order

According to a Washington dispatch Fuel Administration officials expect a decrease in the price of bituminous coal and coke to result from the order of Jan. 17 discontinuing maximum prices on these commodities and eliminating the zone system of their distribution. The order is effective Feb. 1, but does not affect anthracite coal.

The regulations rescinded by this order include those governing purchasing agents' commissions and profit margins allowed wholesale and retail dealers. The Fuel Administration announced, however, that these were subject to reinstatement if price, wage, labor, production, or other conditions which may arise require it.

Reduction in the demand for bituminous coal as the result of the ending of hostilities and the mild weather this winter made it impossible, officials said, to maintain maximum prices.

The only restrictions on domestic consumption of fuel that remain are on anthracite and natural gas.

With the issuing of the order affecting bituminous coal and coke, the Fuel Administration began preparations for the stoppage of most of its activities. Orders went to district representatives to give notice to employees that the offices would cease functioning on Feb. 1.

Maintenance Equipment Fairly Active

Current Market, However, Is of "Hand-to-Mouth" Variety With No Tendency to Stock

While there may not be a particularly vigorous market for new rolling stock equipment and supplies, there is nevertheless a fairly active market for maintenance equipment. To be sure, the volume of purchasing is not as large as it has been in past years. However, there is sufficient material for this purpose being ordered to keep the supply field in an optimistic frame of mind.

It is more apparent now perhaps than ever before that orders of a "hand-to-mouth" variety are occupying virtually the entire market. Almost no stock orders are being placed. This fact, however, gives a more stable tone to the supply market in that a more even, though small, purchasing load is the result. In other words, until conditions in the electric railway field become better there is less probability of a fluctuating demand.

As evidence of the degree in which traction companies are now placing orders a couple of items have come to notice showing orders for field coils and car wheels. In the former case where normally orders would average around twenty they are now for around five coils; likewise in the matter of car wheels current orders are for two or three instead of a dozen or more.

$4,210,000 for Cars

Brooklyn Receiver Outlines Expenditure Upon Which Court Will Pass on Jan. 27

An expenditure of $4,210,000 for new cars and for car reconstruction is the program set down by Receiver Garrison of the Brooklyn (N. Y.) Rapid Transit Company for the approval of Judge Mayer in the Federal Court, to whom he is responsible. The item as included in the receiver's budget of Jan. 22 to the court, to which brief reference was made in these columns last week, is: To provide for fifty additional surface cars already contracted for, and improvements to existing equipment, approximately $710,000; to purchase and equip 200 additional surface cars to comply with court orders affecting additional surface car equipment from $1,500,000 to $2,000,000; purchase of 100 additional subway cars, say from $2,000,000 to $2,500,000.

In connection with the item of $2,500,000 for additional subway cars Mr. Garrison says:

> I am advised by W. S. Menden, chief engineer, that on account of the increase in traffic on the rapid transit lines, and in view of the fact that additional lines are to be placed in operation during the present year, orders should be placed immediately for at least 100 additional steel subway cars, each of which is estimated to cost a minimum of $18,000 and a maximum of $25,000. These additional 100 cars should be available for service before the winter season of 1919-1920.

No contracts have been entered into for the acquisition of any of this equipment and no determination has been made as to the type of car that may be required, except that fifty of the 200 cars are specified as trail cars and a tentative order for car bodies for this number of cars has been agreed upon without any formal order having been placed.

The expenditure of $4,210,000 for cars represents three of sixteen items in a total budget of $16,900,000 upon which the court will be asked to pass on Monday, Jan. 27.

Pole-Line Materials Market

Yellow Pine Crossarms Have Advanced in Price While Insulator Pins Are Lower

Some interesting developments have taken place in the pole-line materials market quite recently. Northern cedar pole cutters are offering distributers a contract for their requirements for the first six months of the current year at present prices. This is the first time, it is reported, that such a thing has happened in this field. Owing to freight, labor and weather conditions there appears to be little prospect of any drop in price. Still there is a possibility that the decision on Monday last in the California lumbermen's freight rate case on shipments east of Denver may be reflected in lower prices to the consumer.

Prices on wood insulator pins are beginning to ease off. During the war they went as high as $25 per 1000 owing to the demand for wooden bolts for wood shipyards. Pins now can be had for around $20 to $21 per 1000. Normal price is in the neighborhood of $11 to $12 per 1000.

Yellow pine has advanced about $4.50 per 1000 board-feet, which brings crossarms about 5 per cent higher. Fir, however, which it is understood is used more for this purpose, has not changed.

Pole-line hardware is holding firm in price. The producers state that lower prices cannot be immediately expected because present prices are below the level that would correspond to the current quotations of iron and steel. The reason for this is that the producers early accumulated large stocks of iron and steel at prices much under the current market and consequently did not feel justified in advancing hardware prices as steel went higher.

Westinghouse to Build Electric Locomotives at Essington

Discussing the prospects for the year 1919 at the Essington, or South Philadelphia Works of the Westinghouse Electric & Manufacturing Company, R. B. Mildon, assistant to the vice-president, made the following statement:

"We share the general opinion in the industrial field that business will slow down somewhat owing to the readjustment of the industries from a war to a peace basis; but by spring this phase should be over and then for the next few years we should have a period of prosperity.

"As far as the Westinghouse Works

at Essington is concerned, we have enough orders on hand to keep us busy for the next year without considering new business which is now beginning to develop.

"We are at present making nothing here but ship propulsion machinery, but our plans contemplate bringing here all of our turbine and electric generator construction work that is now being handled at East Pittsburgh. Before we can accommodate this additional business, however, we shall have to erect several new buildings, including an office building, a shop for making turbine blades, and an electric generator shop. Unless we are mistaken in our expectations, however, this new construction work should begin this spring.

"Looking a little further ahead into the future it is probable that we shall in time erect a building for the construction of electric locomotives. The electric railroad situation is unquestionably very favorable and a large amount of electrification will be undertaken in the next ten years. We co-operate with the Baldwin Locomotives Works in the manufacture of electric locomotives and our location here, so close to the Baldwin plant, makes this the proper place to do our part of the work.

"In other words, we plan to build at Essington all of our large and important apparatus, and as the demand for this class of apparatus is certain to increase rapidly from year to year, we expect to see our plant expand in the near future to many times its present size."

Effect of Fires on Equipment Market

Probably Between 5 and 10 Per Cent of 1918 Rolling Stock Purchases for Replacement of Cars Lost by Fire

While it may not be exactly a nice thing to depend upon, it seems nevertheless true, that fires play no inconsiderable part in the market for electric railway materials. Last year there were quite a few fires in the early months that destroyed carhouses, shops and a large number of cars. In preceding years fire also took its toll of railway equipment. This material, buildings and cars had to be replaced. No accurate check has been made on the total fire loss and subsequent replacement, but it is probably true that the loss by fire in 1918 accounted for between 5 and 10 per cent of the orders placed for rolling stock last year. In addition orders for quite a volume of supplies, not to mention buildings, were given to replace those lost.

Sometimes where the damage has not been too great the cars can be salvaged. In such cases, dependent on the extent of the damage, equipment supplies must be purchased. Seats, curtains, cord, floor treads, motor parts, paint, glass, headlinings, etc., are as a rule most apt to be called for.

Recent Incorporations

Evansville & Ohio Valley Railroad, Evansville, Ind.—The Evansville & Ohio Valley Railroad has filed articles of incorporation with the Secretary of State of Indiana, presumably as the successor of the Evansville & Eastern Electric Railway, the Evansville, Henderson & Owensboro Railway and the Evansville & Mount Vernon Railway. Capital stock, $1,500,000. Among the directors are Marcus S. Sonntag, William H. McCurdy and Albert Karges.

Eastern Massachusetts Street Railway, Boston, Mass.—A certificate of incorporation has been filed by the Eastern Massachusetts Street Railway, organized to take over the property of the Bay State Street Railway.

Franchises

Buffalo, N. Y.—William B. Cutter, receiver of the Buffalo & Depew Railway, has asked the Public Service Commission for the Second District of New York for authority to construct a single track road in the town of Lancaster from the present terminus of the company at Burlington Avenue and Ellicott Road along Ellicott Road to Central Avenue and in Lancaster village from the intersection of Ellicott Road with Central Avenue, south in Central Avenue to about 50 ft. northerly from intersection of Central Avenue with the New York Central tracks and also from the intersection of Burlington Avenue with Ellicott Road easterly in Ellicott Road to Central Avenue. The United States Housing Corporation has agreed to loan the petitioner up to $45,000 for the new construction, to be secured by receiver's certificates, and the American Car & Foundry Company has agreed to donate $5,000 toward the construction.

Track and Roadway

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—Work will be begun at once by the Augusta-Aiken Railway & Electric Corporation on the rehabilitation of its system. Motors, controllers, motor armatures, rails and other equipment needed will be ordered immediately.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—Plans are being made by the Honolulu Rapid Transit & Land Company for an extension of its system. It is understood that the plans of the company will be submitted to the various improvement clubs of the city before they are finally decided upon. The company has obtained a statement from Governor McCarthy that he will not oppose an extension of its franchise.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—It is reported that this company proposes to construct an extension of its lines in Waukegan to Greenwood Avenue.

New Orleans Railway & Light Company, New Orleans, La.—J. D. O'Keefe, receiver of the New Orleans Railway & Light Company, has authorized the expenditure of $60,000 for repairs to the tracks and lines of the company. The money will be used principally in the replacing of worn-out switches, frogs, fish-plates and such repairs to the tracks and rails as may be deemed essential to immediately relieve present conditions. Mr. O'Keefe estimates that about $40,000 of this sum will be expended for materials, the other $20,000 being for labor.

United Railways & Electric Company, Baltimore, Md.—The Central Construction Company, Harrisburg, Pa., has been awarded the contract by the United Railways & Electric Company for its proposed double-track extension to the yards of the Bethlehem Shipbuilding Corporation at Sparrows Point.

Bay State Street Railway, Boston, Mass.—The Bay State Street Railway has re-established car service from Iron Hill Street, East Weymouth, to Columbian Square, South Weymouth, and from Columbian Square to Lincoln Square, Weymouth Landing. The resumption of service resulted from a conference by Wallace B. Donham, receiver of the Bay State Street Railway, and the Selectmen of Weymouth. The latter promised that if service was resumed the company would be paid, by popular subscription, $2,500 for immediately needed repairs. The service was discontinued Dec. 14, when the Selectmen refused to pay to the company $13,500, which it had demanded for repairs as a condition of continuing service.

Morris County Traction Company, Morristown, N. J.—An automatic signal system has been installed by the Morris County Traction Company on its single-track line between Danforth Road and Elm Street, Madison.

Brooklyn (N. Y.) Rapid Transit Company.—Application has been made by Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, to the Federal Court for permission to issue receiver's certificates to the amount of nearly $16,900,000. The sum asked for provides not only for all the current obligations of the Brooklyn Rapid Transit Company and its two subsidiaries, the New York Municipal Railway and the New York Consolidated Railroad, but for important extensions of power station facilities, for the purchase of additional subway and surface cars, for construction now going on and for additional contracts for construction and equipment to be entered into within the next sixty or ninety days.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has canceled the bids received recently for the elevated part of the Fourteenth Street-Eastern District line and has recalled from the Board of Estimate three contracts which had been awarded for the construction of a part of the elevated structure in Westchester Avenue. These bids will be readvertised later.

Cincinnati (Ohio) Traction Company.—To improve street car service to Kennedy Heights and Pleasant Ridge, the Cincinnati Traction Company is contemplating taking over the track of the Interurban Railway & Terminal Company leading from Norwood.

Oklahoma Union Railway, Tulsa, Okla.—It is reported that the Oklahoma Union Railway will construct an extension from Kiefer southward.

St. Thomas (Ont.) Street Railway—The City Council of St. Thomas plans to construct an extension of the St. Thomas Street Railway.

Northampton, Easton & Washington Traction Company, Easton, Pa.—The Board of Public Utility Commissioners of New Jersey has ordered the Northampton, Easton & Washington Traction Company to place a standard deck of ties on its bridge No. 51 and to do all the work necessary in the way of grading approaches to the structure before May, 1919, and to place standard inside guard rails on five other bridges before July 1.

Philadelphia, Pa.—The Public Service Commission of Pennsylvania has approved the plan of the Department of City Transit for the completion of the Frankford elevated system from Callowhill Street to Front and Arch Streets.

Monongahela Valley Traction Company, Fairmont, W. Va.—The Baltimore & Ohio Railroad and the Monongahela Valley Traction Company contemplate rebuilding the approach to the bridge across the Monongahela River, to cost about $15,000 and also the construction of a bridge from Cleveland Avenue to the railroad station and express office, estimated to cost $15,000.

Power Houses, Shops and Buildings

Lethbridge (Alta.) Municipal Railway.—The Lethbridge Municipal Railway contemplates the purchase of a 300-kw. d.c. generator, 600 volts, for direct connection to its present engine.

Savannah (Ga.) Electric Company.—A new 665-hp. boiler will be installed by the Savannah Electric Company at its Riverside power house.

Hagerstown & Frederick Railway, Frederick, Md.—The new power plant of the Hagerstown & Frederick Railway at Dam No. 5 on the Potomac River has been completed and placed in service. The plant, including the dam, cost about $450,000.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—The Missouri Public Service Commission has ordered the St. Joseph Railway, Light, Heat & Power Company to install additional equipment in its power plant in order to give St. Joseph adequate heat, traction, light and power service by Feb. 15. The company was also ordered to furnish not later than May 1, plans for increasing the capacity of the present plant, or plans for a new plant or purchase of energy from an outside source.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York is preparing at an early date to acquire the necessary property for the construction of storage yards in connection with the Pelham Bay Park line, the Corona elevated line and the Livonia Avenue branch of the Eastern Parkway line.

Toledo Railways & Light Company, Toledo, Ohio.—At a recent meeting of the stockholders of the Toledo Railways & Light Company a bond issue of $3,200,000 was authorized, the proceeds of which will be used in making improvements and extensions to the light and power property. Plans for the improvements are being worked out by the engineers.

Pennsylvania Railroad, Philadelphia, Pa.—Plans have been filed by the Pennsylvania Railroad for seven new buildings at Greenwich Point, Philadelphia, to cost $138,000.

San Antonio (Tex.) Public Service Company.—Fire recently destroyed the power plant of the San Antonio Public Service Company at Villita and South Presa Streets, causing a loss of $25,000.

Monongahela Valley Traction Company, Fairmont, W. Va.—Construction work is practically completed on the new power house of the Monongahela Valley Traction Company at Rivesville, and rapid progress is being made in the installation of new equipment. It is expected that the plant will soon be placed in operation.

New Advertising Literature

Sherwin-Williams Company, Cleveland, Ohio: A folder on its insulating products.

National Tube Company, Pittsburgh, Pa.: Two folders entitled, respectively, "The Answer" and "The Chief Consideration."

Blaw-Knox Company, Pittsburgh, Pa.: A third and revised edition of its booklet describing the Blaw single-line clamshell buskets.

Deister Concentrator Company, Fort Wayne, Ind.: A bulletin dealing with the No. 7 Deister-Overstrom diagnonal deck coal-washing table.

Union Electric Company, Pittsburgh, Pa.: A cloth-bound catalog of 1124 pages. The numerous electrical and railway supplies and apparatus made by the many manufacturers for which the company is agent have been illustrated, described and list-priced in this new catalog, No. 8.

Rolling Stock

Bamberger Electric Railroad, Salt Lake City, Utah, intends to build four new motor cars and three express trailers.

Virginia Railway & Power Company, Richmond, Va., mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 19, 1918, as contemplating the purchase of twenty-five new cars, has been reported as having ordered a number of cars of a new type; these should arrive in the near future.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has received the thirty new one-man cars ordered from the American Car Company, as noted in the ELECTRIC RAILWAY JOURNAL of July 27, 1918. The company, it is reported, is making investigation preliminary to purchasing twenty-five additional cars.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has applied to the New Jersey Public Utility Commission for authority to sell twenty-eight old summer car bodies and fifteen of the single-truck closed cars of the company as junk. The matter was taken into conference by the commission. The company had no further use for the cars as rolling stock because of the fact that they were condemned by the commission and an order to sell is expected. President Johnson said that the company had ordered six new cars and these are expected to arrive in a fortnight.

Trade Notes

Irving Burrows has been released from the United States Navy, where he served as an ensign, and will shortly reopen the San Francisco office of the Blaw-Knox Company at 528 Second Street.

Lehigh Car Wheel & Axle Works, Catasauqua, Pa., is reported to have increased its capital from $300,000 to $600,000, and to have arranged to increase its indebtedness to $600,000 to be used for general expansion.

Wellman-Seaver-Morgan Company, Cleveland, Ohio, has opened a San Francisco office at 415-417 Rialto Building, in charge of Norman E. Ross. Business originating from California, Nevada west of the 115th meridian, Lower California and the counties of Josephine, Jackson and Klamath in Oregon is in this territory.

C. J. Brown, who has been connected with the sales division of the R. D. Nuttall Company for the past three years, has become associated with Frank M. Erb, representing in the Pittsburgh district the Silver Manufacturing Company, National Forge & Tool Company, Horsberg Forge Company and Meadville Malleable Iron Company. Mr. Brown will be located at 902 Second National Bank Building.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, February 1, 1919 *Number* 5

The State Is Supreme in Illinois

THE clean-cut decision of Judge Baldwin of the Circuit Court in Chicago, in the Elevated 6-cent fare case, mentioned in last week's issue, has cleared the atmosphere as far as home rule over public utilities is concerned in that city. It has also set the public to wondering whether they made a mistake in rejecting an ordinance which was voted on last November and was designed to give the people absolute control over the local elevated and surface lines. The decision in question was one denying an injunction to stay the order of the State Public Utilities Commission which granted a 6-cent fare to the elevated roads. In brief, the ruling is to the effect that the city has the power to determine over what streets the roads may operate and to make contracts with the roads, but has not the authority to fix the rate of fares to be charged from time to time. The same position has been taken in other States and is based on the theory that the State has never surrendered its superior police power and that having delegated that power to the Public Utilities Commission the latter body may fix such rates as are just, reasonable and sufficient, regardless of contracts previously entered into between municipalities and operating companies. One of the lawyers summed up the decision by saying that the city has power to make contracts with its utilities but has not the power to enforce them. This ruling if sustained in the higher courts will absolutely remove utility companies in Illinois from the influence of hysterical local clamor when an attempt is made to deny a proper return to capital invested in such corporations. It is added evidence also of a growing recognition of the joint responsibility of the community and the utility for good service by the utility, coupled with a fair return for the service rendered.

Midyear Meeting on March 14

THE midyear meeting and banquet of the American Electric Railway Association will be held in New York on Friday, March 14.

The technical sessions will be held in the Engineering Societies' Building, 29 West Thirty-ninth Street, beginning at 10 a.m. The program follows:

[1]

Report of Committee on Readjustment, P. H. Gadsden, Chairman.

[2]

The State of the Industry

- (a) Modern regulatory plans and theories, by an electric railway executive.
- (b) Capital and electric railways, by a banker.
- (c) From the regulatory viewpoint, by three active or former public utility commissioners.

The annual banquet will be held in the evening at the Waldorf-Astoria Hotel. The general topic of the addresses will be "Rehabilitation."

Skip Stop Does Not Increase Accidents

THE fundamental principles which contribute to economical car operation have been long recognized by electric railway engineers. One of the most important of these is the saving and benefits to be derived from decreasing the number of stops by establishing skip-stop operation. Such operation during the war period has demonstrated its advantages both to the traveling public and to the railways. Where the number of stops is reduced a faster, more comfortable and more frequent service can be maintained without increasing the energy input. These are some of the profits gained by the public. The railway company receives benefits from the decrease in the work placed on the equipment which results in fewer troubles and a decreased maintenance expense. The public in general has failed to appreciate the value of this change in service which was introduced as a war measure and is being continued in many cities now for economical reasons. This lack of confidence no doubt has been caused by the ignorance of the public as to the advantages and to insufficient co-operation between the railway and its passengers. In another part of this issue we give a description of the publicity campaign which has been instituted by the Philadelphia Rapid Transit Company to correct the erroneous impression that the use of the skip stop in that city caused an increase in the number of fatal accidents that occurred on the company's lines. A committee composed of all classes of citizens was asked to hold public hearings and take testimony from all who might wish to present evidence that the skip stop had been responsible for any fatalities. The newspapers which had been instrumental in spreading this false impression were also invited to send representatives and give any information they might have in support of the theory. No newspaper representative appeared, and the committee made a report stating that no evidence had been presented to prove that additional casualties had resulted from skip-stop operation.

This spirit by which a company takes the public into its confidence is to be commended and it is to be hoped that the seed sown in this publicity campaign will take firm root and result in correcting the false impression and assist in creating confidence in the skip stop.

Help Make the Committee Reports as Valuable as Possible

AFTER an intermission of two years, the affiliated associations are again taking up active work and are laying plans for the preparation of committee reports to be presented at the convention next October. The two and one-half years which have elapsed since the last convention was held in 1916, have been the most momentous in the history of the industry. New problems have arisen in practically every branch of the business, and the result is that the number of topics to be considered is actually bewildering. The executive committees of the several associations are now going over carefully this extended list to determine which are the most important, all things considered, to be taken up. Committees will then be appointed.

All of this planning will largely go to waste, however, unless hard work in the way of investigation is put on these topics by the committee appointed to consider them. This is a matter where the responsibility is partly that of the man himself and partly that of the executive of his company. We realize that this is a time when detail problems are pressing at home, and many a chief executive feels that it will be difficult to spare the time of any of his men who may be asked to engage in committee work. But this is not the right way of looking at the matter. The work must be done, and it can be done only through sacrifice and provided each committee man puts into the work the best that is in him. The welfare of the industry as well as of each individual company is at stake.

There are also compensating advantages for the time spent in committee work, both to the man himself and to his employing company. These advantages come from the fact that the committeeman gets in touch with other men selected because of their special knowledge to solve the problem on which they are engaged. Each committeeman cannot but profit by the interchange of information and ideas at committee meetings beyond the data actually embodied in the printed report, and this opportunity is of direct benefit to the company which employs him.

There is therefore every reason to induce the operating companies to co-operate with the associations by permitting their men to engage in committee work. There is special reason this year for the need of co-operation in committee work, partly because of the extent of the problems and partly because of the shortness of time. Usually it has been possible to get committees at work shortly after the annual meeting, or in November or December. This year, on account of the uncertainty, the start has necessarily been delayed some two months. This means that the work must be carried on with more than the usual activity. But with all working in accord, the 1919 convention should be the most valuable in the history of the associations.

Railway Ills Call for Prevention Rather than Cure

THE technical journals of an industry reflect with considerable accuracy the current tone and trend of thought in that industry. By a study of the back files of such journals the development of an industry may be readily traced. In looking over our own files recently it occurred to us that a number of striking changes in viewpoint have taken place in the electric railway industry within the last fifteen years. At the beginning of this period the ELECTRIC RAILWAY JOURNAL, then the STREET RAILWAY JOURNAL, was replete with descriptions of construction work and new roads. Heavy electric traction was in its infancy and the "battle of the systems" was in its "earliest phases." To push construction work ahead and get the wheels rolling was the leading thought. With the passing of the construction period came the necessity of paying dividends, and plans for traffic promotion and for cutting down operating expenses began to receive attention. These are the problems that are still with us.

It is a significant fact, and one that gives some hope as to the future, that whereas plans for affecting savings were much discussed ten years ago they were more in the way of remedial than preventive measures. To illustrate: The trend of discussion in those days with reference to accident claims was more along the line of proper handling of claims and the reducing of the cost per claim than in studying out methods of getting at the root of the evil, namely, the prevention of accidents. The latter phase of the problem is the one which has received the most serious attention these latter days with the result that safety cars, safety devices, and safe operating methods have materially reduced the number of accidents.

The same trend is noticeable in other departments of the industry. It seems to us that this trend is decidedly in the right direction. Remedial medicine may help alleviate the pains of a sick man, but preventive medicine keeps him from getting sick and is therefore the most economical as well as the most logical.

Burdens, grievous ones, have fallen on the industry as a result of the war. But the old saying "'Tis an ill wind that blows no one good" is still true. The war has forced us to get down to bedrock at the roots of our problems in many instances. It has taught us that we can save in many ways that we before had not dreamed possible. It has torn away some of the old traditions that in the past have hampered us. Last but not least, it has burst asunder some of the shackles of public prejudice with which we have been tied down. We have learned that in many instances much can be gained by the application of correct engineering and accounting methods to the diverse problems of the industry. And the field is by no means exhausted. Some of the prominent men in the industry feel that we are only getting a good start in the matter and that the wider application of such methods will yield greater results than an equal amount of endeavor spent along any other line.

Possibilities in the Zone System of Fares

SO MUCH has been said in these columns in favor of more general adoption of the zone system of fare collection that we are pleased to find the authorities giving serious thought to this innovation in many places. The recommendation of Prof. A. S. Richey, mentioned in our issues of Dec. 28 and Jan. 18, for the adoption of a two-zone system on the Boston Elevated Railway property is a case in point. Careful study of some such plan is also progressing in St. Louis and on the system of the Public Service Railway. These investigations, together with the results of experiments in various other cities, are an indication of the way the wind is blowing, and we have no doubt that the current year will find the solution of the fare problem on more than one property in having rates in cities proportioned, to some extent at least, to journey lengths.

It was established by the report of the Boston Joint Commission in 1914 that the maximum length of a profitable haul on the Boston Elevated system was 4.25 miles, without allowing a greater return on investment or allowance for depreciation than were then in effect on that property. Similarly in 1917 Professor Richey reported that the paying haul in the central 5-cent zone of Springfield, Mass., allowing the same return on investment as was then in effect, was about 2.76 miles. From two such careful surveys we may see what a difference there is between the length of profitable haul in two cities. In each case it is shown that a person who rides beyond the distance indicated is getting more than his money's worth. Consideration of the two reports suggests the folly of attempting to establish a standard distance for zone fares applicable to all cities.

Arguments which have been offered for and against a zone system are so well known as to merit no further repetition here. Professor Richey calls attention to many of them in his report. He quotes President McCulloch of the St. Louis company as saying, "every day we are doing things differently from the way they were done last year," and we are all aware of the effect of the great war on long-established habits. The American genius for overcoming obstacles is generally recognized, and if the only thing that stands in the way of making a zone system successful is a practical method of fare collection we may take it for granted that such a method will be found. The one recommended for Boston reads like a workable system, and undoubtedly this plan or some variation from it will yet be put into effective operation.

The Boston car-riding public certainly has had its share of experiment with flat fares of different grades under public trustees who can be charged with no ulterior motives in trying to put local transportation on a paying basis for the good of the community. It is very likely, therefore, that these people will welcome any change which promises a solution of their difficulties without imposing a higher unit fare. It would not be surprising either if another of Professor Richey's suggestions is given a trial—namely, the matter of experimenting with low-fare cars on short routes in congested districts. These routes, as he suggests, should be carefully chosen with a view to connecting points of common interest, the speed to be reasonably fast and headway between cars to be sufficiently short. Any plan that will attract short riders is worthy of serious consideration. Developments in Boston will be watched closely.

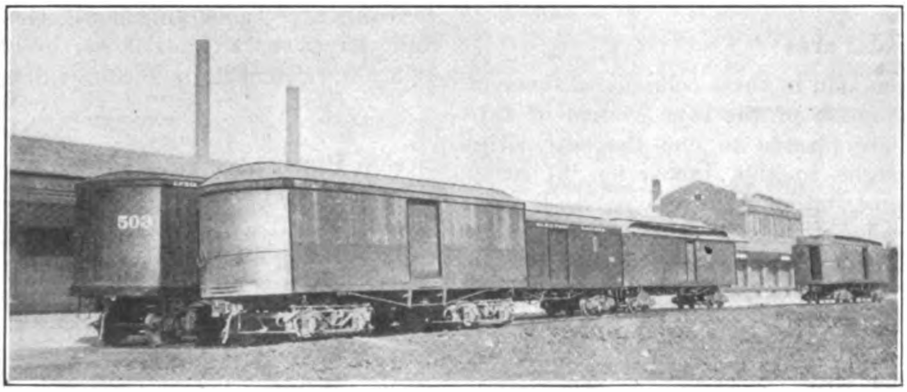
Steam Roads Are Experimenting With Concrete Ballast

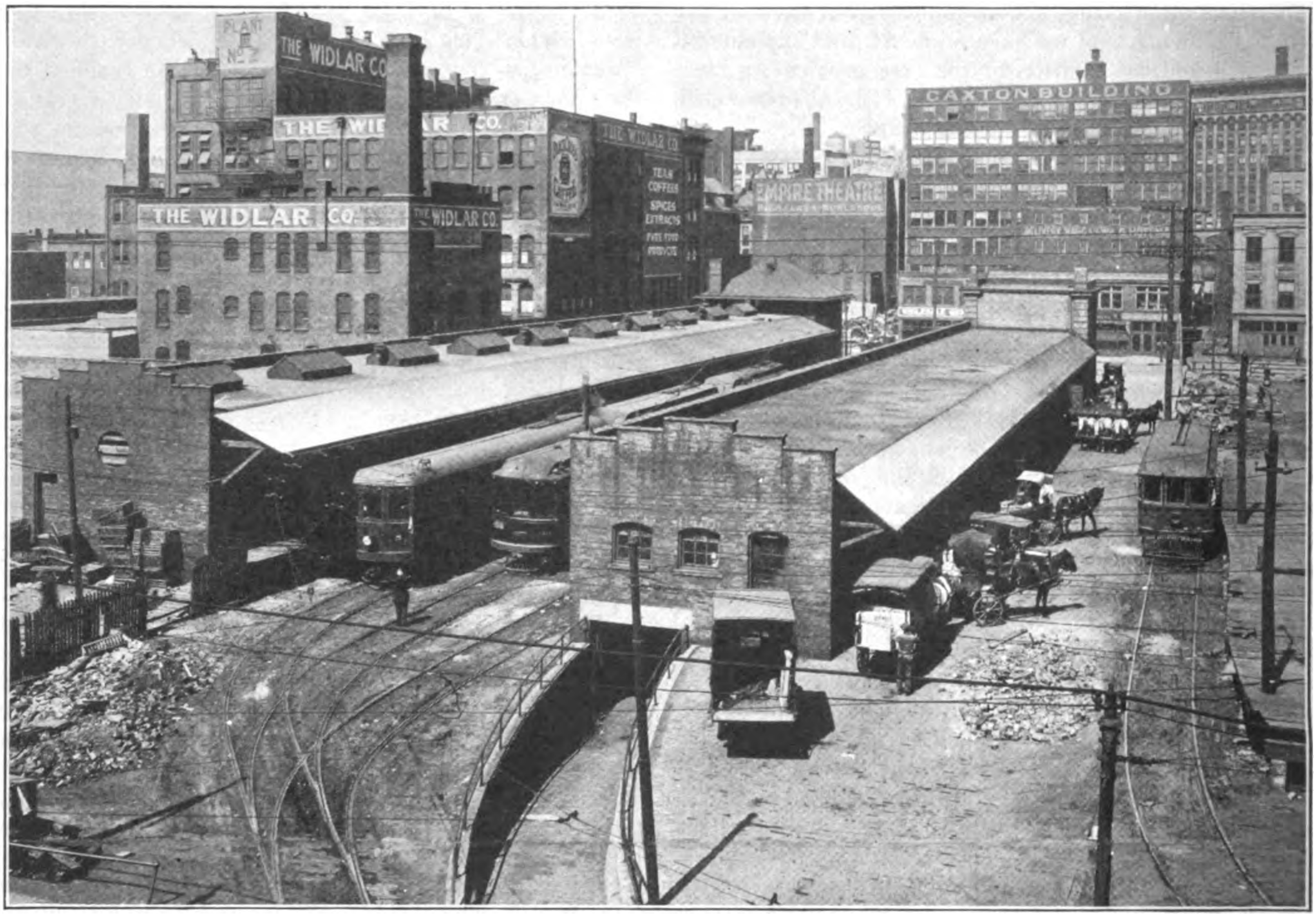
WILL the steam railroads ultimately adopt some form of concrete slab ballast or sub-ballast construction for their tracks? This question is raised by the experiments now reported after four years of service test of a form of this general type of construction on the Northern Pacific Railway. The general features of the construction used are described elsewhere in this issue. There has been a growing tendency with steam roads to use concrete in some form in the roadbed for the treatment of troubles incident to ballasted tracks in wet cuts. but we believe the 2000-ft. experimental section of the Northern Pacific Railway to be the most extensive so far undertaken by the steam roads in their endeavors to produce a more stable roadbed and track under the constantly increasing loads.

Several roads have used some form of concrete ballast in tunnel construction and at terminals with satisfactory results, and the newer subway tracks in New York City are usually built in a similar manner at stations, but in these instances the reasons for its use have been mainly for cleanliness and to simplify maintenance problems which tunnel construction presents. It is particularly difficult to renew standard ties within the close limits of subway and tunnel walls. The boldness of the experimental use of concrete for open main-line track will be appreciated as a radical departure from accepted steam road practice.

Meanwhile electric railways, particularly in street construction, have been using concrete ballast in two principal forms, one wherein the ties are embedded in concrete and the other where the ties are laid upon several inches of ballast which in turn is laid upon a concrete slab sub-ballast. The latter is gaining in favor where conditions warrant the expense. It is interesting, therefore, to note the tendency of the steam roads, in their struggle with the roadbed and ballast question, toward the adoption of a form of construction which electric railways have found quite successful in application to electric railway conditions. Another feature worth noting is the report that the continuous wooden stringer type of construction has given the best service of the three types of construction under test. It leads us back to the old horse-car and early electric railway days, when the wood stringer was used almost universally to support the rails.

The experiments in question will be followed with great interest, not only by steam road engineers but also by those interested in electric railways, particularly because it is reported that the new types of construction have so far been maintained for about 5 per cent of the maintenance cost of adjacent tracks of regular ballasted construction, on the same line, under the same traffic and built at the same time. It would seem that such a saving in maintenance will justify the added cost for the new construction, although we have no information as to the cost, which must have been at least three or four times as great as regular ballasted track.

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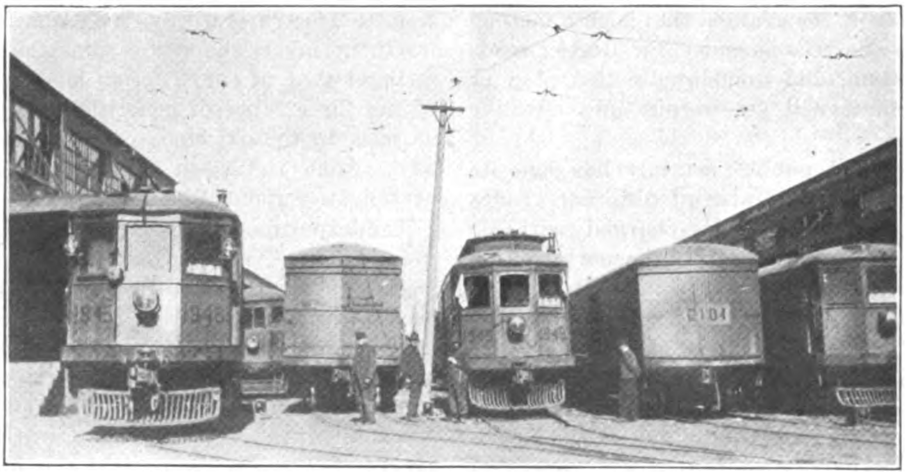
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Electric Railway Freight Terminals

At top, carload freight of the Terre Haute, Indianapolis & Eastern Traction Company, at Indianapolis, Ind. In center, Electric Package Express Company, Cleveland, Ohio. At bottom, house tracks of the Detroit (Mich.) United Railway.

What Freight Handling on Electric Roads Requires and Costs

Electric Railways Have a Drastic Need of Adequate Freight Terminals, and Mechanical Freight-Handling Devices Should Supplant Brute-Power Devices in the Interest of Scientific and Economical Management—Valuable Operating Data Are Given for Electric and Steam Line Freight Houses

By A. B. Cole

Westinghouse Electric & Manufacturing Company

Preceding articles by Mr. Cole on the subject of electric railway freight service were published in the ELECTRIC RAILWAY JOURNAL of May 11, 1918, and Jan. 4, 1919.

TO GIVE man-size freight service upon electric railways, proper station buildings, track layouts and other facilities must be provided. Moreover, in many instances it is necessary for the company to assist in locating grain elevators, coal yards, lumber yards, stock yards, and loading chutes. Each station site should include a plot of land, say 300 ft. x 2000 ft., to permit the offering of attractive long-term leases for grain elevators and the like.

The standard station building of one progressive road is a brick, concrete and steel structure, 101 ft. x 22 ft. As nearly all passenger stations on this line are combined with an electrical substation, the building is divided into four parts. The substation equipment occupies 30 ft. 6 in. of length at one end of the building; the ticket office comes next with a length of 12 ft. and extends across the width of the building; then there is a waiting room 16 ft. long, leaving a freight room of 36 ft. long to occupy the other end of the building. At some way stations, where the traffic demands it, stock yards of six pen capacity, hog showers, and grain elevators will be found.

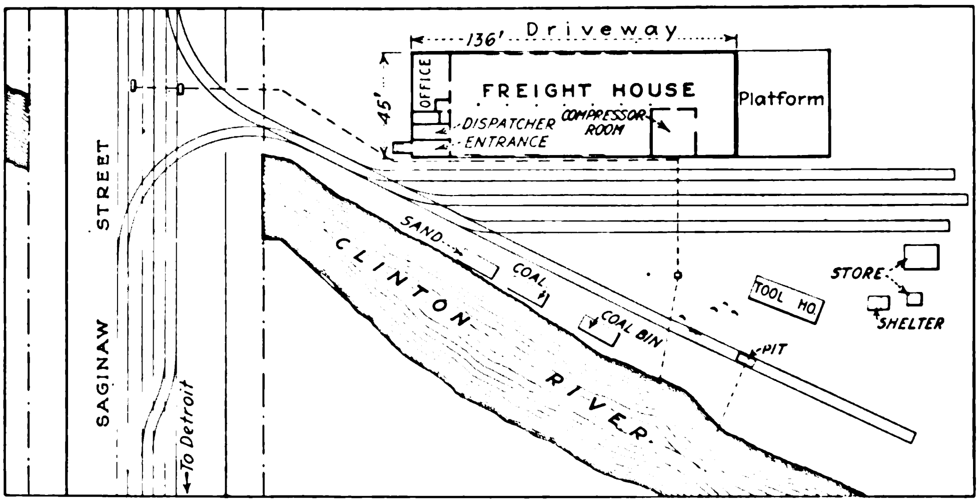
Of paramount importance is the length of sidings. Passing sidings are as long as 2000 ft., while the minimum length of an industrial track is 1000 ft. With the latter there is sufficient room for industries along such a track to make it pay in time, while a long passing track adds considerably to the flexibility of freight handling on a single track line with large passenger business. Once a freight train is on the passing track, it can do all its work without blocking the main line.

One road, when projecting its line had enough foresight to buy, in all towns, sufficient land to draw many industries next to the railroad. In other words, all industries with track facilities are on land leased from the electric line. This advantageous location of industries pleases both the shipper and the railway.

These are important phases of freight-handling in its more advanced stages. As stated in preceding articles, such complete facilities are not required for electric railways to start the haulage of freight, but they constitute the means needed for extended development later. At present, however, some lines that are old at the business of carrying freight have not developed their facilities sufficiently about this line to answer present needs, let alone future requirements. In fact, it must be obvious that freight haulage could be considerably improved if interurban electric railways had something better than defunct store buildings, livery stables and barns—the class of buildings in which most of such companies cradle their freight business. Perhaps this condition is due to lack of money, but it must none the less be regarded as a detriment to the interurbans through the prevention of the efficient handling of freight.

Furthermore, labor-saving devices for handling freight are practically non-existent. In electric railway freight houses a large amount of freight for a certain shipper or group of shippers may be found piled around numbered posts. Since electric railway freight service is largely of a dispatch nature, it would be far better if managements would look into labor-saving devices instead of copying practices that led Mr. Brandeis, now judge of the United States Supreme Court, to accuse the steam railroads of wasting $1,000,000 a day. Most electric railways have power houses, substations and car shops where they use power hoists, jib cranes and traveling cranes, as a matter of course—even in power houses and substations where they are rarely needed. Yet there is practically no freight house—either steam or electric—in this country that has a traveling crane!

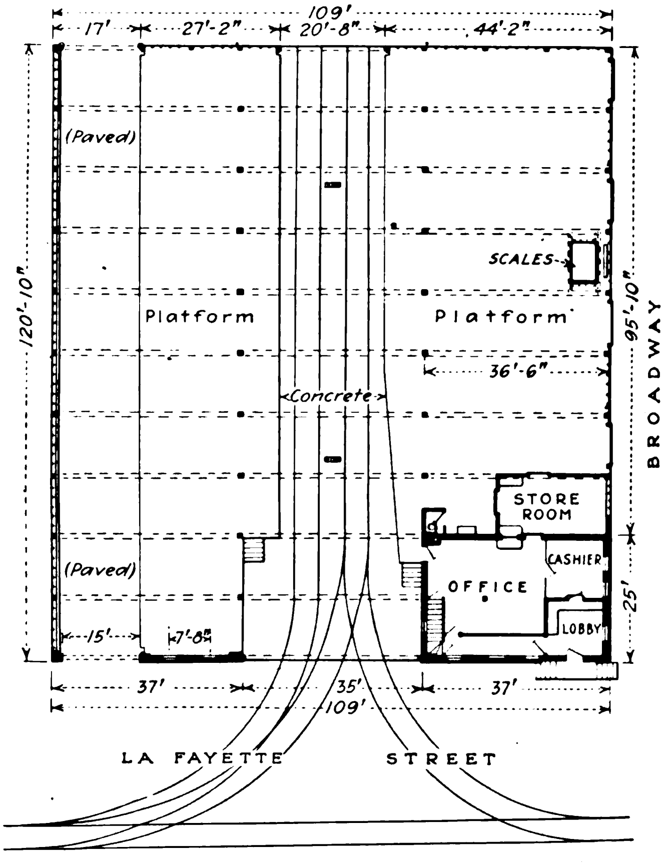
Labor-saving devices for moving material have been extensively adopted by practically all the large industrial plants in the country. Surely in these days the use of brute-power devices like two-wheel and four-wheel trucks is entirely out of harmony with the modern idea of speed in the loading, unloading and storing of freight, and of scientific, economical management in general.



TYPICAL FREIGHT STATION LAYOUT, DETROIT UNITED RAILWAY, PONTIAC, MICH.

Moreover, work is too often not made as easy for teamsters as it should be. A satisfied customer is any company's best advertisement. Since in freight handling the teamster is often the point of intimate contact between the railway and the shipper, it is of paramount importance that the teamster be kept in the best of humor. To this end he must be supplied with facilities which will assist him in delivering his loads, receiving them and getting away from the freight house with the least loss of time.

One of the first things that should always be considered in laying out a team driveway and team yard is the provision of proper paving. A road in a muddy and rough condition is always a trial to the temper of the teamster. He may experience some difficulty on this seemingly small point and complain that it is hard to get shipments into the electric line warehouse without serious delays. As a result his employer may finally decide to ship via some competing line that provides better facilities. This situation may seem far-fetched, but the point covered is not uncommon and should receive consideration. In handling freight, there are several types of houses peculiar to certain classes of traffic. These freight houses divide themselves as follows: l. c. l., trap and transfer. In practically every case, however, provision is made to handle inbound as well as outbound freight. The most extensive layouts provide for the handling of two classes of freight in separate structures. This arrangement greatly facilitates the flexible handling of cars and also expedites the service for the shipper.



FIRST-FLOOR PLAN OF L. C. L. FREIGHT HOUSE OF NEW YORK STATE RAILWAYS, UTICA LINES

Most interurban lines have heretofore made a specialty of less-than-carload freight. By virtue of its nature, such freight seems to be easily adapted to interurban conditions. In many cases the freight business grew up solely through service that was more or less comparable with express. Ultimately it grew so that large quantities of merchandise for various points along the line had to be handled in separate motor-freight cars, and these motor cars, in turn, were sometimes compelled to handle trailers.

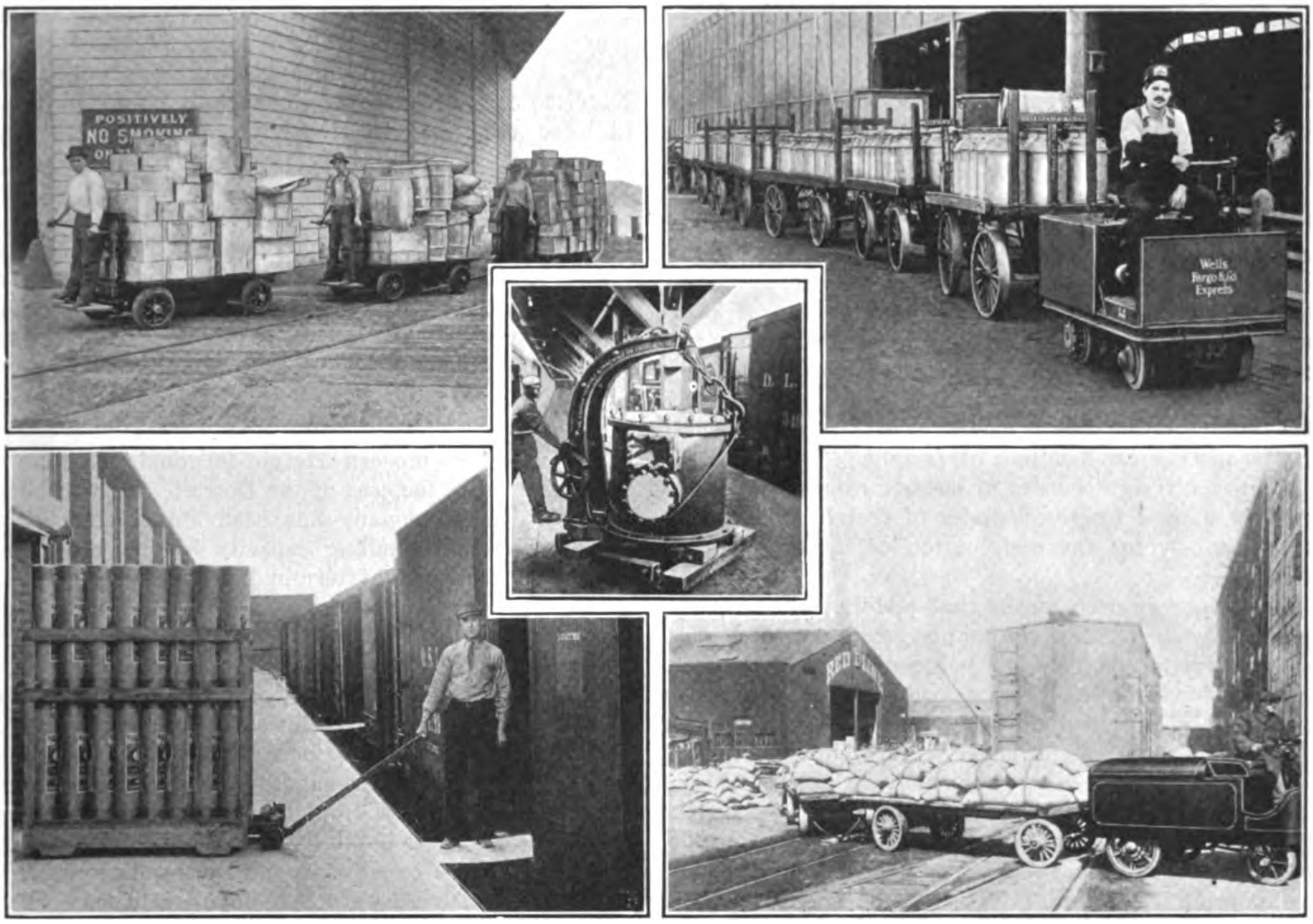
As the electric railways extend their freight facilities from now on, they should handle much more carload freight. Carload freight shipments do not necessarily pass through a freight house; they may be loaded from the team track in the freight yard of the electric line or at the industry where the freight originates, the car in turn being switched to the main line.

Under present conditions, however, interurban freight traffic is of such a character that the freight houses usually come under the first classification—the l. c. l. type. The building used is generally a low one with a driveway on one side and with a house track on the other. This track may extend beyond the platform, giving capacity for one or two cars to be loaded or unloaded by team. Often, however, one finds freight houses with the team track on the same side as the team driveway. Moreover, there are many instances where the public streets are used as the driveway. The daily carhouse capacity varies considerably, from one, two or three cars to sometimes a hundred, as in the case of the Detroit and Indianapolis terminals.

ECONOMICAL HANDLING OF L. C. L. FREIGHT

The problem of handling l. c. l. freight properly—*i. e.*, with regularity, efficiency and economy—is of vital importance. While the transporting of merchandise freight is in itself an expensive service and while the savings from the use of freight-house mechanical equipment are, to speak broadly, small in comparison with the total cost of operation, still it is highly important that all possible handling facilities be provided that are commensurate with the traffic furnished and the revenue received.

The necessity for the relief of congestion is in itself a powerful argument for the proper use of freight-handling devices. The congestion may arise from special causes or it may be the result of the gradual growth of traffic, l.c.l. business having been found to double in volume every fifteen years. All congestion means increased costs, and in numerous cases this factor has run the operating costs to a high figure. Conditions of congestion in many electric railway freight terminals would be considerably relieved through the use of certain mechanical devices.



HOW FREIGHT HANDLING IS MADE EASY

The subject requires study in each particular case, of course, for most electric railway freight terminals are not so extensive as steam ones, and all the factors of cost should be considered before an electric line determines how far to go in regard to using mechanical devices. In general, however, it may be said that the four-wheel auto truck seems to be the unit which would largely help electric lines to solve the problems of freight handling.

Both steam and electric men seem to have the erroneous impression that the well-known two-wheel type of truck is the most practical unit for freight handling. In recent exhaustive investigations, however, it has been proved that the four-wheel auto truck merits first consideration. That an appreciable reduction in cost per ton is possible, is accepted by many of the best engineers studying this particular problem. With a four-wheel auto truck one man can move from 2000 to 3000 lb. as compared to an average of 400 to 600 lb. on a two-wheel truck. The most up-to-date freight stations almost invariably have the four-wheel type of freight-handling rolling stock, and its use is very essential to the successful operation of the l. c. l. type of freight house.

The automobile industrial truck, which is equipped with a storage battery and propelled by electric motor, has been in common use in many manufacturers' warehouses. Being what might properly be called an electric tractor, it can in many cases be used with trailers of the four-wheel type, which save a large amount of time, labor and expense.

One form of this truck has a platform which can be lowered to pick up a loaded multiple platform. The multiple platform is built in the form of a sled, without steel runners, and it is only used as a vehicle for quickly loading and unloading a given amount of freight. The truck platform, having an adjustable height, can be run under a multiple platform, and the latter can be picked up and hauled to any point in the warehouse. This would seem a most logical device for electric railways generally.

In addition to inside facilities, better unloading arrangements should be provided in the yards for heavy tonnage freight which requires team-track unloading.

GRAIN ELEVATORS ARE CLOSE BY ON THE TOLEDO & WESTERN RAILROAD

Some steam railroads provide a derrick, and others a bridge which extends over the cars and part of the driveway. This bridge has a traveling hoist so that large pieces of freight can easily be lifted from the car into the shipper's truck

In the mechanical handling of any freight, one point must be borne in mind, *i. e.*, the impossibility of keeping down the cost per ton unless close supervision is provided. The maximum economy to be obtained is only possible when freight from starting point to destination is kept on the same set of wheels. This is a fundamental in the mechanical handling of freight.

Transfer freight houses of electric railways are generally employed for the transfer of freight collected by trap cars, or for the distribution of interline l. c. l. freight.

Trap-car operation means that certain industries are supplied with one or more empty small cars each day, as the occasion demands, it being understood that the shipments will be less-than-carload. The trap cars are picked up at specified times during the day and taken to the transfer freight house. Here the freight for certain destinations is assembled in carload lots to secure efficient loading.

The use of trap cars not only increases the capacity of the warehouse but also makes possible the more efficient handling of l. c. l. freight. The steam-railroad way of handling this class of freight with regulation cars is very inefficient, as cases are known where the daily load of l. c. l. freight is not more than 400 to 500 lb. The trap car, however, is built to carry a small tonnage, and when it is held for l. c. l. service the unused capacity is minimized.

How a line can extend its freight-handling facilities through the use of trap cars is shown by the experience of the Waterloo, Cedar Falls & Northern Railway. This company operates a 7½-mile freight belt line which, as shown by the map on page 225, extends around the factory district of both east and west Waterloo, and ties together all steam lines entering Waterloo.

The company has two trap cars, each comprising a flat car with cab equipped with four 40-hp. motors. These cars call regularly on the manufacturers of Waterloo to secure the smaller freight shipments, which are conveyed to the East Waterloo terminal freight house, for mixed or l. c. l. shipments.

The trap-car service includes calling at the East Waterloo freight house of the Chicago Great Western Railroad and the office of the American Express Company for l. c. l. and express shipments respectively. These last two points are reached by a track on city streets and are used by the trap cars only.

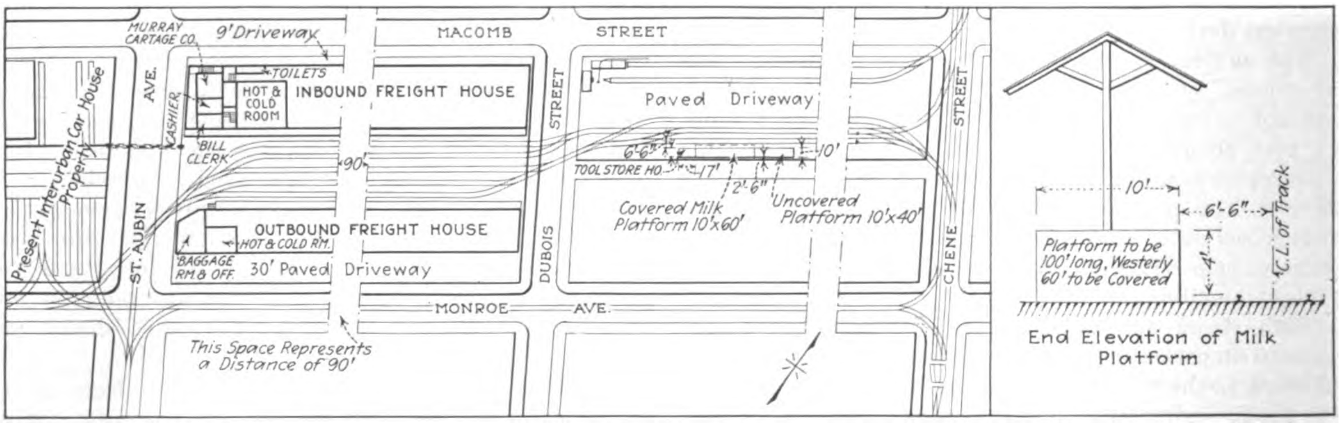
Trap-car service makes it possible for the Cedar Valley road to provide the manufacturing interests of Waterloo with one of the highest class and most efficient freight services that could be desired for both carload and l. c. l. shipments.

HANDLING A HEAVY FREIGHT BUSINESS IN DETROIT

The value of modern freight-terminal facilities is clearly shown in the case of the Detroit (Mich.) United Railway. This company has been able practically to triple its freight-handling capacity by placing in use a spacious new freight terminal. This has materially reduced the cost of handling freight and provided accommodations for the greatly increased business of the company.

The Detroit United Railway was formerly much limited in freight-handling facilities at its main source of business, Detroit. Conditions at the old terminal necessitated considerable rehandling of goods in effecting deliveries—a condition found in many electric freight houses. Embargoes had to be declared often to give the railway a chance to clean up, and new means for conducting the business were found imperative.

The new terminal site is located 1 mile east of the Detroit City Hall, a location which necessitates for the present a long haul by shippers of the west side. The company also has on the west side a large new freight


MURRAY CARTAGE CO.
9' Driveway
MACOMB STREET
TOILETS
HOT & COLD ROOM
INBOUND FREIGHT HOUSE
CASHIER
BILL CLERK
90'
Present Interurban Car House Property
AVE.
ST. AUBIN
OUTBOUND FREIGHT HOUSE
HOT & COLD RM.
BAGGAGE RM. & OFF.
30' Paved Driveway
MONROE AVE.
This Space Represents a Distance of 90'
STREET
DUBOIS
Paved Driveway
6'-6"
10'
TOOL STORE HO.
17'
2'-6"
Covered Milk Platform 10'x60'
Uncovered Platform 10'x40'
CHENE STREET
10'
6'-6"
4'
C.L. of Track
Platform to be 100' long, Westerly 60' to be Covered
End Elevation of Milk Platform

LAYOUT OF EAST-SIDE FREIGHT TERMINAL ON THE DETROIT UNITED RAILWAY building, 100 ft. longer than the east side one and representing one-half of the pending west-side terminal development. Unfortunately the company has been prevented by existing war conditions from securing the materials for the completion of the west-side terminal, and the building that is finished is leased as a garage. When the whole west side terminal is built and added to the east-side development the Detroit United Railway will be in an enviable position from the standpoint of electric railway freight handling, as its facilities will in many ways be commensurate with those of steam roads.

But already, as said before, the company's freight-handling capacity has been increased threefold by the east-side terminal, and a description of the facilities used to effect this result may be of interest. Previous notes in regard to this terminal were published in the ELECTRIC RAILWAY JOURNAL of April 12 and Aug. 11, 1917, but a brief resurvey will be made here. It is noteworthy that such an extensive terminal could be developed so near the center of the city.

The outbound freight house of the east side terminal, shown in an accompanying diagram, is 45 ft. x 405 ft., and the inbound 60 ft. x 405 ft. Between these two buildings is a yard, consisting of five loading or house tracks. The streets along the outer sides of the freight houses serve as a team and truck way to the station. The buildings and house tracks occupy a complete city block, and in the block beyond are storage tracks for loading and unloading carload shipments. These include four team and storage tracks 600 ft. long, connecting between the two buildings, and also the main line.

The outbound freight house is built two bays wide, with practically continuous doors on the track side and with pairs of doors spaced 35 ft. on the receiving or team side. These are wooden and counter-balanced so that they can be lifted easily. At the far end of the outbound building a chain hoist, for heavy shipments, is mounted on a monorail across the building. The end bay of this building is used by the American Express Company, and at the opposite end the regular baggage room is located in a space 30 ft. x 45 ft. Here a 1000-lb. automatic scale is installed. The company does not handle any baggage on its passenger trains; all baggage is delivered to the outbound freight house and is loaded into express cars.

TRAP CAR OF THE WATERLOO, CEDAR FALLS & NORTHERN RAILWAY

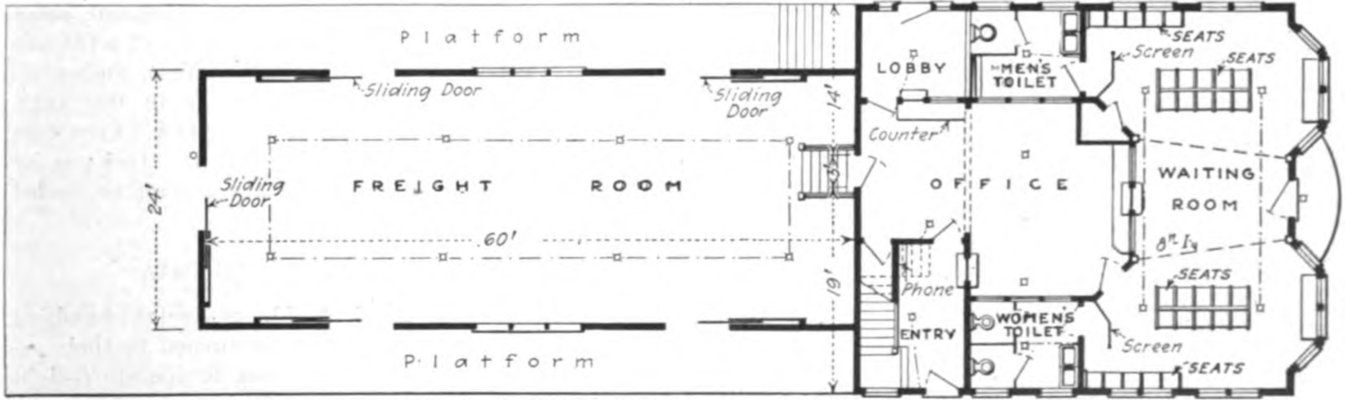
The inbound freight house, which is 15 ft. wider than the outbound freight house, is in practically all other respects a duplicate of the outbound building. It is also equipped with a monorail hoisting system, opposite that in the outbound freight house. Two automatic 4000 lb. scales are conveniently located for checking.

The front end of the inbound freight house is two stories high and is utilized for offices. The cashier's office, which is on the first floor with that of the cartage company, has facilities for handling a large volume of work. On the first floor also are the bill clerks and freight-house foreman with clerks working in the cashier's office. The general freight office is located on the second floor, and the local freight agent has there a private office.

On the average eighty to 100 cars a day are landed out of the east-side terminal of the Detroit United Railway, thus making approximately 2000 to 2200 cars per month. This compares favorably with the record of many a steam line terminal. It must be remembered, too, that each electric motor car is equivalent in service to from three to five steam railroad cars. When the electric cars go out they quickly discharge their loads and are readily available for new business.

CEDAR VALLEY LINE HAS INTERESTING TERMINAL

Another terminal to which attention may be directed is that of the Waterloo, Cedar Falls & Northern Railway, located only a short distance from the principal business district of Waterloo, Ia. The freight house and yard tracks are on on a 32-acre site near the Cedar River. The freight house is a one-story brick structure



PLAN OF WAY STATION OF THE DETROIT UNITED RAILWAY AT IMLAY CITY, MICH.

TABLE I—COST OF HANDLING FREIGHT AT COLUMBUS FREIGHT HOUSE OF OHIO ELECTRIC RAILWAY*

Month, 1918	Tonnage Handled by Pounds	Total Revenue	Average Revenue Per Ton	Depot Labor Expenses	Cost per Ton to Handle
January	5,475,834	$11,194.03	$3.28	$895.00	32 cents
February	6,579,698	12,090.76	3.76	1,055.00	32 cents
March	7,543,619	16,320.57	2.70	1,057.46	28 cents

* Tonnage handled includes only freight originating at and destined to Columbus, and does not include freight transferred.

ACTUAL PAYROLL FOR COLUMBUS FREIGHT HOUSE IN MARCH, 1918

Agent	$85.00
Chief clerk	75.00
Cashier	65.00
Bill clerk	65.00
Bill clerk	40.00
Delivery clerk	65.00
Utility clerk	70.00
Abstract clerk	41.94
Day foreman at 24 cents per hour	72.72
Night foreman at 22½ cents per hour	71.55
One freight handler at 22½ cents per hour	66.45
Six freight handlers at 20 cents per hour	339.80
Total	$1,057.46

TABLE II—FREIGHT-HOUSE DATA OF NORFOLK & WESTERN RAILWAY AT COLUMBUS, OHIO

	Cents per Ton
Operating cost, March, 1918	32.1
Outbound Freight House:	
Receiving	1.5
Trucking	26.7
Delivery (loading check clerks)	4.6
Stowing	3.1
Supervision Miscellaneous } Overhead	0.9
Total cost	36.8
Inbound Freight House:	
Receiving (unloading check clerks)	4.8
Trucking	12.5
Delivery (connecting line traffic and city)	4.3
Stowing (outbound trip cars)	1.3
Supervision Miscellaneous }	0.9
Total cost	23.8

GENERAL DATA ON FREIGHT HOUSES USED

	*Outbound	*Inbound
Actual length (feet)	480	300
Width (feet)	47	36
Length used (feet)	450	280
Number of house tracks	3	2
Number of team tracks	3	7
Width of driveway (feet)	30	25
Driveway frontage (feet)	800	700
†Cars per day (average)	52	45
†Cars per month (average)	1,300	1,125
†Cars per year	15,600	13,500

* Separate inbound and outbound stations, located one city block apart.
† Includes team-track cars.

L. C. L. MERCHANDISE CARS PER YEAR:

	1913	1914	1915	1916	1917
January	1,379	1,311	1,142	1,370	1,630
February	1,367	1,387	1,192	1,431	1,470
March	1,680	1,497	1,496	1,722	1,823
April	1,347	1,545	1,470	1,598	1,792
May	1,598	1,437	1,444	1,667	1,821
June	1,544	1,474	1,457	1,623	1,779
July	1,490	1,476	1,423	1,601	1,624
August	1,489	1,547	1,465	1,698	1,617
September	1,605	1,574	1,575	1,776	1,595
October	1,785	1,499	1,656	1,845	1,802
November	1,382	1,391	1,623	1,810	1,633
December	1,305	1,226	1,568	1,729	1,312

	Inbound	Outbound
L.c.l. car-standing capacity at freight warehouses	15	48
Ratio of cars per day to car capacity (per cent)	167	100
Driveway frontage per car capacity	37	10
Platform (floor) area (square feet)	10,080	19,000
Platform (floor) area per car capacity	272	396
Trucking distance from receiving door to car and return (feet)	40	100

NOTE—Approximately 80 per cent of l.c.l. tonnage handled is in transfer to or from connecting line stations.

Value of land per square foot (estimate in cents)	80	.....

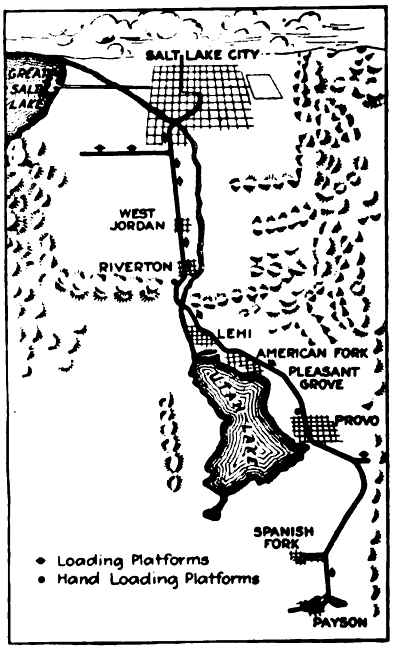
Scales:

Type and Make	Number	Individual Capacity
Fairbanks, warehouse	5	10,000 lb.
Fairbanks, wagon	1	20,000 lb.
Kron, automatic dial	1	2,500 lb.
Toledo, automatic dial	1	2,500 lb.

Trucks:

Type and Make	Number
Reynolds four-wheel, hand	8
Wooden two-wheel, hand	54

Elevators: None



LOADING STATIONS FOR SUGAR BEET FACTORIES ON THE SALT LAKE & UTAH RAILWAY

having a two-story office end with basement. The roof is tar and gravel composition, laid on steel trestles and purlins. The foundation is of concrete and for part of the way is carried down 20 ft. to bed-rock. On the team side of the building there are five sliding steel doors, of sufficient width to accommodate two teams. The track side is composed entirely of rolling steel doors, eighteen in all. These doors are so arranged that it is possible to run in a string of empty cars to the house track without "spotting" them, so that the car and freight house doors will be exactly opposite, a procedure which is not always easy or convenient. By this arrangement the freight house can be opened up to a car wherever it may be on the track.

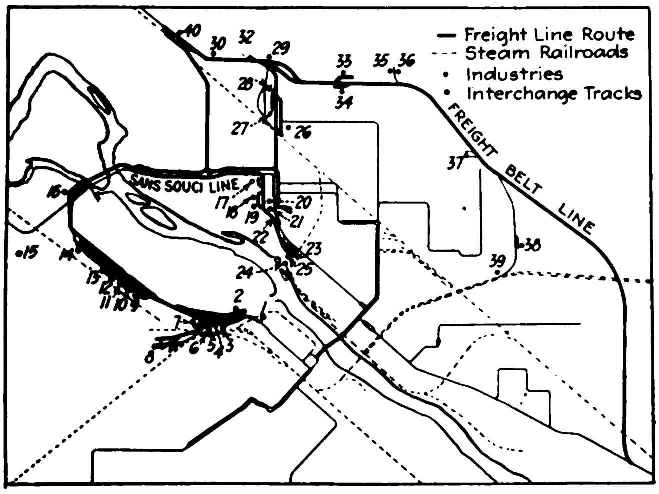
On the team side, there is a wide, wooden canopy covered with Barret specification roofing and fastened by heavy rods to the building columns. On each side of the building above the doors extends a row of windows, so that the interior is excellently lighted. Two Fairbanks dial scales of 4-ton capacity each and with a hard maple floor are used.

For taking care of its large amount of perishable freight the company has built in one corner of the freight house an insulated storage room about 17 ft. square. The walls of this compartment, which are 10 ft. high, are made from 19 in. of plain brick and 4 in. of cork with a cement plaster lining on the inside.

The two-story portion, which is trimmed in cut limestone, houses a freight office on the first floor, and on the second, offices for the line superintendent and roadmaster and despatcher. The floors in this part are of reinforced concrete. In the basement are located the boiler room, the coal storage and the fireproof vault (15 ft. x 20 ft.) The heating plant consists of a tubular boiler of sufficient capacity to heat the offices, the warming room and five standard road cars in the yard. Three tracks extend into the freight yard. Five cars can be "spotted" at the freight house per track; or by trucking through the cars, fifteen cars can be loaded at one time.

FREIGHT HOUSE OPERATING DATA

So much for the physical side of freight-handling facilities; let the attention now be turned to their accounting aspects. What does it cost to operate freight houses? This is a subject upon which every prospective freight-carrying line should put serious study.



INTERCHANGES, INDUSTRIES AND STEAM RAILROADS ALONG CEDAR VALLEY BELT LINE IN WATERLOO
(See table at right for numbered key to industries)

KEY TO INDUSTRIES ON WATERLOO BELT LINE

1—Cream separator plant
2—Gasoline engine plant
3—Wholesale oil
4—Furnace manufacturing plant
5—Ford assembling plant
6—C. R. I. & P. Ry. interchange
7—Chicago & Gt. Western interchange
8—W. C. F. & N. Ry. power station
9—Tractor plant
10—Meat packing plant
11—Agricultural plant
12—Foundry
13—Machine shop
14—Seed house
15—Motor truck plant
16—Dairy cattle congress
17—Bedding manufacturing plant
18—Warehouse
19—Chemical works
20—Structural steel plant
21—Fabrication plant
22—Coal yard
23—Manufacturing plant
24—Waterloo lighting station
25—Farm wagon plant
26—Illinois Central interchange
27—Farm wagon plant
28—Foundry
29—Junk yard
30—Stock yards
32—Paving manufacturing plant
33—Wholesale oil plant
34—Tank and silo plant
35—, 36— } Engine tractor plants
37—Farm tools manufacturing plant
38—Asphalt paving plant
39—Chicago & Gt. Western interchange
40—Stone crusher

In general, in order to arrive at the operating costs of a freight house, it is necessary to consider the following items: receiving, trucking, stowing, delivery, supervision and miscellaneous. These last two items are called over-head. Moreover, consideration must be given to certain facilities of paramount importance which should be provided in sufficient capacity to handle the business offered. These are: platform area, platform furnished for teams, car standing capacity (including suitable lead or approach tracks) and team driveways.

Investment per car capacity varies considerably with the locality of the freight house, ranging from $4000 to $42,000 for single-level freight houses where the land runs from $1 to $20 per square foot. In freight houses of the one-level type, there is usually an allowance of 2000 sq.ft. per car. In the case of the double-deck freight houses, the cost is found to vary from $5,000 to $24,000 per car capacity where the land ranges in value

TABLE III—FREIGHT HOUSE DATA FOR CHICAGO, ROCK ISLAND & PACIFIC RAILWAY AT FORT WORTH, TEX.

	Cents per Ton
Operating cost†	3889
Receiving	2.43
Trucking	17.04
Delivery	*
Stowing	4.02
Supervision	3.59
Miscellaneous (overhead)	6.52
Callers	3.90
Sealer	1.39
Total cost	38.89

† Inbound and outbound freight in one house.
* Included under "Receiving."

GENERAL DATA ON FREIGHT HOUSES USED

Actual length (feet)	245
Width (feet)	30
Length used (feet)	245
Number of house tracks	5
Width of driveway (feet)	35
Driveway frontage (feet)	500
Tonnage per month	2,907
Cars per day (average)	10
Cars per month (average)	362
Cars per year (average for past five years)	4,444

CARS PER YEAR

	1913	1914	1915	1916	1917
January	559	581	339	354	297
February	464	503	339	348	273
March	496	554	365	340	314
April	530	463	338	304	247
May	527	405	315	333	203
June	492	376	308	303	207
July	425	448	319	301	207
August	493	351	314	309	197
September	493	378	298	273	174
October	564	413	300	295	202
November	527	378	322	283	199
December	577	415	348	270	223

Car-standing capacity, including suitable lead and approach tracks	64
Driveway frontage per car apacity	14
Platform (floor) area (square feet)	17,650
Maximum trucking distance from receiving door to car and return (feet)	614

Scales:

Type and Make	Number
Dormant Fairbanks	3
Portable Fairbanks	1

Trucks:

Type and Make	Number
Hercules two-wheel (steel)	24
Reynolds four-wheel (wood)	5
Reynolds two-wheel (wood)	8
American two-wheel (steel)	31

Other power labor-saving devices: three dollies, two lifts.
Elevators: • None.

TABLE IV—DATA FOR LOS ANGELES FREIGHT HOUSE OF PACIFIC ELECTRIC RAILWAY

OPERATING COST

Outbound and Inbound Freight Houses:	Cents per Ton
Receiving Trucking Delivery Stowing	Cost of handling not segregated. Average cost of both inbound and outbound 52 cents per ton. *52
Supervision Miscellaneous } overhead	3
Total cost	55

* Cost of handling not segregated. Average cost for both inbound and outbound is as stated.

GENERAL DATA ON FREIGHT HOUSES USED

	1918	
	Inbound	Outbound
Actual length (feet)	350	580
Width (feet)	55	55
Length used (feet)	350	580
Number of house tracks	2	3
Number of team tracks	3	1
Width of driveway (feet)	56	56
Driveway frontage (feet)	28	28
Tonnage per month	.....	*12,600
Cars per day (average)	22	32
Cars per month (average)	600	800
Cars per year	7,200	9,600

* For both inbound and outbound houses.

CARS PER YEAR

	1913	1914	1915	1916	1917
January	950	960	950	970	980
February	870	900	910	900	920
March	960	980	990	985	990
April	940	965	970	975	980
May	890	900	900	910	925
June	900	945	950	955	960
July	940	960	975	980	990
August	955	970	980	985	1000
September	930	960	965	970	1050
October	975	990	995	990	1060
November	980	980	985	990	1050
December	1000	990	1000	1010	1100

Car-standing capacity, including suitable lead and approach tracks	81
Ratio of cars per day to car capacity (per cent)	70
Platform (floor) area (square feet)	47,850
Platform (floor) area per car capacity	590
Trucking distance from receiving door to car and return (feet)	280

Value of land per square foot. Land in this vicinity has recently been appraised at $3.10 per square foot.

Scales:

Type and Make	Capacity
Fairbanks Platform, No. 12	2 tons
Fairbanks Wagon, No. 1	20 tons

Trucks:
Type and Make, Two-Wheel
Hand Trucks, 300
Four-Wheel
Dollies, 5.
Elevators: None.

TABLE V—INBOUND TONNAGE AND COST OF HANDLING AT ST. LOUIS FREIGHT HOUSE OF M. K. & T. RY. ON MARCH 30, 1918

No.	Occupation	Days	Hours	Rate	Amount
1	Verification	1	0	$75 00	$2 88
0	Receiving and loading clerks	0	0	.00	00
5	Unloading and transfer clerks	4	5	75 00	12.96
0	Routing clerks	0	0	00	00
5	Delivery clerks	5	0	75 00	14.40
5	Delivery clerks	5	0	70.00	13.45
16	Total	15	5	....	$43.69
	Handling:				
0	General foreman	0	....	....	00
1	1st ass't foreman	1	....	$85 00	$3.26
1	2nd ass't foreman	1	....	80.00	3.07
10	Pickers		100	.235	23.50
0	Stowers		0	......	00
32	Truckers		320	.22½	72.00
1	Coopers		10	.24½	2.45
	Current		...	.01½	4.11
45	Total	2	430	....	$108.39
61	Grand total	...	....	....	$152.08

		Pounds
Inbound cars (M. K. & T.)	7	111,973
Cooler cars	0	0
Inbound cars (T. St. L. & W)	20	435,426
Total	27	547,399
Average per car transferred	0	20,026
Inbound shipments delivered	97	(M. K. & T.)
	270	(T. St. L. & W.)
Reported for work	7	(a.m.)
Hours relieved	6	(p.m.)
Hours on duty	10	....

Total tons handled inbound, 274. Inbound cost of handling per ton (cents), 55.50.

TABLE VI—OUTBOUND TONNAGE AND COST OF HANDLING AT ST. LOUIS FREIGHT HOUSE OF M. K. & T. RY. ON MARCH 30, 1918

No.	Occupation	Days	Hours	Rate	Amount
0	Verification	0	0	$75 00	$0.00
6	Receiving and loading clerks	6	0	75 00	17 28
3	Unloading abd transfer clerks	2	5	75 00	7.76
1	Routing clerks	1	0	75 00	2 88
1	Car sealer	1	0	60 00	2 30
4	Delivery clerks	4	0	70.00	10 76
15	Total	14	5	......	$40 98
	Handling:				
1	General foreman	1	0	$115.00	$4.42
0	1st ass't foreman	0	0	....	00
0	2nd ass't foreman	0	0	....	00
9	Pickers		90	.23½	21.15
5	Stowers		50	.24½	12.25
34	Truckers		335	.22½	75.37
1	Coopers		10	.24½	2.45
50	Total	1	485	....	$115.64
65	Grand total	...	....	....	$156.62

		Pounds
Outbound cars (T. St. L. & W.)	6	116,600
Outbound cars (M. K. & T.)	34	769,785
Cooler cars	0	0
Inbound cars	0	0
Total	40	886,385
Average per car	..	22,640
Cars transferred	10	....
Cars delivered in yard	1	(M. K. & T.)
	5	(T. St. L. & W.)
Cars loaded in yards	2	(M. K. & T.)
	2	(T. St. L. & W.)
Reported for work	7	(a.m.)
Hours relieved	6	(p.m.)
Hours on duty	10	....

Total tons handled outbound	443	Cost	$156 62	Outbound cost of handling per ton (cents)	35.35
Total tons handled inbound	274	Cost	152.08	Inbound cost of handling per ton (cents)	55.50
Total tons handled	717	Cost	$308 70	Combined cost of handling per ton (cents)	43.05

TABLE VII—INBOUND TONNAGE AND COST OF HANDLING AT ST. LOUIS FREIGHT HOUSE OF M. K. & T. RY. ON OCT. 9, 1916

No.	Occupation	Days	Hours	Rate	Amount
1	Verification	1	0	$70 00	$2.69
0	Receiving and loading clerks	0	0	....	00
3	Unloading and transfer clerks	3	....	65.00	7.50
0	Routing clerks	0	0	....	00
1	Delivery clerks	1	0	65 00	2 50
2	Delivery clerks	2	0	70 00	5.38
7	Total	7	....	....	$18.07
	Handling:				
0	General foreman	0	....	....	00
1	1st ass't foreman	1	....	$85.00	$3.27
0	2nd ass't foreman	0	....	....	00
11	Pickers		100½	.20	20.10
0	Stowers		0	....	00
20	Truckers		194½	.19	36 95
0	Coopers		0	....	00
0	Current		....	....	2.83
0	Electrician	...	....	....	....
32	Total	1	295	....	$63.15
39	Grand total	...	....	....	$81.22

		Pounds
Inbound cars (M. K. & T.)	4	40,193
Cooler cars	0	
Inbound cars (T. St. L. & W.)	25	338,154
Total	29	378,347
Cars transferred	0	....
Inbound shipments delivered	140	((M. K. & T.)
	452	(T. St. L. & W.)
Cars delivered in yard	592	....
Reported for work	7	(a.m.)
Hours relieved.	6	(p. m.)
Hours on duty	10	....

Total tons handled inbound, 189. Inbound cost of handling per ton (cents), 42.97.

TABLE VIII—OUTBOUND TONNAGE AND COST OF HANDLING AT ST. LOUIS FREIGHT HOUSE OF M. K. & T. RY. ON OCT. 9, 1916

No.	Occupation	Days	Hours	Rate	Amount
0	Verification	0	0	$0.00	$0.00
7	Receiving and loading clerks	7	0	70.00	21.52
5	Unloading and transfer clerks	5	0	65.00	12.50
1	Routing clerks	1	0	70.00	2.69
1	Car sealer	1	0	55.00	2.11
0	Delivery clerks	0	0	....	00
14	Total	14	0	....	$38.82
	Handling:				
1	General foreman	1	....	$115.00	$4.42
0	1st ass't foreman	0	....	....	00
0	2nd ass't foreman	0	....	....	00
10	Pickers		100	20.00	20.00
8	Stowers		80	21.00	16.80
36	Truckers		360	19.00	68.40
1	Coopers		10	21.00	2.10
56	Total	1	550	....	$101.72
70	Grand total		....	....	$140.54

		Pounds
Outbound (T. St. L. & W.)	5	25,857
Outbound (M. K. & T.)	47	794,240
Cooler	1	6,470
Inbound	0	0
Total	53	826,567
Cars transferred	11	
Cars delivered in yard	1	(M. K. & T.)
	6	(T. St. L. & W.)
Cars loaded in yards	1	(M. K. & T.)
	0	(T. St. L. & W.)
Reported for work	7	(a.m.)
Hours relieved	6	(p.m.)
Hours on duty	10	....

Total tons handled outbound	413	Cost	$140.54	Outbound cost of handling per ton (cents)	34.02
Total tons handled inbound	189	Cost	81.22	Inbound cost of handling per ton (cents)	42.97
Total tons handled	602	Cost	$221.76	Combined cost of handling per ton (cents)	36.83

from $1 to $20 per square foot. This is based on a floor area of 1000 sq.ft. per car.

Data covering the freight house of the New York Central Lines located at Columbus, Ohio, show an average operating cost of 38.6 cents per ton. From this freight house about 900 cars per month are handled. To give a general idea of the cost of service in additional existing freight houses, a number of interesting operating costs are herewith presented to assist electric railway men to determine the probable cost of operation of their freight terminals.

Table I shows the cost data for handling freight at the Columbus freight house of the Ohio Electric Railway. The tonnage includes the freight forwarded and received, local and interline, but does not include the transfer freight handled in local cars for other divisions. There are no figures available on just what this amounts to, although at one time a record was kept at the Dayton freight house, which is a large transfer point, and it was found that the transfer-freight cost was about one-third of the total freight-handling expense. In the case of the Columbus freight house it would not be so large.

The cost of handling freight on the Ohio Electric Railway varies from 11 cents to 25 cents per 1000 lb., or about 22 cents to 50 cents per ton. This variation is due to physical conditions at the freight house, which sometimes do not permit as much direct loading from wagons into the cars as desired.

It is the policy of the company that rather than spend a large amount of money to enlarge freight houses to take care of increased business, it is better and cheaper, from not only the investment standpoint but also the operating standpoint, to build team tracks to permit the loading of freight direct from the wagons and tracks into the cars. There are a number of advantages in direct loading, for the receiving clerk checks the freight into the car and notes the car number on the bill of lad-

TABLE IX—COST OF HANDLING ALL KINDS OF FREIGHT AT PRINCIPAL STATIONS OF THE GULF, COLORADO & SANTA FE RAILWAY

					Total Cost Freight Handling, L. C. L.								Distance in Feet Freight Is Handled			
					Trucking Force				Clerical Force (Supervision)							
Station	Month	Tons Handled	Total Payroll	Cost per Ton	Avg. No. Men per Day	Total Pay-roll	Cost per Ton	Tons per Man per Day	Avg. No. Men per Day	Total Pay-roll	Cost per Ton	Tons per Man per Day	Longest	Shortest	Average	Kind
Houston	Jan. 16	5,469	$1,268.16	23.2	13.5	$571.83	10.5	15.6	9	$696.33	12.7	23.4	1,140	70	80	All
	Feb. 16	5,882	1,289.50	21.9	14	589.50	10	16.8	9	700.00	11.9	26.1				
	Mar. 16	6,793	1,338.28	19.7	15	638.28	9.4	16.7	9	700.00	10.3	27.9				
	April 16	5,837	1,325.16	22.7	14.5	625.16	10.7	16.1	9	700.00	12	25.9				
	Total	23,981	5,221.10	...	57	2,424.77	....	....	36	2,796.33						
	Average	5,995	1,305.27	21.8	14.3	606.19	10.1	16.3	9	699.08	11.7	25.9				
Dallas	Jan. 16	5,213	$2,209.41	42.4	32	$1,586.41	30.4	6.3	9	$623.00	12	22.3	495	25	260	All
	Feb. 16	5,594	2,369.01	42.3	35	1,746.01	31.1	6.4	9	623.00	11.2	24.9				
	Mar. 16	6,402	2,409.76	37.6	35.5	1,745.47	27.2	6.7	9.5	664.29	10.4	25				
	April 16	5,755	2,570.43	44.7	38	1,870.11	32.5	6.1	10	700.32	12.2	23				
	Total	22,964	9,558.61	..	140.5	6,948.00		..	37.5	2,610.61		...				
	Average	5,741	2,389.65	41.6	35.1	1,737.00	30.3	6.4	9.3	652.65	11.3	23.9				
Temple	Jan. 16	5,395	$1,920.00	35.6	25	$1,422.00	26.4	8.3	7	$498.00	9.2	29.6	800	50	250	All
	Feb. 16	5,144	1,914.78	37.2	26.8	1,416.78	27.5	7.7	7	498.00	9.7	29.4				
	Mar. 16	5,923	2,218.31	37.5	30.5	1,720.31	29.1	7.2	7	498.00	8.4	31.3				
	April 16	5,232	2,010.06	38.4	27.7	1,512.06	28.9	7.6	7	498.00	9.5	29.8				
	Total	21,694	8,063.15	..	110	6,071.15	....	..	28	1,992.00		..				
	Average	5,423	2,015.79	37.2	27.5	1,617.79	28	7.7	7	498.00	9.2	30.1				
Ft. Worth	Jan. 16	2,856	$932.57	32.6	14.7	$694.57	24.3	7.5	3	$238.00	8.3	36.6	470	50	200	All
	Feb. 16	2,855	882.39	30.9	14.7	641.89	22.5	7.8	3	240.50	8.4	38.1				
	Mar. 16	3,436	895.11	26.1	14.5	654.61	19.1	8.8	3	240.50	7	42.4				
	April 16	3,424	905.84	26.4	14.8	665.34	19.4	9.3	3	240.50	7	45.7				
	Total	12,571	3,615.91		58.7	2,656.41	....	....	12	969.50	..	..				
	Average	3,145	903.98	28.7	14.7	664.10	21.1	8.3	3	239.87	7.6	40.6				
Galveston	Jan. 16	1,758	$543.02	30.9	10	$378.02	21.5	6.8	2	$165.00	9.4	33.8	417	20	250	All
	Feb. 16	2,233	550.65	24.7	11	385.65	17.3	8.1	2	165.00	7.4	44.6				
	Mar. 16	2,696	611.46	22.7	11	446.46	16.6	9.1	2	165.00	6.1	49.9				
	April 16	2,040	544.06	26.7	9	379.06	18.6	9.1	2	165.00	8.1	40.8				
	Total	8,727	2,249.19	...	41	1,589.19		.	8	660.00	.	...				
	Average	2,182	562.29	25.7	10.3	397.29	18.2	8.2	2	165.00	7.5	42.3				
Cleburne	Jan. 16	2,254	$539.00	23.9	7	$303.00	13.4	12.4	3	$236.00	10.5	28.9	495	25	260	All
	Feb. 16	2,207	538.25	24.4	7	302.25	13.7	12.6	3	236.00	10.7	29.4				
	Mar. 16	2,256	559.25	24.8	7.1	323.25	14.3	11.8	3	236.00	10.5	27.8				
	April 16	2,298	528.50	23	6.5	292.50	12.7	14.1	3	236.00	10.3	30.6				
	Total	9,015	2,165.00	...	27.6	1,221.00			12	944.00	...	...				
	Average	2,253	541.25	24	6.9	305.25	13.5	12.7	3	236.00	10.5	29.2				
Beaumont	Jan. 16	2,160	$586.00	27.1	8	$380.00	17.6	10.4	3	$206.00	9.5	27.7	440	40	200	All
	Feb. 16	2,203	607.00	27.6	8	401.00	18.2	11	3	206.00	9.4	29.4				
	Mar. 16	2,380	614.25	25.8	8	408.25	17.2	11	3	206.00	8.6	29.4				
	April 16	2,192	593.10	27.1	8	387.10	17.7	11	3	206.00	9.4	29.2				
	Total	8,935	2,400.35		32	1,576.35	....	.	12	824.00	.					
	Average	2,233	600.09	26.8	8	394.09	17.6	10.8	3	206.00	9.2	28.9				
Gainesville	Jan. 16	854	$256.00	30	4	$176.00	20.6	8.2	1	$80.00	9.4	32.8	450	50	200	All
	Feb. 16	917	257.52	28.1	4	177.52	19.4	9.2	1	803.00	8.7	36.7				
	Mar. 16	900	249.60	27.7	4	169.60	18.8	8.3	1	80.00	8.9	33.3				
	April 16	881	256.00	29.1	4	176.00	20	8.8	1	80.00	9.1	35.2				
	Total	3,552	1,019.12	....	16	699.12	....	.	4	320.00	....	....				
	Average	888	254.78	28.6	4	174.78	19.6	8.6	1	80.00	9	34.5				

RECAPITULATION OF AVERAGES

Station	Tons Handled	Total Payroll	Cost per Ton	Avg. No. Men per Day	Total Pay-roll	Cost per Ton	Tons per Man per Day	Avg. No. Men per Day	Total Pay-roll	Cost per Ton	Tons per Man per Day	Longest	Shortest	Average	Kind
Houston	5,995	$1,305.27	21.8	14.3	$606.19	10.1	16.3	9	$699.08	11.7	25.9	1,140	70	80	All
Dallas	5,741	2,389.65	41.6	35.1	1,737.00	30.3	6.4	9.3	652.65	11.3	23.9	495	25	260	All
Temple	5,423	2,015.79	37.2	27.5	1,517.79	28	7.7	7	498.00	9.2	30.1	800	50	250	All
Fort Worth	3,143	903.98	28.7	14.7	664.10	21.1	8.3	3	239.87	7.6	40.6	470	50	200	All
Galveston	2,182	562.29	25.7	10.3	397.29	18.2	8.2	2	165.00	7.5	42.3	417	20	250	All
Cleburne	2,253	541.25	24	6.9	305.25	13.5	12.7	3	236.00	10.5	29.2	495	25	260	All
Beaumont	2,233	600.09	26.8	8	394.09	17.6	10.8	3	206.00	9.2	28.9	440	40	200	All
Gainesville	888	254.78	28.6	4	174.78	19.6	8.6	1	80.00	9	34.5	450	50	200	All

ing. It is almost impossible to load the goods into the wrong car; the whole shipment moves in the same car; there is less handling of freight; there is no trucking expense in the freight house, thus permitting more room for the handling of inbound freight, and there is less liability from claims arising from extra handling or goods lying around the freight house.

At the large freight houses, such as those at Dayton, Springfield, Columbus, Lima and Toledo, the freight forces work twenty-four hours a day. This has been found to be very advantageous, as the night men transfer the freight from the cars into the house. Thus the freight is ready for delivery as soon as the house is opened in the morning. This same force also loads up as much freight as possible so that when the day force arrives the house is cleaned up and ready for the day's business.

The costs of operating two steam-railroad freight houses, one belonging to the Norfolk & Western Railway at Columbus, Ohio, and one to the Chicago, Rock Island & Pacific Railway at Fort Worth, Tex., are shown in Table II and Table III. Table IV gives operating data on the Los Angeles freight house of the Pacific Electric Railway. A study of these data may be of particular interest to electric railway men who are interested in the electric railway freight-house operating costs.

As a matter of special interest, data on the Broadway double-deck freight house operated by the Missouri, Kansas & Texas Railway, St. Louis, Mo., are shown in Tables V, VI, VII and VIII. In these tables it will be noted that the inbound and outbound costs are separated, but a combined cost is figured on the outbound sheets. The amount was 43.05 cents per ton on March 30, 1918. The office clerical force is not included in arriving at the cost per ton, but the laborers for loading and unloading the transfer clerks, the general foremen and the assistant foremen are included. Moreover, 1½ cent per ton is included on the inbound cost for current consumed by the elevators.

From Table VIII it will be noted that this road on Oct. 9, 1916, handled, inbound and outbound, 1,204,000 lb. of package merchandise. On this date they delivered to the drays from the inbound platform 592 inbound shipments, representing 285,200 lb. On the same day, 137 drays loaded from the inbound platform, the average tonnage for each dray being 2080 lb. There were 82 cars loaded and unloaded, the average tonnage per car being 14,681 lb., inbound and outbound. On that day fifty-six truckers worked, averaging per warehouse truck load 254 lb. The total tonnage handled by each trucker was 21,800 lb., and a close estimate of the number of packages handled was 16,200.

One particular advantage of this double-deck type of freight house is that the inbound storage platforms run across the building instead of lengthwise. An elevator is located on each of the inbound platforms, which are separated by 40-ft. driveways. Freight can be handled in double-deck freight houses economically providing the house is properly laid out, and the elevators so located as to be able to take care of the unit moves.

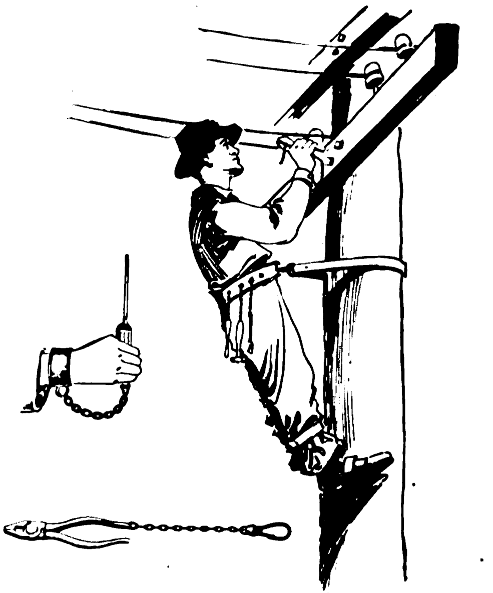
Many engineers have laid great stress on the cost of trucking freight. They seem, however, to have been laboring under the impression that if the trucking is reduced, the cost per ton is decreased, but this is not the case. By working out the platform sheets, it will be noted that the percentage of trucking does not enter into the proposition. The layout of the freight house and supervision are what controls the cost of handling of package freight.

The elevators in the Broadway Station of the Missouri, Kansas & Texas Railway are 14 ft. 8 in. long in the clear, and 8 ft. 7 in. wide in the clear, and they operate at a speed of 75 feet per minute. Each elevator handles an average of fifteen loads per hour, averaging 30,000 lb. per elevator per hour. When operated at their full capacity, they handle on an average of 300,000 lb. per day.

Table IX shows the cost of handling freight in the principal stations of the Gulf, Colorado & Santa Fé Ry. The study was made for the purpose of determining the proper balance between mental and manual labor in freight handling. These data may be of particular interest in showing how steam railroads endeavor to arrive at a definite cost of operating different stations on their lines.

Preventing the Dropping of Linemen's Tools

In line with the "safety first" movement in all branches of industry the following method of securing linemen's tools has proved very successful. To avoid the accidental dropping of such tools which may result in injury to the passer-by as well as prove a source of inconvenience to the workmen each tool is fastened to the belt by means of small chain with a snap catch. To eliminate the danger of causing short-circuits to live wires these chains should not exceed 5 in. in length. A band with a ring is buckled round the wrist of the linemen and while using any particular tool this is unsnapped from the belt and fastened to the wrist band. The short length of chain gives sufficient freedom for carrying out the work and there is no danger of the tool being dropped to the ground.


"SAFETY FIRST" ATTACHMENTS FOR LINEMAN'S TOOLS

Papers Read at I. E. R. A. Chicago Meeting

At Annual Meeting Illinois Association Shows Vital Interest in Regulation, Safety and Freight and Express Transportation

AT THE MEETING of the Illinois Electric Railways Association, held in Chicago on Jan. 17, papers were presented by H. B. Adams, safety supervisor Aurora, Elgin & Chicago Railroad; Hon. Carl D. Jackson, chairman Wisconsin Railroad Commission, and Charles A. Laney, traffic manager Northern Ohio Traction & Light Company. R. N. Hemming, superintendent of transportation Fort Wayne & Northern Indiana Traction Company, repeated the allegory of the "Grim Reaper" and followed with an address on the subject of the conservation of humanity. H. A. Johnson also sent a brief paper on mechanical developments of the industry. The discussion at the meeting was digested in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 25, page 179. This included the additions made by Mr. Laney to the text of his paper as printed in the issue for Nov. 30, 1918. The same is true with regard to Mr. Henning's address. Abstracts of the papers by Messrs. Johnson, Jackson and Adams follow.

Mechanical Developments of the Industry*

Developments in the Mechanical Engineering Division Include the Increased Use of One-Man Cars and Power Checking Device

BY H. A. JOHNSON

Master Mechanic Chicago Elevated Railways

IN LOOKING over the progress made in the mechanical engineering division of the electric railway industry during the past year it seems to me that the chief items of interest may be grouped under four general headings as follows: (1) Continued experimentation on the types of car bodies with reference to the exit and entrance of passengers and methods of fare collection; (2) the extended use of the one-man car (3) power checking devices and (4) the Electric Railway War Board "standardized" car.

1. Various combinations and locations of doors are now being used, such as, (a) entrance at the rear—exit at the front; (b) both entrance and exit at the center of the car; (c) both entrance and exit at the front of the car, and (d) entrance at the front and exit at the center of the car. As to methods of fare collection there is the prepayment plan where the passenger pays either on the rear platform or at the front of the car at time of entrance, and the 'pay-pass" system in which the conductor is located at the center door of the car, which in this case is used as an exit. Passengers remaining in the front part of the car pay their fare as they pass the conductor when leaving the car, while those who go into the rear half of the car pay the conductor upon passing to the rear section and then exit directly from the rear at the center exit door.

2. During the last year the use of the one-man car has been widely extended and this method of operation is being applied to larger cars. The small one-man safety cars are being placed in operation in larger cities than ever before. The American Electric Railway Association War Board submitted a brief on one-man cars after studying their operation in the following cities: Columbus, Ga.; population 21,000; Tampa, Fla., population 37,000; Beaumont, Tex., population, 50,000; Houston, Tex., population 120,000; Fort Worth, Tex., population with soldiers 100,000; El Paso, Tex., population with soldiers 100,000; Tacoma, Wash., population 100,000; Seattle, Wash., population 400,000; Everett, Wash., population 25,000, and Bellingham, Wash., population 37,000.

The War Board summarized the information gained in its study as follows: First, the one-man safety car is applicable to a wide range of electric railway conditions; second, safety cars of new construction permit enormous savings in fuel; third, all safety cars permit greatly increased service to the public while still permitting a large reduction in platform personnel; fourth, the safety car, because of the use of automatic devices, can be operated at a higher schedule speed by one man than an older style car can be operated by two men; fifth, the safety car fully justifies its name as a preventer of accidents through the inter-operation of control, brakes, doors, steps, sander and emergency brake; sixth, only the economies in operation and improvements in service made possible by the safety car have made it financially practicable to maintain railway service in small cities where short headways are a necessity and in larger cities where the shortage of labor has seriously impaired the ability to give adequate service even with but one man per car, as at Seattle and Tacoma; seventh, the safety car is preferred by the men themselves because it eliminates all manual labor and avoids division of responsibility with a second platform man; eighth, the safety car promotes better public relations in demonstrating the good-will of the railway, thereby paving the way for a solution of the local utility problems.

3. Since the United States entered the war and since the unfavorable experience of last winter in connection with the coal situation, the Fuel Administration and the Electric Railway War Board have advocated economy to reduce the amount of fuel necessary to operate the electric railways. This has caused many companies to install some device for measuring or checking the amount of energy used by motormen for the operation of cars or trains. Although these devices were being installed by a considerable number of companies before the war, the last year has given an added impetus to this movement and in checking up the various installations it seems that, practically without exception, the devices are producing good results. I believe that shortly every electrically operated car will be equipped with some kind of a power-checking device.

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*Abstract of a paper prepared for delivery before the Illinois Electric Railways Association in Chicago on Jan. 17, but not read because of the absence of the author.

4. The development and sale of the one-man safety car during the last four years was one of the first long steps toward a uniform electric railway car. It was found that these one-man safety cars could be built on a stock order by the car builders and later sold to various railway companies. The idea of a "standardized" car has been further worked out by the American Electric Railway Association War Board in co-operation with the United States Bureau of Industrial Housing and Transportation, following a request for designs and specifications from Otto M. Eidlitz, director of the bureau. The problem was to design one or two uniform cars which could be ordered from the car builders by the government in comparatively large quantities and be placed in any part of the country to meet the requirements of the local railway system. This would reduce the cost of cars especially to those companies ordering in small quantities. Keeping these cars in stock would enable the local railway company to obtain prompt relief and save the time necessary to build cars to its specifications.

As the designs and specifications were completed just prior to the signing of the armistice, we did not have a good opportunity to try out the operation of these cars in various parts of the country, but the fact that a car upon which a committee could agree could be designed is certainly a great step in advance in the electric railway field and points toward interesting and valuable development in the future.

Public Utility Regulations*

Commissions Have Justified Their Existence During War Period—Municipal Ownership Not Ultimate Solution of Present Problem

By Hon. Carl D. Jackson
Chairman, Wisconsin Railroad Commission.

PUBLIC utility and railroad acts provide that the rates shall be reasonable, fair and non-discriminatory. They are subject to investigation either on petition of municipalities or consumers, or on the petition of the public utility. The spirit of the laws was one not only of securing just and fair rates to the consumers but of establishing just and fair rates for the public utility. While regulation in its present form unquestionably grew out of the necessity of curbing any unjust exercise of arbitrary power by those engaged in the public utility business, and while it was unquestionably the intent of the legislators that public utility commissions would prevent any such abuse and secure to the consumers fair, reasonable and non-discriminatory rates, a glance at the statutes will also show that the legislators had in mind a fair and square deal to the public utilities and those investors who risk their capital in establishing and developing utility service for the benefit of the public.

Unquestionably there was also the thought that this power of regulating rates should be placed in a body competent to handle the matter fairly and justly to all having an interest in the matter. Such a body could act intelligently only when it understood the problems of manufacture and distribution and had at hand the assistance of experts, both statistical and engineering, capable of furnishing necessary information to those acting upon the subject.

HAVE THE COMMISSIONS JUSTIFIED THEIR EXISTENCE?

During the early history of regulation, the improvement in the generation and distribution of electrical energy often made it possible to bring about lower rates to the consuming public without affecting a fair return to the public utility. However, a severe and wholly unforeseen test of regulation came with the world war. With new labor conditions, world monetary inflation, and greatly increased operating costs in practically all departments, the public utilities faced in a large number of instances throughout the United States emergency conditions demanding relief to prevent bankruptcy and to permit a continuance of public service. Have the commissions as a whole met this test and justified their existence? In answer, I think that it can be said that on the whole the commissions have acted justly, fearlessly and patriotically, and that in years to come the measures taken to meet the entirely changed conditions will redound to the credit of these commissions. Secondly, I am of the opinion that with exceptions here and there, the great body of the consuming public have understood the necessity for the actions taken, have patriotically and fairly accepted and approved of these actions, and that on the whole the public utility commissions still retain the confidence and respect of the public.

I am perfectly aware that in some instances we shall be met by the claim on the part of the public utilities that the action taken by the commissions has not been adequate or has been delayed, or that it has not given the full measure of relief demanded. Perhaps some will deny that the commissions have met the situation as it should have been met. On the other hand, many instances in all the different states can be found where the actions of the commissions have not always been received without adverse and sometimes bitter criticism on the part of some particular community. This is especially so in those instances where relations between the public and the public utility are either subjects of long political struggle or are positively unfriendly.

THE UTILITIES HAVE BORNE THE BURDEN

It has been our experience in Wisconsin that in the vast majority of instances where applications have been filed with the commission for necessary increases in rates such applications have not been filed by the public utilities until they themselves have for some time borne the burden of changed conditions, and very often the relief asked has been of an emergency or temporary nature and often without a demand for a full measure of return. Such attitude on the part of these public utilities, which could and did bear their share of the war burden without asking the full transfer to the consuming public, should be fully recognized and appreciated. Certainly my own experience with the different utilities has convinced me that in the large majority of cases the public utilities are operated by men with the highest sense of patriotism and with a liberal spirit.

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*Abstract of address presented at annual convention of Illinois Electric Railways Association, Chicago, Jan. 17, 1919.

I believe that regulation has on the whole justified itself and that it must and will remain as a permanent public policy. There are many reasons why this should be so. On the one hand, no one acquainted with the temper of the public mind can for a moment conceive that public utilities will be allowed a free hand either in making rates or in establishing practices. The return to the unregulated condition of twenty years ago is not contemplated by the public. Therefore, if our public regulating bodies are not to remain, something must be substituted for them, either public ownership of all public utilities with regulation by the public owning body, or the substitution of regulation through local units for regulation by an expert body. The only substitute for these alternatives is federal regulation of all public utilities throughout the United States, a proposition which I do not think will appeal either to the public utilities or to the thinking citizen.

THE AVERAGE CITIZEN IS UNKNOWINGLY PART OWNER OF THE LOCAL UTILITY

Perhaps during the last year and a half, or two years, regulation would have been more easily acquiesced in by the consuming public where dissatisfaction may have existed, were the public really to think more clearly below the surface of things. The actual ownership of most public utilities is by the people themselves. The first liens on most public utilities are very often owned by trust companies, banks, and largely by insurance companies throughout the United States. Nearly every man carries an insurance policy. The average citizen has a bank account, yet not one citizen out of a hundred realizes that in one form or another his actual savings and insurance and his wife's and children's welfare depend upon the solvency and continued operation of public utilities. There is probably not one man in fifty whom we meet on the street who does not own a part of a public utility, whether he knows it or not. So the questions relating to public utilities are not confined to the consumers on one side and the public utilities as such on the other, but the whole question is one involving financially nine-tenths of the entire population. Furthermore, public utilities should not only be solvent in themselves, but there should still remain a reasonable incentive to reasonable development along the lines to be demanded by future generations. Nothing should take place in this country to discourage individual and collective efforts along progressive lines.

The public utility law in Wisconsin recognizes public ownership of public utilities as a contingency which may be desirable. The public utility law provides the necessary machinery therefor, and some public utilities, mostly water works, have been taken over from time to time and are now municipally owned, and in many instances successfully operated. Up to the present time there has not been a pronounced movement in the direction of general public ownership, nor would it, in my opinion, be a solution of any existing problems. If public ownership shall increase in the future it should be undertaken gradually and only where the municipality is in a position to acquire such public utility and handle it efficiently. In many instances the municipalities are not in a position to take over the large systems though in some instances they act as distributors, buying the power at wholesale rates.

The most pressing and difficult problem now presented in the public utility line is unquestionably in the street railway field, where the conditions cannot be said to be satisfactory either to the public or to the companies. In Wisconsin's smaller cities, the problem has in some instances become acute, and the question is really one of continuing to render public service. In many instances the feeling is growing that direct municipal participation is perhaps advisable and fully justified. Certainly the solution is not in federal control or operation of public utilities, unless it be a mere question of regulation of interstate relations. There is nothing in the present federal control, either of railroads or the telephone companies, which encourages one to believe that the solution of any public utility problems lies in a federal direction. My conclusion, is that the welfare of the utilities, the communities and the state depend upon the continued regulation and control through commissions and that their abolition can mean nothing but loss to investors, general financial unrest, deteriorating service to the public and abandonment of all hope for future progress through individual initiative and enterprise.

If the public could learn the facts in regard to valuation and operating results of utility properties, many of the difficulties of regulation would be eliminated. Take the question of valuation alone. It is not an uncommon thing for experts on one side to differ with experts on the other in the ratio of three to one as to the value of the property, the experts for the utility including all possible elements of valuation or reproduction, while the experts for the municipalities are often equally as far from the truth. These various figures are given publication either in the newspaper or from the stump and the public, which isn't an expert to begin with and hasn't the time or means actually to arrive at the facts, is left in a confused state of mind, and only in so far as it has confidence in the commission's fairness and ability is it able to arrive at anything like the actual truth. We have been hoping in Wisconsin finally to fix upon valuations which shall be stable for the value, subject only to those changes coming from renewals, extensions, etc. If this condition could possibly be brought about and the public utilities would in all instances follow the commission's rulings as to the treatment of new capital, renewals, depreciation funds, etc., a large element of discussion and dispute would be eliminated. The same could follow in the matter of revenues and disbursements.

The Preservation of Humanity*

The Management of an Electric Railway Is Responsible for the Safety of Its Employees and Should Lead in Safety Work

BY HENRY B. ADAMS
Safety Supervisor Aurora, Elgin & Chicago Railroad, Aurora, Ill.

SAFETY work by electric railways has been more or less a feature of operation during several years past, and many companies have reaped benefits commensurate with the effort put forth. At a time like this the analysis of statistics is tiresome, but such analysis is worth while in proving that continual, regular and systematic work brings results in proportion to the unanimity with which the management and the employees co-operate for the prevention of accidents.

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*Abstract of a paper presented at annual convention of Illinois Electric Railway Association, Chicago, Jan. 17, 1919.

Our nation has voluntarily given many of its best citizens and vast amounts of money and materials to make the world safe forever from the power of evil autocracy over the lives and well-being of the people, and when we realize that in connection with our allies this magnificent result has actually been accomplished, our hearts swell with patriotic pride in the knowledge that the co-operation of over 100,000,000 individuals, all doing our full share, was the prime factor in the glorious victory. But the loss of life through so-called accidents in the United States during the period of the war exceeds the deaths in the entire army of the nation for the same time. Now that our thoughts are free from war problems, let us direct our energies to the elimination of the causes which bring so much sorrow and suffering to our fellow citizens.

The management of an electric railway carries a vast responsibility for the safety of its employees and its patrons, and should lead in safety work. It should first do all that is possible to eliminate dangerous physical conditions, and then ask for the co-operation of employees in the work of correcting careless and dangerous practices. The company and its employees should be always ready to take an active part in public safety, and not selfishly confine to their own properties their efforts in saving life and limb. There are many methods of doing safety work, and we are all desirous of showing results.

As he who profits by his own experience does well, he who profits by the experience of others does better, and hence membership in the National Safety Council is advisable in that it furnishes the ideas of safety workers from all over the country. The National Safety Council, the greatest organization in the world for the prevention of accidents, furnishes its membership with weekly bulletins which are forceful and up to date; has a large number of stereopticon slides and moving picture films, and has a library of safety literature of unlimited scope, the use of which is available to members at actual cost. It also furnishes first-class speakers for safety meetings anywhere, without charge beyond actual traveling expenses. The headquarters are in Chicago, where is maintained a corps of competent safety experts always ready to confer with and advise members upon questions of organization and special problems in safety work. There are now 131 electric railways operating nearly 16,000 miles of track who are receiving the benefit of the Council through its electric railway section.

The International Register Company has practically completed the airplane instrument work for the Army and Navy which it had undertaken during the war period and is now prepared, with about double its former facilities, to handle promptly all electric railway orders. A statement in Professor Richey's report on the Boston zone system, recently published in this paper, relating to the crowded condition at this company's shops, was based on a statement made by the company before the armistice was declared and does not apply to present conditions.

Manufacturers' Night Celebrated by New England Street Railway Club

Four hundred and fifty members and guests of the New England Street Railway Club assembled at the Hotel Somerset, Boston, Mass., on Jan. 23, to celebrate Manufacturers' Night, which has become an annual institution in the affairs of the club. The entire evening was devoted to relaxation and from the opening strains of the "Star Spangled Banner" to the close of the vaudeville entertainment which followed the dinner, good-fellowship reigned supreme. Nearly 100 electric railway manufacturing and supply organizations contributed to the success and hospitality of the occasion. William W. Field was general chairman and Charles C. Peirce director of the evening's program, the committee chairmen being: George C. Ewing, hotel; Warren L. Boyer, finance; George Acker, entertainment, and Charles A. Record, program.

Cedarmen Meet at Minneapolis

THE Northern White Cedar Association held its twenty-third annual meeting at Minneapolis, Minn., on Jan. 22, with representatives of twenty-four firms in attendance. In outlining the situation in the white cedar industry President Gerich called attention to the importance of the labor problem in this field, where labor constitutes so large a part of the total expense. He urged that labor unrest and trouble be forestalled by showing the men that increased production and higher wages are partners, and by creating as nearly ideal living and housing conditions as is possible in camp life. He said further that, while dormant recently, the competition from steel and iron fence posts, which have been popularized by means of scientific advertising, is increasing. The association has not done much in the way of post advertising, but the pole advertising has been continued during the past year with good results. The actual consumer has been reached directly, particularly through the trade journals.

Secretary Boucher reported for a number of committees of the association, the work of which had to do with practical matters such as accident compensation, transportation relations, inspection, etc. He stated that considerable dissatisfaction had resulted from the specifications for ties prescribed by the United States Railroad Administration. A meeting of manufacturing tie contractors had been scheduled to be held at an early date to consider the matter. In the discussion of the secretary's report it was stated that the pole situation was not as good as might be wished, the sales for the year being about 50 per cent of the preceding annual rate, while the stocks on hand were probably 75 per cent of the 1917 production. Weather conditions had not been favorable to the business. In this matter the arbitrary position taken by the carriers in the producing territory was causing producers no little concern.

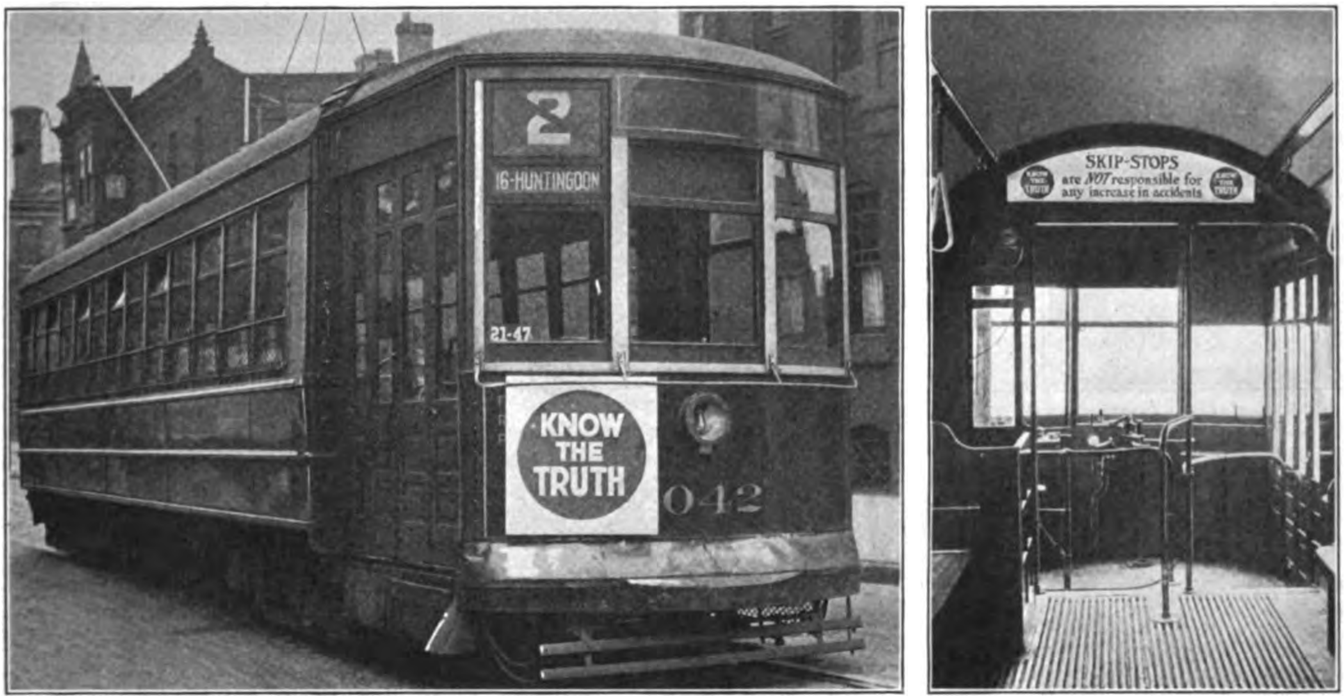
The election of officers resulted in the choice of L. L. Hill, Page & Hill Company, Minneapolis, for president; L. A. Furlong, Valentine-Clark Company, for vice-president; W. B. Thomas of Manistique for treasurer; N. E. Boucher of Minneapolis for secretary, and Benjamin Finch of Duluth and M. J. Bell of Minneapolis for directors to serve two years.

Telling the Public the Truth About the Skip Stop

Strong Effort Being Made in Philadelphia to Acquaint the Public With the Merits of Rapid Transit and Correct Misapprehension About the Skip Stop

A VIGOROUS publicity campaign has been waged by the Philadelphia Rapid Transit Company since last December for the purpose of correcting statements made by certain of the local newspapers to the effect that the skip stop had caused an increase in fatal accidents, and for the further purpose of making generally known the many advantages to be secured by the public through a continuation of the skip-stop plan.

The principal medium used for bringing the facts before the car riders was a series of signs carried on the front dash of the cars, in combination with interior signs in the bulkhead spaces over the end doors. As described in THE ELECTRIC RAILWAY JOURNAL for Dec. 7, 1918, the crusade was opened by the displaying on the front dash of all the cars of white cardboard signs (Fig. 1) bearing the words "Know the Truth" in large white letters in a bright red circle. The appearance of this sign on the streets caused wide conjecture and interest as to the meaning, and after this curiosity had been allowed to run for three days, the first of the interior bulkhead signs (Fig. 2) was posted, reading "Skip Stops are *not* responsible for any increase in accidents."


2
16-HUNTINGDON
21-47
KNOW THE TRUTH
042
SKIP-STOPS are NOT responsible for any increase in accidents

FIGS. 1 AND 2—THE FIRST DASH SIGN FOLLOWED BY A BULKHEAD SIGN

After three days, the front dash sign was changed to read as shown in Fig. 3, and at the same time the interior bulkhead sign, shown in Fig. 4, was displayed. The effect of this set of signs was to inform the public that the skip stop was not a plan local to Philadelphia, but that it had been adopted successfully in other large cities throughout the country.

As an evidence of the fairness of the company's position, and to refute the charge that the skip-stop plan was being forced upon the public against its will, the management announced that after the stops had been properly adjusted and the schedules shortened to take advantage of the time saving, the car riders on each line would be asked to decide by vote whether they wanted skip-stop operation continued or discontinued. Accordingly the dash sign reproduced in Fig. 5 was displayed on Dec. 10 and 11, and the interior sign, Fig. 6, was carried from Dec. 10 to Dec. 23 inclusive.

As exaggerated and misleading statements were still being made in certain quarters with regard to the skip-stop system, the front dash of the cars was again used for three days, Dec. 18, 19, and 20, for what is known as a "teaser" or mystery advertisement by posting in large, black letters a sign reading, "Proverbs XII:19," with the "Know the Truth" trade-mark reproduced in one corner (Fig. 7). The verse referred to in Proverbs is as follows: "The lip of truth shall be established forever: but a lying tongue is but for a moment."

The appearance of this sign sent many thousands of people scurrying for Bibles, and the application of the verse was generally appreciated. In this connection the secretary of the Philadelphia Branch of the American Bible Society promptly issued a public statement announcing that a great many people had visited the office of the Society seeking information as to the meaning of Proverbs XII:19. The Society expressed its appreciation of this method of advertising in the following words:

"The object of this communication is not to discuss the merits or demerits of the present system, but simply to call attention to the most commendable motive of the present management to take their patrons into their confidence and to secure, if possible, an intelligent decision. President Mitten and his associates should be commended in the highest possible terms for the substantial interest that they are showing in their thousands of employees and in their undoubtedly sincere efforts to do what is best for the largest number of citizens."

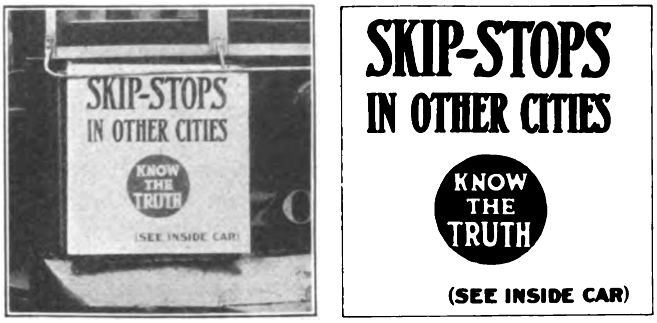

SKIP-STOPS
IN OTHER CITIES
KNOW THE TRUTH
(SEE INSIDE CAR)

Fig. 3

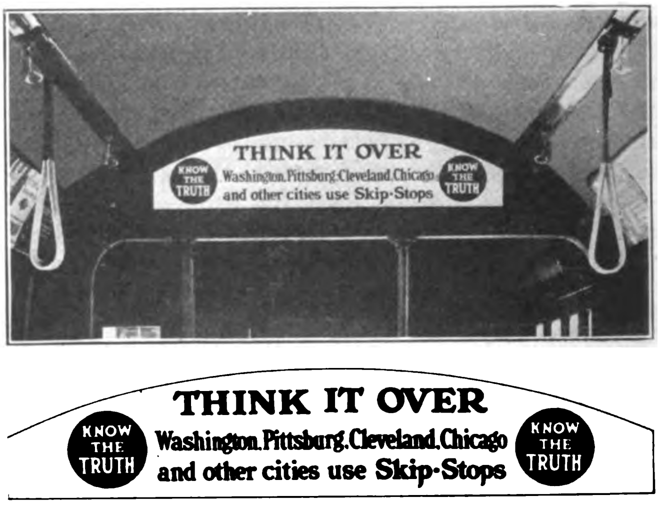

THINK IT OVER
Washington.Pittsburg.Cleveland.Chicago
and other cities use Skip-Stops
KNOW THE TRUTH

Fig. 4

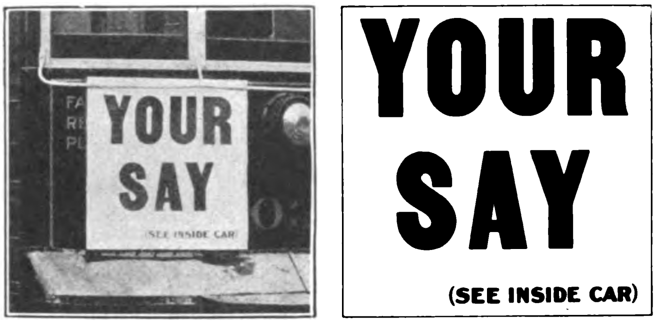

YOUR
SAY
(SEE INSIDE CAR)

Fig. 5

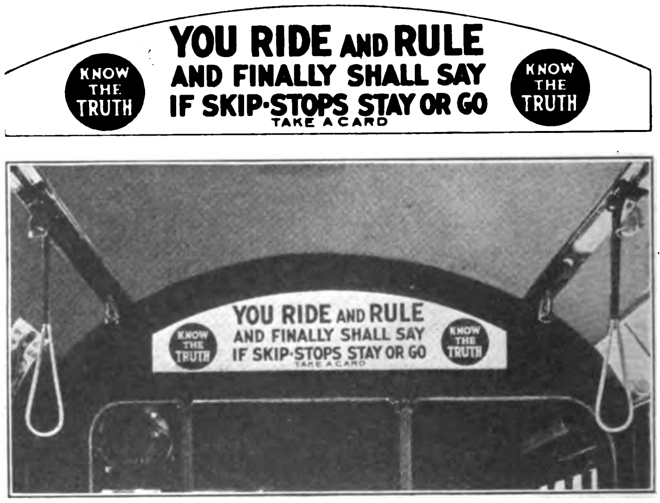

YOU RIDE AND RULE
AND FINALLY SHALL SAY
IF SKIP-STOPS STAY OR GO
TAKE A CARD
KNOW THE TRUTH

Fig. 6

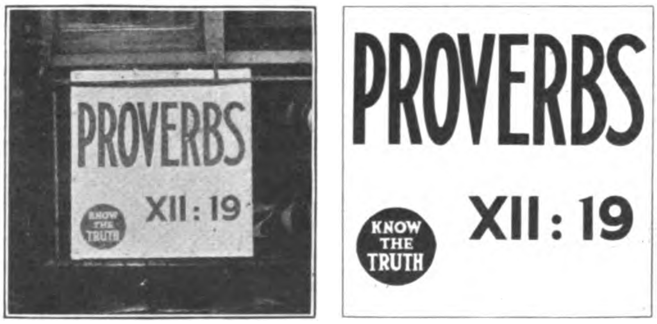

PROVERBS
XII:19
KNOW THE TRUTH

Fig. 7

FIGS. 3 TO 7—DASH SIGNS AND INSIDE BULKHEAD SIGNS IN THE ORDER OF THEIR USE

As stated in the article in these columns previously referred to, President Mitten, finding that, as a result of the misleading headlines in the newspapers, the public mind was becoming confused on the question of whether skip-stop operation was causing accidents, requested thirteen of the most representative citizens of the city to act as a committee for the purpose of determining the truth of these statements. The members of the committee were drawn from all walks of life, including state and city government, business, education, religion, and the home.

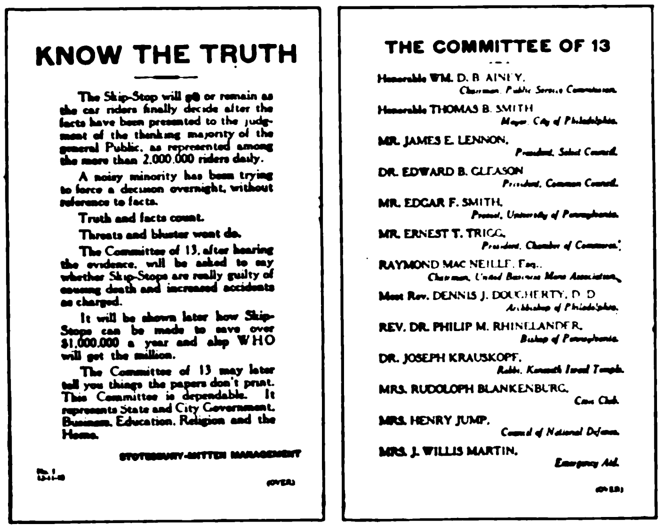
This committee held two public meetings at the City Hall for the purpose of hearing all who might have evidence or testimony to present as to the skip stop having been responsible for fatalities or casualties. It addressed an invitation to the responsible head of each of the newspapers which had made such charges, asking them to appear before the committee and present the evidence upon which these charges were based. None of the newspaper heads invited appeared, however, and none presented any evidence of any character.

On Jan. 3 the committee of thirteen made public its findings, which were in part as follows:

"1. That there has not been presented to the committee of thirteen any evidence to justify the charges made that deaths have been caused by skip stops.

"2. That there has not been furnished to the committee any evidence to prove that any other casualties have been caused by the operation of skip stops."

The coroner also appeared before the committee to give evidence concerning the testimony at the coroner's inquests held in such fatal trolley cases as had occurred



KNOW THE TRUTH

The Skip-Stop will go or remain as the car riders finally decide after the facts have been presented to the judgment of the thinking majority of the general Public, as represented among the more than 2,000,000 riders daily.

A noisy minority has been trying to force a decision overnight, without reference to facts.

Truth and facts count.

Threats and bluster wont do.

The Committee of 13, after hearing the evidence, will be asked to say whether Skip-Stops are really guilty of causing death and increased accidents as charged.

It will be shown later how Skip-Stops can be made to save over $1,000,000 a year and also WHO will get the million.

The Committee of 13 may later tell you things the papers don't print. This Committee is dependable. It represents State and City Government, Business, Education, Religion and the Home.

STOTESBURY-MITTEN MANAGEMENT

(OVER)

THE COMMITTEE OF 13

Honorable WM. D. B. AINEY,
Chairman, Public Service Commission.

Honorable THOMAS B. SMITH
Mayor, City of Philadelphia.

MR. JAMES E. LENNON,
President, Select Council.

DR. EDWARD B. GLEASON
President, Common Council.

MR. EDGAR F. SMITH,
Provost, University of Pennsylvania.

MR. ERNEST T. TRIGG,
President, Chamber of Commerce.

RAYMOND MAC NEILLE, Esq.,
Chairman, United Business Mens Association.

Most Rev. DENNIS J. DOUGHERTY, D. D.
Archbishop of Philadelphia.

REV. DR. PHILIP M. RHINELANDER,
Bishop of Pennsylvania.

DR. JOSEPH KRAUSKOPF,
Rabbi, Keneseth Israel Temple.

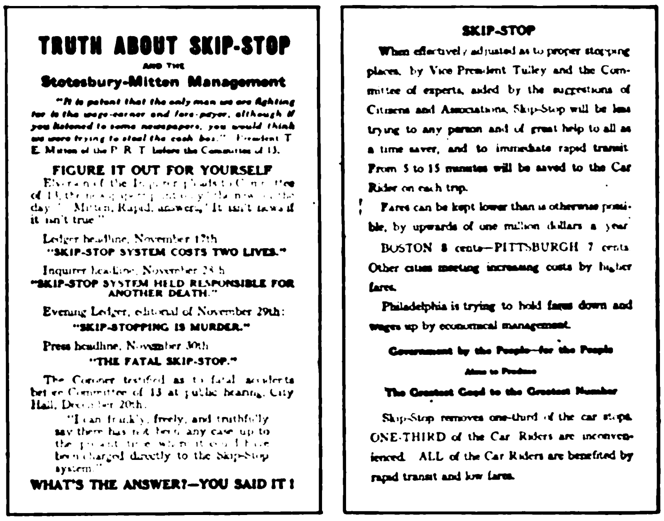
MRS. RUDOLOPH BLANKENBURG,
Civic Club.

MRS. HENRY JUMP,
Council of National Defense.

MRS. J. WILLIS MARTIN,
Emergency Aid.

(OVER)

FIG. 8—FRONT AND BACK OF CARD, GIVING NAMES AND PURPOSE OF COMMITTEE OF THIRTEEN



TRUTH ABOUT SKIP-STOP
AND THE
Stotesbury-Mitten Management

"It is patent that the only man we are fighting for is the wage-earner and fare-payer, although if you listened to some newspapers, you would think we were trying to steal the cash box." President T. E. Mitten of the P. R. T. before the Committee of 13.

FIGURE IT OUT FOR YOURSELF

Eleven of the Inquirer [illegible] Committee of 13, the [illegible] news of the day. Mitten, Rapid, answers, "It isn't news if it isn't true."

Ledger headline, November 12th
"SKIP-STOP SYSTEM COSTS TWO LIVES."

Inquirer headline, November 28th
"SKIP-STOP SYSTEM HELD RESPONSIBLE FOR ANOTHER DEATH."

Evening Ledger, editorial of November 29th:
"SKIP-STOPPING IS MURDER."

Press headline, November 30th
"THE FATAL SKIP-STOP."

The Coroner testified as to fatal accidents before Committee of 13 at public hearing, City Hall, December 20th.

"I can frankly, freely, and truthfully say there has not been any case up to the present time where it could have been charged directly to the Skip-Stop system."

WHAT'S THE ANSWER?—YOU SAID IT!

SKIP-STOP

When effectively adjusted as to proper stopping places, by Vice President Tulley and the Committee of experts, aided by the suggestions of Citizens and Associations, Skip-Stop will be less trying to any person and of great help to all as a time saver, and to immediate rapid transit. From 5 to 15 minutes will be saved to the Car Rider on each trip.

Fares can be kept lower than is otherwise possible, by upwards of one million dollars a year.

BOSTON 8 cents—PITTSBURGH 7 cents. Other cities meeting increasing costs by higher fares.

Philadelphia is trying to hold fares down and wages up by economical management.

Government by the People—for the People
Aims to Produce
The Greatest Good to the Greatest Number

Skip-Stop removes one-third of the car stops. ONE-THIRD of the Car Riders are inconvenienced. ALL of the Car Riders are benefited by rapid transit and low fares.

FIG. 10—FIRST AND THIRD PAGES OF FOUR-PAGE FOLDER DISTRIBUTED ON THE SKIP STOP

subsequent to the institution of the skip stop. The coroner testified: "I can frankly, freely and truthfully say there has not been any case up to the present time where it could have been charged directly to the skip-stop system."

President Mitten appeared in person at the hearing before the committee of thirteen and gave a complete outline of the whole skip-stop question. The following is a summary of his statement:

WHAT THE SKIP-STOP MEANS

BY PRESIDENT MITTEN

Skip-stop operation having been put in by order of the government, was installed in a hurried way. There was little time and no opportunity to select the stops properly—we were told that they should be six to the mile.

We found that there was a very great saving in coal to be made by the skip stop. We saw that it enabled a very great saving in time of men, in time of passengers on the cars, and that it would help us bridge the almost impassable gulf between reasonable service to the public and what we have been able to give pending ability to utilize the city's projected transit development, which at best we cannot hope to help us for some considerable time to come.

When the skip stop no longer was required as a war measure, we continued it as an economic measure. A campaign of misrepresentation designed to convict the skip stop of murder was begun, and the skip stop stood in the felons' dock accused of being responsible for many fatalities. The public mind was becoming so convinced. The management knew that skip-stop operation was now the only hope for increased capacity and quicker service and that it would go far to keep wages up and fares down, but so long as the public was misled into the belief that the skip stop was a murderous thing, maintained for the profit of the company, no reasonable consideration of its real merits could be expected.

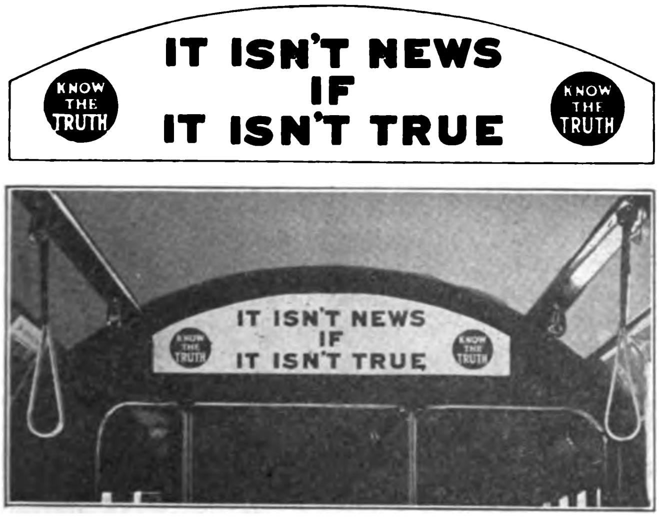
Hence, because Mr. Stotesbury is engaged in an endeavor to help Philadelphia by straightening out the muddle in which he found the Philadelphia Rapid Transit Company eight years ago and, because I am trying to carry out this idea, the committee of thirteen was formed in the knowledge that their influence, through the organizations they represent, and their positions and reputations in the community, were such that their findings in the matter at issue would be accepted by all fair-minded people as based on the evidence and facts.

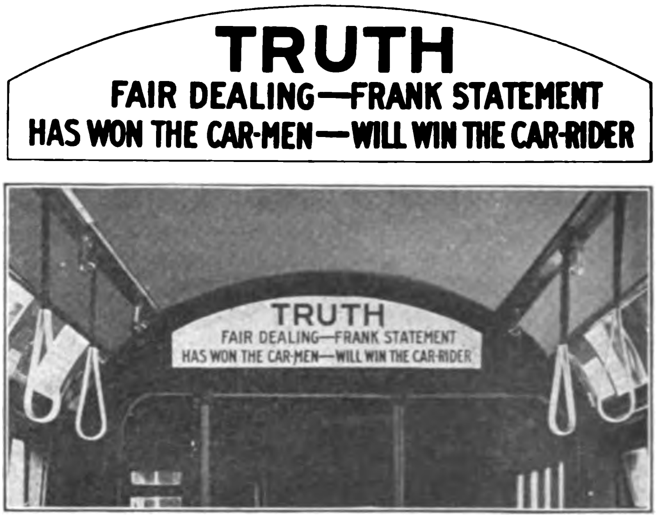
The complainants were requested by this committee to appear in public meeting and support the charges. They failed to do so. Not one particle of evidence that the skip stop is responsible for a single accident was presented.

The conclusion that the skip stop is not responsible for fatalities or casualties is therefore clear, and fair-minded people can now thank this committee for the opportunity given by which the car rider can finally and without prejudice say if the skip stop shall go or the skip stop shall stay.

The problems confronting us are that we have crowded cars; we have slow service; we have long delays coming to work in the morning and going home in the evening; and we ask the co-operation of the car riders in helping us solve these problems for their benefit.

The city contract says that the Rapid Transit Company shall get 5 per cent per year on its $30,000,000 of capital actually paid in. It provides for increased fares as may




TRUTH
FAIR DEALING—FRANK STATEMENT
HAS WON THE CAR-MEN—WILL WIN THE CAR-RIDER

FIGS. 9 AND 11—FINAL BULKHEAD SIGNS CARRIED ON THE SKIP STOP be necessary to meet the higher costs and still pay to the company the agreed 5 per cent. Not 1 cent more or less—just 5 per cent per year.

If the transit management did throw away a saving of more than $1,000,000 a year from skip stop operation without careful investigation and explanation, then the management would be both cowardly and incompetent, because the million, if wasted, must be added to the cost of your rides.

We are practically the only city that is not already either demanding or collecting an increased fare. Boston is charging 8 cents. Pittsburgh 7 cents. All the little roads surrounding Philadelphia are going to 6, 7 and threatening 8 cents. Even Cleveland is now charging 5 cents with an extra penny for a transfer. *We are here endeavoring to hold the fares where they are, or at least as low as possible. We say nothing about trying to cut wages down when the soldiers come back. It will be our effort to keep wages up.*

You are interested in getting the best service that the money will buy. We are interested in giving you just that. Now, how are we going to bring it about? You, the car rider, shall say. But when shall you say? When we have shown you what we are driving at. Our duty now is first properly to place the car stops by a competent force of experienced engineers, who will consider all suggestions from citizens and business men's associations, addressed to Vice-President H. G. Tulley, Eighth and Dauphin Streets. Having accomplished the shortening of the time required to take you to and from your home, we shall then say to the riders on each line, "Do you want what you have now got or do you want what you had?" And upon their decision each line will either keep the skip stop, as we finally put it in, or go back to the old method.

FINAL EFFORTS IN CAMPAIGN

Concurrently with the appointment of the committee of thirteen and its public hearings, the company continued its campaign of publicity.

On Dec. 12 2,000,000 cards, one of which is reproduced in Fig. 8, were distributed in the cars. On one side of the card appeared the names of the committee of thirteen and on the other the statement shown.

From Dec. 24 to 27 inclusive there was displayed in the bulkhead spaces of all the cars the sign reproduced in Fig. 9. This sign was in answer to the plea of the newspapers that they had only printed the news of the day. On Dec. 26 the company distributed on all the cars a small folder headed, "Truth About the Skip Stop and the Stotesbury-Mitten Management." The first and third pages of this folder are reproduced in Fig. 10. The folders were distributed from a small metal holder located in each car near the exit door, within convenient reach of the passengers. A sign bearing the invitation, "Read the Answer. Take a card" was displayed in a frame suspended from the ceiling over the aisle.

Following the publication of the report of the committee of thirteen, all the bulkhead signs were, on Dec. 28, changed to that shown in Fig. 11. This slogan was carried on the cars until the hearing on the skip stop before the Public Service Commission on Jan. 29.

At the hearing before the Public Service Commission on that day less than twenty individuals were present to protest against the plan. The complaint of most of those who spoke was that the cars did not stop at the corner nearest their store or home. The commission pointed out the desirability of rapid transit, and at its suggestion the United Business Men's Association, which was represented at the meeting, agreed to appoint a committee to confer with the company's officials as to any change which should be made, the matter to be considered then later by the commission.

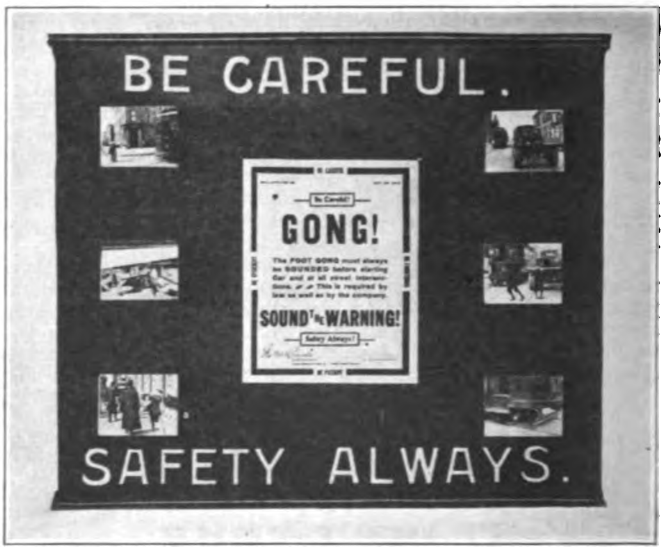
Later on the same day skip stops were considered by the Common Council, and the City Solicitor was asked to give an opinion whether the Council or the Commission had jurisdiction in the matter.

The Philadelphia Rapid Transit Company instituted the skip stop in several steps, beginning in July and extending into October, 1918, each section of the city being treated separately. The introduction followed a thorough field survey with the object of securing to the public the advantages of the skip-stop system with the least inconvenience to the car riders.

The elimination of unnecessary stops increased the average distance between stops from 480 ft. before the change to 720 ft. under the skip-stop plan. About one-third of the total number of previous stops were discontinued. Skip-stop operation, it is estimated, will, when in full effect and thoroughly adjusted, afford improved service equal to the supplying of 200 additional cars on the system and will save the car riders from five to fifteen minutes in their daily rides.

Attractive Display Box for Safety Bulletins

A NEW TYPE of display box for bulletins arranged with stereopticon slides at either side to attract attention is used by the Tacoma Railway & Power Company. The box, as shown in the accompanying illustration, is arranged for a bulletin in the center with three stereopticon slides on each side. A 300-watt lamp in the back of the box illuminates the bulletin and slides through a plate of ground glass which diffuses the light, distributes it evenly and eliminates glare. The box is painted dark green similar to the color of metal filing cases. The bulletin and slides are changed each week.



ILLUMINATED DISPLAY FOR SAFETY BULLETINS

Previous to the installation of this box the men showed little interest in the safety bulletins and would hardly read them, and it was a very difficult matter to get the trainmen together to present an illustrated lecture. This box has been placed prominently in the extra room at the trainmen's depot, where the men examine the slides and of course they read the bulletins. The design has been copyrighted by E. C. Clarke, former superintendent of instruction and efficiency.

Connecticut Lines Need Help*

If the Public Is to Have Electric Railway Service, It Must Recognize the Legitimate Needs of the Industry and Support It Properly

By L. S. STORRS
President The Connecticut Company, New Haven, Conn.

THE Connecticut traction situation at present is this: Two of the properties are in receivership and another property is only continuing in private control because of considerable revenue obtained from power and electric business. Another of the smaller companies is unable to pay its bills. One of the larger companies is in a position to escape receivership solely because of the personal pride in the continued operation of that property of the man who brought together under one control a large number of small units. And finally the largest property in the State has not been able to accumulate sufficient cash at the present time to pay its annual taxes to the State.

It takes but little thought to appreciate the full value of the electric railways to the State. The great development of the lines through the rural districts has been of great importance to the welfare of the State as a whole and has a direct bearing upon its industrial supremacy. It is doubtful if towns which now have electric railway service would care to go back to the days before the trolley rails were laid in their streets. These railways have made possible the development of industries in these small towns. They have brought about the development of real estate. They have linked the country with the city so effectively that the dependency of one community upon the other is more and more being realized.

To do this it has been necessary to build lines in many cases through sparsely settled territory. Mile upon mile of electric railway goes through territory that contributes but little revenue. If an abandonment policy were to become necessary—all, of course, hope it will not be—these country lines would, of course, be the first ones to be suspended. Such a suspension would be calamitous because there are not a few communities in Connecticut that are almost entirely dependent upon the trolley lines for easy communication with the outside world.

It has been possible for the cities to develop rapidly because the electric railways have been built into suburban territory and in many cases have preceded the coming of the householder and industrial plants. Were it not for this development, the growth of industry, business and commerce in large cities would have been very much slower. The new suburban construction thus created has a value of many millions of dollars, the taxes on which have made possible the improvement of the cities and towns themselves.

The investors in electric railways built the lines in the hope that eventually there would be a fair return upon their investment. It was the investment in these lines that created in a large measure the increased valuation of the cities and towns. Therefore, should there be a reduction in service, or a further destruction of incentive to invest in electric railway securities, there would naturally follow a slackening of community and industrial development.

DECLINING EARNING POWER OF CONNECTICUT COMPANY

On Oct. 31, 1914, the entire property of the Connecticut Company was placed in the charge of trustees appointed by the court in the suit for separation brought against the New York, New Haven & Hartford Railroad by the Federal Department of Justice. The trustees are directed to operate the property "solely in the interest of the Connecticut Company without regard to the interest of the New Haven company, but with due regard for the public interest." Since their appointment all their efforts have been given to carrying out this intent, and to this end they have authorized the application of all surplus funds to a continual betterment of the property.

As showing the trend of the gradual impoverishment of this system the following tabulation from annual reports to the Public Utilities Commission are illuminating. The figures are the net revenue of the property after the payment of operating expenses, taxes, fixed charges and rentals, but without the application of any of the revenue to a return upon the value of the property or interest upon the amount expended by this company in betterment of the plant:

1913		$1,609,021
1914		1,501,072
1915		1,323,457
1916		1,678,488
1917		619,848
1918	(approximate)	400,000

The great importance in keeping the equipment and plant in good repair and having an ample supply of coal so that there would be no possibility of interruptions to the service that would have the effect of slowing down any of the numerous war industries in the territory made it necessary to have a supply of materials for repairs and coal far in excess of the requirements. Payments for such materials and supplies have so depleted the cash resources that money has not been available to settle taxes and fixed obligations other than such as have been necessary to keep the property intact.

Since the independent control of its property by the Connecticut Company, the amount of revenue available for the payment of a return upon the value of the property has averaged only 3 per cent per year upon the fair value of all of the property, this return having dropped to below 2 per cent during that period. In the four years since the appointment of the trustees by the government, however, only $1,200,000 has been paid in the way of dividends to the New York, New Haven &

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*Abstract of address presented before the Connecticut Editorial Association at New Haven on Jan. 25.

Hartford Railroad, the owner of the stock—representing an investment by that company of $40,000,000. All surplus cash resources have been used for additions to or betterment of the plant, leaving absolutely no surplus from which any dividend could be paid during the last two years.

CREDIT MUST BE RESTORED

In order to obtain funds for development it is essential that the credit of the company be established. For some years the New York, New Haven & Hartford Railroad acted as the banker, advancing the necessary cash to meet capital obligations, but because of the dissolution proceedings it has no longer been possible to borrow from that source. The only money that has been available has been from the current income.

This diversion of the entire surplus current income to capital account, however, is unusual. It must, of course, be clear why new units of the utility plant should be paid for by the addition to capital account instead of from current income. In the first place, in order to provide the necessary cash from revenues the rates of fare would have to be materially increased, and then, too, any investment made at the expense of the car riders during any year would be for the benefit of those of future years. In the opinion of the regulating commissions the charge of the cost of additions to the property to current expenses would make possible exorbitant charges for the service rendered.

Briefly, the capital expenditures for additions to and betterment of the Connecticut Company property have averaged $2,000,000 per year since the purchase of the original lines. Owing to the inability to obtain funds, these items totalled but $700,000 in 1917 and still less in 1918. The company has been able to obtain the assistance of the United States Housing Corporation in the purchase of some new rolling stock and for a few track extensions, solely by reason of the fact that during the progress of the war the essential character of the transportation of munition workers was recognized. This loan has only postponed the day of reckoning, for the amount advanced will ultimately have to be repaid through the issuance of some sort of marketable securities.

There is a constantly accumulating list of essential betterments that will have to be provided if the property is to continue its proper function, but before loans can be made it is essential that full solvency may be assured. To be a recognized factor in the money markets the revenues of the company must be sufficient to pay all the operating expenses, taxes, fixed charges, depreciation allowance and a reasonable return upon the fair value of the property.

An essential to the consideration of the entire problem is the determination of the return upon the investment: First, what rate of return is a reasonable one to consider in fixing the amount of revenue provided through fare collections by the public? and second, what actual return must be made to the investor in order to induce the continued supply of funds needed to keep the plant up to an adequate capacity?

Numerous different expedients have been resorted to by the traction utilities all over the United States in an effort to stimulate the revenues by increasing the rates of fare. In no instance, however, has the resulting revenue even approximated the percentage in the increase in rate, and in most instances it has not produced an amount sufficient to even meet the increase in payrolls made necessary during these times.

Prior to Oct. 1, 1917, the Connecticut Company was operating on a 5-cent fare; on that date it was increased to 6 cents. The period since the increase has been one of intense industrial activity throughout the territory served. Almost all of the industries in Norwalk, Bridgeport, Waterbury, New Haven, Hartford, New Britain and surrounding towns were devoted to intense development looking toward the rapid production of the essentials of war. The actual results upon railway revenue from the increase in fare is no indication at all of the change in the riding habits of the community brought about by this industrial condition.

The passenger revenue for the first twelve months during which the 6-cent fare was in effect was $9,227,460, an increase of only $80,431 or less than 1 per cent. The contributing factors in connection with this are primarily the loss of so many men to active service in the army and the desire of the young women of the community to do their bit in the factories or offices, which eradicated the desire to continue those purely social activities upon which the pleasure riding was based.

Moreover, the financial necessities of the government have developed a spirit of thrift and saving heretofore unusual in this country, and unnecessary expenditures have been eliminated from the average family budget, thus automatically reducing the non-essential travel. During the summer months the company generally carries a large number of people to the shore resorts from the interior section of Connecticut, but last summer the conditions of the communities were such that the people did not take their usual shore vacation or even the one-day trip to such resorts. This was not due to the increased rate of fare, because the transportation item is such a minor portion of the expenditures necessary for a day's excursion, but was entirely due to a change in habits.

During the months of December, January and February last winter the conditions were so extreme that in some of the territory service was severely crippled, and the cold was so great that people did not move so freely within the community.

The inducement of high wages in the industries made it impossible to obtain the full complement of platform men, with the result that car mileage was reduced. This, of course, had a tendency to reduce revenues. In Bridgeport a contributing factor has been an intensive jitney competition which was fostered by the 6-cent fare, for while there were jitneys in operation prior to Oct. 1 there has been a great increase since that time, and the railway has lost very largely to that form of competition.

After having weighed all the various factors, I have come to the final conclusion that the increase to 6 cents has had the effect of increasing revenues about 10 per cent over what the company might have expected to receive had it continued to operate under a 5-cent rate.

Of these contributing factors the only one in which the public is deeply interested is that of jitney bus competition. At present this form of transportation closely follows the trend of traffic in the most congested portions of the cities, all of which was developed by the transportation agencies to meet the requirements of the various communities. Such competition cannot be to the benefit of cities in their development.

There may be a certain value to jitney service when properly regulated and controlled and more especially when used as a medium for extending existing transportation facilities. Within the limits of such needs the Connecticut Company can make no exception. When the jitneys are allowed to run in unrestricted competition, however, it is necessary to state clearly that the communities will receive an impaired trolley service which will ultimately be a great disadvantage to such communities and seriously retard their growth and the continued growth of their industries. There is no room for both methods of transportation in general service throughout any city, and jitney service is not capable of being developed to a point where all the transportation needs of a community can be provided.

DETAILED TRAFFIC SURVEY BEING MADE

Some months ago it became apparent that a readjustment in the rates of fare that would increase the revenues was an absolute necessity, this in addition to some measure of relief from burdens imposed upon the revenues, in order that the property might escape a more drastic readjustment with a possible abandonment of portions of its lines.

For the purpose of having at hand an accurate picture of the service conditions as well as the actual use made of the cars, we have had a most exhaustive survey made of the traffic, the results of which are being tabulated and on which basis a complete readjustment may be worked out. As I stated before the commission, "all the Connecticut Company wishes to obtain is a reasonable rate of return upon the value of its property, this to be obtained from a system of fares that will be most pleasing to the great majority of the patrons."

In discussing the requirements of the electric railways, the greatest emphasis should be put upon the requirements of public co-operation. The electric railway problem is no longer merely one of transportation. It is a state and community problem. The public must realize that unless it supports the electric railways, it simply cannot have electric-railway service. The public depends upon the street cars for service. The company depends upon the public for successful operation. Boards of trade, business men's associations, municipal bodies, the legislature and the Public Service Commissions are coming to realize that electric railway service deserves their earnest attention and helpful co-operation. Unless the public is willing to be fair, sooner or later it will cease to enjoy the benefits of electric railway service.

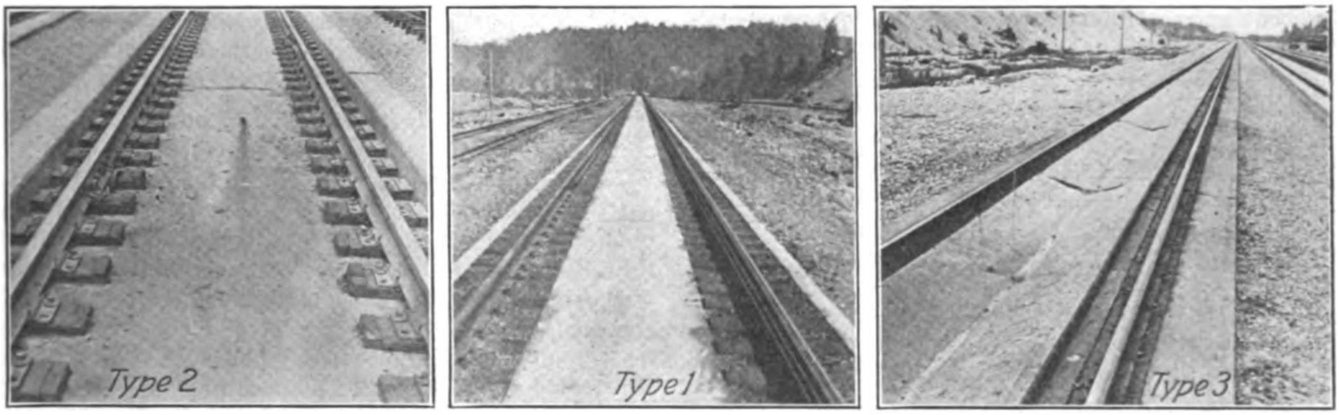
Five cents today does not go as far as 2½ cents went a few years ago, and it has been the unwillingness of the public to recognize that the electric railways cannot make 5 cents go farther than any individual can make it go that has brought the regretable situation the electric railways are now in.

To sum up the whole situation, one might say that if the public is to have electric railway service, it must first of all recognize the legitimate needs of the electric railway companies. Having recognized them, it must be willing to give the industry proper support. It must be willing to pay the cost of transportation and a fair return upon the investment the electric railway systems represent. Instead of hampering them by severely restrictive legislation, it should adopt a liberal attitude, always retaining to itself the powers of regulation that now exist.

Concrete-Base Track on Steam Road

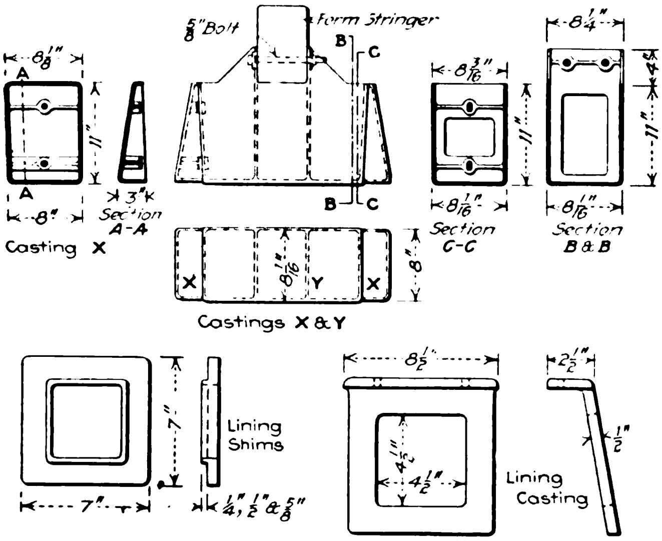
Northern Pacific Railway Has Short Experimental Section of Slab Construction Very Similar to That Used by Electric Lines

THE use of reinforced concrete ballast for main-line steam road track construction in the open country upon private right-of-way is a radical departure from accepted standards of steam road track construction. Nevertheless, it is interesting to electric railway track engineers because of the extended use of this construction for electric railway tracks. An experimental stretch of double track 2000 ft. long on the Northern Pacific Railway, using the types of concrete ballast construction shown in the accompanying illustrations, has been under test for more than four years with gratifying results. This experiment was reported upon briefly by the committee on ties of the American Railway Engineering Association at the convention held last March in Chicago and is described in detail in a recent issue of the *Engineering News-Record.*



NORTHERN PACIFIC RAILWAY IS EXPERIMENTING WITH CONCRETE-SLAB ROADBED DESIGNS

The experiment was conducted as a part of the original construction of a new line, and a good chance was had to make comparisons with the regular standard ballast type of construction under exactly the same conditions of traffic and other controlling factors. The experimental construction combines three variations of one general design, whose main feature is the use of a continuous reinforced concrete slab to support either wood blocks or stringers upon which the rails are laid.

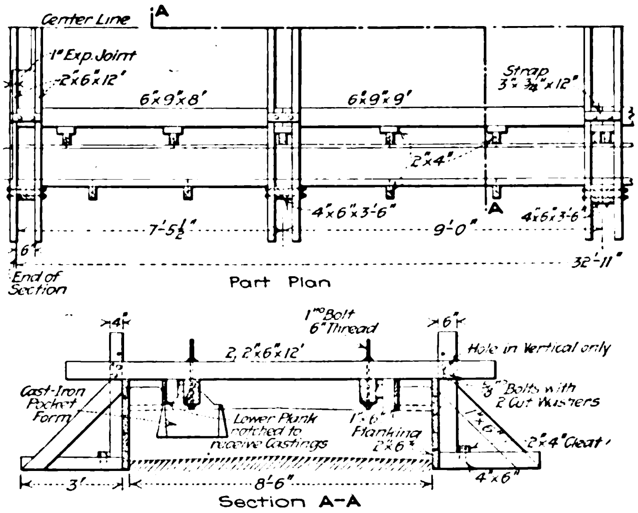


Casting X
Section A-A
5/8" Bolt
Form Stringer
Section C-C
Section B & B
Castings X & Y
Lining Shims
Lining Casting

IRON FORMS FOR POCKETS IN SLAB AND IRON SHIMS FOR RAIL BLOCKS

The use of wood is to gain resilience and cushioning effect in order to avoid the direct placing of rails on rigid concrete. The live load used in the design was a 26,000-lb. wheel load on two ties, with 100 per cent allowed for impact. Compression and shear in the concrete were assumed as 250 and 500 lb. per square inch respectively, and the tension in the reinforcing steel was taken as 12,500 lb. In two types, short wood blocks set in the slab form the rail support, while in the third, continuous stringers or sills were used.

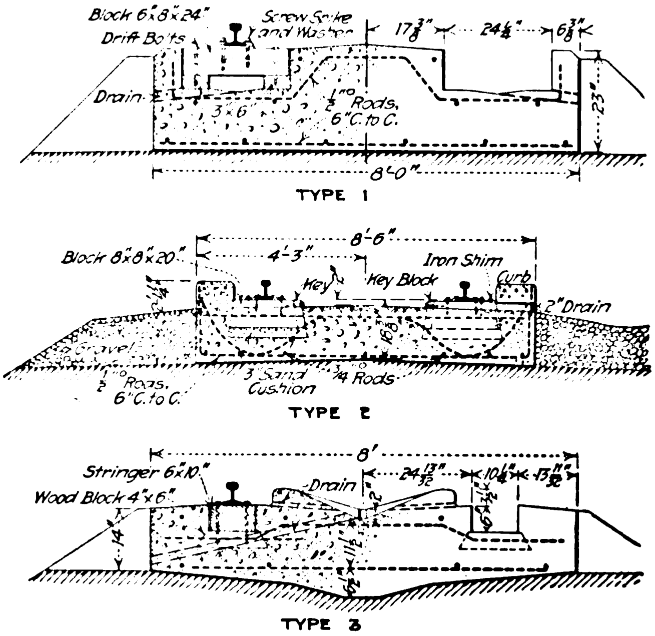
The experimental construction is located in a wide, open cut upon a fair gravel roadbed, which was carefully leveled to grade and tamped before the concrete was placed upon it without the use of bottom forms. Very little settlement is reported, and where this occurred the construction extended out upon a fill. The slabs are from 8 to 8 ft. 6 in. wide; from 16 ft. 5½ in. to 32 ft. 11 in. long and from about 18-in. to 24 in. thick. They were mortised at their ends, and expansion joints $\frac{9}{16}$ in. wide filled with hot 1:4 asphalt mastic were used as a seal. The mortise was used to prevent lateral shifting. Gravel was placed on each side of the slabs to assist in keeping them in line and to act as a protection for the subgrade.



Center Line
1" Exp. Joint
2"x6"x12'
6"x9"x8'
6"x9"x9'
Strap 3"x¼"x12"
2"x4"
4"x6"x3'-6"
7'-5½"
9'-0"
32'-11"
End of Section
Part Plan
1" Bolt 6" Thread
2, 2"x6"x12'
Hole in Vertical only
Cast-Iron Pocket Form
Lower Plank notched to receive Castings
1"x6" Flanking 2"x6"
¾" Bolts with 2 Cut Washers
2"x4" Cleat
4"x6"
3'
8'-6"
Section A-A

FORMS FOR SLAB OF TYPE 2

The timber used for the tie blocks and stringers was creosoted fir, while tie plates were used with the blocks but not with the stringers. Screw spikes were used in all cases. The rails were 90-lb. A.R.A.—B section, 33-ft. lengths, with standard 24-in. angle-bar joints laid opposite. It is stated in particular that there has been very little wear on the timber stringers, not exceeding ⅛ in. in depth, and thought to be due to compression of surface fiber. The rails crept some on the stringers, but this was stopped by cutting them at intervals and applying rail anchors which bear against the ends of the stringers. The concrete was 1:3:5 mix, using gravel of ¾ in. to 1½ in. size for coarse aggregate.



Block 6"x8"x24"
Screw Spike and Washer
Drift Bolts
Drain
3"x6"
½" Rods, 6" C. to C.
8'-0"
TYPE 1
Block 8"x8"x20"
8'-6"
4'-3"
Iron Shim
Key
Key Block
Curb
2" Drain
Gravel
½" Rods, 6" C. to C.
3" Sand Cushion
¾" Rods
TYPE 2
Stringer 6"x10"
Wood Block 4"x6"
Drain
8'
TYPE 3

THREE TYPES OF CONCRETE SLABS FOR TRACK CONSTRUCTION ON NORTHERN PACIFIC RAILWAY

The costs are not reported, but as the section is compartively short, it is presumed that they can be greatly reduced if the work is done on a larger scale. Each of the three types has given general satisfaction, but the type using the stringers has maintained the best surface and line, and all three types give a smoother riding track than the adjacent regular ballasted tracks. It is also stated that the cost of maintaining the sections so far has been only 5 per cent of that for the adjacent ballasted tracks.

The experiment was originated by W. L. Darling who was chief engineer in 1914 when the line was built. The designs were prepared by the engineering staff and are not patented.

The importance of this experiment will be appreciated as being perhaps the first attempt to use a type of construction upon open roadbed which has given good results in tunnels and at terminals on steam roads and in subways at stations, as well, of course, as in electric railway tracks in streets. The experimental sections so far constructed are said to be the most extensive as yet undertaken by steam roads.

Metallurgical Problems Met in Electric Arc Welding*

The Successful Welding of Steel, Malleable Iron and Cast Iron Depends on the Character of the Material and on the Skill of the Operation

LITTLE is known at present regarding the effect of impurities on weldability where the electric arc welding process is used. No data have been published on the subject. It is known, however, that steel containing 5 per cent or more of carbon is subject to "burning" at much lower temperatures than low-carbon steels. This fact can readily be observed in arc welding practice, *i.e.*, the tendency being toward "burnt" metal in the weld. The observations which have been made to date seem to indicate that the tendency toward "burning" shown in steels of comparatively high carbon content is the only considerable effect which is produced on weldability by the presence of impurities in usual amounts.

The welding process simply adds a certain amount of cast steel of a given composition. The metal added is usually in the form of a steel wire or bar which has been rolled. However, after it has been melted it cools into cast steel and the artificial structure produced by the rolling is entirely lost.

The rate of cooling of the metal in the weld is determined by the shape of the casting and by the manipulation of the arc by the operator. The rate of cooling may be different in different localities in the same weld, with a corresponding difference in character of the metal in different sections. This is, of course, more noticeable in the higher carbon steels than those which contain around 0.10 per cent.

The metallurgical problems met in the welding of steel plate are the same as those met in the welding of cast steel, so far as the character of the metal in the weld is concerned. In sheet metal, we have, however, a product which has passed through a process which improves its quality beyond that of cast steel, namely, the mechanical treatment in the rolls. The result of this mechanical treatment is greater compactness of the structure with resultant increase in toughness. The welded piece of sheet metal consists of two grades of metal—the original metal which has received mechanical treatment and the metal added by the welding process which has not received mechanical treatment. The metal added by the welding process has, in general, the characteristics of cast steel, and the original unmelted plate has the properties of rolled metal.

Up to the present time no cast steel has been produced which has all of the properties to the same degree as are found in any given piece of rolled metal. This limitation of any welding process in which steel is melted should never be lost sight of in welding.

From the foregoing several conclusions may be drawn: (1) The tensile strength of the cast steel in the weld may be made less than, greater than or equal to the tensile strength of the metal in the original section. This holds for commercial plate only. (2) The metal may be harder or softer than the metal in the original piece. The tensile strength of the metal in the weld varies with the hardness. Burned metal is neglected in this conclusion. (3) The elasticity of the metal in the weld is always less than the elasticity of the metal in the original plate.

CHARACTER OF WELD DEPENDS ON COMPOSITION OF WELDED METAL

The character of the finished weld depends on the composition of the metal being welded and upon the skill of the operator. The mere fact that the metal is melted and allowed to run into a joint does not indicate that the metals are welded, since it is easily possible to melt the metals without welding them. A weld is made when the metals to be welded are in the liquid state, with the slag and oxide floating on top. The simplest analogy is the case of welding together two pieces of pitch. While cold the pieces will not even adhere. Brought to the liquid state the two pieces merge into each other, and at the region of contact entirely lose their separate identities. Upon cooling, the joint is perfect. Now if the pieces of pitch be coated with paint (which corresponds to the oxide on hot steel), and the attempt is made to weld them together, it will be found that until the two pieces are perfectly liquid and the paint is floated out of the joint a perfect weld is impossible.

Flaws and imperfect welds in steel are due to the fact that the metals were not properly liquefied in welding, and the presence of the oxide, or slag, or both, prevents a perfect union. In autogeneous welding the actual union is made in plain view of the operator, so that if the union is not perfect he knows it. Knowing the tensile strength of the plate and of the metal added, the skillful and conscientious operator can predict accurately the behavior of a given welded piece under a pulling test.

The few failures of the process have been due, perhaps, to the fact that it is too easy to make an arc-welded joint which appears to have the same tensile strength as a riveted joint. The single-riveted lap joint is 55 per cent efficient under the most favorable conditions, while the quadruple-riveted, double-strapped joint may have an efficiency as high as 85 per cent. A skillful electric arc welder will make a joint which has an efficiency of 90 per cent without particular effort. Stiffness equivalent to that of the riveted joint may be produced by making the section of the joint greater than that of the unwelded section, or by the use of alloy steel electrodes.

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*From the 1918 report of the committee of the Association of Railway Electrical Engineers. For other articles on the same subject, see issues of this paper for Dec. 7, 14, 21 and 28, 1918; also Jan. 11, 18 and 25, 1919.

An intelligent analysis of the problems encountered in the service required of a given joint, together with an application of established welding methods, will leave no excuse for the failure of a joint which has been calculated to hold. The intelligent welder does not guess; he knows what the joint will do.

The failures of the past have been due to ignorance and to haphazard application, and not because the results which are obtained from the arc welding process are uncertain.

METAL ELECTRODES USED FOR WELDING STEEL

Practically all sheet-metal welding, where metal is added, is done by the metal-electrode process, although the carbon electrode may be used on plates over ½ in. in thickness in certain applications. At present two kinds of electrodes are in general use on sheet metal work; Norway or Swedish iron (or their American equivalent) and carbon-steel wire. The iron wire gives metal in the weld of a tensile strength of approximately 48,000 lb. per square inch, while the steel of the 0.10 per cent carbon content may be relied upon to produce metal in the weld of a tensile strength of about 50,000 lb. per square inch. On plates of ⅛ in. thickness and less, an electrode of $\frac{1}{16}$ in. to $\frac{3}{32}$ in. in diameter gives the best results. A current density in the circuit of not to exceed 75 amp. should be used with this small electrode. Plates between ⅛ in. and ⅜ in. thick are usually welded with electrodes ⅛ in. or $\frac{5}{32}$ in. in diameter, with a current not exceeding 125 amp. for the ⅛-in. electrode, and 155 amp. for the $\frac{5}{32}$-in. electrode. Plates thicker than ⅜ in. are usually welded with $\frac{3}{16}$-in. electrodes, using a current of approximately 175 amp.

Iron electrodes may be melted more rapidly than steel electrodes, and have less tendency to burn than the steel. In general, however, it is more difficult to weld with iron electrodes than with steel. To get the best weld possible with any electrode, the current density in the circuit should be kept as low as is consistent with a usable arc.

Practically no applications of the electric arc process have been made on plates having a thickness of less than $\frac{1}{16}$ in. where a butt joint is required. This is due to the great intensity of the heat with the consequent tendency to "burn through." In the case where the edges of the plates are in parallel planes, however, they may be melted together with a low current carbon arc with excellent results.

The application of the electric arc-welding process to the welding of steel forgings is in every way similar to its application to boiler plate and structural shapes. This is due, of course, to the fact that forgings belong to the same classification, namely, metal which has had mechanical treatment. The metal added by this process is cast metal and has a lower degree of elasticity than the metal in the forging.

ANNEALED SECTIONS OF MALLEABLE CASTINGS ARE WELDED

The correction of flaws in malleable castings by the electric arc process effects very large savings. The welding is always done after the casting is annealed and made malleable. The annealing usually affects the casting to only a small depth, and it is in this annealed or softened section that the welding is done. The annealed section is essentially low-carbon cast steel. The work may be done with either the carbon or metal electrode process, depending on the size and shape of the casting. Due to the thinness of the annealed section a comparatively low current density is used on the carbon electrode. The electrode in the hand of the operator is sometimes made the positive electrode in order to reduce the effective heat on the casting.

If the casting is to be machined in the welded section it is reannealed. This is usually necessary owing to the fact that the heat of the arc will in effect reverse the annealing process; that is, the carbon which was thrown out as graphite by the annealing is dissolved in the iron again when the metal becomes molten in the heat of the arc. The carbon in combination with the iron will of course make the casting hard.

SATISFACTORY WELDING OF CAST IRON IS UNCERTAIN

Cast iron is difficult to weld by any process under the most favorable conditions, due to its brittleness and low tensile strength. No reliance can be placed on a piece of cast iron which has been welded. The welded joint in cast iron may hold, but there is no way known at the present time by which the strength of the welded joint can be accurately predetermined. Cast iron can be welded by the electric arc process about as well as by any other process, but the results are always uncertain.

Cast iron should never be welded unless the person ultimately responsible for the work has a full knowledge of the facts as outlined above and a thorough appreciation of the uncertainty of the results. Broken cast-iron parts, such as cast-iron wheel centers, etc., have been successfully welded with the metallic arc by applying what may be termed a mechanically welded patch. The edges to be joined may or may not be beveled. Half-inch or ⅝-in. holes are drilled and tapped along the edges in which studs are screwed and allowed to extend out of the casting approximately ¼ in. The studs should be staggered to give the best results. The casting should always be preheated to remove the chill, and if there is no danger of distorting the parts, better results may be obtained by heating the casting almost to a cherry red.

CAREFUL WORKMANSHIP WILL PREVENT FAILURE

In the general application of welding processes to parts of machines which have within them possibilities of death and destruction in case of failure of the welded part, too much caution cannot be given the operator. Owing to the fact that in the case of electric arc welding the work is done in plain view of the operator and he is competent to judge the nature of the completed job, disastrous failures may be prevented by the exercise of ordinary judgment.

The field for the electric welding process on railways is almost unlimited. The process can be made use of in the motive power department, the car department and the maintenance of way department, in a very extensive manner, as well, of course, in any other industry that makes use of iron and steel. Thousands of dollars worth of material is scrapped by railway departments every year, a huge proportion of which could be reclaimed at slight expense by electric welding.

Rust Prevention as a Steel Conservation Measure

The Writer Gives His Experience in Removing Rust from Steel Cars and Preventing Its Spreading to a Damaging Extent

BY DENIS O'BRIEN
Foreman Painter Fresh Pond Repair Shop
Brooklyn Rapid Transit Company

THE importance of planning for the reconstruction period which is now about to start has long been recognized. It is evident that the great demand for steel will continue and that we shall need to conserve the supply which we already have. One method of aiding in such conservation is by instituting a vigorous anti-rust campaign.

The first step in such a conservation policy must be the re-education of the painter. He must be taught the evil that exists in allowing rust to be formed, he must be taught how to combat it and, finally, he must be made to realize that the burden of responsibility for its existence is directly up to him. Next, extreme care must be exercised in the selection of good paints. The old idea that "any old" paint will serve the purpose is wrong; instead of applying a streak of color, as was the former practice in painting steel, we must treat the surface to a mass of pigment.

Spennrath says with regard to rust and its origin: "Chemistry shows us that rust is a hydrated oxide of iron, a compound of the metal iron with oxygen and water, 100 parts of dry iron rust containing 52.2 parts of iron, 22.3 parts of oxygen and 25.5 parts of water."

The water is here in a state of chemical combination and not present as a mechanical adjunct in the form of moisture. Consequently iron exposed to the air cannot rust in the absence of water, and iron immersed in water must remain free from rust if access of oxygen is prevented.

I have seen a greater formation of rust on a piece of steel plate exposed to a brief shower of rain, than on a piece of steel plate completely immersed in water for an entire day. If rust were a solid, and formed a compact coating over the steel, we could ask for no better protection; but instead of being solid, it is porous and, being porous, it absorbs and retains water and condenses oxygen, thereby creating more rust.

SMALL SPECK OF RUST MAY CAUSE LARGE EXPENSE

Let us figure if we can the cost of a speck of rust. Let us assume that on a steel plate of a car shopped for overhauling and painting the painter discovers a speck of rust ½ in. in diameter, and let us further assume that the painter has not been educated as to the evil possibilities of rust and that he works along the old line of theory that "paint kills rust." He removes the loose scale by scraping and then applies the paint. However, underneath that thin film of paint small particles of rust are left and they continue to multiply. The next time that the car is shopped we find that the ½-in. speck of rust has developed to such an extent that it becomes necessary to remove the affected plate and to install a new one. The initial cost of killing the rust (labor and material) would not have exceeded 10 cents. The final cost in this case would be the cost of cutting the plate away from the car body together with the cost of a new steel plate and cost of installation. Does it pay?

There is no better method of preparing a steel surface about to be painted than by sand blasting, but every shop is not equipped with sand-blasting apparatus. This method is economical only where the old paint is to be removed entirely and the car "brought up" from the foundation. Where the car is shopped for repainting, re-enameling or varnishing, it would not be of any advantage to sand blast the few specks of rust that might appear on the car body. In this case there is no better method for killing the rust than by applying sulphuric acid, after which the rust spot should be washed off with milk of lime. I have obtained excellent results by washing off the acid with caustic soda solution. After the surface is perfectly dry the steel can then be painted, but care must be taken to see that the acid is thoroughly removed and under no circumstances should the paint be applied to a damp surface. When we are certain that the steel contains no rust we can proceed with the painting. Unlike wood, which will absorb oil or varnish, iron and steel are impenetrable to them. We must therefore be positive that the paint used will adhere perfectly, and it must also be elastic enough to withstand the expansion and contraction that the steel undergoes due to the weather elements.

ROUGH SURFACES TAKE PAINT BEST

I have found the best surfaces to paint are rough or pitted, rather than polished ones, since the paint cannot penetrate the steel. A rough or pitted surface insures adhesion. The particles of pigment will find lodgement in the depressions of the steel and offer an excellent foundation upon which successive coats can be built up. I do not know of any better pigment for the priming of steel or the retarding of rust than pure unadulterated red lead. The vehicle should be pure raw and boiled linseed oils. Under no circumstances should turpentine be used as this, while rendering the paint more workable, destroys the value of the linseed oil. For the same reason japan driers should never be used, as they are an oxidizing agency. An objection to red lead may be its color, but I do not know of an instance where red lead has failed.

Iron oxides, while not possessing the good drying qualities found in red lead, make excellent paint, the only objection to them being that they can only be had in dull and dark colors such as reds, browns, blacks and slates. It is wrong to reject iron oxides as pigments on the ground that they produce rust, for when suspended in oil an oxide can neither condense oxygen nor absorb water.

RUST IS A CANCER

Rust is a "cancer" on the steel plate, and if it is not removed will permeate the entire plate and ultimately destroy it. Unlike the cancer that attacks the body and for which there is no remedy, the cancer that attacks steel and iron in the form of rust can be conquered with good workmanship, common sense, good oils and pigments.

A pigment that suspends feebly in the vehicle is not worthy of the name of paint. Lamp black, having practically no suspension, belongs in this class. If we take the weight per cubic inch of the pigments we can get an idea of the relative numbers of particles of pigment that should be obtained from them. These unit weights are: Red lead, 0.20 lb.; white lead, 0.13 lb.; iron oxides, 0.10 lb.; lamp black, 0.06 lb. From these figures we see the true relative value of red lead. Second to it is white lead, of which Dr. A. Landolt says: "White lead, used alone and in a pure state, is not a good paint for iron work. Apart from the fact that the pure white of the pigment will speedily become impaired and dirty, the paint also sets very hard in a short time, the elasticity disappears and cracks are formed."

White lead is thus eliminated from the field unless it is used with other pigments, leaving us the alternative of using red lead or iron oxides. I give the lamp black figure simply for comparison with the others to show it has no value as a paint.

AMERICAN ASSOCIATION NEWS

T. & T. Association Drafts Plans for Coming Year

AT A MEETING of the executive committee of the Transportation & Traffic Association held in New York on Jan. 28, plans were drafted for the coming year. There was a good attendance of officers and members of the executive committee, those present being L. C. Bradley, Houston; W. H. Collins, Gloversville; R. P. Stevens, New York; L. H. Palmer, Baltimore, and G. T. Seeley, Chicago. R. R. Anderson, Providence, and E. B. Burritt, secretary, were also in attendance. Mr. Seeley was formally elected a member of the committee in place of H. B. Potter, of Boston, resigned, and resolutions were passed regretting the resignation of Mr. Potter and inviting him to attend meetings of the committee, whenever possible, in an unofficial capacity.

In connection with the program for the October convention the decision was reached that the association would discuss only a few topics this year with the idea that sufficient time could thus be had for a more thorough consideration of each topic than would be possible with a longer program.

There will be three sessions of the convention, and it was decided that on two of these, only one report would be presented. On the third day it is expected that two reports will be considered so that the convention of the association this year will be devoted practically to the discussion of only four reports.

The subject selected for one of the sessions is the collection and registration of fares, particularly fractional fares or fares whose payment involves the collection and registration of two or more coins. It is hoped by the committee that this session will be made a joint session with the Accountants' Association, so that the topic may be considered from both the transportation and accounting standpoints. The committee will be instructed to consider the subject both as regards a uniform and a zone system of fares.

The subject selected for the other full session was "Operation of One-Man Cars From a Transportation Standpoint." It is hoped, at this session, to show a series of moving pictures illustrating the operation of one-man cars under different conditions in city service. An offer to prepare such a series of pictures has been received from a group of manufacturers. It is believed that such views will not only be of great interest to railway managers whose companies have not introduced one-man operation, but they will afford a very easy way of explaining to public authorities and others the many admirable features of the safety car.

The topics to be presented at the third session are (a) a report on the proper form of contract between city companies and interurban companies for the use of city terminal facilities and (b) a code of traffic principles designed to promote reliability of electric railway schedules.

It was decided to appoint two members of the executive committee to be sponsors for each of the four topics selected. The appointments made were: (1) Messrs. Stearns and Palmer; (2) Donecker and Stevens; (3) Collins and Seeley; (4) Dempsey and Bradley.

Chicago Section Contemplates Course in Public Speaking

AT THE MEETING of the Chicago Elevated Railways company section held on Jan. 21 a plan was outlined for organizing a class in public speaking and quite a number signified their intention to become members should the plan be carried out. H. A. Johnson gave an interesting summary of what had been accomplished through the first year's operation of coasting clocks, the results obtained having been exceedingly gratifying. G. T. Seely followed with a brief talk on his work while connected with the Emergency Fleet Corporation, illustrating his remarks with lantern slides and colored posters. Capt. M. W. Bridges described briefly his experiences in the European war up to the time of his injury and told of the excellent hospital care that is given the wounded.

Among items of business, program and membership committees were appointed. The audience sang patriotic songs and J. H. Mallon told some amusing stories. The meeting was attended by 125 members and guests.

Detroit United Railway Adds New Compressor Equipment

The Detroit (Mich.) United Railway is installing, at various carhouses, eight new type Q-3-VD National air compressors, made by the Westinghouse Traction Brake Company with a displacement of 400 cu.yd. of free air per minute as part of its storage air-brake system. These are being located at the larger stations, and the smaller units which they replace, of a displacement from 50 to 125 cu.ft. per minute, will be transferred to smaller stations.

The new machines do not take up as much floor space as the old 50-ft. units, and are a modification of the standard machine to fit local conditions. They are of the two-stage, compound type and are designed to operate against a 325-lb. mean pressure. Each compressor is driven by a Westinghouse 125-hp. type SK-190, 550-volt motor, and it is equipped with type HP (hydropneumatic) automatic control.

Recent Happenings in Great Britain

England Points the Way in Reconstruction Both With Respect to Labor and in Preparing for Foreign Trade Expansion

(From Our Regular Correspondent)

The industrial situation in England at the end of the past year was intensely interesting. On the one hand we had the efforts on the part of employers, capitalists and financiers for a great expansion of business, partly to make up for the arrears of work accumulated during the war, and partly for the inauguration of new developments. On the other hand, we had the constantly growing demands of labor for higher wages and shorter hours. With few exceptions, these demands were granted frequently in whole, though sometimes in part.

LABOR'S POWER MAY CONTINUE

Under the stress of war necessities, labor got things all its own way and the signs are that this increased power of trade unions is going to continue and the employers are going to be far more at the mercy of their work people than ever they were before the war. How far the expansion of industry is to be compatible with steadily increasing wages and large reductions in the number of hours worked per day or per week is a problem of enormous difficulty.

In the case of producing industries it may be solved in part, at least, by an increased use of machinery and by the workmen working for all they are worth during their shortened hours. But these remedies are not applicable in the case of transportation industry so far as the traffic staff is concerned. There the only visible remedy is increase of fares.

As regards the expansion of business, preliminaries are in full swing. The releasing of leading essential men from the army has begun, and during December there was a stream of government notices removing restrictions on business which had been imposed during the war. Freedom is coming to manufacturers, and in this direction the iron, steel and electrical industries are already benefiting. The whole elaborate system of priority and licenses in manufactures is going; so are the restrictions on imports and exports. Though the release of men from the army must be gradual, some help is at hand by the release of men from munition works.

MANUFACTURERS ON THE ALERT

Manufacturers for the traction industry are already advertising that they are prepared to take orders. The first two instances since the war of considerable orders being actually in the market come from Liverpool and Sheffield. The tramways committee of the former city have determined to order 100 motor omnibuses for the purpose of augmenting the services given by their tramways. It appears that, meantime at least, it is easier to get new omnibuses than new tramcars, and apparently the former will to some extent at least run on routes where there are no tramways. To get parliamentary authority to lay new tramways would take a considerable time, and to construct them afterward would take more. Meantime, that need is urgent, and it can be met temporarily as soon as the omnibuses are ready. The Sheffield City Council is apparently in less hurry, or it may have got promises of early deliveries. The Council there has invited tenders (which must be in by Jan. 7) for the supply of fifty double-deck, top-covered, vestibule tramcars.

On the manufacturing side the great immediate development now talked about is that of Dick, Kerr & Company, Ltd. In recent time that firm has acquired or become affiliated with the businesses of the United Electric Car Company, Willans & Robinson, Siemens Brothers, the Coventry Ordnance Works, etc., and is thus able to undertake practically any kind of engineering manufacture in addition to its production of electrical machinery. The facilities for the latter are also much increased.

DICK, KERR & COMPANY EXPANDING

The firm has established in France and Japan companies to exploit its manufacturing rights in connection with apparatus for railways and tramways. The affiliation with the Coventry Ordnance Works, which is the latest "deal," is very important. These works, it is expected, will be devoted to the production of heavy electric machinery. The Coventry Ordnance Works is not a public company, but is owned by the world-renowned firms of John Brown & Company, Cammell Laird & Company and the Fairfield Shipbuilding & Engineering Company. In pursuance of the expansion policy there was registered in December a new concern called the English Electric Company, Ltd., with a nominal capital of £5,000,000 in £1 shares (£1,500,000 preference and £3,500,000 ordinary). The shareholders of Dick, Kerr & Company and of the Coventry Ordnance Works will exchange their holdings for shares in the new company. The names of the first directors of the new company are instructive and significant. They are: C. T. Cayley, chairman of Dick, Kerr & Company; B. A. Firth, chairman of Thomas Firth & Sons; W. Rutherford, managing director of Dick, Kerr & Company; J. Sampson, director of John Brown & Company; P. J. Pybus, managing director of the Phoenix Dynamo Company; Col. J. H. Mansell, managing director of the Coventry Ordnance Works; A. Gracie, Fairfield Works, engineer; W. L. Hitchens, chairman of Cammell Laird & Company; and C. E. Ellis, manufacturer, Nottingham. The offices are at 3 Abchurch Yard, London, E. C., a building which is now occupied by the head offices of Dick, Kerr & Company. It is hardly necessary to point out that great developments are indicated by the above facts.

Other engineering firms also contemplate developments as indicated by the issue of additional capital. Recent examples are the British Westinghouse Company, the Morgan Crucible Company and the Mond Nickel Company.

GOVERNMENT YIELDS TO MEN

As to labor, the government, which now controls British railways, has recently yielded to a demand by the two trade unions of employees for an eight-hour working day. With respect to tramway employees, the position is uncertain. Efforts have been in progress for some time for the formation of a joint industrial council of employers and employed to embrace all the tramways of the country, but so far without success. Some of the employees are said to be recalcitrant.

Councils of this sort have within recent months been formed in a number of industries and much is expected from them in the way of settling disputes and preventing strikes. The Councils are composed of representatives of employers and employed and are the outcome of a report by a Parliamentary committee (called after its chairman, the Whitley committee) recommending such councils as a means of promoting industrial peace. Meantime trade unions connected with the tramway industry are formulating impossible demands.

Another example of the labor position is indicated by the fact that apparently the tramway services in a larger number of towns than ever before were suspended on Christmas Day. The suspension does not take place because the town councils or companies concerned wish it, but because the employees refuse to work on that day. For the first time on record there was a Christmas suspension on the London County Council Tramways. The men wanted the whole day off, but a compromise was reached under which the cars ran until 4 o'clock in the afternoon. The public inconvenience in London was specially marked because the distances traversed by the cars are exceptionally long.

TRAMWAY SERVICES INADEQUATE

In regard to the inadequacy of existing tramway services all over the country, there is no present prospect of improvement, as the coal controller states that supplies of fuel will not for some time permit of the relaxation of the present rationing. Miners are being released from the army to come back to the mines, but the demands for coal from Britain's allies on the Continent remain unabated, and the returned miners will not for some time be able to make their influence felt.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Valuation Base Accepted

Buffalo Figure Placed at $22,792,759 in Negotiations for Service-at-Cost Arrangement

An agreement has been reached between the International Railway, Buffalo, N. Y., and the municipal authorities on the physical valuation of the company's property within the city of Buffalo as of Dec. 31, 1918. The amount fixed as the base is $22,792,759. This sum will be used by the board of arbitration to be appointed soon after Feb. 24 as a basis of a permanent agreement whereby the city will establish control over the company's property similar to the plan in effect in Cleveland.

ARBITRATION PROVIDED

The resolution which was passed by the City Council on Jan. 25, affirming action previously taken in committee, submits all questions in dispute between the company and the city to a board of arbitration. Under the commission charter, the resolution cannot become effective for thirty days. It is subject to referendum, and petitions are now being circulated so that the voters may again be called upon to affirm or repeal the action of the Council.

Values of intangibles claimed by the company are to be arbitrated. As allowed they are to be added to the figures agreed upon by the city. From the amount agreed upon is to be deducted the amount of depreciation where the arbitrators determine depreciation exists. The city claims depreciation of about $7,000,000. E. G. Connette, president of the company, says this sum is excessive.

Neither the city nor the company will be bound by the decision of arbitrators. Should the Council feel that the valuations found by the board are too high, it will be at liberty to reject the whole procedure. If the company feels the figures are too low, it has a like privilege. One member of the board will be selected by the city; the second by the company and the third will be chosen by these two. If no agreement can be reached, the umpire will be designated by outside parties.

FARE MATTER STILL PENDING

Decision has been reserved by the Supreme Court at Albany, N. Y., on the application of the International Railway for a writ of mandamus directing the Public Service Commission for the Second District to receive the company's answer to the proceedings started before the commission several years ago by the city in an effort to bring about an investigation, which, at that time the municipal authorities thought would result in a 4-cent or 3-cent fare. Arguments were heard in Albany on Jan. 25.

The railway is seeking to bring the fare question before Public Service Commission. If the court decided that the commission must receive the company's answer and thereby assume jurisdiction in the rate case, despite the franchise limiting the company to a 5-cent fare, the arbitration agreement between the city and the company will probably be waived until the final determination of the case before the commission.

The municipal authorities contend that the commission has no jurisdiction when the company is bound to give service under a 5-cent fare franchise with the city.

City and State Consider Relief

The financial condition of the Rhode Island Company, Providence, R. I., is being considered by city and State authorities and it is possible that one or the other will in the near future propose a plan for helping the company.

At a meeting of the committee on Rhode Island Company affairs of the City Council, it was voted to extend an invitation to the United Traction & Electric Company to send representatives to a meeting of the committee to discuss the present condition of the Rhode Island Company and ascertain whether there is any common ground upon which the city and company can meet in an attempt to solve the street railway problem. While no definite action was taken, the committee also considered a bill presented to the Council providing for the presentation to the Legislature of a plan for the reorganization of the company with a view particularly to the simplification of the corporation structure. Governor Beeckman and leaders of the State Legislature are opposed to any plan providing for State ownership or operation of the street railways. The Governor said recently:

> There is nothing more that the State can do for the Rhode Island Company. We are ready to do everything in reason, but we can suggest nothing more and neither can the company. Reorganization is the only remedy. It is bound to come sooner or later. If it is to come now, so much the better.

Representatives of the New York, New Haven & Hartford Railroad which owns the capital stock of the Rhode Island Company, have been in consultation with officers of the United Traction & Electric Company for the purpose of establishing a basis for a revision of present leases, but to date nothing has materialized.

B. R. T. Policy Stated

Receiver Reviews Obligations of the Company as He Sees Them—No Room for Half-Baked Remedies

At a luncheon of the Bond Club at the Bankers' Club, New York, N. Y., on Jan. 24, Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, said that the new management realized that the organization was a public service corporation, a quasi-public institution, and that its primary duty was to the public. In this connection he said in part:

> Now, as to the policy to be pursued by the court and the receiver, of course I can speak only in generalities. We have, as you know, of course, but one single policy in all that we do. We realize that this is a public service corporation, a quasi-public institution, and that its primary duty is to the citizens, to the public; and, of course, we intend, to the fullest measure that the facilities admit, to devote them to the best possible service that can be given to the public. We realize that in doing that we are serving our trust, because the other obligation of the trust is to the people who have put their money into this property, who have financed it, and who are entitled to proper treatment of their investment.
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> We have to work through and with and under the city authorities, both the Public Service Commission and the Board of Estimate, and, of course, our purpose is to work in absolute harmony with them. We do not purpose to start out with good intentions and then run amuck, by which I mean to put into effect any half-baked theories, or half-thought-out remedies.
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> We hope, therefore, that those who are interested, and that practically includes everybody, will endeavor in every way that is in their power to sympathize with our difficulties, and to hearten and cheer us on our way of progress when we are headed in the right direction, and I, for one, have very little, if any, fear that eventually the dark clouds that now overshadow the situation will not turn out their silver linings, and the situation will turn into one of great promise for the future.

In explaining the system of financing that brought about the need for seeking the protection of the court through receivership Mr. Garrison said:

> In so far as the present situation of the company is concerned, it is attributed to a policy which has been pursued for many years, by which the parent company, out of income that it received from operating revenue, has spent that money for betterments and improvements, capital expenditures for the subsidiaries, taking therefor their certificates of indebtedness, and not floating in turn from their own resources, bonds or stock or other means of raising capital to replace that money. It has on hand to-day some $37,000,000 of these certificates of indebtedness, and when it was faced with the necessity of making capital expenditures, almost wholly capital expenditures, amounting to $16,000,000, which we have got to have to complete the obligations of the company in respect to the subway contract, and to complete its own roads on account of the arrangement with the Public Service Commission and the city, they were in no position to market their securities—the market was in no position to absorb any security that they might put out—and they were face to face with a stone wall, and had to seek the protection of the court.

Frederick P. Royce, the new general manager of the company, has entered upon his duties. It is announced that John J. Dempsey, vice-president, will retain supervision over transportation.

Blocks Philadelphia Rapid Transit Lease

Commission Objects to Financial Agreement with City and to Lack of Valuation to Fix Fair Initial Rate

The rejection of the Philadelphia rapid transit lease by the Pennsylvania Public Service Commission has blocked for at least the time being the program for the operation of the new city-built lines by the Philadelphia Rapid Transit Company. Embodying features which the contracting parties accepted as being in accord with the latest and best thought concerning utility operation and control, the lease as a whole was generally believed to warrant adoption.

FINANCIAL CONDITIONS OPPOSED

From the explanation given by the commission for its action—this was briefly noted in the ELECTRIC RAILWAY JOURNAL of Jan. 25, page 199—it appears that the lease was disapproved for two primary reasons—first, because the commission disagreed in regard to some details of the lease, and second, because it felt that the city and the company had not reached a proper agreement as to fundamental financial conditions.

The commission's attitude on this second point calls for further mention. The gross revenues of the unified company and the city property, it will be recalled, were to be used for the following payments in the order named:

1. Operating cost, maintenance and damages.
2. Taxes.
3. Company fixed charges required by mortgage, lease or contract.
4. Interest and sinking-fund payments on new securities, and dividends and sinking-fund payments on new capital stock of company.
5. Depreciation reserve funds.
6. Sinking-fund payments under 1907 contract; payments to city for taxes on dividends to stockholders of subsidiary lines, and payments under 1907 contract in lieu of paving, snow removal and car licenses.
7. Payments to the city and the company in proportion to the relative investment of each equal to a return of 5 per cent per annum, the company's investment being fixed at the par value of capital stock issued, $30,000,000, less any unpaid installments.
8. Payment to city equal to the difference between the 5 per cent paid to the city and the total amount of interest and sinking-fund charges on its investment in transit facilities.

It was provided further that all these payments should be cumulative. In the case of the first five items payments should be cumulative in the order named and should be made before the application of gross revenue in subsequent years to current payments. But deficits in Items 6, 7 and 8 should not be made up out of subsequent gross revenue until all current payments in any year were made and the initial surplus restored, and then any deficit in Item 7 should be made up before deficits in Items 6 or 8.

The commission objected to this arrangement, however, upon the ground that the payments to the city under Item 6, now amounting to nearly a million dollars a year, should be paid before any dividends were declared and should not be "postponed." That the priority of Item 7 would exist only in an emergency period and that even then the city could receive a return commensurate with the company's dividends apparently did not in the commission's mind justify any concession on the city's part. It was asserted that the 1907 contract specifically prohibited any preference for dividends over the sinking-fund payments, although the commissioners elsewhere were quick to assert their refusal to approve even by indirection the 1907 contract.

Moreover, the commission alleged that the very right of the company to a 5 per cent dividend on $30,000,000 of stock had not been established. This phase of the case relates not only to the objections made against the financial arrangement noted above, but also to those presented against the rate-making basis of the lease. The commission on the latter point objected to the adoption of a fare revision plan without a valuation to determine the proper initial fare. This idea was brought out in various ways. For example, the main report said:

"We cannot approve of the method proposed for increasing or lowering the rate of fare. To do so would in effect be determining that the initial rate is just and reasonable. This the commission declines to do except in accordance with the methods and upon consideration of the principles recognized by the public service company law."

According to the concurring opinion of Commissioner McClure, an indirect approval of the 1907 contract and the provisions for the revision of fares would evidence "assent to all the rentals and other obligations of the transit company to its underlying companies, amounting to $7,365,900 per annum, being used in the making of a rate base regardless of the real value of their properties used and useful in the transportation of passengers." But, in his opinion, nothing in the contract would prevent the commission upon complaint from fixing a reasonable rate based upon fair value. Commissioner Rilling in concurring raised the same issue.

Power for St. Paul Electrification

More than 15,000 hp. is to be delivered the latter part of this year by the Washington Water Power Company, Spokane, for the electrification of the Chicago, Milwaukee & St. Paul Railway from Avery, Idaho, to the Columbia River. The contract for the power was made some time ago with the Intermountain Power Company. The electrification has been delayed, for under the contract 10,000 hp. was to have been utilized by this time. At the Long Lake plant an additional unit of 16,500 hp. is in process of installation, to meet the requirements of the Milwaukee contract. Indicative of the growth of the electric railroad business, there is a showing that for the calendar year 1916 the company produced 163,000,000 kw.-hr.; in 1917, 188,000,000 kw.-hr.; and for the twelve months ending Nov. 30, 1918, 194,500,000 kw.-hr.

Why the Milwaukee Men Struck

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has publicly disclaimed that it is trying to dictate the form of revenue increase to be granted the Milwaukee car lines by the Railroad Commission of Wisconsin. The company says that it merely asks the commission to decide the matter in time to prevent a threatened strike of trainmen on Feb. 1. With respect to the recent short strike the company says:

> That strike was ordered by majority vote of the transportation department members of the Employees' Mutual Benefit Association. Their vote was taken by the Australian secret ballot system. The majority of votes cast for a strike was large.
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> The company knew the men were entitled to the wage increase they demanded, and said so frankly. It also told the men it was unable to pay the increase, without robbing its stockholders of all wage on their investment, unless increased car earnings could be obtained.
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> The Employees' Mutual Benefit Association, through its own independent audit of the company's books, was satisfied that what the company said was true. Nevertheless, the men struck. The company will be unable to prevent them from striking again on Feb. 1, if their January wage increase is not continued. Contrary statements are incorrect. Upon this point, as upon every other detail of the company's affairs, it welcomes the most searching investigation by any impartial organization or committee representing the public.

All the electric company's employees, except the executive officers, are hired by the employment office of the Employees' Mutual Benefit Association, under its contract with the company. All such men, if permanently employed, must become members of the Employees' Mutual Benefit Association, just as in a "closed shop" of any kind all workers must be or become members of the unions which supply employees.

Intervention of a committee of the Milwaukee Association of Commerce was largely responsible for the settlement of the recent strike. That association obtained the views of the men, the company and the commission and on the evening of the first day of the strike induced the company to pay during the month of January the increased wages asked by the men. The business men's committee in return promised to use its best efforts to have the commission render a decision by Feb. 1.

The company says that to prevent a renewal of the strike on Feb. 1 the commission only has to decide whether or not the company can afford to pay the increased wages out of earnings. If the commission says the company cannot pay the increase out of its earnings, presumably fares will be increased.

The alternative is for the commission to rule that the company has sufficient revenue out of which to pay the men an additional $460,000 a year. In this event the company will continue to pay the wage increase. There will be no strike as the company, if the decision is unfavorable to it, will have the privilege of appealing to the courts on the grounds that its property is being confiscated.

Some Columbus Problems Remain Unsettled

Redemption slips issued to passengers of the Columbus Railway, Power & Light Company, Columbus, Ohio, while a straight 5-cent fare was charged, are giving the new board of directors and officers of the company considerable concern. The aggregate liability under these redemption promises is about $75,000. Passengers are filing the slips with the company and asking for their money under the promise which was made when the reorganization was effected recently. Representatives of the Federal War Labor Board, who visited the city recently to learn how the company is meeting the increased wage problem, insist that the redemption slips be held in abeyance until the back pay due employees is made good. An official order from the board touching upon this is expected soon.

Charles E. Kurtz, president of the company, has announced that the directors want to redeem the slips, but that the attitude of the War Labor Board will make delay necessary. He has asked the people to be patient and has explained that an attempt will be made to arrange to exchange the slips for tickets at the old rate of eight for a quarter with universal transfers.

A decision was reached recently to the effect that the stockholders at the annual meeting will not adopt blanket resolutions indorsing the acts of the directors. This would put the stockholders on record as not in sympathy with some of the recent moves of the management that resulted in public criticism of the company.

Attorneys for some of the stockholders are still gathering data to be presented in case of future hearings on the Slaymaker receivership case. This case was left open in order that certain features of the management by the Clark Management Company may be considered further, if necessary.

Boston Freight Terminal Destroyed

A tank containing more than 2,000,000 gal. of molasses collapsed at Boston, Mass., on Jan. 15, killing at least eleven persons, injuring many others and destroying most of the electric freight terminal owned by the Boston Elevated Railway on Commercial Street and operated under lease by the Bay State Street Railway and Boston & Worcester Street Railway.

The collapse of the tank sheared off one column and bent two others supporting the elevated railway structure passing the site of the disaster, causing the fall of two spans and forcing the immediate suspension of traffic on both north and south tracks of the rapid transit lines connecting the two principal railroad terminals of the city.

An elevated train had just passed when the disaster occurred. No employees of the railway companies lost their lives, but several of the Bay State force on the premises were injured. The Boston company lost two cars, and several other cars are being salvaged from the wreckage of molasses and building debris which covers the district.

The brick office building of the freight terminal escaped with little or no injury. It has not been decided whether the terminal will be restored, as it was established in large measure to facilitate the handling of molasses from the waterfront to the plant of the United States Industrial Alcohol Company, Cambridge, active in munitions work.

Fort Collins M. O. Plans Maturing

The city of Fort Collins, Col., with a population of 13,000, at an election held on Jan. 7, voted five to one on a $100,000 bond issue to purchase the local property of the Denver & Interurban Railroad, referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 25, page 204. The railroad went into the hands of a receiver last spring. This system comprises 7.51 miles of operative line, about 5 miles of which are within the city.

The property, consisting of all the tracks, both in and out of the city, carhouses and considerable other equipment, is being purchased by the city for $75,000, on a junk valuation basis. The old cars, although in excellent shape, are considered heavy for the local conditions and will be sold. A portion of the line also is to be junked. The 300-kw. rotary converter, formerly used, will be sold and replaced by a 75-kw. motor generator. Four lightweight safety cars will be operated in place of the old heavy ones.

An interesting feature in connection with financing the purchase is that the municipal purchase bonds bearing 5 per cent will be sold locally in denominations of $50 and $500. It is the intention of those in charge to give the bonds the widest possible local distribution in order to create a better spirit of co-operation among the citizens. Officers of the city were advised by bond dealers that the bonds, to be salable on the market at par, would have to bear 5½ per cent interest. One citizen has applied for one-half of the issue.

Expediting Seattle Purchase

The State Supreme Court of Washington has set Feb. 7 for the hearing on the appeal in the case to restrain the city of Seattle from completing the purchase of the railway property of the Puget Sound Traction, Light & Power Company. Corporation Counsel Walter F. Meier applied for an early hearing. In two actions brought in the King County Superior Court to prevent the completion of the railway purchase, the court decided in favor of the city, and the case was appealed. The consummation of the purchase is awaiting the disposition of the friendly court proceeding now in progress.

Twin City President Explains Predicament

Horace Lowry, president of the Twin City Rapid Transit Company, addressed a mass meeting at Lake Harriet on Jan. 13 on the railway problems before the company in Minneapolis and St. Paul. He outlined frankly the present predicament of the company, showing the inability to give satisfactory service in a constant effort to keep out of a receiver's hands, and the need for a cost-of-service franchise to insure its maintenance in the future. In this connection he said:

> The street car service to-day is admittedly far below what it has been. It cannot be improved under the present conditions. With the revenue to-day it is a problem to operate the lines on the present reduced service scale. Last year we operated on a basis of 2,800,000 car-hours, meaning actual time that cars were in operation. The year before the total was 3,500,000 hours.

Mr. Lowry said that he could not suggest a satisfactory fare increase, one which would mean sufficient revenus to operate the lines efficiently. This was due, he said, to uncertainty as to the actual amount of revenue increases to 6, 7 or 8 cents would bring.

Should the new franchise be adopted in which the company would turn over all surplus over and above a reasonable return on the money invested and the cost of depreciation, Mr. Lowry suggested that 75 per cent should go to the city and the remaining 25 per cent go to the corporation. The surplus could be used to allow ultimate fare reductions, he declared, and to build extensions. In conclusion Mr. Lowry said:

> We have no secrets. Our books are always open. Our one big purpose is to serve the people. Our second purpose is to give the men who have money invested in a company a reasonable return on their investment.

San Francisco Encroachment Case Before Supreme Court

United States Senator Hiram W. Johnson has been requested by the city of San Francisco, Cal., to represent it as its advocate when the suit of the United Railroads against the San Francisco Municipal Railway for paralleling its tracks on Market Street is heard before the United States Supreme Court in Washington in February.

Mayor Rolph of San Francisco was recently quoted as follows:

> Senator Johnson is not only one of the nation's foremost champions of municipal ownership. but is a man who always has the interests of San Francisco at heart. He has been a loyal friend of the Municipal Railway here. Personally I believe the city will have just cause for congratulation if it succeeds in getting him to be its spokesman in this suit.

The suit pending before the United States Supreme Court promises to be a major legal combat. While not a part of the suit, damages asked against the city by the United Railroads for $6,870,130 are indirectly involved.

As noted in the ELECTRIC RAILWAY JOURNAL for Jan. 25, page 201, the Superior Court recently upheld the city's demurrer in this case, stating that any damage resulting to the value of the franchises of the United Railroads had arisen as a result of rightful competition by the city and that the loss did not constitute a cause of action.

Paris Employees Strike

Cable dispatches from Paris dated Jan. 25 announced that the strike on the transportation lines of that city had come to an end after the government had announced it would requisition transport facilities.

The employees of the subway and surface railway companies adopted a resolution declaring they had decided "to respond to the requisition," it being understood that negotiations will be opened immediately with the companies or the government, which has substituted itself for them. Work was resumed progressively.

The employees of the Metropolitan subway earlier in the day put forward these demands: Permanence of work, eight hours a day after demobilization, an increase in wages of 2 francs daily, an annual vacation of twenty-one days with pay, a minimum pension of 2000 francs a year after twenty years of service, back pay of 3 francs daily on account of the high cost of living from Oct. 15, 1917, to July 1, 1918.

St. Louis Mayor Defended

Mayor Henry W. Kiel of St. Louis, Mo., apparently has as many defenders as detractors of his action in settling tax matters with the United Railways, to which reference has been made before in the ELECTRIC RAILWAY JOURNAL. The opposition was quick and loud in voicing its protest, but the element that is accustomed to withholding its opinion until it has inquired carefully into the merits of such controversies as come before it is making its strength felt. A resolution of confidence in the Mayor adopted by representative business men follows:

> We, the undersigned, interested in St. Louis and its prosperity, and in its good name for fair and honest dealing with its citizens who invest in its public service corporations, beg to assure you that we most heartily approve of, and thank you for, the recent agreement made with the United Railways and the spirit which actuated you in making it.
>
> You have been watchful of the city's interest, with no desire to play the demagogue or the destroyer of other people's property, and you have made a good, fair, honest settlement with the railways.
>
> We feel you are entitled to and will receive the approbation of the people of St. Louis. As taxpayers in St. Louis, we are thoroughly content to leave our interests in your hands.

For the convenience of the committees representing the Board of Aldermen and the Chamber of Commerce, President Richard McCulloch and General Counsel T. E. Francis of the United Railways, have issued a statement of facts in regard to settlement of litigation between the company and the city. This statement discusses the mill tax litigation, franchise agreements and sets forth the reasons for and terms of the recent settlement between the company and the city.

News Notes

Increase in Wages in San Juan.—The board of arbitration has awarded motormen and conductors of the Porto Rico Railways, Ltd., San Juan, P. R., an increases in wages of about 40 per cent, in settling the strike which began on Thanksgiving's Day.

Minor Changes in Oakland Grant.—The matter of a resettlement franchise for the San Francisco-Oakland Terminal Railways, Oakland, Cal., which has been referred to previously from time to time in the ELECTRIC RAILWAY JOURNAL, has not yet reached a final conclusion. During the last month or six weeks the franchise has been in the hands of a committee consisting of officials of the city of Oakland. This board is understood to have made a few minor changes in the grant.

Knoxville Wages Increased.—Trainmen in the employ of the Knoxville Railway & Light Company, Knoxville, Tenn., have been granted wage increases by a decision of the War Labor Board. The new wage scale is: 36 cents for the first six months; 38 cents for next three months and 40 cents for the time thereafter. The new scale will be retroactive from Aug. 3, 1918. The old wage scale allowed conductors 22 to 29 cents an hour according to the length of service with an additional 2 cents an hour bonus, when the employees worked continuously for twenty-eight days in the month.

Arbitration in Washington. — All questions in dispute between the Washington Railway & Electric Company, Washington, D. C., and 700 of its union employees, including recognition of the union, will be submitted to the National War Labor Board for arbitration and settlement. In accordance with the terms of a resolution adopted by the directors of the company, W. F. Ham, president, was willing to proceed at once to the discussion of any of the questions raised in the contract, but the committee of the employees stated it was only empowered by the union to sign the contract, which had been adopted at the recent mass meeting of the company's union employees.

Governor in Role of Accelerator.—A conference between Governor Smith of New York and the members of the Board of Estimate of New York City was held in Mayor Hylan's office on Jan. 25 at which the letter of the Public Service Commission to the Governor, complaining of the board's refusal to grant appropriations for rapid transit work, was thoroughly discussed. Apparently the results of the meeting were not highly satisfactory. The Governor, when asked about it, said: "There are two sides to the question. I can't make any decision. The only thing I can do is to urge both sides to stop quarrelling and get together; and vote the necessary appropriation to finish the subway."

Brooklyn Venue Change Allowed.—The five officials and the motorman of the Brooklyn (N. Y.) Rapid Transit Company who were indicted for manslaughter as a result of the wreck in the Malbone Street tunnel of the road in Brooklyn on Nov. 1 last, when almost 100 persons were killed, were granted a change of venue to Nassau County on Jan. 21 by Justice Stephen Callaghan of the Supreme Court in Brooklyn. The five officials and the motorman were to have been tried on the charge of manslaughter on Jan. 6 last, but the cases were postponed when they applied for a change of venue. Mineola, where the cases will be tried, is easy of access from Brooklyn over the Long Island Railroad.

Texas Going In for Regulation.—Senator Dorough has introduced a bill in the Texas Senate placing all public utility corporations, including electric railways, under control of the Railroad Commission of Texas. This bill is arousing strong opposition from Dallas, Fort Worth, Houston and other cities of the State that have exercised control over their local railways. It is maintained that State control would result in unified regulation that would destroy the efficiency of the individual systems. An amendment has been proposed that would not make the bill applicable in cities of more than 50,000 population, but this amendment does not satisfy the opponents of the measure, who want the act killed.

Bill to Protect Women Workers.—Assemblyman James H. Caulfield, Jr., of Brooklyn, at the request of the Women's Joint Legislative Conference, on Jan. 24, introduced a bill in the Legislature similar to the one which Senator Lockwood offered a few days ago regarding the hours of work of women on surface, elevated and subway cars. The measure limits the hours of women transportation workers to nine consecutive hours a day and provides for one day's rest in seven and no night work after 10 o'clock. Certain sanitary facilities are made compulsory. It also seeks to eliminate the "swings," and provides that the women should be paid from the time they report for work, whether or not they are immediately sent out on "swing."

Program of Meeting

Southwestern Electrical & Gas Association

Galveston, Tex., has been selected as the convention city for the Southwestern Electrical & Gas Association, according to announcement made by H. S. Cooper, Dallas, secretary of the association. The convention will be held between April 15 and June 10, the exact date to be chosen later.

Financial and Corporate

Receivership in Birmingham

Municipal Attacks Principal Factor in Destroying Credit of Railway, Light & Power Company

The Birmingham Railway, Light & Power Company, Birmingham, Ala., has gone into the hands of Lee C. Bradley as receiver. The appointment was made by Judge Grubb of the Federal Court in that city. This is the third property under control of the American Cities Company for which a receiver has been appointed within the last few weeks. The others are the New Orleans Railway & Light Company and the Memphis Street Railway.

PARENT COMPANY FILED PETITION

The appointment at Birmingham was made on the application of the American Cities Company. The receivership was asked in equity to safeguard the interests of the bondholders and creditors of the company. It is not a bankruptcy proceeding. The credit of the company has been destroyed largely through demands made upon the company from the local city administration. One of the previous creditors of the company on receipt of a recent order for goods notified the company that "due to existing local conditions the shipment would not be made unless cash was guaranteed."

Attached to the receivership application was the resolution of the City Commission of Birmingham in which it was outlined that the company must meet certain fixed requirements in the operation of the railway lines. The company considered these requirements to be unduly burdensome.

The total bonded indebtedness of the company is set out in the complaint to be $16,991,000, which includes $2,000,000 of short-term notes and $1,000,000 of bonds of the Tidewater Company.

The company has failed to pay any dividends on its common stock since 1914. In that year 6 per cent was paid. A 6 per cent dividend was paid on the preferred stock through 1914, but in 1915 only 3 per cent was paid. In 1916 and 1917, in addition to the regular 6 per cent on preferred stock, an additional dividend of 1 per cent was paid on account of arrears.

DETAILS OF ORGANIZATION

The Birmingham Railway, Light & Power Company was incorporated under the laws of Alabama on June 6, 1901, as a consolidation of the Birmingham Railway, Light & Power Company, the Birmingham Gas Company and the Consolidated Electric Company. About 86 per cent of the common stock and 80 per cent of the preferred stock is owned by the American Cities Company.

The Birmingham Tidewater Company, which is owned by the Birmingham Railway, Light & Power Company, was incorporated on Sept. 1, 1916, to take over the Birmingham Ensley & Bessemer Railway. The Tidewater Company was acquired by the Birmingham Railway, Light & Power Company on Feb. 26, 1917. The capital stock of the Tidewater Company is $325,000, with a property investment of $1,807,566, and a funded debt of $1,500,000.

Receiver for Providence

Company Operating All Rhode Island Lines Succumbs Under War-Time Conditions

Frank H. Swan, an attorney of Providence, R. I., on Jan. 30 was appointed temporary receiver of the Rhode Island Company, Providence. A hearing on the question of making the receivership permanent will be held on March 4. This action was taken by Justice Tanner in the Superior Court on petition of John J. Orr, Providence, a contractor, whose bill of complaint alleges that the company owes him $605; that it is unable to pay its bills, and is insolvent.

The affairs of the company have been before the public in one form or another for the last two or three years. War prices on labor and material have forced the company to seek aid wherever it could be found. A special commission of the last General Assembly found conditions desperate.

The Public Utilities Commission authorized a substantial increase in fares, but the extra revenue failed to cover increasing expenses. Among the largest of these expenses was an increase granted to employees by the War Labor Board. More recently, as noted on page 247 of this issue, the city and State authorities decided again to inquire into the affairs of the railway company with a view to recommending help for the company.

The inability of the company to pay rentals totaling $147,500 due to the United Traction & Electric Company on Dec. 24 resulted in the latter company making a demand for the payment of the same before Jan. 26. This matter was satisfactorily compromised, however, under an arrangement whereby the Rhode Island Company made a payment of $100,000 on Jan. 22 and was allowed an indefinite period of grace in which to pay the remaining $47,500. The sums represented payments on three leases.

Still more recently the general treasurer of the State of Rhode Island, as required by law, notified the Attorney-General of the failure of the company to pay its franchise tax approximating $125,000 and due on Oct. 1 last.

Under proceedings in the New Haven dissolution case, the railroad agreed to dispose of its electric railways. Federal trustees have since administered the Rhode Island property. The company operates 400 miles of line.

$22,500,000 Financing

New Jersey Corporation Outlines Plan for Meeting Maturing Obligations, Floating Debt and Capital Needs

The Public Service Corporation of New Jersey, Newark, N. J., has completed plans for comprehensive financing. It was necessary to procure $22,500,000 in order to put the corporation in a position to meet its collateral notes, amounting to $7,500,000 at par, maturing on March 1 next; to pay off all the other unfunded and floating indebtedness of the corporation, and to provide it with sufficient fund for its capital requirements for the current year. Subject to the approval of the shareholders of the corporation, at a meeting called to consider the plan, to be held on Feb. 10, the financing has been worked out in the following manner:

> The board of directors at its meeting on Jan. 28 authorized the creation of an issue of 8 per cent cumulative preferred stock to the authorized amount of $50,000,000, at par, that being the authorized amount of the existing capital of the corporation. The condition of the money market at the present time made it essential to make this stock an 8 per cent stock, in order that it might have proper selling quality, but it is provided that the corporation may, upon proper notice, redeem so much of this authorized issue of preferred stock as may from time to time be issued and outstanding at 110 per cent of its par value. This will serve to protect the corporation against the permanent existence of an 8 per cent preferred stock, should financial conditions return to a normal basis.
>
> When the necessary legal machinery shall have been complied with it is proposed to offer to the existing shareholders of the corporation $12,500,000 of gold collateral three-year 7 per cent notes of the corporation, to be secured by $14,000,000 at par of the general mortgage bonds of the corporation and $5,000,000 at par of the stock of the Public Service Electric Company belonging to the corporation. These notes are to be offered to the shareholders at 98½ per cent of their par value, and may be converted into the 8 per cent preferred stock of the corporation, at the option of the holders thereof, any time prior to Dec. 1, 1921.

A syndicate has been formed by Messrs. Drexel & Company, Philadelphia, and Bonbright & Company, Inc., New York, which has agreed to take such of these notes as may not be taken by the shareholders. It is simultaneously proposed to offer to the existing shareholders the right to subscribe pro rata to $10,000,000 at par of the new preferred stock.

The corporation will thus be entirely free from unfunded debt, except as to the new collateral gold note issue above referred to. It is expected that during the life of the notes either all or the major portion of them will be converted by the holders into the new preferred stock. If all are converted the corporation will be entirely free from unfunded debt, with a large amount of free and available assets in its treasury.

$3,000,000 Loan Approved

Brooklyn Receiver Authorized by Court to Arrange for This Sum for Immediate Use

Federal Judge Julius M. Mayer on Jan. 27 authorized Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, to borrow $3,000,000 for immediate use with such resources as he has. Judge Mayer said that he would appoint E. Henry Lacombe, retired judge of the United States District Court, as special master to determine conditions affecting the issue.

The chief assets upon which the loan by the receiver can be based is $5,000,000 in 4 per cent refunding first mortgage bonds of the Brooklyn Rapid Transit Company in its treasury. The receiver expressed confidence in his ability to meet obligations as they develop.

Interest amounting to $539,000 on first mortgage bonds of the Brooklyn Union Elevated Railroad and the Kings County Elevated Railroad, subsidiaries of Brooklyn Rapid Transit Company, will be due on Feb. 1. A default on this interest might lead to a foreclosure suit that would jeopardize the dual subway contract.

Interest on paper in banks amounting to $40,000 is past due. The Brooklyn Rapid Transit Company has outstanding bank loans amounting to $3,800,000. Other interest payments will become due soon. A number of lawyers representing banks and Mr. Bogue of the War Trade Board, which holds $17,000,000 in notes, spoke in behalf of these claims.

The receiver said that it was his intention to pay interest on loans, but he would not renew the loans in a form that would make them obligations against the receivership. The lawyers assented to this and were in agreement that their clients would not press the receiver to put up additional collateral.

Some concern was expressed about the effect on existing collateral if the 4 per cent Brooklyn Rapid Transit bonds in the receiver's possession are put on the market. The receiver said he would not take this course without giving notice to the creditors.

Epidemic Effects Earnings

Operating Ratio for October for Country Reaches 80 Per Cent, Establishing New Record

The effect of the influenza epidemic on the receipts of electric railways is plainly shown in the comparative figures for October, 1918 and 1917, made public by the information bureau of the American Electric Railway Association.

Not only was there a decrease of 45.43 per cent in the net earnings of the companies, but for the first time since the association began the publication of statistics an actual decrease in the operating revenues per mile of line was shown. For the United States this amounted to 6.74 per cent. At the same time operating expenses continued to mount, there being an increase of 13.16 per cent. The consequence was an operating ratio for the country of 80.12, which again establishes a high record, the highest preceding operating ratio being that for January, 1918, which was 73.60 per cent.

SOME HARDSHIPS SUFFERED

Thus in 1918 the railways, in addition to the adverse conditions brought about by the war, were subjected to the hardships entailed by the severe weather of January, February and March, which not only greatly increased operating costs but cut down travel as well; the large increases in wages caused by the decisions of the National War Labor Board and an epidemic, which as previously stated caused an immense falling off in the number of passengers carried.

The Southern District makes the worst showing. This was to be expected, however, in view of the virulence of the influenza in that section of the country. Here operating revenue decreased 23.19 per cent while net earnings showed a decrease of 64.55 per cent. The operating ratio rose to 81.04 per cent. For the Western District the decrease in operating revenue was 9.07 per cent, the decrease in net earnings 48.15 per cent, and the operating ratio 78.53 per cent. The Eastern District showed a 4.21 per cent decrease in operating revenue, a 42.35 per cent decrease in net earnings, and an operating ratio of 80.38 per cent.

NOT SO BAD IN SOUTH

If the Southern District had experienced the same increase in operating expenses as did the Eastern and Western Districts its net earnings statement would have been even worse than it was. In the two latter districts the increase in operating expenses was more than 14 per cent, while in the former it amounted to but 5.65 per cent. This may in part be accounted for by the fact that wage awards of the National War Labor Board have been effective in more instances in the East and West than in the South.

How much better showing the returns for November will indicate is problematical. It will be remembered that the influenza was active in both months and that while it was perhaps at its height in October the situation was by no means entirely cleared up in November.

UNUSUAL CLASSIFICATION FOLLOWED

The returns from the city and interurban electric railway companies, as shown in detail in the appended tables, have been classified according to the following geographical grouping: Eastern District—East of the Mississippi River and north of the Ohio River. Southern District—South of the Ohio River and East of the Mississippi River. Western District—West of the Mississippi River.

COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR OCTOBER, 1918 AND 1917

Account	United States				Eastern District				Southern District				Western District			
		Per Mile of Line				Per Mile of Line				Per Mile of Line				Per Mile of Line		
	Amount, October 1918	1918	1917	% Increase Over 1917	Amount, October 1918	1918	1917	% Increase Over 1917	Amount, October 1918	1918	1917	% Increase Over 1917	Amount, October 1918	1918	1917	% Increase Over 1917
Operating revenues	$8,492,548	$1,771	$1,899	†*6.74*	$6,755,750	$1,978	$2,065	†*4.21*	$586,129	$1,176	$1,531	†*23.19*	$1,150,669	$1,304	$1,434	†*9.07*
Operating expenses	6,806,731	1,419	1,254	13.16	5,428,526	1,590	1,392	14.22	474,920	953	902	5.65	903,285	1,024	894	14.54
Net earnings	1,685,817	352	645	†*45.43*	1,327,224	388	673	†*42.35*	111,209	223	629	†*64.55*	247,384	280	540	†*48.15*
Operating ratio, per cent	1918, 80.12; 1917, 66.03				1918, 80.38; 1917, 67.41				1918, 81.04; 1917, 58.92				1918, 78.53; 1917, 62.34			
Av. No. miles represented	1918, 4,795; 1917, 4,722				1918, 3,415; 1917, 3,409				1918, 498; 1917, 448				1918, 882; 1917, 865			

COMPANIES REPORTING TAXES

Account	United States				Eastern District				Southern District				Western District			
Operating revenues	$4,870,077	$1,680	$1,738	†*3.34*	$3,734,552	$1,818	$1,843	†*1.36*	$9,648	$546	$591	†*7.61*	$1,125,877	$1,361	$1,497	†*9.08*
Operating expenses	4,042,564	1,394	1,230	13.33	3,154,863	1,536	1,359	13.02	9,392	531	482	10.17	878,309	1,061	921	15.20
Net earnings	827,513	286	508	†*43.70*	579,689	282	484	†*41.74*	256	15	109	†*86.24*	247,568	300	576	†*47.92*
Taxes	376,067	130	121	7.44	288,963	141	130	8.46	192	11	13	†*15.38*	86,912	105	100	5.00
Operating income	451,446	156	387	†*59.69*	290,726	141	354	†*60.17*	64	4	96	†*95.83*	160,656	195	476	†*59.03*
Operating ratio, per cent	1918, 82.98; 1917, 70.77				1918, 84.49; 1917, 73.74				1918, 97.25; 1917, 81.56				1918, 77.96; 1917, 61.52			
Av. No. miles represented	1918, 2,900; 1917, 2,878				1918, 2,055; 1917, 2,050				1918, 18; 1917, 18				1918, 827; 1917, 810			

†Indicates decrease.

Boston Doing Better

The net earnings of the Boston (Mass.) Elevated Railway for December were only about $150,000 less than "cost of service," which compares with a $500,000 loss in November and nearly $800,000 loss in October. December's proportion of dividends was $116,997, which of course means that nothing was earned toward dividends in the month. Charges, however, were very nearly covered, for the first month since the property has been operated by the public trustees.

The receipts and number of revenue paying passengers in the six full months of public operation are as follows:

	Fare	Fare Receipts	No. of Passengers
July..............	5-cents	$1,525,538	30,510,760
August...........	7-cents	1,915,261	27,360,870
September........	7-cents	1,722,738	24,610,540
October..........	7-cents	1,688,494	24,121,340
November........	7-cents	1,919,914	27,427,340
December........	8-cents	2,234,532	27,931,650

The Boston *News Bureau* regards the improvement as progressive. That paper says:

> While the road may soon be able to write in black figures the results of operation under an 8-cent fare, there is no sound basis for the belief that an 8-cent fare will very quickly make up any material part of the $3,274,467 deficit accumulated in the six months to December, inclusive. Eventually, with materials and operating costs generally lower, 8 cents may yield a good surplus. But for the time being the State guarantee will be needed.

Sale Postponed

Charles J. Finger, Delaware, Ohio, receiver of the Columbus, Magnetic Springs & Northern Railway, reports that the proposed sale by him of the property of that railway was postponed from Jan. 15 to a date not yet fixed by the court.

Financial News Notes

Discontinuance Allowed.—The Railroad Commission of California has authorized the Los Angeles & San Diego Beach Railway, Los Angeles, Cal., to discontinue its railroad service, having been shown that receipts from operation are insufficient to pay operating expenses.

Bondholders Buy Road.—The right, title, interest and franchise of the Carbon Transit Company, Mauch Chunk, Pa., were sold on Jan. 20 on a second mortgage claim of $100,000. Believing the company to be hopelessly involved the second mortage creditors have been agitating for their money for some time and the court appointed William Dobbs and Grant S. Mushlitz, Mauch Chunk, as receivers. The property was bought in behalf of the receivers who represent the second mortgage bondholders, the purchase price was $5,000, subject to the first mortgage of $150,000 and a number of claims for taxes, wages and liens, aggregating $20,000.

Connecticut Line Threatens Abandonment.—The Shore Line Electric Railway, which operates from New London north through Norwich, Baltic and Willimantic to South Coventry, has threatened to discontinue that part of the line between Baltic, Willimantic and South Coventry unless the present General Assembly grants it some measure of relief. The company says that the part of the road referred to has been run at a loss for the past year, due to poor patronage, increased wages and taxes which it regards as excessive. The Chamber of Commerce of Willimantic, the population of which has remained practically stationary for more than a decade, has taken the matter up.

Deposit of New Orleans Bonds Asked.—The holders of New Orleans Railway & Light Company 4½ per cent general mortgage, gold and other bonds affected by the default and receivership are invited to deposit their bonds with coupons due on Jan. 1, 1919, with the New York Trust Company, Hibernia Bank & Trust Company, New Orleans, La.; Commercial Trust & Savings Bank or the Interstate Trust & Banking Company, New Orleans. Negotiable certificates of deposit will be issued for deposited bonds. Application will be made to list such certificates on the several stock exchanges where the bonds are now listed.

Philadelphia Company Financing.—Shareholders of the Philadelphia Company, Pittsburgh, Pa., are being asked in a circular to send their proxies to a committee in order to secure enough stock to authorize the carrying out of the company's financial plan, which calls for authorization of a mortgage upon the property to secure $30,000,000 of bonds which will be used as collateral for an issue of $15,000,000 of 6 per cent notes. It is proposed, however, to sell only $10,000,000 of these notes in the immediate future for refunding purposes. The special meeting of shareholders will be held on Feb. 3. The proxy committee consists of Charles Hayden, chairman, Benjamin Guinness, Everett B. Swezy and Eugene V. R. Thayer.

Electric Railway Monthly Earnings

BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$25,505	*$14,785	$10,720	$3,976	$6,744
1m., Nov., '17	20,518	*9,907	10,611	3,611	7,000
12m., Nov., '18	261,797	*140'916	120,881	46,069	74,812
12m.' Nov., '17	230,584	*115,717	114,867	42'662	72,205

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$6,443	*$9,361	†$2,918	$1,425	†$4,343
1m., Nov., '17	8,511	*9,858	†1,347	1,285	†2,633
12m., Nov., '18	104,214	*118,105	†13,891	16,710	†30,601
12m., Nov., '17	124,194	*123,927	267	14,556	†14,289

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$49,235	*$37,075	$12,160	$6,528	$5,632
1m., Nov., '17	42,612	*28,256	14,356	6,468	7,888
12m., Nov., '18	507,951	*382,584	125,367	78,409	46,958
12m., Nov., '17	458,245	*293,237	165,008	78,668	86,340

COLUMBUS (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$106,270	*$53,792	$52,478	$34,661	$17,817
1m., Nov., '17	106,369	*37,508	68,861	31,729	37,132
12m., Nov., '18	1,182,908	*555,575	627,333	394,047	233,286
12m., Nov., '17	1,076,629	*408,472	668,157	355,848	312,309

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '18	$87,857	*$64,791	$23,066	$14,934	‡$8,436
1m., Oct., '17	76,333	*45,043	31,290	12,242	‡21,678
12m., Oct., '18	1,086,207	*617,542	468,665	159,567	‡322,138
12m., Oct., '17	925,937	*511,642	414,295	131,953	‡296,284

EL PASO (TEX.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$106,565	*$73,287	$33,278	$6,820	$26,458
1m., Nov., '17	108,205	*68,006	40,199	6,503	33,696
12m., Nov., '18	1,243,797	*859,022	384,775	80,637	304,138
12m., Nov., '17	1,292,396	*789,758	502,638	65,835	436,803

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$241,487	*$177,525	$63,962	$39.431	$24,531
1m., Nov., '17	196,272	*122,876	73,396	38,328	35,068
12m., Nov., '18	2,644,639	*1,795,750	848,889	471,119	377,770
12m., Nov., '17	2,055,027	*1,365,078	689,949	449,166	240,783

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$22,838	*$15,411	$7,427	5,078	$2,349
1m., Nov., '17	25,987	*16,986	9,001	5,075	3,926
12m., Nov., '18	322,007	*217,881	104,126	60,285	43,841
12m., Nov., '17	341,718	*211,220	130,498	61,465	69,033

JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$90,341	*$70,176	$20,165	$16,970	$3,195
1m., Nov., '17	60,939	*42,368	18,571	15,848	2,723
12m., Nov., '18	916,697	*677,588	239,109	197,881	41,228
12m., Nov., '17	690,833	*462,942	227,891	188,581	39,310

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$216,149	*$153,788	$62,361	$27,967	‡$43,976
1m., Nov., '17	270,510	*144,286	126,224	28,259	‡107,548
12m., Nov., '18	2,974,455	*1,864,541	1,109,914	339,454	‡885,459
12m., Nov., '17	2,470,263	*1,399,103	1,071,250	348,390	‡742,025

PENSACOLA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$48,813	*$37,416	$11,397	$8,543	$2,854
1m., Nov., '17	32,129	*18,647	13,482	7,825	5,657
12m., Nov., '18	490,376	*339,145	151,231	98,458	52,773
12m., Nov., '17	342,220	*198,055	144,165	93,503	50,662

TAMPA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$90,807	*$55,158	$35,649	$5,031	$30,618
1m., Nov., '17	78,087	*45,153	32,934	5,334	27,600
12m., Nov., '18	1,046,833	*613,757	433,076	61,226	371,850
12m., Nov., '17	1,004,802	*559,024	445,778	55,401	390,377

* Includes taxes. † Deficit. ‡ Includes non-operating income.

Traffic and Transportation

Patrons Organize Relief

Plan to Do What Commission Recommended But Can't Do and City Has Failed to Do

Prospects seem to be bright for the New York & North Shore Traction Company, Roslyn, N. Y., obtaining through the concerted and voluntary action of its patrons the measure of relief from war-time burdens which has been withheld from it by the officials of the city of New York.

RESIDENTS TO THE RESCUE

Residents of the territory through which the company operates have taken up the matter by enlisting in a campaign to induce the riders voluntarily to pay the company a 7-cent fare. The movement appears to be becoming cumulative in its effect. Conductors reported on Jan. 28 that for the three days ended Jan. 27 they had received on an average 250 7-cent fares a day.

Those behind the movement have had placards printed calling attention to the needs of the company and have had these posted in the cars and at conspicuous places along the route to acquaint strangers with the facts and gain adherents to the cause. In the localities served by the company petitions have been prepared requesting the authorities to authorize the company to collect a 7-cent fare. When these petitions have been filled with signatures they will be presented to the Board of Estimate.

The effort of the company to obtain additional revenue through a fare increase was started early in 1917 in an action before the Public Service Commission. Decision was rendered in January, 1918. The commission held that, due to the agreement of the company with the city, it was powerless to act in the matter. This view of the commission with respect to its authority over fares was later sustained in the so-called Rochester case.

CITY OFFICIALS LISTEN ATTENTIVELY

The agitation in favor of an increase in fare was continued and carried direct to the city officials of New York. In consequence, Mayor Hylan, Comptroller Craig and Borough President Connelly of Queens discussed the case of the company in June before a crowd that packed the courtroom in Flushing.

The declared purpose of this meeting was to hear whether the public desired to pay 7 cents or preferred to have the line abandoned. At the close of this meeting the question was put to a vote. The decision was overwhelmingly in favor of the fare increase. Mr. Connelly explained at this meeting that the application of the company was before the Board of Estimate because the Court of Appeals in the Rochester case had ruled that the Public Service Commission was limited in its rate-making powers by the terms of the municipal franchise contracts and that an increase could be obtained only by a modification of the franchise by the Board of Estimate. Despite their knowledge of the situation confronting the company and their acquaintance with the attitude of the public members of the local administration in New York have taken no action on the matter.

COMPANY THREATENS TO SUSPEND

In September, the company declared that operation would cease unless the city granted financial relief or positively signified its intention to do so at an early date. This threat was renewed by the company recently and patrons of the railway, convinced that the company was entitled to an increase and fearing that service would be suspended, organized to do voluntarily what the Public Service Commission was powerless to do and what the city officials of New York had failed to do through inaction.

New Paper in Buffalo

The first issue of *The Service Spot Light*, published by the newly organized publicity department of the International Railway, Buffalo, N. Y., was issued on Jan. 20. The publication is an eight-page pamphlet issued every Monday. The motto of the publication, printed on the first page is "A White Light on Open Dealings." A feature of the publication is "The Transformer" page, which contains poems and witty paragraphs.

The Service Spot Light is placed in the "Take One" boxes in the cars and in the stations along the company's interurban lines. The object of the pamphlet is to present to the traveling public the company's side of traction problems.

"Our Hero Gallery" is another feature of the publication. Pictures will be reproduced from week to week of the company's men in the military service. The interurban and owl schedules are published together with a page devoted to "What's Doing in Buffalo." The public is invited to send the editor of the publication the numbers of conductors and motormen whose acts of courtesy should receive publicity. The company's lost and found department is featured and space is given to the advantages of the International's interurban express trains and service. The editor is a prominent Buffalo newspaperman.

Los Angeles Running Behind

Commission on Feb. 4 Will Start Inquiry of Relief for Los Angeles Railway Corporation

The Railroad Commission of California has set Feb. 4 as the date for the beginning of its investigation into the affairs of the Los Angeles Railway Corporation. The inquiry was asked by the company in an effort to devise ways and means for meeting its financial troubles and its traffic troubles. The preliminary hearing will be held at the Los Angeles office of the Railroad Commission, and the merits of the case will be gone into by E. O. Edgerton, president of the commission, and Commissioners Brundige and Martin.

Last December the company, after vainly striving to find a means to meet its financial obligations and preserve its standard of service without asking for help in the shape of increased fares, determined to call in the aid of the Railroad Commission. In its petition to the commission it set forth that it had already taken the matter up with the city authorities of Los Angeles and the board had recommended certain service changes that would result in more economical operation. The company says further:

> The company has other suggestions and recommendations to make in the way of retrenchment and desires the benefit of such advice and recommendations as the commission may make after careful study and investigation.

The Los Angeles corporation declares that for some time past it has been sustaining a heavy financial loss because of the increase in wages and in cost of materials. During the last two years, the company says, wages have been increased at least 45 per cent, and the cost of materials from at least 50 to 150 per cent, the increase in wages alone amounting to $1,200,000 a year.

TEN MONTHS' DEFICIT $336,400

According to exhibits filed by the corporation, its gross income for the past ten months has been $5,548,431 and the gross expenses, including operation, depreciation, taxes and interest, $5,744,610, showing $196,178 expenditures in excess of revenue. This does not include $170,221 sinking fund. With this fund added, the total deficit for the last ten months will reach $336,400.

Pittsburgh Service Order Suspended

The Public Service Commission of Pennsylvania has suspended until Feb. 8 the order of Dec. 10 requiring all cars of the Pittsburgh Railways, except summer cars, to be put in condition for use. In the meantime a study of conditions is to be made and the order will be repealed if a decided improvement is shown in the service. Under the original order the company would have to make repairs to nearly 200 cars, which it is claimed are unsuited for operation. The order as now in force requires 1302 cars to be put in use.

International Railway, Buffalo, Prepared

Following Investigation Commission Finds City Lines Fully Equipped for Service Demands

A report of an investigation of traffic conditions in Buffalo has been sent by Chairman Hill of the Public Service Commission for the Second District of New York to Mayor Buck and the International Railway. The commission says the general facilities for rendering railway service in Buffalo have been very substantially improved, and that systematic checks which have been made of the present service indicate that the service is reasonably satisfactory.

COMMISSION POINTS OUT DEFECTS

The commission in a report made to the company on May 22, 1917, pointed out defective facilities and made certain recommendations. Full compliance was delayed for various causes and the improvements contemplated were not effected during the winter of 1917-18. This was one of the causes of the unsatisfactory service last winter, which was aggravated by unusually severe weather conditions.

The report now forwarded to Mayor Buck and the railway by Chairman Hill makes further recommendations to insure good service in Buffalo this winter.

The commission found that one of the important causes of the poor service last winter was insufficient number of cars, principally owing to the large number out of service, damaged and crippled, also the practical breakdown of the mechanical equipment. On Feb. 21, 1918, there were 276 or 42.3 per cent of the cars out of service, damaged or crippled. Inadequate and unsatisfactory service followed, especially during rush hours. The company lost forty-five cars by fire in April and two were retired. The company since that time has received 130 new cars of which 127 have been assigned to the Buffalo service, so that at present there are assigned to the city service 732 cars, a net increase at present, compared with last year, of eighty cars. On Nov. 5 there were 111 cars out of service or 15.2 per cent of the assigned equipment.

SHOP FACILITIES INCREASED

Increased shop facilities and improved methods justify the estimate of the company that 660 cars are available for service in Buffalo. The winter's schedule requires 620 cars, and allowing 10 per cent for cripples and overhaul there will be 659 cars available to meet the city's requirements, or thirty-nine more cars than required.

As far as the number of cars is concerned, the report states that the company seems to be reasonably equipped for the present winter's operations. This improved condition is due in a great measure to the improvements in shops, carhouses and mechanical equipment brought about by compliance with the recommendations of the commission, including rearrangements and additions of facilities in the Cold Springs shop, appliances added in the carhouses, complete reorganization of the mechanical department and an improvement in standard of car maintenance.

Shortage of cars prevented lack of seating capacity last winter during rush hours. To improve this condition the report says:

> The company is making schedules on a basis that, during each fifteen minutes interval of the rush hours, the number of passengers carried past a given point shall not exceed the seating capacity furnished by more than 50 per cent. While the commission does not believe it advisable at this time to establish a precedent by aproval of this basis, yet in some other cities the basis of 50 per cent of standing passengers is exceeded and it is believed that if cars required by a schedule on this basis are run on schedule regularity that the people of Buffalo will receive a materially improved service over that furnished last winter, and one which can be properly classified as reasonable.

The report decides not to recommend a resumption of discontinued night service at the present time. The company is to be allowed further trial of the present night service schedules.

Following the commission's recommendations, 348 cars have been equipped with the modern system of forced draft hot air heating and ventilation and 127 new cars are likewise equipped. The work of equipping the remaining 262 cars has been delayed by reason of the company's inability to secure materials, even if its financial condition would permit. Defects in lighting have been remedied.

The railway has added five modern sweepers and the snow fighting equipment has been overhauled and necessary repairs made. This equipment is considered sufficient and in proper shape, if efficiently utilized, to keep the tracks in condition for service run on schedule regularity except perhaps in extreme and unusually severe storms, and in such cases the duration of interference with operation should be limited.

The commission says that the company is properly equipped with power for this winter's operations.

Houston Must Have More

Review of Fare Relief Case Which Had Its Beginning Last June—City Commission Decision Recalled

The Houston (Tex.) Electric Company is facing financial collapse, according to David Daly, general manager, in an appeal to the public for support of the company's efforts to secure a 6-cent fare. Mr. Daly said:

> The problems facing this company and the disaster which it is struggling to avert are bad enough, viewed only from the standpoint of the company, but it is not alone the company that is involved, for the breaking down of the transportation system would mean a blow to the development of Houston. Our problem is at once the problem of every citizen and taxpayer in Houston.
>
> The Houston Electric Company has long since reached the point where it costs more than 5 cents to furnish a ride. If the company is to live and furnish service to the people of Houston, it must have an increase in fares. That it can continue indefinitely to do business at a loss is obviously impossible.
>
> In an election held in November we were denied an increase in fares. The point was made against us that the public had not been furnished sufficient information as to the value of our property. In order to meet this criticism and as a part of the plan to get this increased fare, which the company must have, we have arranged to have a valuation of our property made at once.

The valuation just referred to will be made by Halford Erickson, Chicago; Robert M. Feustel, Madison, Wis., and Mr. Powers, New York.

Prior to this action, the Houston Electric Company has tried by every means to secure an increased fare, but without avail. Last September, following an exhaustive investigation of the company's properties and operating income, the City Commission of Houston enacted a city ordinance authorizing the company to charge a fare of 6 cents with half-fare tickets for children and students. Upon petition of the required number of taxpayers, the City Commission then suspended this ordinance and submitted it to the people for ratification under the referendum provision of the city charter. At this election, held on Nov. 5, last, the ordinance was defeated. Members of the City Commission considered the results of this election as instructions on the fare question and the ordinance was repealed, and another enacted fixing the fare at 5 cents.

CASE CARRIED TO COURT

The next move made by the traction company was the filing of a suit in the Sixty-first District Court asking for an injunction to restrain the city from enforcing the 5-cent fare ordinance. The company in its petition to the court, which was referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 25, page 208, asked that the city be enjoined from interfering with the company in collecting the 6-cent fare provided in the ordinance passed on Sept. 19 and preventing it from delegating its rate-making powers to any other authority. The company contended that rate-making is a legislative function, which under the charter granted the city of Houston by the Legislature in 1905 was specifically delegated to the governing body of the city of Houston, which in fact is the Mayor and City Commission. It was further contended that the city is without authority to re-delegate this power and that therefore the action of the commission in submitting to the people for ratification the 6-cent fare ordinance was null and void and that this ordinance is still in effect.

The pleading, with numerous exhibits attached, recites a history of the company's negotiations with the city for an increase in fares beginning in June, 1918. It is shown that while the petition for an increase in fare was pending the War Labor Board made a ruling requiring still further increase in wages amounting to approximately $100,000 a year, and that the company amended its original petition by asking for a 7-cent fare in order to enable it to grant this further increase in wages to employees. Acting in good faith in accord with the city ordinance of Sept. 19, the company granted increased wages to its employees, which it was wholly unable to do and earn a fair and just return upon its investment.

Final hearing on the company's petition will be postponed pending a report from the board of engineers appointed to make valuation of the company's properties.

Receiver Wants Citizens to Help

James E. West, Chief Scout Executive of the Boy Scouts of America, has written to Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, suggesting that the receiver "organize a small citizens' committee among those who use each of the various divisions of the lines in receivership, to serve without compensation as advisers to you with reference to improvement in service."

Mr. West said that he was convinced "that men and women of ability would gladly enter into the spirit of such a scheme and render you valuable service, not primarily to increase the dividends of the Brooklyn Rapid Transit Company, but to give the public better service, and this course would mean increased dividends in the long run. Certainly it would serve as a clearing house for the consideration of the merits of various complaints and suggestions which will be made to you."

Mr. Garrison wrote to Mr. West immediately accepting the suggestion, but in somewhat different form from that in which it was made. In his letter Mr. Garrison said:

> I do not think it would be desirable for me to organize the citizens' committee of which you speak, but I would be very glad if such a committee should be organized. I am extremely desirous of rendering the very best service with the facilities under my control, and I recognize the benefit of sensible and well-meaning advice from every source, and I have no doubt that such a committee as you speak of would be of great use to me in the proper execution of my duties. May I venture to suggest that you set about organizing a committee for that purpose, and I assure you that I will work in the fullest co-operation with you and with such committee.

Six Cents in Springfield

The Public Service Commission of Missouri on Jan. 22 advised the Springfield Traction Company that it had granted the company's application for an increase of passenger fares from 5 cents to 6 cents, effective on Feb. 1.

The additional fare was recommended some time ago by a citizens' committee headed by Judge John T. Sturgis, presiding judge of the Springfield Court of Appeals. It was approved by the City Commissioners.

The increase in the fare followed a demand on the part of the railway employees for increased pay as motormen and conductors. A few weeks prior to this demand an increase of 20 per cent had been granted, but the men held that this increase was not in keeping with war-time cost of living. A change in the working hours was also sought in order that the men would work only nine hours a day.

Effective at the same time the increased fare is authorized, the men will receive an increase of wages amounting to about 43 per cent. The total increase will increase the payroll of the company from $95,000 to about $175,000 a year. The men will now receive 36 cents to 40 cents an hour. The installation of pay-as-you-enter cars will enable the company to operate the street cars with practically the same force it now has. One man will be assigned to each car.

There is no change in the transfer system. Children's fares will be 3 cents. The new fare will be effective for a period of six months.

The matter has been carried to a satisfactory settlement through the cordial co-operation of the citizens as reflected in the attitude of the committee appointed from among them. This committee's activities were referred to in the ELECTRIC RAILWAY JOURNAL for Nov. 30, page 988.

Transportation News Notes

Board of Trade Convinced.—The Louisville (Ky.) Board of Trade is said to favor a 6-cent fare after investigating the condition of the Louisville Railway as shown by its earnings and operating costs for 1918.

Proposed Increase Suspended.—The application of the East St. Louis (Ill.) Railway to increase rates in East St. Louis has been suspended until July 20, 1919, by the Public Service Commission of Illinois. The company is now charging 6 cents.

Skip Stops Go in St. Louis.—The skip-stop system of operation put into effect by the United Railways, St. Louis, Mo., on Sept. 22, 1918, as a fuel conservation measure, has been ordered eliminated by the Public Service Commission of Missouri. The order also affects St. Joseph and Springfield.

Rhode Island Hearing Again Postponed.—The Supreme Court of Rhode Island has postponed from Jan. 27 to Feb. 14 the hearing before it on the appeal of the towns of Warwick, North Providence, East Providence, Johnstown and the city of Cranston from the decision of the Public Utilities Commission in granting the Rhode Island Company permission to increase fares.

Organizing Its Own Express System.—The Illinois Traction System, Peoria, Ill., is perfecting plans to organize an express company to operate over the 400 miles of its lines. The tariff schedules are being prepared for filing with the Public Service Commission of Illinois. No express shipments have been handled over the Illinois Traction System since the American Railway Express contract expired.

Schenectady Tariff Further Suspended.—The Public Service Commission for the Second District of New York has passed an order further suspending to and including Feb. 28 operation of the new schedule of passenger rates on all divisions of the Schenectady Railway, the investigation of the reasonableness of the increased fares not having been concluded by the commission. The suspension order previously in force expired on Jan. 30.

Objects to Service Order.—The St. Paul (Minn.) City Railway, included in the system of the Twin City Rapid Transit Company, went into Federal Court on Jan. 23 and procured an order from Judge Wilbur F. Booth, restraining the city from invoking mandamus proceedings to force the railway to comply with the service ordinance adopted by the City Council on Jan. 28, 1918. The petition of the company asks for a temporary injunction against the city, pending a hearing on a permanent injunction.

Rochester-Syracuse Rates Restored.—The Rochester & Syracuse Railroad under special permission of the Public Service Commission for the Second District will restore joint one-way fares in effect prior to Nov. 24 from Clyde, East Rochester, Fairport, Jordan, Lyons, Macedon, Memphis, Newark, Palmyra, Port Byron, Port Gibson, Rochester, Savannah, Warner and Weedsport to Auburn, Baldwinsville, Fulton, Minetto, Oswego and Phoenix on the Empire State Railroad. Reductions are effected.

Freight Service Between Canton and Detroit.—Through freight service has been established by the Northern Ohio Traction & Light Company between Canton, Ohio, and Detroit, Mich. Beginning on Jan. 27 cars will be operated on Monday, Wednesday and Friday of each week until the volume of business warrants more frequent trips. The cars will start from each end of the line in the evening, thus making the greater part of the trips at night. Operation will be over the line of the Lake Shore Electric Railway.

Rate Appeal Matter Undecided.—At the annual meeting of the New Jersey League of Municipalities held at the Municipal Building, Trenton, N. J., on Jan. 22 the matter of appealing to the United States Supreme Court the right of the Board of Public Utilities Commissioners of New Jersey to abrogate municipal franchise contracts was thoroughly discussed. It was decided to refer the matter of appealing the Public Service Railway rate case to the

League's legal advisory committee. The committee will make a report on it later.

Fare Boxes in Washington.—On Jan. 26, cars of the Pennsylvania Avenue line of the Capital Traction Company, Washington, D. C., were equipped with coin-registering fare boxes. It is the purpose of the company to complete the equipment of all its cars with these boxes as soon as they can be obtained. The conductors have been instructed to give passengers, requiring it, the exact change for any amount up to $2. The Washington Railway & Electric Company also installed fare boxes and the prepayment method of collection on Jan. 26. Both companies advertised the change extensively in the daily papers.

Des Moines Fare Hearing Feb. 3.—Judge Martin J. Wade has notified city officials, the Des Moines (Iowa) City Railway, the Harris Trust & Savings Company, and the North American Construction Company that he will hear the petition of the Des Moines City Railway for an increased fare on Feb. 3. According to Judge Wade the hearing will be only on the construction of the terms of the franchise secured three years ago by the City Railway. The company is in the hands of a receiver. It carried its case to the court after failing to obtain some measure of relief from the city from burdens that had become to onerous for it to bear.

Special I. T. S. Commuter Rates.—The Illinois Traction System, Peoria, Ill., is contemplating a special tariff for the convenience of commuters who regularly use the lines between stated points. This tariff, which will probably be put in effect within the next thirty days, will affect the rate between points where the one-way fare is between 15 cents and 90 cents. It will provide for a 20-mile ride commuter's book at a discount of 10 per cent; a forty-ride book at a discount of 20 per cent; and a fifty-two-ride book which will reduce the fare to slightly below 2 cents per mile. The books will be limited to use of the purchaser within the calendar month in which issued.

Indiana Commission Denies Fare Advance.—The Public Service Commission of Indiana has denied the petition of the Hammond, Whiting & East Chicago Traction Company, Chicago, Ill., for an increase in fare from 5 cents to 7 cents. The company filed its petition last August. According to the commission the company is earning 9.03 per cent on $1,168,145, which sum the commission found to be the reproduction value of the property. The figure represents a valuation of approximately $30,000 a mile. The commission estimated that net revenue for 1919 would be $121,029. The commission engineers found the book value of the company to be $2,762,746.

Dayton Fare Concessions Unsatisfactory.—It is rumored that the railways of Dayton, Ohio, will reject the offer of the City Commission for a straight 5-cent fare. Officers say that the proposed means of relief will be of no benefit to them, particularly as there is nothing to prevent the wholesale purchase of tickets at the old rate, should the new ordinance be passed. The City Commission has, however, now amended the ordinance in such a way that tickets will be void when it goes into effect, but a bureau must be established to take over the tickets at cost. One section of the ordinance was rewritten to make it plain that the new grant is only a temporary measure. The companies have ten days within which to accept the ordinance.

A. E. & C. Wants Illinois Commission Restrained.—The Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has brought suit to enjoin the Public Utilities Commission of Illinois from enforcing its maximum fare ruling of 2 cents a mile, pointing out that Judge Landis held that other electric lines operating in Illinois could charge 3 cents a mile. It is alleged that the Interstate Commerce Commission set the rate for electric roads during the war at 2.4 cents per mile, but that the Public Utilities Commission of Illinois continued the 2-cent fare on the Aurora, Elgin & Chicago Railroad and that the Supreme Court of Illinois upheld its power to do so. The present action is similar to others in Illinois to which reference has been made at length previously in the ELECTRIC RAILWAY JOURNAL.

Four-Cent-a-Mile Rate in Effect.—Increased passenger rates went into effect on Jan. 23 on the Southern New York Power & Railroad Corporation's road between Mohawk and Oneonta, under the recent decision of the Public Service Commission for the Second District. The order permitting the increase from 3 cents to 4 cents a mile is on the understanding that application to reopen the order may be made when reasons for the increase in fare no longer exist. The mileage book rate is to be increased from 3 cents, to 3½ cents a mile. New rates do not apply in Oneonta and between Oneonta and Junction and between Herkimer and Mohawk over the New York State Railways' tracks. The decision of the Commission in this case was reviewed in the ELECTRIC RAILWAY JOURNAL for Jan. 11, page 116.

Mr. Ross Retained in Birmingham.—I. W. Ross, vice-president and general manager of the Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., has been retained by the City Commission of Birmingham, Ala., to report on the financial status and operating and physical condition of the Birmingham Railway, Light & Power Company. In a statement which he made Mr. Ross said that he had not been advised and did not know what use the city intended to make of the information he was gathering and that he was not interested in that feature of the matter. In this connection he is quoted as follows: "I am only temporarily in Birmingham for the purpose of collecting information and turning it over to the city authorities. This information will consist primarily of statistical data which I am obtaining with the co-operation of the Birmingham Railway, Light & Power Company."

Wants Interchangeable Transfers Abolished. — The receiver for the Buffalo & Lackawanna Traction Company, Buffalo, N. Y., has applied to the City Council of Buffalo for permission to abolish interchangeable transfers with the International Railway. It is pointed out that by abolishing these transfers, the company would be able to increase its revenue by almost $1,600 a month. The Council "received and filed" the company's request and has promised to make an investigation. The company operates from a terminal in the heart of the retail business section of the city to the city line of Lackawanna. It accepts transfers from the local lines of the International Railway and issues transfers to the International lines. The property is being run at a deficit and the receiver told the Council that unless the company is allowed to increase its income through higher fares or other means, he will be forced to apply to abandon the route.

Booklets Review New York Fare Appeals.—A recapitulation of the arguments used by the New York Railways and the Interborough Rapid Transit Company in support of their applications for increased fares and in opposition to municipal operation is contained in two booklets sent out and signed by Theodore P. Shonts, president of the companies. One is entitled, "Your Subways: A statement of the Facts About the Partnership Between the City and the Interborough Rapid Transit Company," and the other is called "Your Street Car Service: A Statement of the Facts About the Situation of the New York Railways Company." In the railways booklet the statement is made that the New York Railways is on the verge of a receivership; that the company is not overcapitalized; that it is economically operated and that it has never paid a dividend on its stock. With respect to the Interborough Rapid Transit Company the situation is presented briefly as follows: The city of New York is facing deficits amounting probably from $13,000,000 to $15,000,000 a year on the operation under 5-cent fare of the dual subway system. Owing to abnormal costs for labor, materials, and supplies, taxes, etc., due to conditions produced by the war, the system is not now earning the preferential payments to be made from operating revenue to the companies. These payments are cumulative, with interest compounded semi-annually. The question which the company asks is: Shall the situation be met by higher fares or additional taxation?

Personal Mention

W. C. Sparks Elected

Vice-President of Rockford & Interurban Railway Made President of the Illinois Electric Railway Association

W. C. Sparks, vice-president and general manager of the Rockford & Interurban Railway, Rockford, Ill., was elected president of the Illinois Electric Railway Association at the annual meeting held in Chicago on Jan. 17.

Mr. Sparks has been actively connected in the electric railway field for the last seventeen years, and has been identified with his present company for eight years. He was graduated from the civil engineering school of the University of Indiana in 1900, and immediately entered government service in the Philippines, where he remained for nearly two years. Upon returning from the Philippines he entered the engineering department of the Union Traction Company of Indiana, and was chief engineer of that company when he resigned in 1910 to become general manager of the Rockford & Interurban Railway Company. He was in addition made vice-president of this company in 1916.

While with the Union Traction Company of Indiana, Mr. Sparks was active in the Central Electric Railway Association, and since his present connection with the Rockford & Interurban Railway he has for many years been active on legislative and executive committees of the Illinois Association. The company of which Mr. Sparks is now vice-president and general manager operates more than 100 miles of interurban lines, doing an extensive passenger, freight and express business. It is a subsidiary of the Union Railway, Gas & Electric Company.

A Prophecy Becomes Fact

James F. Shaw, of Knauth, Nachod & Kuhne, New York, N. Y., investment bankers, and former president of the American Electric Railway Association, was interviewed by the *Wall Street Journal* in its issue of Jan. 13 on the traction situation in New York. Mr. Shaw says that the bottom has been scraped in that city. He then is quoted in part as follows:

> The worst that can happen has already happened. It is not conceivable that the city administration can or will in the long run deny to the companies an increase in rates. The city has too heavy an investment in the enterprise deliberately to wreck it and I am willing to predict that even if politics have to be adjourned, an increase in fares will be forthcoming in the not distant future.

Mr. Shaw referred to statements made by him as far back as 1910 about the inadequacy of the nickel fare to show more than a 3 or 4 per cent return on the cost to reproduce the property of the old Metropolitan Street Railway, now the New York Railways, not taking into consideration the expenditure for organization and obsolescence.

Mr. Royce Made Manager

New B. R. T. Official Who Replaces Colonel Williams Is a Practical Operating Official

Frederick P. Royce, a member of the Stone & Webster organization, Boston, has been appointed general manager for the receiver of the Brooklyn Rapid Transit Company. Mr. Royce will take up his new work by Jan. 31, will be in full charge under the receiver of all matters pertaining to operation and will take the place of Col. Timothy S. Williams, president of the company, who, at his own request, will be relieved of all responsibility for the administration of the system. The new manager will have the same relation toward Mr. Garrison, the receiver, as the chief of staff when Mr. Garrison was Secretary of War. His duties will be to investigate different matters and do everything possible to bring about a better condition of affairs in the operation of the various lines.

F. P. ROYCE

Mr. Royce has had a wide experience with his firm in all branches of administration, including construction work, investigation and analysis of public utility situations, the preparation and carrying out of financial plans, the direction of local operating managers and the maintaining of satisfactory relations with the public served. He is in a position to bring to bear on the problems of the Brooklyn Rapid Transit Company the varied knowledge the Stone & Webster organization has acquired through its many years of city railway management.

Mr. Royce was born in Newton, Mass., on Oct. 5, 1858. He attended the Massachusetts Institute of Technology and since 1890 has been associated continuously with the electrical and public utilities interests, in charge of operating and construction matters. For several years he was the head administrative officer for an important group of public utilities companies in Massachusetts and in 1909 became one of the leading men in the Stone & Webster organization of Boston. In addition to being a vice-president of the Stone & Webster Management Association, Inc., he is a director of the American Pneumatic Service Company, Lamson Consolidated Store Service Company, Boston Woven Hose & Rubber Company, Concord (Mass.) Electric Company, Paducah Traction & Light Company, Houghton County Electric Light Company, Blackstone Valley Gas & Electric Company, Haverhill Gas Light Company and Fall River Gas Works.

New I. T. S. Appointments

New appointments by the Illinois Traction System during the week ended Jan. 25 are as follows:

J. I. Catherman, engineer of maintenance of way, Springfield.

A. S. Bergschneider, superintendent of transportation, Springfield.

A. McNeil, superintendent, Decatur.

Henry C. Leutert, general agent, St. Louis.

James J. Dooley, traveling freight and passenger agent, St. Louis.

F. J. Blaicher, contracting agent, St. Louis.

W. M. Long, traveling freight and passenger agent, Peoria.

C. E. McGuire, general agent, Decatur.

H. H. Happe, city freight and passenger agent, Springfield.

E. L. McKee, general agent, Springfield.

George Palm has been appointed general manager and purchasing agent of the Southern Cambria Railway, Johnstown, Pa., to succeed C. A. Houghton.

J. A. Trawick, formerly vice-president of the Appalachian Power Company, Bluefield, W. Va., has been elected president of the company to succeed R. C. Morse.

R. Broadwater, formerly vice-president of the Union Traction Company, Sisterville, W. Va., has been elected president of the company to succeed H. W. McCoy.

K. K. Garrett has been appointed manager and purchasing agent of the Hanover & McSherrystown Street Railway, Hanover, Pa., to succeed E. H. Ramsbotham.

Curnal Fox has been appointed master mechanic of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., to succeed William Sheldon.

S. H. J. Reid has been appointed secretary, treasurer and general freight and passenger agent of the Brantford (Ont.) Municipal Railway to succeed John Creasser.

Paul McKay has been appointed secretary and treasurer of the Spokane & Inland Empire Railroad, with headquarters at Portland, Ore., to succeed W. G. Davidson.

C. Bibby, secretary of the Sudbury, Copper Cliff & Suburban Electric Railway, Sudbury, Ont., has also been appointed treasurer of the company to succeed L. O'Connor.

George K. Hyde has been appointed purchasing agent of the Toronto & York Radial Railway and the Schomberg & Aurora Railway, Toronto, Ont., to succeed Walter C. Douse.

A Nevin Pomeroy has been elected vice-president of the Chambersburg & Shippensburg Railway, Chambersburg, Pa., to succeed C. P. Miller, who still retains the position of treasurer.

Charles Basse has been appointed auditor of the Arkansas Valley Interurban Railway, with headquarters at Wichita, Kan., vice H. M. Dobbins, resigned to engage in other business.

Harry S. Calvert, secretary and general manager of the Westmoreland County Railway, Pittsburgh, Pa., has also been appointed treasurer of the company to succeed Joseph G. Vilsack.

Charles B. Attlesey has been appointed acting division superintendent at the Ninth Avenue depot of the Brooklyn (N. Y.) Rapid Transit Company, to succeed the late Henry Mueller.

M. H. McLean, secretary of the Harris Trust & Savings Company, Chicago, Ill., has been elected a vice-president of the Des Moines City Railway and the Inter-Urban Railway, Des Moines, Iowa.

E. R. Heiny has been appointed superintendent of the Arkansas Valley Interurban Railway with headquarters at Wichita, Kan., vice Charles A. Stanley, resigned to accept services elsewhere.

Francis Tingley has been appointed superintendent of construction of the Altoona & Logan Valley Electric Railway to succeed F. D. Hain, who some time ago was appointed engineer of the city of Altoona.

R. J. Semsch, local auditor of the Wisconsin Railway, Light & Power Company at La Crosse, Wis., has been appointed chief clerk to the general manager, in charge of the La Crosse office. This position is a new one.

Alba H. Warren, formerly manager of the Galveston (Tex.) Electric Company, a Stone & Webster property, has been transferred to El Paso, where he has been made manager of the El Paso Traction Company, also owned and operated by Stone & Webster.

J. D. Callery, formerly one of the receivers of the Pittsburgh (Pa.) Railways, and chairman of the board of the Philadelphia Company, has been elected vice-president of the Beaver Valley Traction Company, New Brighton, Pa., to succeed J. H. Reed.

Josiah M. Billing, who has been chief clerk in the office of the Montgomery Light & Water Power Company, Montgomery, Ala., for some time, has been promoted to the position of secretary and treasurer of the Athens Railway & Electric Company, Athens, Ga.

Albert McNeil, who has been chief dispatcher for the Illinois Traction System at Decatur, Ill., for the last seven years, has been made superintendent of the lines of the company in that city to succeed A. S. Bergschneider, transferred to Springfield.

A. S. Bergschneider, who has been superintendent of the Illinois Traction System at Decatur, Ill., for a number of years, has been appointed superintendent of transportation of the company with offices in Springfield. He succeeds F. R. Edmonston, who has gone to the Wabash Railway at Moberly, Mo.

Alexander Shapiro, who for the last four and one-half years has been connected with the secretary's office of the American Electric Railway Association as research assistant and statistician, has been forced to resign on account of ill health. He has been undergoing a rest cure and is reported to be recovering rapidly.

Lieut. W. T. Waters, Jr., advertising manager of the Georgia Railway & Power Company, Atlanta, Ga., and editor of *Here We Are*, published by that company, is back in America after a long stay in France. Lieutenant Waters, it is expected, will resign from the service soon and return to the company in his former capacity.

Paul Stark has been appointed auditor of the Eastern Wisconsin Electric Company, with headquarters at Sheboygan, Wis., to succeed William E. McGovern, who resigned to undertake government work at Washington in the late summer. Mr. Stark was formerly connected with the accounting department of the Public Service Commission of Indiana.

William B. McKinley, president of the Illinois Traction Company, Peoria, Ill., and Congressman from the Nineteenth Illinois District, is mentioned as a candidate to succeed United States Senator Lawrence Y. Sherman, who has decided that he will not be a candidate for re-election upon the completion of his present term.

Brig.-Gen. Henry Worth Thornton, formerly general superintendent of the Long Island Railroad, has been raised to the knighthood by King George in recognition of his services to the British nation during the war as general manager of the Great Eastern Railway of England. Only a few months ago Mr. Thornton was promoted from a colonel to a brigadier general in the British army.

B. F. Wickersham has been appointed general manager and purchasing agent of the West Chester, Kennett & Wilmington Electric Railway, Kennett Square, Pa., to succeed Hamilton Baluss, who, as noted in the issue of the ELECTRIC RAILWAY JOURNAL of July 20, 1918, resigned to accept a position with the United States Ordnance Department as army chief inspector at Philadelphia, Pa.

Edwin W. Clapp, former superintendent of the Bristol & Norfolk Street Railway, Randolph, Mass., who entered the employ of the Bay State Street Railway, Boston, Mass., five months ago, has been advanced to head of the safety department with offices in Boston. Mr. Clapp was a former Bay State Street Railway employee at South Braintree and was superintendent of the Bristol & Norfolk street railway for three years.

J. P. Tretton has been appointed superintendent of transportation of the Indianapolis Traction & Terminal Company, Indianapolis, Ind. Mr. Tretton has been connected with the company since 1899, when he began work in the truck department at the repair shops. He was appointed storekeeper in 1902; paymaster in 1906; schedule maker for the transportation department in 1907; and has been assistant superintendent of transportation since 1908.

John I. Catherman, formerly assistant engineer of maintenance of way of the Illinois Traction System, Peoria, Ill., who has been in military service for the last year, has been appointed head of the maintenance of way department with headquarters at Springfield, Ill. Mr. Catherman succeeds L. B. Martin, who was recently named general superintendent of the Illinois Traction System. Mr. Catherman was with the Pennsylvania Lines for some time before he became associated with the Illinois Traction System in 1913.

Homer Loring has been elected chairman of the recently appointed trustees of the Eastern Massachusetts Street Railway, the proposed successor to the Bay State Street Railway, Boston, Mass., under the conditions set forth in the ELECTRIC RAILWAY JOURNAL for Jan. 25, page 210. The trustees will not assume the responsibility of operating the property until it has been transferred to the new company, probably about April 1. In the meantime, they will study the many problems of the system and co-operate with the various committees in completing the reorganization plans.

Major Joseph Caccavajo, who organized the Nineteenth United States Engineers, has returned to New York from the French battle front. The major, prior to entering the national service, was consulting engineer for New York City subway construction. He wears the Croix de Guerre, awarded him for extraordinary bravery and heroism at the Champagne front. Major Caccavajo was a member of the general staff of the Thirty-sixth, comprising Texas and Oklahoma national guardsmen. He was in command of the American camp near Brest, at which 36,000 troops were landed daily.

Capt. J. C. McPherson, just returned from army service with the railroad engineers in France, has been made assistant general superintendent of the

Pacific Electric Railway, Los Angeles, Cal. Capt. McPherson served with the Pacific Electric as motorman, dispatcher and in various official positions, including superintendent, from 1895 to 1913. In June, 1913, he was transferred to Oakland as superintendent of the electric lines of the Southern Pacific Company, which also controls the Pacific Electric Railway. He remained at Oakland until he received his commission with the army. Immediately thereafter he was sent to France and for a time was superintendent of terminals at Bordeaux, the port through which an immense volume of supplies for the American army was handled.

F. R. Edmonston has resigned as superintendent of transportation for the Illinois Traction System at Peoria, Ill., to become connected with the Wabash Railroad at Moberly, Mo. Mr. Edmonston had jurisdiction over all the lines west and north of Decatur and South of Springfield. He was born in Galloway County, Mo., on Dec. 1, 1878. He was connected with the Chicago & Alton Railroad at various places on the Kansas City division as student operator and agent from April, 1894, to September, 1896. He was with the Wabash Railroad at various places on the Kansas City division as telegraph operator, agent, trainmaster, clerk and train dispatcher from September, 1896, to September, 1907. He next entered the service of the Missouri, Kansas & Texas Railroad, with which he continued from September, 1907, to March, 1913. He was appointed division superintendent of the Illinois Traction System, northern division, on March 10, 1913, and served in that capacity until Aug. 1, 1914, when he was appointed superintendent of transportation with jurisdiction as noted previously.

J. D. O'Keefe, recently appointed receiver of the New Orleans Railway & Light Company, New Orleans, La., is second vice-president of the Whitney-Central National Bank, that city. For three years Mr. O'Keefe handled one of the biggest receivership proceedings ever instituted in the Federal Court at New Orleans—that of the Frisco railroad. He is a man of wide experience in such matters, has the complete confidence of the public, and enjoys also the confidence of the financial interests involved in the railway receivership. Moreover, he is especially competent to deal with the labor situation. During the Frisco receivership when the Southern Pacific strike took place, and the Frisco car repairers refused to work because they thought they were being used to repair cars from roads on which the men were on strike, Mr. O'Keefe settled the matter very quickly and satisfactorily. Only recently he successfully handled labor troubles at the plant of the New Orleans Dry Dock Company, of which he is managing secretary. Mr. O'Keefe was at one time a member of the Dock Board of New Orleans, holding a public office very successfully. His experience has thus covered many lines of endeavor.

E. K. Stewart has resigned as vice-president and claim adjuster of the Columbus Railway, Power & Light Company, Columbus, Ohio. Mr. Stewart was formerly general manager of the road, but relinquished that office some time ago that he might accept duties somewhat less arduous. Mr. Stewart was born in Columbus in 1845. His educational advantages were confined to the common schools of that city. His first work was in a bank. He continued in this line until he became cashier of the P. Heyden & Company Bank. For several years he had held a financial interest in the East Park Place Street Railway, Columbus, which later became the Long Street line. This property was included in the Main and High Street consolidation and Mr. Stewart remained as an officer of the company. In 1892 he was made vice-president and general manager of the Columbus Street Railway, the first of several local consolidations. He retained that place and title in each succeeding enlargement of railway activities in the city. Mr. Stewart is president of the Case Crane Company and of the Columbus Dry Goods Company, vice-president of the Union National Bank and a director of the Columbus Gas Light & Heating Company, the Citizens' Savings & Trust Company, and other institutions. Mr. Stewart thus closes a career of more than twenty-five years with the local railways.

R. M. Howard, manager of all departments of the Wisconsin Railway, Light & Power Company, except the La Crosse Street Railway, has been appointed general manager for the company at La Crosse, succeeding Dean Treat, who resigned. Mr. Howard will co-operate with Peter Valier, vice-president, who will be resident executive officer, having jurisdiction over all departments including Winona and Hatfield. Mr. Howard has been with the Wisconsin Railway, Light & Power Company since it was organized in 1913, having previously held the same position for two years with the receiver of the La Crosse Water Power Company. He has heretofore had charge of the power and electrical department of the company, including the Hatfield dam, the hydro-electric power station, the power transmission lines from Hatfield to La Crosse and Winona, the substations and distribution system in La Crosse, the Onalaska electric utility and steam power stations and electric distribution system in Winona, and the Winona Street Railway. Prior to becoming connected with the Wisconsin Railway, Light & Power Company, Mr. Howard was general manager of the Green Bay Traction Company, the Green Bay Gas & Electric Company and the Northern Hydro-Electric Power Company, Green Bay, which have since been consolidated under the name of the Wisconsin Public Service Company. Before going to Green Bay, Mr. Howard was general manager of the Clinton (Iowa) Street Railway for nine years. The Wisconsin Railway, Light & Power Company is one of the group of properties controlled by the Clement C. Smith interests.

J. P. H. De Windt, formerly chief of the transit bureau of the Public Service Commission for the First District of New York, will continue with the Pratt Engineering & Machine Company, Atlanta, Ga., in the capacity of chief of construction. In the spring of 1918 Mr. De Windt was requested by the Pratt Engineering & Machine Company to assume charge as field executive of the construction of a $7,000,000 picric acid plant at Little Rock, Ark., being erected and equipped for the government. In order to take up this work Mr. De Windt was granted a leave of absence without pay for three months by the Public Service Commission. At the expiration of this period, however, the work had not been completed and as Mr. De Windt's further services were essential to the carrying out of the construction the government authorities refused to release him. In consequence he tendered his resignation to the commission effective on the expiration of his leave of absence. Mr. De Windt was for some time vice-president and general manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala., and while with that company was assigned in addition to his regular duties to considerable engineering work with the American Cities Company, by which the Birmingham property is controlled. As noted previously in the ELECTRIC RAILWAY JOURNAL, Mr. De Windt has been succeeded with the Public Service Commission by George F. Daggett, former assistant secretary of the commission.

Obituary

A. R. Walbridge, recently appointed receiver for the St. Paul (Minn.) Southern Electric Railway, died at his home in Hastings, Minn., on Jan. 15. Mr. Walbridge was prominent in Hastings in business and social circles and was also well known in St. Paul and Minneapolis. He is survived by his widow and two daughters.

Percy Dwight Henders, auditor for the Chicago, Ottawa & Peoria Railway, Ottawa, Ill., died recently at his home in Ottawa, following an illness of several months. Mr. Henders was born in Ottawa in 1882, and practically all his life has been spent in that city. His education was obtained in the schools of Ottawa and the University of New York. After fitting himself for commercial life, he entered the employ of George W. Reed & Company, later going with the First National Bank. Eleven years ago he became connected with the Chicago, Ottawa & Peoria Railway and was advanced several times, finally becoming auditor.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Prevailing Condition in Wire Market

New Standards Discontinue Certain Grades in Small Sizes—Easier Manufacture of Circ.Mil Sizes

January is hardly the time of year to look for heavy buying in the wire market. While the month has provided few orders of a large size, it has created a market for small amounts in many instances. Only absolutely necessary extensions have been made, but considerable maintenance and repair work has been carried into effect.

Steadiness in Price Anticipated

With the departure last week of the committee of copper producers for Europe, the price of copper will probably hold rather steady until word from them is received. Since the price of wire depends largely on the price of the base copper, as soon as the large buyers have decided that the bottom level has been approximately reached, the larger orders may be expected to come in. The price of copper in most cases has been on a 23-cent base, but one case is known when it has been as high as 27. Some of the smaller producers have been selling as low as the 20-cent base, but it is probable that as soon as their stock becomes pretty well depleted they will raise their price somewhat. Quotations in the open market this week went below 20 cents for spot shipments of electrolytic. Little copper is being sold to the wire manufacturers, as their stocks as a rule are ample for current production at prevailing wire prices.

Inquiries Show Satisfactory Condition

There have been many inquiries received by the larger wire producers for quotations on large orders. One manufacturer has a standing order which is to take effect when he, the manufacturer, is satisfied that copper has become satisfactorily low and stable.

Some inquiries on bare trolley wire have come from South American countries. In the South the month of February should begin to show an increase, but throughout the country generally buying in any large amounts will probably not be felt before March and April. Where in season there would be found an order for 30 or 40 miles of trolley wire, there is now found nearer 2 or 3 miles.

There have likewise been inquiries for copper-clad trolley wire for both foreign and domestic use. Until the metal market shall have found itself substitutes are being used. There have been cases where bare copper wire has been used, although copper-clad may have been more desirable, just as where in one case in South America condenser tubes have recently been made of iron, even with their short life, as being cheaper in the end than present copper. Deliveries in bare trolley wire are running three to four weeks, as it is not stocked; it is, however, kept in rods.

Considerable standardization on rubber-covered wire and cable has been effected. Code, 30 per cent and 40 per cent are insulation standards. No. 8 B. & S. gage and smaller rubber-insulated N. E. C. with double braided wire and twin wire will not be manufactured. Single-conductor single-braid will be substituted therefore. The number of standard colors of flexible cords has been limited to black, green, yellow, red and white. Lamp cord and brewery cord are the standard types of N. E. C. flexible cords.

Change in Wire Standards

In the manufacture of stranded conductors cables of even diameters have been eliminated and approximate diameters substituted therefor. Thus where 400,000 circ.mil is called for a cable of thirty-seven strands of No. 10 B. & S. gage wire, giving 384,095 circ.-mil will be sold. The same will hold good for other sizes. In some cases the approximate size will be nearer the even hundred than in the above instance, but in no case will it be very far off. There are the same number of steps between the present No. 16 and 2,000,000 circ.mil as formerly, and each step approximates more or less closely the former corresponding step.

Railway Material for Sale by Government

Equipment valued at $10,000,000 and owned by the United States Spruce Production Corporation, with headquarters in Portland, Ore., is to be sold and sealed bids for the same will be received by the sales board in the Yeon Building in that city up to Feb. 15.

The equipment, which consisted of everything from picks and shovels to complete railroads and mills, contains many items of interest to the electric railway field, as follows: A. C. motors, 440-volt, three-phase, 60-cycle, 3 to 75 hp., with or without starters; 2581 tons new 60-lb. rails; 5030 tons 67½-lb. new rails; 2910 tons new 80-lb. rails, besides a number of standard automobile trucks of 1½ to 5-ton capacity.

Outlook on Rail Bonds Hopeful

Further Reduction This Past Week Said to Bring Price to Bottom Level

This track accessory has pretty consistently followed copper in price movement for some time. When copper, the cost of which enters so materially in the cost of the finished bond, rose some time ago the rail bond's cost followed it up, and came down with it early this winter. In the last two months discounts from list for rail bonds have increased from 10 per cent to 17½ per cent, and early it was brought up to 20 per cent. With this last drop in price it is predicted in the trade that the bottom level has been reached.

Distributers are of the belief that buying should be quite active this spring as electric railways have not kept their maintenance in this line up to the standard for the past four years. Most new orders from traction systems for bonds, the trade reports, have been for short extensions, no large new lines having been laid.

There have been many inquiries received by manufacturers for quotations on fair sized orders for this country, and others have come through from Europe, notably France, Spain and Sweden. There is no difficulty with deliveries as in most cases they could come from stock.

Mild Winter Easy on Car Glass

Although there has been a very dull market for car window glass in the United States, within the last two weeks 125,000 boxes of glass have been reported on order from France. How much of this will find its way into rolling stock is not known, but returning soldiers bring reports that French rolling stock is virtually being operated as open cars. Discounts on car window glass, single strength, A and B quality, remain at 77 per cent, while double strength remains at 79. Maintenance orders have been the only ones of account from the traction systems. Ordering for one month's requirements is now taking the place of the former practice of placing orders for six months' requirements by one elevated railway in the East. The very open and mild winter in the East has had considerable to do with the small maintenance orders.

Little car window glass is being stocked either at the factory or locally. Orders are being filled at the factory in from two to three weeks.

Trade Notes

W. J. Ritchie & Company, Sheffield, England, steel manufacturers and engineers, have moved their London office to 9 New Broad Street, E. C. 2.

Steel City Electric Company, Pittsburgh, Pa., has appointed R. S. Wakefield its representative at Dallas, Tex.

William K. Swift, Philadelphia, Pa., has become associated with the sales department of the Bound Brook Oilless Bearing Company, Bound Brook, N. J.

Phoenix Utility Company, 71 Broadway, New York City, is the new name for the Phoenix Construction Company. This company, which handles used machinery and equipment, had its name changed because of the existence of two different construction companies with the same name.

J. C. Hill, pioneer street car advertising man of Kansas City, and for twenty-four years head of the Central Advertising Company, has recently announced his retirement from the active advertising field, and the disposal of his interests in the company to Barron G. Collier of New York. Mr. Hill is retained on the board of directors of the Central Advertising Company and will maintain his office at 311 Bryant Building. He did much to bring street car advertising to a high level and incorporated many new ideas.

Roller-Smith Company, New York City, announces the appointment of James E. Wood as manager of its Cleveland office, located at 711 Williamson Building. Mr. Wood assumes the position formerly held by C. S. Ripley. Mr. Wood has been engaged in telephone development, first with the Screw Machine Products Corporation of Providence and later with the Western Electric Company at Chicago. Recently he has been with the government in radio work. The Roller-Smith Company also announces the opening of a Detroit office in the New Telegraph Building, in charge of C. H. Nicholson, who was formerly connected with the Chicago office of the company. During the war Mr. Nicholson was with the Signal Corps.

Drew Electric & Manufacturing Company, Indianapolis, Ind., manufacturer of line materials and electric railway supplies, announces the appointment of R. B. McDonald as sales engineer. Mr. McDonald has been previously identified as an engineer in the electric and traction field and his past experience and knowledge of engineering requirements will again be available with Drew specialties. Frederick B. Schafer, formerly advertising and sales counsel on the staff of the McGraw-Hill engineer publications, will direct the publicity and sales of the Drew company. The Drew Electric & Manufacturing Company has completed its biggest year and enters the new year with the most promising plans. In the opinion of James H. Drew, president of the company, the central stations and the electric railway field are facing one of the most successful periods ever experienced in their history.

Rolling Stock

Stockton (Cal.) Electric Railroad will shortly begin remodeling one of its older type cars and install safety devices.

Stark Electric Railroad, Alliance, Ohio, expects to purchase this year two quadruple motor equipments and trucks for two interurban cars.

Southwestern Gas & Electric Company, Texarkana, Ark., lost its carhouse and twelve cars by fire on Dec. 21, causing a loss of about $100,000.

Evansville (Ind.) Railways, which was recently sold to the Evansville & Ohio Valley Railway Company, expects to purchase several new cars.

Bamberger Electric Railroad, Salt Lake City, Utah, has rebuilt in its own shops, six excursion cars which had been burned in the fire at the company's Ogden carhouse last May, as reported in these columns of May 25, 1918. A number of other cars are to be rebuilt so that the road will be suitably equipped with rolling stock when the resort season opens.

New Advertising Literature

Republic Engineers, Inc., 60 Broadway, New York City: Bulletin on 66,000-volt transmission line in Mahoning Valley.

Heine Safety Boiler Company, St. Louis, Mo.: Booklet, "The Heine Idea," describing its boilers and superheaters.

NEW YORK METAL MARKET PRICES

	Dec. 5	Jan. 30
Copper, ingots, cents per lb	26	19
Copper wire base, cents per lb	28.75	28.75
Lead, cents per lb	7.05	5.50
Nickel, cents per lb	40	40
Spelter, cents per lb	8.75	7.00
Tin, cents per lb	†72.50	†72.50
Aluminum, 98 to 99 per cent., cents per lb	†33.10	†33.10

† Government price in 50-ton lots or more' f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Dec. 5	Jan. 30
Heavy copper, cents per lb	21.00 to 21.50	15.50 to 16.00
Light copper, cents per lb	17.00 to 17.25	12.00 to 12.25
Red brass, cents per lb	21.00 to 21.50	9.00 to 9.50
Zinc, cents per lb	7.00 to 7.50	5.00 to 5.25
Yellow brass, cents per lb	13.00 to 13.50	7.00 to 7.50
Lead, heavy, cents per lb	5.75 to 6.00	4.50 to 4.75
Steel car axles, Chicago, per net ton	$41.52	$28.00 to $30.00
Old carwheels, Chicago, per gross ton	$29.00	$24.00 to $25.00
Steel rails (scrap), Chicago, per gross ton	$34.00	$22.00 to $23.00
Steel rails (relaying), Chicago, gross ton.	$60.00	$50.00 to $55.00
Machine shop turnings, Chicago, net ton	$16.00 to $16.50	$6.50 to $7.50

ELECTRIC RAILWAY MATERIAL PRICES

	Dec. 5	Jan. 30
Rubber-covered wire base, New York, cents per lb	34	27
Weatherproof wire (100 lb. lots), cents per lb., New York	38.75 to 40.00	30.75
Weatherproof wire (100 lb. lots), cents per lb., Chicago	38.75 to 39.76	32.76 to 36.75
T rails (A. S. C. E. standard), per gross ton	$70.00 to $80.00	$60.00 to $65.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton	$67.50	$57.00 to $60.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$62.50	$55.00 to $60.00
T rail, high (Shanghai), cents per lb	4½	...
Rails, girder (grooved), cents per lb	4½	...
Wire nails, Pittsburgh, cents per lb	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb	4½	3.90
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	*3¼	3
Tie plates (brace type), cents per lb	*3¼	3
Tie rods, Pittsburgh base, cents per lb	7	7
Fish plates, cents per lb	*3¼	3
Angle plates, cents per lb	*3¼	3
Angle bars, cents per lb	*3¼	3
Rail bolts and nuts, Pittsburgh base, cents per lb	4.90	4.90
Steel bars, Pittsburgh, cents per lb	*2.90	2.70
Sheet iron, black (24 gage), Pittsburgh, cents per lb	*5.00	4.55
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	*6.25	5.60
Galvanized barbed wire, Pittsburgh, cents per lb	4.35	*4.35

	Dec. 5	Jan. 30
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	77%
Car window glass (single strength, first three brackets, B quality), New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York discount	79%	79%
Waste, wool (according to grade), cents per lb	13 to 15	15
Waste cotton (100 lb. bale) cents per lb.	12½ to 13	12
Asphalt, hot (150 tons minimum) per ton delivered	$38.50	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	$42.50	$43.00
Asphalt filler, per ton	$45.00	$45.00
Cement (carload lots), New York, per bbl	$3.20	$3.20
Cement (carload lots), Chicago, per bbl.	$3.34	$3.34
Cement (carload lots), Seattle, per bbl.	$3.68	$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal	‡$1.63	$1.48
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$‡1.65	$1.55
White lead (100 lb. keg), New York, cents per lb	14	13
Turpentine (bbl. lots), New York, cents per gal	64	75

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* Government price. † These prices are f. o. b. works, with boxing charges extra.

‡ Bid price, no quotation.

Franchises

Cardin, Okla.—James H. McNicholas and associates have asked the City Council of Cardin for a franchise to construct an electric line on Main Street or Jefferson Highway.

Dallas, Tex.—The City Commissioners of Dallas have granted to the Dallas Railway an extension of 9 months in which to carry out the provisions of its franchise involving the expenditure of $1,200,000 in improvements and betterments. The improvements called for include extensions of several lines, two new lines, laying of heavier rails in connection with paving on several streets and betterments in the service in various respects. The new lines will be the Oakland Cemetery line and the Oak Lawn and City Hospital extensions.

Track and Roadway

Denver & Interurban Railway, Denver, Col.—A bond issue of $100,000 has been voted by the city of Fort Collins for the purchase of the local lines of the Denver & Interurban Railway in Fort Collins. Of this amount, $25,000 will be spent by the city in improvements.

Peoria & Chillicothe Electric Railway, Peoria, Ill.—At the recent annual meeting of the Peoria & Chillicothe Electric Railway, which proposes to construct a line between Peoria and Chillicothe, John F. Lynch was elected president, A. O. Brock elected vice-president, W. E. Emery re-elected secretary and E. A. Mitchell re-elected treasurer. [March 2, '18.]

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—As soon as weather conditions permit concrete construction, the Indianapolis Traction & Terminal Company will begin work on permanent double tracks on South Street from Delaware Street to Virginia Avenue. In the meantime, the company will construct a temporary single track on South Street from Delaware to Alabama Streets, on Alabama to Louisiana, thence east to Virginia Avenue, for the use of the interurban cars of the Indianapolis & Cincinnati Traction Company and the Interstate Public Service Company.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company reports that it plans to construct 4 miles of new track during 1919.

New Orleans, La.—A conference will be held on Feb. 27 and 28 to arrange plans for the construction of a proposed municipally-owned electric interurban railway to connect New Orleans, La., and Mobile, Ala., with all of the Mississippi coast towns. All of the cities and towns along the route of the proposed interurban will send commissioners to lay the groundwork for building the line. Among the plans to be considered will be the construction of hydro-electric plants on streams near the coast to generate current for the interurban system. The conference will arrange for estimates of the cost of the railway and take steps to prorate the bonds among the municipalities interested in the enterprise. [Nov. 9, '18.]

Kansas City (Mo.) Railways.—The citizens of Independence have voted a loan of $50,000 to the Kansas City Railways for the extension of the Independence line from its north terminus at Liberty Street to Sugar Creek.

Interborough Rapid Transit Company, New York, N. Y.—Announcement has been made by Travis H. Whitney, acting chairman of the Public Service Commission for the First District of New York, that the Clark Street subway of the Interborough Rapid Transit Company will be opened for service by April 1.

Goldsboro (N. C.) Electric Railway.—A report from this company states that it will reconstruct 1 mile of track in 1919.

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—This company reports that during 1919 it will reconstruct 1½ miles of track.

Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont.—A report from the Windsor, Essex & Lake Shore Rapid Railway states that during 1919 it expects to replace the trolley wire on 36 miles of its line or install steel auxiliary wire under its present trolley wire. The company will also replace 10,000 ties.

London (Ont.) Street Railway.—This company reports that it will purchase 2 miles of No. 00 wire during 1919.

Dallas (Tex.) Railway.—Announcement has been made by the Dallas Railway that it is ready to proceed with the improvement of its tracks on Jefferson Avenue from Lancaster Avenue to Polk Street, a distance of about 2 miles, in connection with the repaving of this thoroughfare. The company will lay heavier rails and pave that portion of the street between and under its tracks. This is the largest paving job to be undertaken by the city this year and will involve an expenditure of nearly $200,000 by the traction company.

Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.—This company reports that during 1919 it expects to purchase 2900 ft. of 500,000-circ.mil feeder cable, 5400 ft. of 300,000-circ.mil feeder cable and 32,000 ft. of 4/0-circ.mil feeder cable.

Seattle, Wash.—Plans are being worked out and will be recommended to the Public Service Commission of Washington by R. H. Thomson, former city engineer of Seattle, for the construction of two large freight yard terminals, one to serve Seattle and Tacoma and another to be accessible on north to Seattle and Everett, in order to relieve the congestion of freight at Puget Sound centers. Tentative plans provide for the electrification of all rail lines serving the proposed terminal facilities.

Power Houses, Shops and Buildings

Fort Smith Light & Traction Company, Fort Smith, Ark.—The Fort Smith Light & Traction Company has completed an addition to its boiler room and has installed one 600-hp. B. W. boiler and one 3000-kva. General Electric generator.

Hagerstown & Frederick Railway, Hagerstown, Md.—Fire recently destroyed the substation and warehouse of the Hagerstown & Frederick Railway at Myersville. Plans are being made for rebuilding the structures.

Boston (Mass.) Elevated Railway.—The Public Service Commission of Massachusetts has granted the Boston Elevated Railway an extension of time until July 1 in which to begin construction of subway and terminal facilities in connection with the continuation of the elevated railway service to Everett. The actual building of the new line from Sullivan Square is practically completed, and is expected to be in operation with a temporary terminal in Everett within two months.

Southern Power Company, Charlotte, N. C.—It is reported that the Southern Power Company, which furnishes energy to the Piedmont & Northern Railway, will begin a mammoth power development on the Catawba River early in the summer. According to the report, two big dams and power plants will be built—one at Rhodhiss and the other at Horseford Shoals, 2 miles below Rhodhiss.

Oklahoma (Okla.) Railway.—A new turbo-generator is being installed by the Oklahoma Railway in its Belle Isle power house, at an approximate cost of $125,000. A new automatic machine for shoveling coal has also been installed at the power plant at a cost of $75,000.

Pennsylvania Central Railway, Johnstown, Pa.—This company reports that during 1919 it will purchase one 1200-volt d.c. rotary converter equipment for its power house.

Bamberger Electric Railroad, Salt Lake City, Utah.—This company contemplates purchasing one automatic substation equipment to convert present manual control.

Lewiston-Clarkston Transit Company, Clarkston, Wash.—This company reports that it will purchase a new motor generator set.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—Plans are being prepared by the Puget Sound Traction, Light and Power Company for the construction of a one-story concrete structure to be built at the Jefferson Street substation to house lightning arresters.

Tacoma (Wash.) Municipal Railway. A report from the Tacoma Municipal Railway states that a new 1000-kw. motor generator set will be purchased in 1919. A new shop will be built and fully equipped.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, February 8, 1919 *Number* 6

The Electric Railway Is the Sick Man of Business

THUS aptly the electric railway is described in a recent application for higher fares by the San Diego (Cal.) Electric Railway. The disease, in the application, is described as being beyond the comprehension of the family doctor. Therefore, it has been necessary to consult a specialist to prescribe a remedy. In this case the specialist is the Railroad Commission of the State. There is nothing to indicate, according to the application, that the company is financially weak but it is incapable of continuing to maintain its normal strength at present, due to the lack of proper nourishment.

A rather extended abstract of the application is published in this issue because the situation described is typical of the entire industry and also because the ownership at San Diego has been in the same small group continuously since its organization, so that it has been possible easily to compile all facts in regard to its financial history. Here is a property representing an investment of approximately $6,000,000 which has made possible the development of a growing city, which has always given good service, has been conservatively capitalized and has introduced economies as they have been developed, like the skip stop and the one-man car. Nevertheless it finds itself now in a position where its income is insufficient to pay for additional bond interest and sinking fund requirements or to retire any part of its investment at the expiration of its present franchise. That these conditions are paralleled elsewhere indicates that they are of general, not local cause.

It has been well said that the industry is not suffering from any trouble which more money will not cure. With the diagnosis already made, there should be hope that the illness will not be of long duration and the invalid will soon be prepared again to do his necessary work in the affairs of the community.

Teamwork and Speed and Special Training Acquired Overseas

ONE of the greatest lessons which the American people have learned from the world war is the amazing speed with which apparently unsurmountable difficulties were overcome by proper organization. The training, discipline and equipment of an enormous army and the transport of this army overseas, together with the continuous supplies of ammunition, equipment and food that were necessary, are achievements which were not dreamed of before the war. This spirit of accomplishing large things by teamwork should do much toward increasing the co-operation desirable in revamping and restoring electric railway equipment which has lost some of its efficiency through deferred maintenance.

The men now returning from army service and entering railway service, particularly in shop work, should be of great assistance in fostering this spirit of doing things. They have learned to do by doing, and they have developed resourcefulness and judgment because they have had to exercise these characteristics to get themselves out of difficulties abroad. These men are returning with keen, alert minds, disciplined to act promptly and thoroughly as members of a team rather than as individuals.

Many of these men have become skilled in standard trades and have been trained in special work. Thus a machinist in the Ordnance Department would naturally be expected to be able to do welding and to maintain the electrical equipment of generators and motors, and many of the carpenters from overseas service have been required to do a large amount of bridge construction. In this way the instinct for industrial work has been developed, and the special training which these men have received should prove of assistance in electric railway maintenance work. Moreover, there has been a necessity for teamwork and speed, qualities which are very useful in a railway organization, just as they are in military campaigns.

The Safety Car Invades the East

THANKS to the United States Housing Corporation the Connecticut Company is the possessor of twenty one-man safety cars which will help relieve the traffic congestion in Bridgeport and elsewhere. Last Sunday, service with a number of these cars was inaugurated in Bridgeport and, as this issue of the paper goes to press, favorable reports have been received as to the reception of this service by the public. In arranging for this service some rerouting was done to give the cars a "fair show," and headways were cut down to such an extent as to furnish a demonstration of what safety-car service really is. The results obtained in Bridgeport will be helpful in many other places where better service is in contemplation, for the congested section of this city presents many obstacles to good transportation so that the conditions can be considered typical rather than ideal. Realizing the importance of the new service, both locally and in its relation to the general transportation problem, the management of the Connecticut Company spared no pains to safeguard the service from interruption. The crews were thoroughly trained and every incentive was given them to make a success of their new work.

The safety car is one of the few elements of the present electric railway situation which promise the considerable service improvement which is necessary for profitable operation. That this fact is appreciated is shown by the large proportion of cars of this type ordered in 1918. According to the statistics published in the issue of this paper for Jan. 4, 1919, more than one-third of the 1918 orders were for such cars. These orders were from properties scattered over a wide area. The experience to be gained with these cars during 1919 will be of great value and interest. Cars of this type have great inherent possibilities. The problem, after getting the cars, is to make the most of these possibilities. Careful adaptation to local requirements, increase in service to the full, development of a co-operative spirit in the employees, a well-planned and carefully executed publicity program and belief in the service-producing qualities of the cars will all conduce to success in this direction.

Service at Cost Versus Cost of Service

PRESIDENT R. W. PERKINS of the Shore Line Electric Railway of Connecticut recently made a very apt remark on the present electric railway situation. The occasion was the annual meeting on Jan. 25 of the Connecticut Editors' Association, at which addresses were made by several Connecticut electric railway executives. In his address Mr. Perkins said:

> You have all been reading a great deal about service at cost, as if it were something quite new and a sure cure for all the ills to which the street railway is subject.
>
> The service-at-cost principle is fully recognized in the Connecticut laws governing the street railways; every decision by the commission has been founded upon that principle, but the truth is that the law while granting to the public transportation at cost fails to guarantee to the corporation the cost of transportation, and just there regulation fails, for while it can and does protect the public against an exorbitant charge for service, it is powerless to put the corporation in possession of a revenue that shall, in turn, enable it to render the service the public demands.

The condition described in these remarks is very true. For the past fifteen years electric railways have been subject to all kinds of limiting legislation and regulation. Service has been specified by the authorities, transfers have been required, wages have been increased and all kinds of improvements have been ordered. The theory upon which this action has been based is that the oversight exercised and the changes ordered were in the interest of the public and so justified. That they may have been in the interest of the public is true, but the additional burdens put in this way upon the company decreased by just so much its earning ability.

Some people are very insistent in declaring that a railway company should be required to live up to its "contract" and should haul passengers for the amount mentioned in its franchise after that fare, through changing conditions, has become unremunerative. Such people forget that the State itself has changed that contract in its own interest many times since it was signed so that its nature as a binding force has completely changed, even if there were no other reasons for the payment of a fair return to the company for its property used in public service.

It has been held, at least in New York State, that a law which required a gas company to sell its product at a price which was reasonable when the law was passed would become unconstitutional, because confiscatory, if conditions changed so that the company could not earn a fair return on the value of its property. Such a conclusion seems good law, and it might help in electric railway cases, if not directly by increasing fares, at least indirectly by abolishing some of the transfers and other exactions which have been saddled on the companies since their franchises were obtained.

The Engineer's Place in Electric Railway Rehabilitation

THERE is one part of the electric railway organization that especially needs safeguarding in these times of stress and distress, namely, the engineering staff. No matter how difficult it may be for the moment to find money to make ends meet, the cars must be kept moving and moving to the satisfaction of the public. Adjustment of differences of opinion between the public and the railway owners as to rates of fare and quality of service will be settled fairly and amicably in due course as both sides come fully to understand each other. In the meantime the properties must not be allowed to run down any further than they are at present; in fact they must be rehabiliated. Good engineering and, therefore, competent and loyal engineers are necessary to this end. Fortunate is the railway management that appreciates this fact; the management whose engineers plan to "stick to the job" at least until they are less urgently needed than now.

There is no use in blinding ourselves to the fact that electric railway engineers are discontented under present conditions. These conditions have been largely beyond the control of the managements. But whatever the cause of the conditions the result must not be the weakening of the engineering backbone of the organization. Most of the engineers now engaged in the upkeep and extension (now all too rare) of the track, structures, line and power plant have been with the railways in prosperous days and "stay by the ship" partly through affection developed when engineering work thereon was more interesting and stimulating. Although they may look with longing eyes to other fields, there is something fascinating enough in this one to hold most of them.

It is significant in this connection to note that those engineers who seem best contented at present are the ones who are helping the managements in the solution of greater than engineering problems. Many, for example, are now working on zoning projects, others are investigating the application of one-man cars and the inauguration of the skip-stop system, while still others are laying out big schemes of expansion for the more prosperous days to come. It is perfectly obvious why these men are better satisfied than others. They are living in the future; they are sharing the hopes and expectations of their employers. The latter appreciate that engineering enthusiasm and virility need food, in the shape of confidence and of tasks that are stimulating no matter how difficult.

An engineer has been aptly defined as one who can do for $1 what others require $2 to do. Isn't this just the type of fellow needed in the railway business now? And are not the real railway engineers the mainstay of the managements these days? And is not this the substance of all that has gone before: "If you have good engineers, hold them; if not, get them"?

Why Not Continue to Save Coal After the War?

DURING the past year the shortage of coal and the severe restrictions placed by the Fuel Administration upon its purchase and use have necessitated the most economical operation of power stations in order that the greatest number of kilowatt-hours of energy per ton of coal might be produced. The efforts in this direction have in many cases been greatly handicapped by the fact that plants accustomed and designed to burn high-grade coal have been compelled to burn a coal with heat value greatly reduced from the fuel used in normal times. Many desirable changes have, however, been made, improvements which in many cases could and should have been accomplished without the severe conditions which have made them imperative. Now that many, under duress, have learned of the economies which have long been possible in the generation of power, they look with respect and possibly even with a little jealousy upon those who effected great savings in their power production upon their own initiative.

Much has been said in the past both for and against a bonus system for the power plant. We are inclined to believe that some bonus system is good under almost any condition, but it is clearly understood that a great deal depends upon local conditions and that any bonus plan must be worked out and handled with great care. A very complete and instructive article on the bonus system as used by the Manila Electric Railway & Light Corporation was published in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 16, 1918, page 308. An equally valuable account of the system used by the Denver Tramway appears elsewhere in this issue. In many respects the two plans are similar while in others they differ widely, and as both have proved unmistakably successful it is well to study them carefully.

The Manila system was inaugurated in June, 1915, with 3.5 lb. per switchboard kilowatt-hour output as a standard basis of coal consumption, the coal used having a heat value of 11,715 B.t.u. per pound. This basis was reduced several times until in September, 1917, the standard was 3.08 lb. or 36,000 B.t.u. per kilowatt-hour. The Denver system started in September, 1917, with 3.1 lb. of coal with a heat value of 9500 B.t.u. per pound, or 29,450 B.t.u. per kilowatt-hour, as a standard, and a bonus is still paid on this basis.

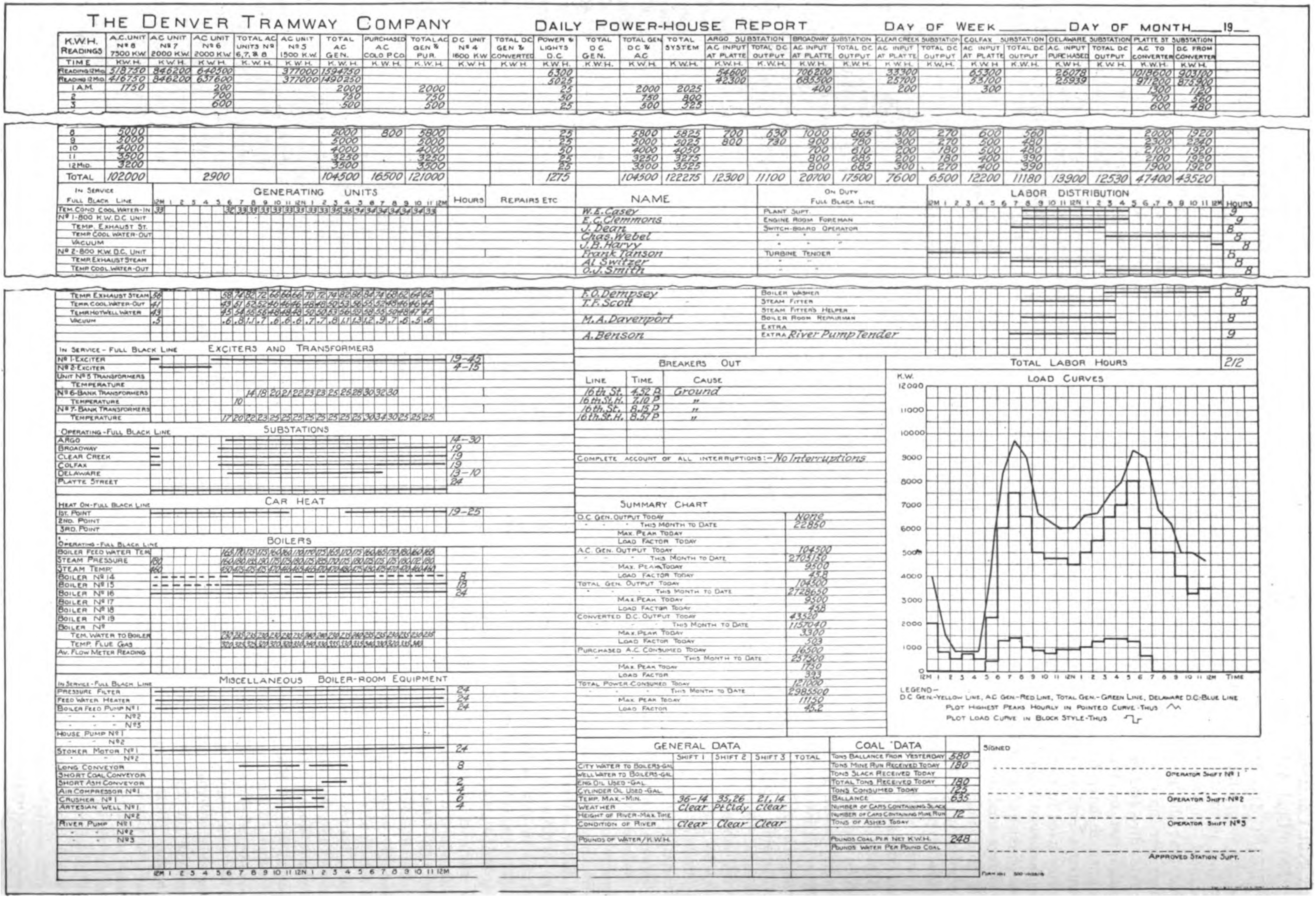
Both systems are alike in that they divide 50 per cent of the value of the coal saved each month among the power-house employees. At Manila, however, this bonus is divided among the men according to the relative value of their occupations, while at Denver all receive equal shares. In Denver the plan is that 90 per cent of the bonus is paid out monthly, 10 per cent being retained and paid semi-annually to all men who have been on the payroll for the previous six months or longer. Both companies adhere to the idea that it is best to pay the bonus on some day other than the regular pay day on account of the psychological effect upon the recipients.

At the time the article on the Manila system was published it was estimated that the saving by the end of 1917 would be 18.5 per cent of 41,000 B.t.u., or in other words, that 1 kw.-hr. would be produced with 33,415 B.t.u. or 2.85 lb. of coal. This saving was attributed equally to the efforts of the employees and the improvements made in the plant. In March, 1917, the coal consumption at Denver reached 5.1 lb. or 48,450 B.t.u. per kilowatt-hour. A new 300-kw. rotary converter was installed at this time and the consumption steadily decreased until in August it was approximately 3.28 or 31,160 B.t.u. per kilowatt-hour. A new 7500-kw. turbine was installed in August and it was estimated that this would further reduce the consumption to 3.1 lb. or 29,450 B.t.u. per kilowatt-hour. Actually this figure has been reduced to an average of 2.5 lb., or 23,750 B.t.u. (in December the actual figure was 2.43 lb.), which would indicate that this further reduction has been largely due to the efforts of the employees, induced by the bonus plan.

Study of Accident Causes Leads to Their Reduction

EMPLOYERS of labor have long known that a high labor turnover is accompanied by an increase in the number of accidents, but real figures on the subject have not always been readily available. Now that the war is over and we may expect greater stability in operating conditions it seems a good time to take stock of the effect of the war on the accident problem. According to some studies made by the General Electric Company, published in a recent issue of *Safety Engineering*, 50 per cent of the accidents which took place within a given period of time occurred to men who had been in the employ of the company less than six months and 80 per cent were due to carelessness. Another point of interest was that the most careful age is 37 while the most accidents occurred to men between the ages of 22 and 26 years and to men over 50 years of age. The experience at the Washington Navy Yard is similar, the lower age limits being 16 to 20 and the higher limit 60. The experience of some of our large steam railways has been that the total annual labor turnover during the war increased from 30 to 50 per cent, the damage to equipment 100 per cent, and 33 per cent of all accidents were chargeable to men who had been in the service less than six months.

These rough figures emphasize the need of thorough training before the new employee is put at a responsible post of duty. They also indicate that the carelessness of youth and the impaired physical faculties of older men are prolific causes of accidents. The figures are therefore of interest to employment agents in connection with the employment of men for a given service. For any railway a complete scientific analysis of all accidents should yield invaluable results both from an administrative and a monetary standpoint. Along this line it may be noted that the experience of the Utilities Mutual Insurance Company of New York has been that marked reductions in the accident compensations of a utility have followed the employment of a safety expert. On more than one electric railway in recent years the portion of gross revenue absorbed by accident claims has been greater than that allotted to dividends. Accident claims are certainly a most unattractive type of disbursement, and if the experience gained from recent abnormal conditions will greatly reduce them the war will have done the industry at least one good turn.



THE DENVER TRAMWAY COMPANY — DAILY POWER-HOUSE REPORT

DAY OF WEEK ________ DAY OF MONTH ____ 19__

K.W.H. Readings / Time	A.C. Unit No 8 7500 K.W. K.W.H.	AC Unit No 7 2000 K.W. K.W.H.	AC Unit No 6 2000 K.W. K.W.H.	Total AC Units No 6, 7, & 8 K.W.H.	AC Unit No 5 1500 K.W. K.W.H.	Total AC Gen. K.W.H.	Purchased AC Colo P Co K.W.H.	Total AC Gen & Pur. K.W.H.	DC Unit No 4 1600 K.W. K.W.H.	Total DC Gen & Converted K.W.H.	Power & Lights D.C. K.W.H.	Total DC Gen. K.W.H.	Total Gen DC & AC K.W.H.	Total System K.W.H.
Reading 12 Mid	518750	846200	640500		377000	1594750					6300			
Reading 12 Mid	416750	846200	637600		377000	1490250					5025			
1 A.M.	1750		200			2000		2000			25		2000	2025
2			700			750		750			50		750	800
3			600			500		500			25		500	525
8	5000					5000	800	5800			25		5800	5825
9	5000					5000		5000			25		5000	5025
10	4000					4000		4000			50		4000	4050
11	3500					3250		3250			25		3250	3275
12 Mid.	3200					3500		3500			25		3500	3525
Total	102000		2900			104500	16500	121000			1275		104500	122275

Time	Argo Substation AC Input at Platte K.W.H.	Argo Substation Total DC Output K.W.H.	Broadway Substation AC Input at Platte K.W.H.	Broadway Substation Total DC Output K.W.H.	Clear Creek Substation AC Input at Platte K.W.H.	Clear Creek Substation Total DC Output K.W.H.	Colfax Substation AC Input at Platte K.W.H.	Colfax Substation Total DC Output K.W.H.	Delaware Substation AC Input Purchased K.W.H.	Delaware Substation Total DC Output K.W.H.	Platte St Substation AC to Converter K.W.H.	Platte St Substation DC from Converter K.W.H.
Reading 12 Mid	54600		706200		33300		65300		26078		1018600	903100
Reading 12 Mid	42300		685500		25700		53100		25939		971200	875900
1 A.M.			400		200		300				1300	1120
2											700	560
3											600	480
8	700	630	1000	865	300	270	600	560			2000	1920
9	800	730	900	780	300	270	500	480			2300	2240
10			700	610	200	180	500	480			2100	1920
11			800	685	200	180	400	390			2100	1920
12 Mid.			800	685	300	270	400	390			1900	1920
Total	12300	11100	20700	17500	7600	6500	12200	11180	13900	12530	47400	43520

GENERATING UNITS

In Service Full Black Line	12M	1	2	3	4	5	6	7	8	9	10	11	12N	1	2	3	4	5	6	7	8	9	10	11	12M	Hours	Repairs Etc
Tem. Cond Cool Water-In	33						32	33	33	33	33	33	33	33	33	35	35	34	34	34	34	34	34	33			
No 1-800 K.W. D.C. Unit																											
Temp. Exhaust St.																											
Temp Cool Water-Out																											
Vacuum																											
No 2-800 K.W. D.C. Unit																											
Temp Exhaust Steam																											
Temp Cool Water-Out																											
Temp Exhaust Steam	56						58	74	82	72	66	66	66	70	72	74	82	86	84	74	68	62	64	62			
Temp Cool Water-Out	41						43	51	52	52	46	46	46	48	48	50	53	56	55	52	48	46	46	44			
Temp Hotwell Water	43						45	54	55	56	48	48	48	50	50	53	56	59	58	55	50	48	47	47			
Vacuum	.5						.6	.8	1.1	.7	.6	.6	.6	.7	.7	.8	1.1	1.3	1.2	.9	.7	.6	.5	.6			

Name	On Duty Full Black Line	Labor Distribution Hours
W.E.Casey	Plant Supt.	9
E.C.Clemmons	Engine Room Foreman	9
J.Dean	Switch-board Operator	8
Chas.Webel	" " "	8
J.B.Haryy	" " "	8
Frank Tanson	Turbine Tender	6
Al Switzer	" "	8
O.J.Smith	" "	8
F.O.Dempsey	Boiler Washer	8
T.F.Scott	Steam Fitter	8
	Steam Fitter's Helper	
M.A.Davenport	Boiler Room Repairman	8
	Extra	
A.Benson	Extra River Pump Tender	9
Total Labor Hours		212

EXCITERS AND TRANSFORMERS

In Service - Full Black Line	12M	1	2	3	4	5	6	7	8	9	10	11	12N	1	2	3	4	5	6	7	8	9	10	11	12M	Hours
No 1-Exciter																										19-45
No 2-Exciter																										4-15
Unit No 5 Transformers																										
Temperature																										
No 6-Bank Transformers									14	18	20	21	22	23	23	25	25	28	30	32	30					
Temperature								10																		
No 7-Bank Transformers																										
Temperature							17	20	22	23	25	25	25	25	25	25	25	25	30	34	30	25	25	25		

SUBSTATIONS

Operating - Full Black Line	Hours
Argo	14-30
Broadway	19
Clear Creek	19
Colfax	19
Delaware	13-10
Platte Street	24

CAR HEAT

Heat On - Full Black Line	Hours
1st. Point	19-25
2nd. Point	
3rd. Point	

BOILERS

Operating - Full Black Line	12M	1	2	3	4	5	6	7	8	9	10	11	12N	1	2	3	4	5	6	7	8	9	10	11	12M	Hours
Boiler Feed Water Tem.							165	170	175	175	160	160	170	170	175	165	170	175	160	165	170	180	160	165		
Steam Pressure	180						160	180	185	190	175	175	180	175	185	170	175	180	175	175	175	180	172	180		
Steam Temp.	460						450	475	475	475	470	465	465	465	470	470	480	475	480	475	470	400	460	460		
Boiler No 14																										8
Boiler No 15																										18
Boiler No 16																										24
Boiler No 17																										
Boiler No 18																										
Boiler No 19																										
Boiler No																										
Tem. Water to Boiler							230	225	235	230	230	230	235	240	240	230	215	240	235	235	230	235	230	235		
Temp. Flue Gas							320	325	325	320	320	320	330	340	330	335	330	335	340	330	320	335	340			
Av. Flow Meter Reading																										

MISCELLANEOUS BOILER-ROOM EQUIPMENT

In Service - Full Black Line	Hours
Pressure Filter	24
Feed Water Heater	24
Boiler Feed Pump No 1	24
" " " No 2	
" " " No 3	
House Pump No 1	
" " No 2	
Stoker Motor No 1	24
" " No 2	
Long Conveyor	8
Short Coal Conveyor	
Short Ash Conveyor	2
Air Compressor No 1	4
Crusher No 1	6
Artesian Well No 1	4
" " No 2	
River Pump No 1	
" " No 2	
" " No 3	

BREAKERS OUT

Line	Time	Cause
16th St.	4.52 P	Ground
16th St. H.	7.10 P	"
16th St.	8.15 P	"
16th St. H.	8.57 P	"

Complete account of all interruptions:—No Interruptions

SUMMARY CHART

D.C. Gen. Output Today	None
" " " This Month to Date	22850
Max. Peak Today	
Load Factor Today	
A.C. Gen. Output Today	104500
" " " This Month to Date	2703150
Max. Peak Today	9500
Load Factor Today	45.8
Total Gen. Output Today	104500
" " " This Month to Date	2728650
Max. Peak Today	9500
Load Factor Today	45.8
Converted D.C. Output Today	43520
" " " This Month to Date	1157040
Max. Peak Today	3300
Load Factor Today	50.3
Purchased A.C. Consumed Today	16500
" " " This Month to Date	257500
Max. Peak Today	1750
Load Factor	39.3
Total Power Consumed Today	121000
" " " This Month to Date	2985500
Max. Peak Today	11150
Load Factor	45.2

LEGEND—
D.C. Gen.-Yellow Line, A.C. Gen.-Red Line, Total Gen.-Green Line, Delaware D.C.-Blue Line
Plot Highest Peaks Hourly in Pointed Curve-Thus ^^
Plot Load Curve in Block Style-Thus ⌐┐┌

GENERAL DATA

	Shift 1	Shift 2	Shift 3	Total
City Water to Boilers-Gal				
Well Water to Boilers-Gal				
Eng. Oil Used-Gal				
Cylinder Oil Used-Gal				
Temp. Max.-Min.	36-14	35,26	21,14	
Weather	Clear	Pt Cldy	Clear	
Height of River-Max Time				
Condition of River	Clear	Clear	Clear	
Pounds of Water/K.W.H.				

COAL DATA

Tons Ballance from Yesterday	580
Tons Mine Run Received Today	180
Tons Slack Received Today	
Total Tons Received Today	180
Tons Consumed Today	125
Ballance	635
Number of Cars Containing Slack	
Number of Cars Containing Mine Run	12
Tons of Ashes Today	
Pounds Coal per Net K.W.H.	2.48
Pounds Water per Pound Coal	

Signed

Operator Shift No 1 ____________

Operator Shift No 2 ____________

Operator Shift No 3 ____________

Approved Station Supt. ____________

Daily Log Sheet of the Power Department, Denver Tramway

Bonus System Reduces Coal Consumption at Denver

By

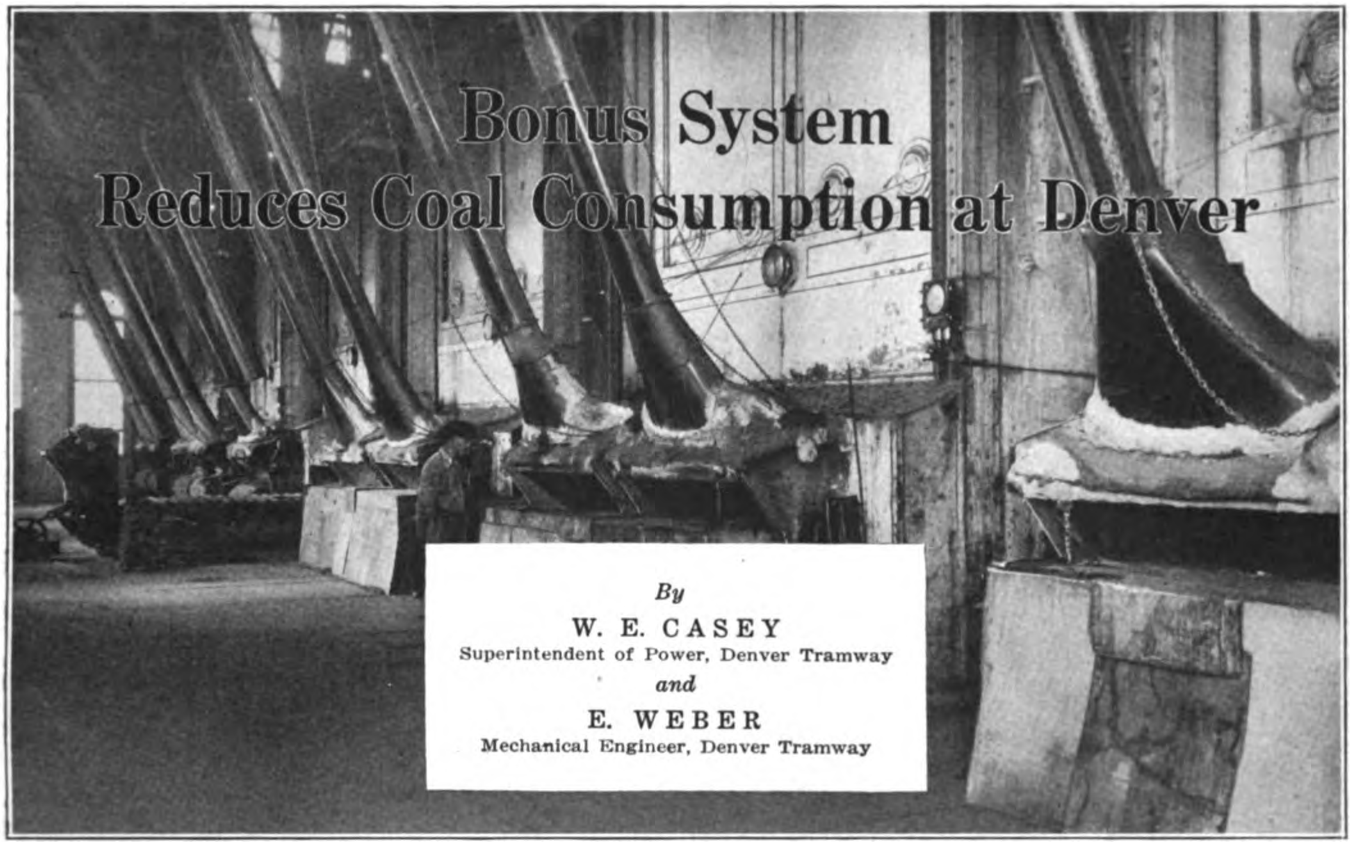
W. E. CASEY

Superintendent of Power, Denver Tramway

and

E. WEBER

Mechanical Engineer, Denver Tramway



750-HP. BOILERS EQUIPPED WITH CHAIN GRATES AND DRAFT GAGES

By Installation of New Turbine and Introduction of Bonus System, Coal Consumption on Denver Tramway System Is Reduced to Less Than 2.5 Lb. per Kilowatt-Hour with Saving in Operating Expenses of About $150,000 per Year

IN THESE DAYS of increased cost of production and operation it will be of interest to many readers of the ELECTRIC RAILWAY JOURNAL to learn how the Denver Tramway has succeeded in improving its power plant and, in spite of the increased cost of labor and coal, how it has by greatly reducing the coal consumption per kilowatt-hour kept the burden from rising to an intolerable extent. Shortly after F. W. Hild was appointed general manager of this company he called in E. A. West, then efficiency engineer of the Portland Railway, Light & Power Company and now chief engineer of the Denver Tramway, to make an investigation and report on the power situation which confronted the company. This report showed that it would be best to install a turbine of capacity sufficient to carry the maximum load of the system, and in this way to obtain a better average water rate than was possible with a number of small units.

In order to explain more in detail the improvements which were made in the plant, it will be necessary to enumerate the principal apparatus formerly at the power house, which at the end of the year 1915 comprised the following: Thirteen 415-hp. and six 705-hp. Stirling boilers, all equipped with chain grates, superheaters and economizers; three 800-kw. direct-current cross-compound engine-driven generators, one 1600-kw. direct-current, cross-compound engine-driven generator, one 1500-kw. alternating-current, cross-compound engine-driven geerator and two 2000-kw. alternating-current turbo generators. One of the 800-kw. generators had to be scrapped in August, 1916.

The new equipment, construction work for the installation of which was started about August, 1916, included one 7500-kw. turbine, hereafter referred to as. No. 8 turbine, with surface condenser, and one 300-kw. rotary converter. Due to delays in delivery, the rotary was not placed in service until March, 1917, and the turbine not until August, 1917, but during the time of construction, or rather after the fall of 1915, the power-house performance was watched closely. Suggestions made by employees were carefully considered and many were adopted. At the same time the employees received advice and instruction so as to enable them better to understand their duties.

It was recognized that in order to obtain the full benefit of the equipment, both old and new, a method would have to be found which would give the men some special interest in their work. After a careful study of the subject had been made a plan for a bonus system was drawn up. In July and August, 1917, the power-house employees were given an opportunity to make their comments on the proposed bonus scale, and with some minor changes the plan was put into operation on Sept. 1, 1917, as described in the following order:

BONUS SYSTEM FOR POWER-HOUSE EMPLOYEES

1. Each employee on the power-house payroll shall be entitled to a bonus, depending on the coal consumption per kilowatt-hour. The method of calculating this bonus will be explained in detail in the following paragraphs:

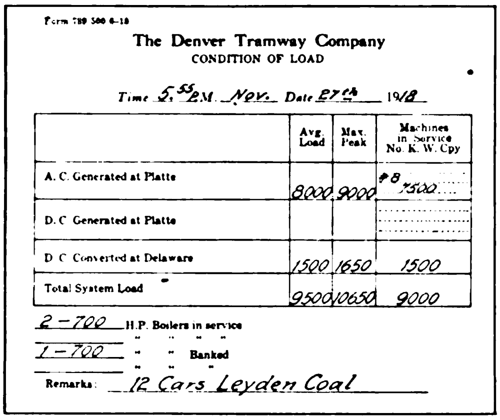
2. The coal used during each month shall be figured from the mine weights. The amounts of coal on hand in bins shall be estimated by the superintendent of power at the end of each month.

RECORD FORMS USED IN DENVER POWER PLANT IN CONNECTION WITH THE BONUS SYSTEM

At top, daily report on load conditions.

In center, No. 8 turbine reports, a.m. and p.m.

At bottom, temporary watt-hour reading record later transferred to log sheet.



Form 789 500 6-18

The Denver Tramway Company

CONDITION OF LOAD

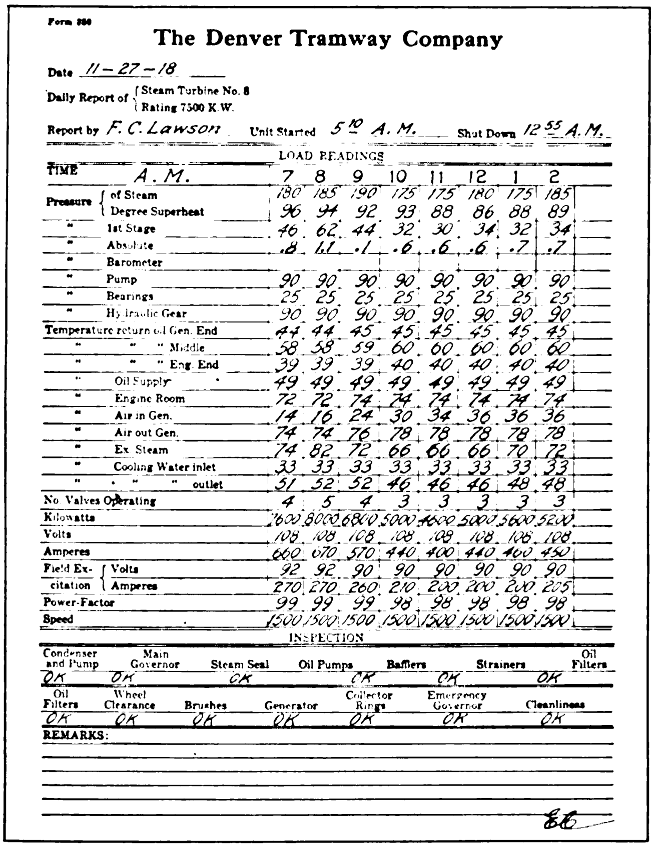
Time 5.55 P.M. Nov. Date 27th 1918

	Avg. Load	Max. Peak	Machines in Service No. K. W. Cpy
A. C. Generated at Platte	8000	9000	#8 7500
D. C. Generated at Platte			
D. C. Converted at Delaware	1500	1650	1500
Total System Load	9500	10650	9000

2 - 700 H.P. Boilers in service

1 - 700 " " Banked

Remarks: 12 Cars Leyden Coal



Form 880

The Denver Tramway Company

Date 11-27-18

Daily Report of Steam Turbine No. 8, Rating 7500 K.W.

Report by F. C. Lawson Unit Started 5.10 A. M. Shut Down 12.55 A. M.

LOAD READINGS

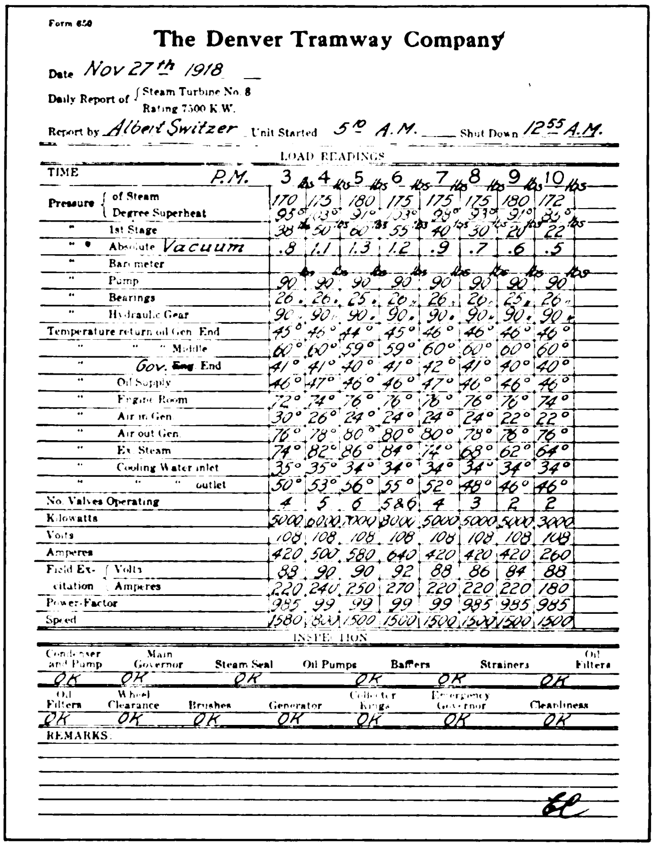
TIME A. M.	7	8	9	10	11	12	1	2
Pressure of Steam	180	185	190	175	175	180	175	185
Pressure Degree Superheat	96	94	92	93	88	86	88	89
" 1st Stage	46	62	44	32	30	34	32	34
" Absolute	.8	1.1	.1	.6	.6	.6	.7	.7
" Barometer								
" Pump	90	90	90	90	90	90	90	90
" Bearings	25	25	25	25	25	25	25	25
" Hydraulic Gear	90	90	90	90	90	90	90	90
Temperature return oil Gen. End	44	44	45	45	45	45	45	45
" " " Middle	58	58	59	60	60	60	60	60
" " " Eng. End	39	39	39	40	40	40	40	40
" Oil Supply	49	49	49	49	49	49	49	49
" Engine Room	72	72	74	74	74	74	74	74
" Air in Gen.	14	16	24	30	34	36	36	36
" Air out Gen.	74	74	76	78	78	78	78	78
" Ex. Steam	74	82	72	66	66	66	70	72
" Cooling Water inlet	33	33	33	33	33	33	33	33
" " " outlet	51	52	52	46	46	46	48	48
No. Valves Operating	4	5	4	3	3	3	3	3
Kilowatts	7600	8000	6800	5000	4600	5000	5600	5200
Volts	108	108	108	108	108	108	106	108
Amperes	660	670	570	440	400	440	460	450
Field Excitation Volts	92	92	90	90	90	90	90	90
Field Excitation Amperes	270	270	260	210	200	200	200	205
Power-Factor	99	99	99	98	98	98	98	98
Speed	1500	1500	1500	1500	1500	1500	1500	1500

INSPECTION

Condenser and Pump	Main Governor	Steam Seal	Oil Pumps	Bafflers	Strainers	Oil Filters
OK	OK	OK	OK	OK	OK	

Oil Filters	Wheel Clearance	Brushes	Generator	Collector Rings	Emergency Governor	Cleanliness
OK	OK	OK	OK	OK	OK	OK

REMARKS:



Form 850

The Denver Tramway Company

Date Nov 27th 1918

Daily Report of Steam Turbine No. 8, Rating 7500 K.W.

Report by Albert Switzer Unit Started 5.10 A. M. Shut Down 12.55 A.M.

LOAD READINGS

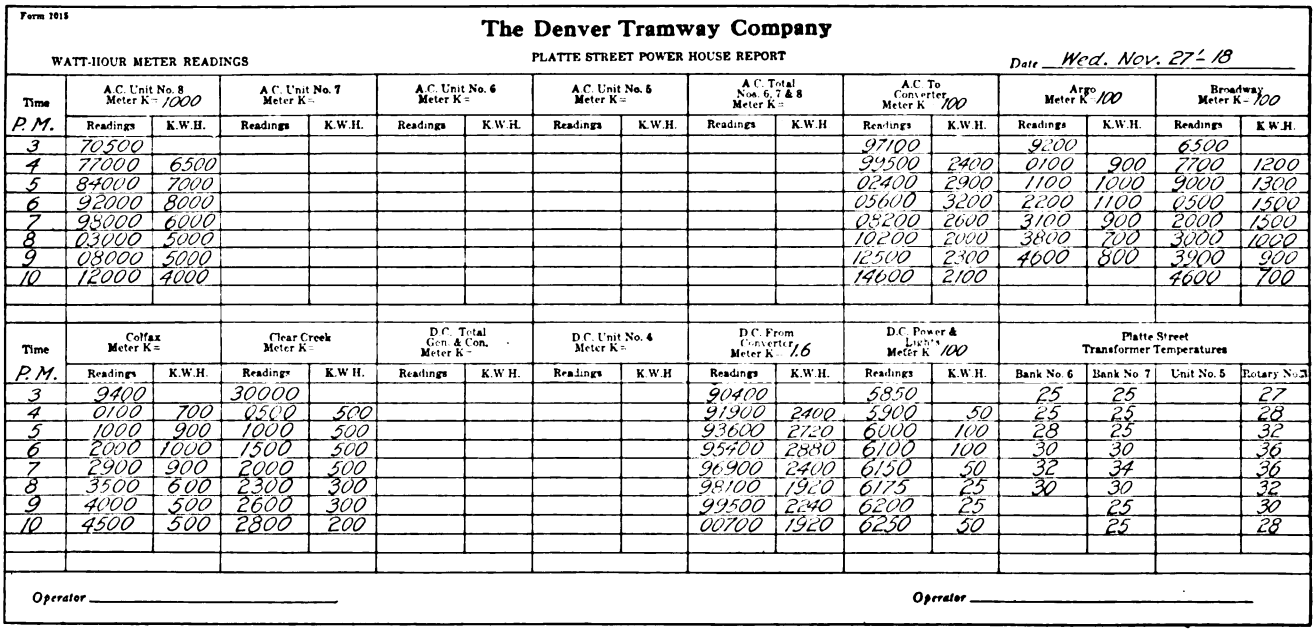
TIME P.M.	3	4	5	6	7	8	9	10
Pressure of Steam	lbs 170	lbs 175	lbs 180	lbs 175	lbs 175	lbs 175	lbs 180	lbs 172
Pressure Degree Superheat	95°	103°	91°	103°	98°	93°	91°	[illegible]°
" 1st Stage	38 lbs	50 lbs	60 lbs	55 lbs	40 lbs	30 lbs	20 lbs	22 lbs
" Absolute Vacuum	.8	1.1	1.3	1.2	.9	.7	.6	.5
" Barometer								
" Pump	lbs 90	lbs 90	lbs 90	lbs 90	lbs 90	lbs 90	lbs 90	lbs 90
" Bearings	26	26	25	26	26	26	25	26
" Hydraulic Gear	90	90	90	90	90	90	90	90
Temperature return oil Gen. End	45°	46°	44°	45°	46°	46°	46°	46°
" " " Middle	60°	60°	59°	59°	60°	60°	60°	60°
" Gov. ~~Eng.~~ End	41°	41°	40°	41°	42°	41°	40°	40°
" Oil Supply	46°	47°	46°	46°	47°	46°	46°	46°
" Engine Room	72°	74°	76°	76°	76°	76°	76°	74°
" Air in Gen.	30°	26°	24°	24°	24°	24°	22°	22°
" Air out Gen.	76°	78°	80°	80°	80°	78°	76°	76°
" Ex. Steam	74°	82°	86°	84°	74°	68°	62°	64°
" Cooling Water inlet	35°	35°	34°	34°	34°	34°	34°	34°
" " " outlet	50°	53°	56°	55°	52°	48°	46°	46°
No. Valves Operating	4	5	6	5&6	4	3	2	2
Kilowatts	5000	6000	7000	8000	5000	5000	5000	3000
Volts	108	108	108	108	108	108	108	108
Amperes	420	500	580	640	420	420	420	260
Field Excitation Volts	88	90	90	92	88	86	84	88
Field Excitation Amperes	220	240	250	270	220	220	220	180
Power-Factor	985	99	99	99	99	985	985	985
Speed	1580	1800	1500	1500	1500	1500	1500	1500

INSPECTION

Condenser and Pump	Main Governor	Steam Seal	Oil Pumps	Bafflers	Strainers	Oil Filters
OK	OK	OK	OK	OK	OK	

Oil Filters	Wheel Clearance	Brushes	Generator	Collector Rings	Emergency Governor	Cleanliness
OK	OK	OK	OK	OK	OK	OK

REMARKS:



Form 1015

The Denver Tramway Company

WATT-HOUR METER READINGS

PLATTE STREET POWER HOUSE REPORT

Date Wed. Nov. 27th 18

Time	A.C. Unit No. 8 Meter K = 1000		A.C. Unit No. 7 Meter K =		A.C. Unit No. 6 Meter K =		A.C. Unit No. 5 Meter K =		A.C. Total Nos. 6, 7 & 8 Meter K =		A.C. To Converter Meter K 100		Argo Meter K = 100		Broadway Meter K = 100	
P. M.	Readings	K.W.H.	Readings	K.W.H.	Readings	K.W.H.	Readings	K.W.H.	Readings	K.W.H.	Readings	K.W.H.	Readings	K.W.H.	Readings	K.W.H.
3	70500										97100		9200		6500	
4	77000	6500									99500	2400	0100	900	7700	1200
5	84000	7000									02400	2900	1100	1000	9000	1300
6	92000	8000									05600	3200	2200	1100	0500	1500
7	98000	6000									08200	2600	3100	900	2000	1500
8	03000	5000									10200	2000	3800	700	3000	1000
9	08000	5000									12500	2300	4600	800	3900	900
10	12000	4000									14600	2100			4600	700

Time	Colfax Meter K =		Clear Creek Meter K =		D.C. Total Gen. & Con. Meter K =		D.C. Unit No. 4 Meter K =		D.C. From Converter Meter K = 1.6		D.C. Power & Lights Meter K 100		Platte Street Transformer Temperatures			
P. M.	Readings	K.W.H.	Readings	K.W.H.	Readings	K.W.H.	Readings	K.W.H.	Readings	K.W.H.	Readings	K.W.H.	Bank No. 6	Bank No. 7	Unit No. 5	Rotary No. 3
3	9400		30000						90400		5850		25	25		27
4	0100	700	0500	500					91900	2400	5900	50	25	25		28
5	1000	900	1000	500					93600	2720	6000	100	28	25		32
6	2000	1000	1500	500					95400	2880	6100	100	30	30		36
7	2900	900	2000	500					96900	2400	6150	50	32	34		36
8	3500	600	2300	300					98100	1920	6175	25	30	30		32
9	4000	500	2600	300					99500	2240	6200	25		25		30
10	4500	500	2800	200					00700	1920	6250	50		25		28

Operator

Operator

3. The kilowatt-hour output for the month shall be the entire amount generated for the month and shall include station power and light. The amount used for station power and light shall not exceed 2.5 per cent of the total amount generated if No. 8 turbine is in service, and shall not exceed 4 per cent if No. 8 is in repair. Each 5000 kw.-hr., or fraction in excess of this amount, shall be figured to increase the coal consumption by 0.01 lb. per kilowatt-hour.

4. Steam used for purposes other than power-house operation shall be credited to coal consumption; 5 lb. of steam used shall be estimated to be equal to 1 lb. of coal, or if such steam is paid for in a lump sum, then each dollar shall be considered equivalent to 1000 lb. of coal.

5. The bonus system is based on the present load characteristic and load factor; if either one or both shall change materially it will constitute a cause for a revision of the bonus scale.

6. If the coal consumption in succeeding months varies more than 0.1 lb. of coal per kilowatt-hour, the chief engineer of the company shall make an investigation before a bonus is paid.

7. The bonus scale is based on lignite coal from the Leyden mine with a heat value of 9500 B.t.u. per pound. If other coal is used the theoretical amount of coal used shall be figured to be in proportion to the heating value of the coal determined by a responsible chemist.

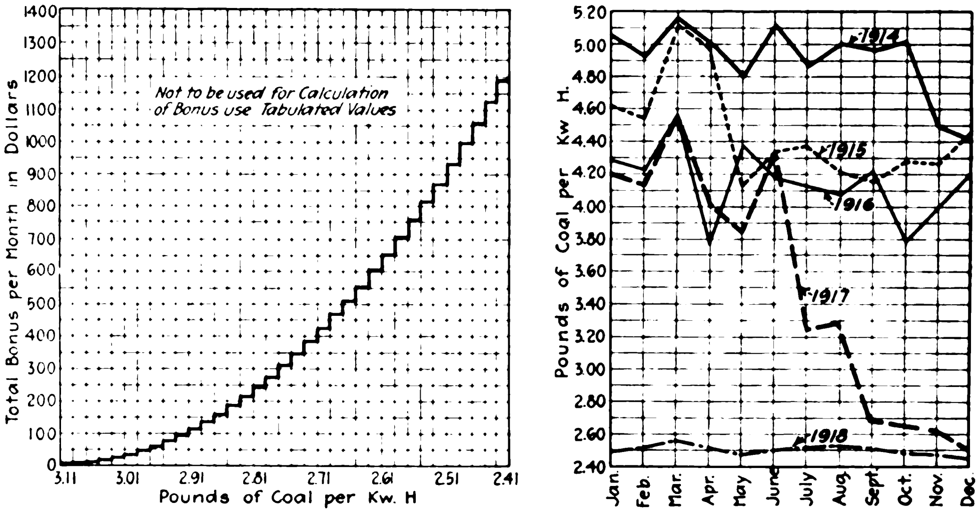
8. The amount of bonus each employee shall receive will be calculated by dividing the total bonus by the number of men on the power-house payroll. In determining the number of men on the power-house payroll, the following rules shall govern:

(a) Extra men taking the place of employees on the sick list shall not be figured as an addition to the number of power-house employees unless on the power-house payroll for a full month or longer. Employees who have been placed on the sick list for six days or longer shall not be entitled to a bonus, but shall be included in the number of power-house employees as long as they remain on the power-house payroll.

(b) Employees taking their vacation shall be included in the number of employees on the payroll and shall receive their bonus, but in case that it is necessary to employ extra men to take the places of men absent on vacation, the total amount of wages paid such extra men shall be deducted from the total amount considered in calculating the bonuses. These extra men shall be entitled to a bonus if they are on the power-house payroll for a full month or longer; but shall otherwise be considered as extra men as outlined above.

9. If No. 8 turbine has to be taken out of service for repairs and the operating force is not at fault, the bonus shall be calculated in the following manner: The output of the old equipment shall be taken at 4 lb. of coal per kilowatt-hour and the corresponding amount of coal deducted from the total monthly consumption. The resulting quantity of coal which will be found, divided by the kilowatt-hour output of No. 8 turbine, shall be used to determine the bonus.

10. If No. 8 turbine has to be taken out of service for repairs due to faulty operation, the whole engine-room crew shall not be entitled to a bonus. In this case each fraction of a month needed to repair No. 8 shall be considered as a full month.

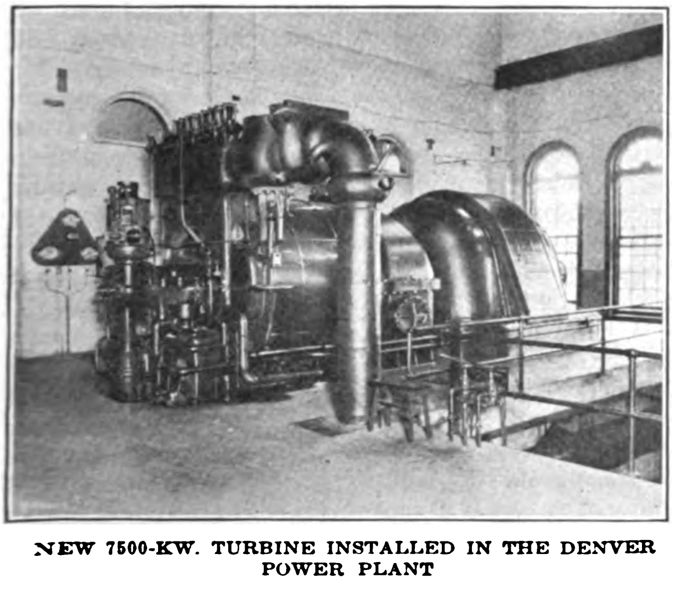


AT LEFT, GRAPHIC PRESENTATION OF POWER-HOUSE BONUS SCALE AT DENVER. AT RIGHT, POUNDS OF COAL PER KILOWATT-HOUR CONSUMED IN DENVER POWER PLANT SINCE 1913

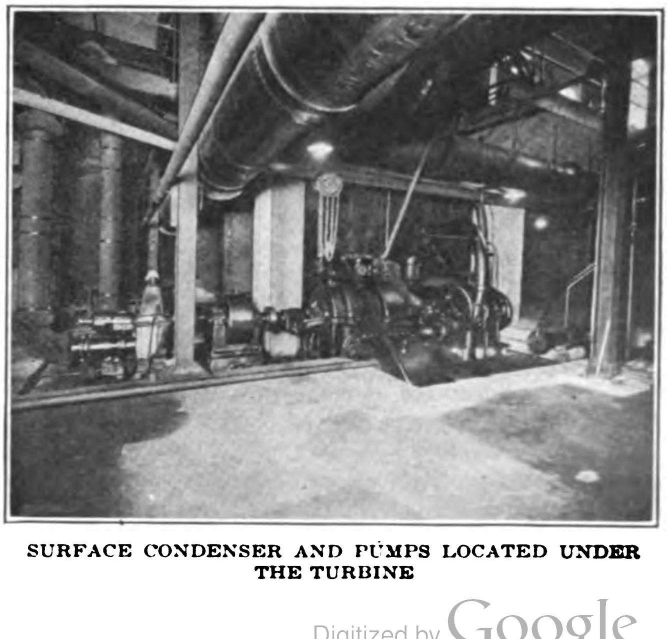
11. No power-house employee shall be entitled to a bonus if, through his fault, damage is caused to the power-house or any of its equipment, and if inspection of any equipment damaged has been overlooked by the foreman to whom this employee reports, he also shall not be entitled to a bonus.

12. In case of power interruption, due to faulty operation, the bonus will be figured for the total number of power-house employees, but the particular employees at fault for the interruption or bad operation shall not be entitled to any bonus.

13. Payment of the bonus shall be made in the following manner: 90 per cent of the total bonus earned will be paid out as outlined above, 10 per cent will be retained, and this sum so retained will be paid out semi-annually to all men who have been on the power-house payroll for the half year or longer just preceding the date at which this last amount is paid.



NEW 7500-KW. TURBINE INSTALLED IN THE DENVER POWER PLANT



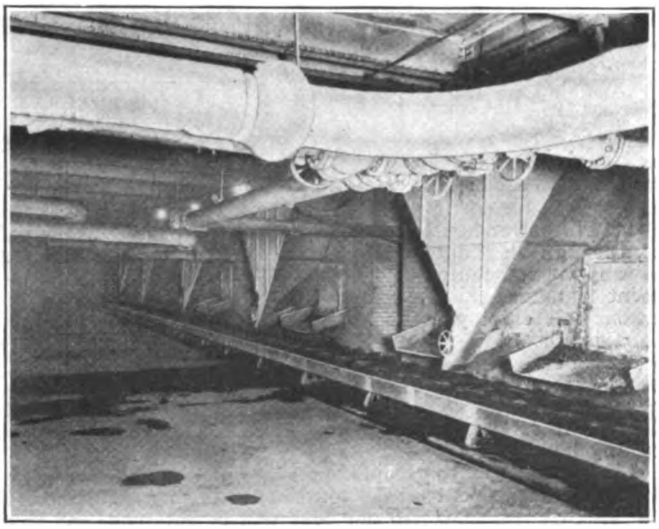
SURFACE CONDENSER AND PUMPS LOCATED UNDER THE TURBINE

14. The following bonus scale shall be used to determine the proper amounts:

Coal per Kilowatt-Hour, Pounds	Total Bonus Per Month	Coal per Kilowatt-Hour, Pounds	Total Bonus Per Month
3.11 to 3.09	$2	2.75 to 2.73	$344
3.09 to 3.07	4	2.73 to 2.71	382
3.07 to 3.05	8	2.71 to 2.69	422
3.05 to 3.03	14	2.69 to 2.67	464
3.03 to 3.01	22	2.67 to 2.65	508
3.01 to 2.99	32	2.65 to 2.63	554
2.99 to 2.97	44	2.63 to 2.61	602
2.97 to 2.95	58	2.61 to 2.59	652
2.95 to 2.93	74	2.59 to 2.57	704
2.93 to 2.91	92	2.57 to 2.55	758
2.91 to 2.89	112	2.55 to 2.53	814
2.89 to 2.87	134	2.53 to 2.51	872
2.87 to 2.85	158	2.51 to 2.49	932
2.85 to 2.83	184	2.49 to 2.47	994
2.83 to 2.81	212	2.47 to 2.45	1058
2.81 to 2.77	242	2.45 to 2.43	1124
2.79 to 2.77	274	2.43 to 2.41	1192
2.77 to 2.75	308	2.41 to 2.39	1262

15. If any employees of the power-house should find the bonus, as figured by the auditor, not to be correct, they can appeal to the chief engineer of the company, whose decision shall be final.

The coal used is a Colorado lignite with a heat value of about 9500 B.t.u. per pound as fired, as indicated in the order. The load on the power plant is purely an electric-railway load, of familiar characteristic form. The guarantees for the large turbine and condenser and some tests on the boilers made it probable that it would be possible to produce a killowatt-hour with 3.1 lb. of coal, as an average for a month, and this was adopted as the standard of fuel efficiency upon which to reckon the savings. If the large turbine is out of order and it is necessary to fall back on the auxiliary equipment, 4 lb. per kilowatt-hour is used as a standard.



BOILER-ROOM BASEMENT SHOWING HOPPERS FOR SIFTINGS FROM CHAIN GRATES AND BUCKET CONVEYORS WHICH CARRY THEM TO OVERHEAD BINS

MANY CHECKING AND ECONOMY DEVICES INSTALLED

The possibility of earning a substantial bonus every month caused every man to consider the losses and how to reduce them. The activity in the boiler room, for instance, was concentrated on stopping air leaks on boiler and economizer settings, while the engine-room force made it a point to use the proper combinations of generating equipment in service. The logsheet and other record forms, reproduced herewith, suggest some of the checking devices installed to assist in the campaign to cut down the coal consumption per kilowatt-hour. In addition recording economy draft gages, thermometers, steam flow meters, and CO_2 recorders are in use. The CO_2 recorder is used as a portable checking device. In connection with the portable draft gage it gives the desired information concerning the condition of the boiler setting, fire, etc. Flue-gas temperatures are taken at intervals. In the boilers the original Stirling arches have been replaced with flat arches, both for reasons of increased economy of operation and because it was believed the flat arch would stand up better and longer. The flat arches have proved to be superior in both ways.

As a result of the improvements the new turbine-generator takes care of all demands and the balance of the generating equipment is held in reserve. Three 750-hp. Stirling boilers take care of the steam demands. Eleven 415-hp. Stirling boilers, together with their equipment such as stokers, economizers, etc., have been removed and sold at a good price. Two more boilers of the same size, with economizers and chain grates and extra chain grates, are for sale now, and as they are in good condition they will probably bring a good price.

The results obtained can probably be best illustrated by the chart on page 269, showing the coal consumption per kilowatt-hour at the present time to be approximately 2.5 lb. (in December actually reduced to 2.46 lb.) which represents a saving in operating cost of approximately $150,000 per year. These results are due partly to the better economy of the large turbine and partly to some other less costly improvements in the boiler room, but in no small degree to the introduction of the bonus plan.

BONUS HAS AMOUNTED TO ABOUT $35 PER MAN PER MONTH

A few words concerning the adopted bonus system may be of interest. The coal consumption per kilowatt-hour is figured for the gross output of the station and includes all power used for the plant, amounting to 1.25 per cent of the gross output. If the coal consumption for net kilowatt-hours is desired the correction should be made.

One of the principles used in working up the scheme was so to arrange the bonus scale that the benefits derived from the special efforts of the employees would be divided evenly between the men and the company, and it was also considered better and simpler to pay all men the same bonus. This has amounted to about $35 per man per month above the regular salary. No especial competition between watches has been encouraged, but as the amount of bonus each man receives at the end of the month depends upon the combined efforts of all, no man is permitted by his companions to "lie down on the job." The daily log sheet, together with the coal book kept by the boiler-room foreman, gives the men all the necessary information so that they can tell where they stand to date on the bonus.

It has been found that the wording of the bonus system order offers sufficient restraint to prevent the employees becoming over-zealous in their efforts, at the expense of the equipment. Thus, in accordance with the order, if No. 8 turbine has to be taken out of service for repairs due to faulty operation, no bonus is paid that month, and if damage is caused to the power house or any equipment through the fault of an employee, he is not entitled to participation in the bonus.

The bonus plan has now been in operation for a little more than one year and no difficulties have arisen. This is probably due to the fact that the whole matter was placed before the men and discussed at meetings prior to the inauguration of the plan, as it was considered very necessary that each man should understand fully the method of calculating his share. One point of interest is that our experience indicates that it is not good practice to pay the bonus on the regular pay day, for in spite of preaching and teaching some of the men form an idea that the bonus is simply wages and not an extra premium for increased efficiency. This point, as a matter of fact, reveals one of the danger marks of the whole bonus system.

Due to the improvements made in the plant, an operating crew of twenty-five men is now required, as compared with fifty-five men formerly. Shifts are now eight hours instead of twelve, and a two-week vacation with pay is granted every man each year. Without doubt the incentive offered by a bonus has increased the economies, and it has also produced a solidarity and co-operation among the operating force which has improved the quality of power service. Cleanliness at the plant is now considered a necessity. Inspection of all parts of the station is made with the greatest care, it being fully understood by the men that laxness may result not only in a pecuniary loss but also in a loss in reputation reflected readily in a decreased amount of bonus earned.

A great deal has been said in the past for and against bonus systems in general, and it is clearly understood that the same system is not suitable for every plant. Our experience, however, with the scheme adopted has worked out exceptionally well not only for both employees and employers, but also for the public in general, through a better utilization of coal and other materials, and an increased reliability in the power supply.

Experience with Pneumatic Sand Cars

A DEVICE that has proved to be very satisfactory in service is a sand car in which the sand is transported in a steel tank which can be put under air pressure for the purpose of forcing the sand out through a hose or spout close to the track. Cars of this kind have been in use long enough to demonstrate their entire reliability. For example, the Philadelphia Rapid Transit Company put a couple of cars in service early in 1913, and they have operated with entire satisfaction and have not introduced any particular maintenance difficulties. There is no trouble through the clogging of sand in the discharge pipe if the sand is perfectly dry. The ease with which sand can be forced out through a pipe under air pressure is surprising, but a glance at an hour-glass in action will readily convince anyone of the "fluidity" of perfectly dry sand. It is certainly a great convenience to utilize this quality in distributing dry sand to carhouses for redistribution to the cars.

When first put into service the Philadelphia cars had but one source of air which had to provide for braking and also for discharging the sand. This proved to be unsatisfactory in that the cars reached the carhouses without full air pressure on the tank and some time was lost in the pumping-up process. Now separate compressors are used for the two functions, with saving of time and lessening of compressor maintenance.

Tool List as Aid in Economical Maintenance of Way

The Pacific Electric Railway Finds Systematic Plan in Posting Tool List to Be Effective in Tool Conservation

BY CLIFFORD A. ELLIOTT
Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

IN 1915 the Pacific Electric Railway maintenance of way department established the practice of posting in its section toolhouses and material yards copies of tool lists for mixed or dirt track sections. This was done to aid in the solution of the problem of supplying tools economically to the sections, and the list as prepared included all tool supplies commonly needed on various parts of the system by section men.

In addition to the lists of tools each poster contains descriptions of the tools furnished by the store department, in order to enable the foremen properly to prepare their requisitions when obliged to order new tools or to send tools into the store for shipment to the company's shops for repairs. The list forms part of the generally established standard system of having a fixed classification of all tools, so that the general storekeeper's and auditor's records and accounts shall correspond when inventories are taken or when documents of any nature involving tools are passed between departments concerned.

Each list as posted, also shows the approximate value of each tool, the price set being high enough to cover ordinary price fluctuations, for the purpose of impressing upon those ordering tools the value of each item and the consequent need for persistent watchfulness against loss and breakage. The lists were printed on white linen cloth so as to render them comparatively indestructible.

Each list comprises tools sufficient for a section gang of six men, for sections working entirely on dirt track and for extra gangs working on dirt or ballasted track or track in paved streets. It is assumed that gangs working on ballasted track or track in paved streets require a more varied assortment of tools than does an ordinary section gang confined entirely to maintenance of dirt track. For this reason, in preparing the lists, two distinctions were made, namely, tool requirements for dirt sections and tool requirements for mixed sections. By the term "mixed section" reference is made particularly to sections which perform maintenance work in city paved streets, as well as on dirt and ballasted track outside of the city lines and on interurban track.

During 1917, after the United States entered the war, it was deemed expedient to revise the tool lists in view of the acute shortage of supplies and of the exorbitant prices prevailing. This was done to show the section foremen and their subordinates the relative prices of tools in 1917 as compared with 1915. In revising and reposting the list, the idea was firmly to impress upon the men that tools not only represent so much physical property but that they represent a great deal of money. The purpose was not only to impress the importance of strict economy but also to impel conservation of materials because the company had found it extremely difficult to secure tools of certain standard makes which in peace times it had found to be economical to use.

Private Operation with Public Ownership Seems the Best Solution

BY THOMAS E. MITTEN
Chairman, Executive Committee, Philadelphia Rapid Transit Company

T. E. MITTEN

DAVID LLOYD GEORGE, the Prime Minister of England, is credited with the following epoch-making utterance:

We must sweep aside prejudices. The difficulty, believe me, is not with interests, it is with prejudice. And that is equally true in every business. People talk about the vested interests. It is not the vested interests I am afraid of, it is vested prejudices. Sweep these away and the State can easily deal with interests. You must not take any man's property away. You cannot build a great State on dishonesty. You are bound to come to grief if you attempt it.

Therein I believe lies the only hope of a right solution of these great reconstruction problems.

The street railways of the United States form a most vital part of the circulatory system of the business and industrial world, and, if we are to maintain our new leadership in international affairs, they must be made to function properly.

To keep pace with the new order of things, much remedying of our street railway systems will be required. Many of the city traction lines of the United States to-day are in the hands of receivers, others are resorting to increased fares in a futile endeavor to solve their problems, and most of the remaining companies are apprehensively anticipating the future.

The company of which I am the operating head has been able to keep wages up to the standard set by the national war labor board and fares down to a basic charge of 5 cents.

Broadly speaking, the development of street railways has been not so much in the direction of public good as for the advantage of property owners and promoters.

In many cities original grants were made to competitive companies, and lines are still being built to advance real estate values and further private interests. There has, therefore, been a great duplication of tracks, with consequent increased expense of track maintenance and operation.

The high rate of return received by investors in the earlier horse-car days proved to be bonanzas for those who, knowing little and caring less of that which might be in store for the future, considered all earnings available for dividends without regard to the wearing out of the property and the consequent gradual extinguishment of the original investment.

Electricity was later heralded as being the agency to increase speed and also reduce the cost, and thus make for greater profit. It was with this thought that our cities generally required of their street railways large compensation for the right to electrify; this added charge extended in some instances to a complete paving and maintenance of the entire streets on which cars were to be operated.

Franchises have been granted to politicians for hold-up purposes and have then necessarily been purchased by the street railway companies.

The sum of such purchase has been almost invariably added to the cost of the property, so that the burden now carried generally is composed not only of actual costs of development from horse cars to the present modern street railways systems, but, in addition, they have had to carry the cost of duplications, the profiteering of the promoter and the price of peace to the politicians.

The remedy largely lies in the rearrangement of existing street railway lines so that the public may be properly served without maintaining tracks on streets not necessary to proper service.

The prime requisite is, of course, that the cars be so operated as to give the most satisfactory service to the greatest number of people, and that the car rider shall receive the maximum possible for the fare paid.

To correct the injustice of the car rider being obliged to pay for that which represents private gain, it would seem necessary that ownership of street railways be vested in the cities served. By this means only does it seem possible to apply corrective measures with a sufficiently firm hand to insure the revision of the existing lines and the planning of the new, with proper regard for the interests of all.

Municipal operation has not, so far as known, been satisfactorily accomplished in this country. The principle of operating with "service at cost" supplies a well-sounding phrase, but if the management is to be either politically controlled or supplied by inexperienced or incompetent trustees, the result in either case is bound to be disappointing. The successful carrying of a large volume of traffic with a very slight margin of profit must necessarily require an operating management possessing both skill and experience, and there should be a measure of reward commensurate with the service rendered and the results secured.

Co-operation with labor, so much to be desired and so seldom secured, is the keystone of all accomplishment in providing satisfactory service to the public.

The highest wage is the cheapest pay when the men and management unite in a common understanding that the underlying principle of their relation is a good day's work for a good day's pay.

An assured profit fails to supply the necessary incentive to insure either the frugal expenditure of money or the combating of unfair demands from other interests. In other words, the management that has the deciding voice in making expenditures should always stand to lose its reward if guilty of extravagance or incompetence.

The summing up of the foregoing actually points to city ownership and private operation, and if the latter be undertaken under fair and equitable terms and the execution is effective, then the fact that the community served is in a position to cancel the undertaking and change the management will serve not only to keep the management effective but, for the reason that the change can be quickly and easily made, is the greatest assurance that such action will not be taken in a hurried or unwise manner.

Application No. 3808

History of San Diego Electric Railway Told in This Request for Relief Made to California Railroad Commission Proves that Rectitude Affords No Guarantee that Income Will Exceed Outgo

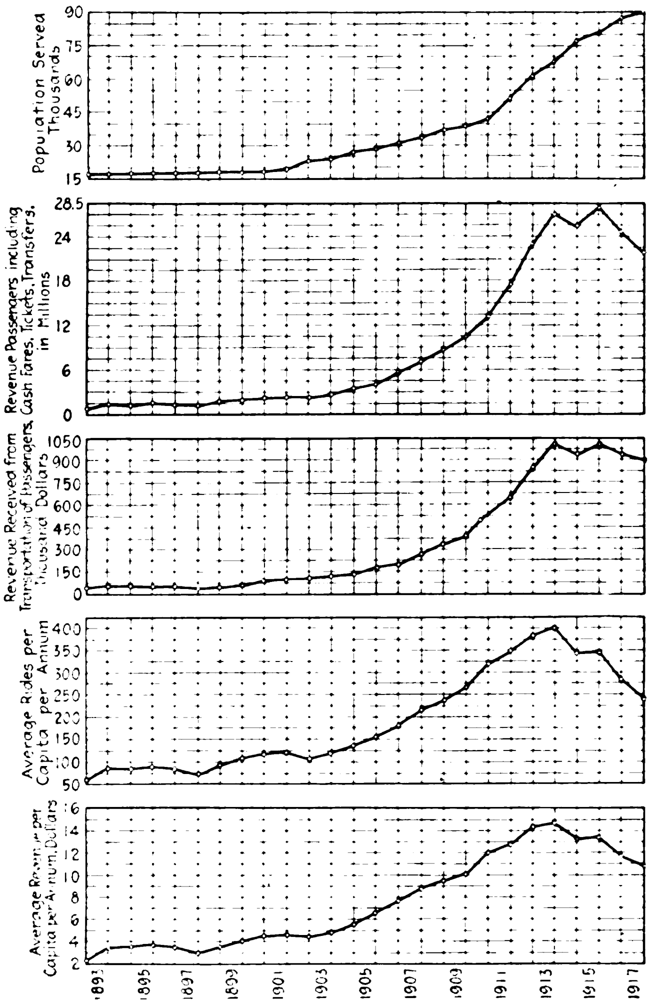
ONE of the most interesting documents ever presented to a regulatory body by an electric railway is the application for relief recently made to the Railroad Commission of California by the San Diego Electric Railway as of Nov. 1, 1918. The petitioner does not attempt to specify the form of help desired, leaving such action to the commission.

Before an abstract of this application is presented it is well to point out the almost unique position of the San Diego Electric Railway. It has nothing to live down in over-capitalization, extravagance of earlier managements, failure to give good service or any other accusation of that kind. On the contrary, it presents the remarkable example of an undertaking that for a long period of years has given far more to the community than it has received, because the property was controlled by the Spreckels family which has kept on putting more and more money into the railway because of its faith in the future of San Diego. It will be seen, however, that the jitney, the private automobile and the war have proved too much even for the patience and the pocket of a Spreckels. **This application, which is abstracted in the following paragraphs, was prepared for the San Diego Electric Railway by E. J. Burns, public utility adviser, San Diego. The application opens with an extract from a speech made by Max Thelen, then president of the Railroad Commission of California, before the University of California Extension Course, March 6, 1918, in which he pointed out that when a street railway asks for relief it must come prepared to show that it has eliminated all unnecessary expense and has introduced all economies of operation compatible with the continuation of reasonably good service to the patrons. Among these features Mr. Thelen classed skipstops, elimination of needless car mileage, reduction of heating and use of one-man cars. Following this appears the correspondence** of last February between President Wilson and Secretary McAdoo urging that state and local authorities afford prompt relief to the public utilities.

SAN DIEGO DEVELOPED BY ITS STREET CARS

Taking as a guide, the sentiments expressed by Messrs. Thelen, Wilson and McAdoo, Mr. Burns begins by saying that the first obligation of an electric railway is to produce and furnish the traveling public with the most efficient service it can afford to give. The city of San Diego would not have grown so rapidly if the San Diego Electric Railway had not been so keen to take advantage of the rapid improvements in electric railway equipment.

Like other street railways, the system had its beginnings in a number of small, disconnected horse lines. The cars weighed about 1500 lb. each, seated ten to fifteen passengers, cost say $1,500 each and ran on 12-lb. to 30-lb. rail. The present cars weigh 43,500 lb., seat **fifty-two passengers and run on 60-lb. to 114-lb. rail. The system grew from 10 miles to 86 miles. The only thing common to the old times and the present day is the 5-cent fare. The system made possible the development of outlying districts, but if it is now held down to a fare that will not pay for good service a decline in values and a stoppage of development will inevitably occur. Since good service cannot be maintained without an increase in revenue the property owners should not put forth the argument that higher fares will tend to decrease the value of their property. In any event, the value of the real estate is due largely to the railway, and if it is necessary to adjust the rates of fare, it would appear that possibly some adjustment will be necessary in realty values. At no time has the railway itself exploited any land in the city of San Diego or outlying districts. Therefore, it has not benefited by additions or extensions other than from**



THESE GRAPHS SHOW OPERATING RECORDS AT SAN DIEGO FOR THE LAST TWENTY-FIVE YEARS, TOGETHER WITH STATISTICS OF POPULATION AND RIDING HABIT its transportation business. The electric railway spent more than $1,000,000 in extra car, power and terminal facilities to take care of the business expected at the time of the 1915 exposition, but it did not receive enough income from transportation in return to pay its operating expenses, depreciation charges, taxes and bond interest. This result was due to unfair jitney competition, permitted in direct contravention of the railway's exclusive franchise, and it cost the San Diego Electric Railway between $400,000 and $500,000. This loss from jitney competition is small, however, compared to that caused by the depreciation of the railway's securities.

Up to 1913 the business of the railway kept pace with the growth of the city. The city has continued to progress but not the railway.

WHY MORE CAPITAL MUST BE RAISED

To interest capital it is necessary to offer an investment that appears to have a future. Investors in street railway securities now know that the business is decreasing; that it requires a larger annual investment than in the past to produce the same commodity but that the price paid for the commodity is the same, and that the chances for a fair rate of return are discouraging. To invest in street railway securities is not even an interesting game of chance. The prospective investor knows perfectly well beforehand that he will lose and is no longer willing that the public should get street railway service at his expense.

> THE public utility regulations do not permit the railway to earn a sufficient surplus during good times to take care of the poor years. Therefore, when costs go up, rates should likewise go up. The car riders should bear in mind that the relief now asked for should have been requested at a much earlier date.
>
> —*From San Diego Application*

From its organization twenty-six years ago to Dec. 31, 1917, the railway has expended approximately $6,000,000 for construction, new property, extensions, improvements and betterments. No matter how good this property is to-day, it will not last forever. Consequently, the company will be faced by some very difficult problems as the time for replacements approaches because:

The income from operation has not been sufficient to set aside a depreciation or deferred maintenance fund;

The income has not been sufficient to pay for additional bond interest and sinking fund requirements;

The income has not been sufficient to pay any return whatsoever on outstanding capital stock since 1914;

The cost of replacing the property now worn out has increased from 50 to 200 per cent without a corresponding increase in quantity of business;

The general forty-one-year franchise expires in thirty-two years, so no refunding bond issue is possible;

The company's past experience proves conclusively that it will be necessary to reconstruct the property every fifteen years during the life of the present franchise;

The expenditures necessary to replace the property during the life of the present franchise will not be less than $6,500,000. This added to the $6,000,000 already invested in the property makes a total investment of $12,500,000. The present income of the company is insufficient to set aside one dollar to retire this investment at the expiration of the present franchise.

The company is required by law to render adequate service, to extend its facilities from time to time within the territory served, to make large expenditures for street work, changes in grade, etc.

The variation in earning power makes the electric railway industry hazardous from the investor's viewpoint, and the uncertainty of the return makes a difficult situation to overcome in securing capital for future replacements or improvements.

There is a marked tendency on the part of some of the newspapers and the people of California toward municipal ownership. This must receive serious consideration by investors or prospective investors in public utility securities.

IS THE FRANCHISE AN ASSET OR A LIABILITY?

Under the uniform system of accounting, officially accepted by the California Commission, Account No. 545, Franchises, provides that the franchise account shall include actual amounts paid to a state or political subdivision thereof in consideration of franchises, etc. The San Diego Electric Railway has every reason to believe that the value of its franchise should be carried on the liability side rather than on the asset side of its books due to the burdens imposed upon the carrier in its endeavor to live up to all the franchise requirements. The cost of the franchise works out as shown in Table I:

TABLE I—TOTAL COST OF FRANCHISE

Cost of franchise	$86,000
Cost of initial paving	507,000
Cost of maintaining paving	200,000
Bond interest initial paving	129,000
Cost of franchise tax *	106,000
Total	$1,028,000

*2 per cent of gross receipts to date.

Of the foregoing sum, $696,000, or $116,000 a year, was spent between 1912 and 1917 inclusive. During the latter period the taxable gross operating revenue was $5,700,000, or $950,000 a year. This means that the actual franchise tax has been 12.2 per cent of the taxable gross operating receipts during the period 1912-1917.

During its entire life, from 1892 to 1917 inclusive, the San Diego Electric Railway has paid in cash $603,000 more to the city for the privilege of conducting transportation than it has to the stockholders who furnished the money for the construction of the transportation facilities.

The electric railway is no different from any other industrial enterprise as regards the relation between cost of manufacture and selling price. In this case the commodity produced is transportation. When the cost of manufacturing transportation advances, the selling price must also advance if the quality of the commodity is to be maintained. Yet in the case of street railways, the popular thought is that the selling price of transportation should be the same regardless of increases in the cost of manufacture. How this condition can be maintained without killing the industry has not been explained. Nothing could show more clearly than this the need for a common understanding and co-operation on the part of the public, public service commissioners and utility operators.

In San Diego or any other city it certainly should not be expected that the capital was invested solely to provide the community with transportation. When the present investors made possible the city's transportation system, that investment was made for the purpose of receiving a fair profit.

To figure intelligently the net result of manufacturing transportation, the elements of cost should first be considered. These include labor and material for maintenance and operation; charges for depreciation of physical plant; taxes and interest on bonds and loans. Deduct these charges from the income received, and the remainder is profit. If there is a remainder it goes to the investor who made possible the production of the commodity, transportation. If nothing remains, then the investor, as in the case of the San Diego Electric Railway, is "out of luck." As a matter of fact, the San Diego stockholders have received no profit on their capital stock since the year 1914.

DEPRECIATION IS AN ELEMENT OF OPERATING COST

Mr. Burns then points out that the standard system of accounting allows only for normal or every-day maintenance and operating expenditures but not for the cost of depreciation due to inadequacy, age or obsolescence. Replacement due to obsolescence is one of the most important items of depreciation. It represents the cost of keeping up to date.

Replacements merely represent maintenance or operating expenditure and therefore should not be charged to capital account unless the cost of replacing in kind exceeds the original investment of the replaced property. The necessity of making replacements, due to depreciation, occurs over a period of years; hence the necessity of a replacement fund to replace worn-out property promptly.

Book figures and guessing are no longer admissible in allowing for depreciation. Local conditions and the past experience of the utility must be considered. The uniform system of accounts provides depreciation accounts in which to include monthly charges to cover depreciation of way and structure, equipment, power plant buildings and power plant equipment for creating reserves. Since July 1, 1914, the accounts also provide that carriers shall accrue depreciation on equipment included in accounts 530 to 535 inclusive, but the accrual of depreciation of way and structures, power plant buildings and power-plant equipment is left optional with the carrier until such time as the commission may direct otherwise.

There is no apparent good reason why the classification should not require the carrier to accrue depreciation on all classes of depreciable property. The thought that it should not be necessary to accrue depreciation on way and structure and power-plant buildings and equipment for the reason that safe and economical operation necessitates constant maintenance of such units to a point of efficiency of their original physical condition is very misleading. Steam and interurban track can be maintained in a high state of excellence without interrupting the service, partly because of the open construction and partly because of the long headways. However, street railway service is operated at headways from one to ten minutes. In most cases the track is imbedded in concrete pavement, so that when renewals occur it is not merely a question of replacing rails but of an entire section of track or pole line. This makes it difficult to draw the line between depreciation and maintenance. Therefore, it would appear to be much better to include monthly charges to cover depreciation of way and structures, power-plant buildings and power-plant equipment in the same manner as the classification provides for the accrual of depreciation of equipment.

Prior to Jan. 1, 1915, it was the policy of the San Diego Electric Railway to accrue depreciation on way and structures, equipment, power-plant buildings and power-plant equipment. However, due to the decrease in the railway's income and the increase in the railway's outgo, this depreciation program was changed on the date named. For the present, only accruals are being made on equipment as required by the uniform classification of accounts. The railway in changing its depreciation program did so only until such time as the income from the operation of the property would be sufficient to make monthly charges to cover all depreciable property. During the years 1912 to 1917 inclusive, $600,535 was charged through the operating accounts as a reserve for accrued depreciation as shown by the following figures:

> TO INVEST in street railway securities is not even an interesting game of chance. The prospective investor knows perfectly well beforehand that he will lose and is no longer willing that the public should get street railway service at his expense.
>
> —*From San Diego Application*

Way and structures	$238,468
Power plant	102,108
Equipment	259,959
Total	$600,535

Of this amount $69,900 has been debited to reserve for accrued depreciation, leaving a balance of $530,635, which was reinvested in the property.

This money was used principally in financing improvements during 1915 and 1916, as it was impossible to sell the bonds authorized for that purpose at the price set by the commission. This depreciation fund is now urgently needed to make replacements of worn-out or obsolescent equipment.

In the San Diego Electric Railway, the fund for accrued depreciation was reinvested in the property for additions and betterments, and the use of this money dispenses with the necessity of additional interest-bearing capital until such time as the fund is needed for its original purpose. The time has now arrived when that money is needed, but due to the decrease in the railway's securities, it is impossible to convert the investments in which the money was invested into cash without a large discount and additional burdens to the fixed charges. The $530,635 representing reserve for accumulated depreciation already reinvested in the property would entail a considerable additional burden on the fixed charges. Of the $4,497,000 bonds (face value) authorized by the commission on Oct. 6, 1914, 3920 $1000 bonds were sold at 85 per cent, netting $3,332,000, and there still remain unissued 577 bonds of the par value of $577,000, or $490,450 if sold at 85. The net proceeds received from the sale of these bonds would be insufficient to return the entire reserve for accrued depreciation by $40,185. In the second place, if the bonds could be sold at 85 per cent of their face value, the railway would be compelled to increase its annual fixed charges as follows:

Sinking fund requirements	$5,770
Discount	380
Interest at 5 per cent	28,850
Total	$35,000

Therefore, the cost of money per annum to replace the fund for accrued depreciation would amount to 6.55 per cent.

The income from operation is insufficient to care for this additional burden, and there is no reason to doubt that the commission would refuse to sanction a future bond issue as the income would be insufficient to pay bond interest and sinking fund requirements. Short-term notes at a much higher rate of interest are also out of the question. Another chance for the return of the depreciation fund would be the sale of stock or a stock assessment. The result of such a course may be guessed from the circumstance that the stockholders received no dividends at all for the first fifteen years, 1892 to 1908, and for the last three years, 1915 to 1917. The stockholder ought to be protected the same as the bondholder.

TABLE II—INCOME AND OUTGO FOR THE YEAR ENDED DEC. 31, 1917

Income	Amount	Per Cent
Revenue from transportation of passengers	$892,166	94.22
Revenue from other railway operations	44,245	4.68
Non-operating income	10,451	1.10
Total	$946,863	100.00
Outgo		
Operating expenses (includes $172,165 uncharged depreciation)	841,802	88.91
Taxes assignable to railway operation	74,264	7.84
8 per cent return on book cost of physical property, amounting to $5,193,585	415,486	43.87
Total outgo	$1,331,553	140.62
Outgo exceeds income by amount of	384,689	40.62
Necessity and Disposition of 8 Per Cent Return on Investment		
Interest on $3,842,000 bonds at 5 per cent	$192,100	46.23
Bond retirement sinking fund	39,200	9.44
Amortization of bond discount and expense	14,776	3.56
Interest on unfunded debt	18	0.01
Conductors' and motormen's accident fund	13,125	3.16
Miscellaneous income deductions	482	0.12
Entries direct to profit and loss	31,797	7.65
6 per cent dividend on $1,250,000 capital stock	75,000	18.05
To surplus	48,986	11.78
Total	$415,486	100.00

Another matter of vital importance to the stockholder is that of securing additional capital required in excess of the depreciation fund at the time of making replacements. Equipment purchased ten years ago and depreciation accruals based on costs at that time and charged off yearly during the useful life of such equipment, will not be sufficient to provide adequate capital to replace the equipment when it is outworn. Assume a mile of track constructed in 1910 with 60-lb. rail at a cost of $30,000 per mile and assume its life as ten years, also that one-tenth of the original cost has accrued annually during its useful life. By 1920, however, the carrier would discover that the cost of replacement was not $30,000 but $60,000. Where is the additional capital, $30,000, to come from? The problem would be simple if there were a progressive growth of the business, but not if the business has stopped growing or even declined. In brief, the railway is then in the same position as the jitney-bus operator who existed off of his investment.

OUTGO EXCEEDS INCOME

It would seem clear that the serious financial situation of the San Diego Electric Railway is due to the need of rates of fare that will yield more revenue than that now paid by the consumer for the commodity transportation. To furnish efficient service at a price less than the cost of production is nothing short of confiscation. There should be no half-hearted relief. The people of San Diego might just as well understand that only permanent relief will save this railway from the fate of its predecessors. The railway's financial condition is not the result of over-capitalization, corrupt methods, frenzied finance or the payment of large and exorbitant dividends to the stockholders. In fact, Commissioner Thelen himself said on Sept. 29, 1912, in connection with Application 1206 of this company:

"There is no question about your honesty in the past. This corporation is one of the most honest utilities I have run across."

Table II illustrates clearly the need for some immediate relief, showing the income and outgo for the year ending Dec. 31, 1917; the income and the outgo per dollar of business are shown in Table III, while the operating data for the year ending Dec. 31, 1917, are shown in Table IV.

Table III shows that the deficit for the year ending Dec. 31, 1917, was $384,689. Table III points out that the investment in physical property represents $5.57 per dollar of business. The income was but 18.2 per cent on the investment, whereas 25.6 per cent was necessary to come out even. It cost the railway $1.406 for each $1 of business handled.

TABLE III—INCOME AND OUTGO FOR EACH DOLLAR OF BUSINESS DONE IN YEAR ENDED DEC. 31, 1917

Income:	
Operating revenue	$0.989
Non-operating income	.011
Total income	$1.000
Outgo:	
Operating expenses	$0.889
Taxes assignable to railway operation	.078
8 per cent return on book cost of physical property	.439
Total outgo	$1.406
Recapitulation:	
Income	$1.000
Outgo	1.406
Outgo over dollar of income	$0.406

Again, Table IV shows that for every revenue car-mile run there was a loss of $0.1058. During the year, 14,864,600 cash-fare passengers were carried. The income at 5 cents per passenger was $749,047.80. The revenue ticket passengers carried amounted to 3,913,911, yielding $143,118.86, or $0.9365 per revenue ticket passenger. To yield sufficient revenue to pay all expenses as shown in Table II, the rate of fare per cash passenger would have been $0.0753 and the rate of fare per revenue ticket passenger would have been $0.94.

During 1917, the average income per revenue passenger, which includes cash fare and revenue ticket passengers, was $0.0504 and the average outgo per revenue passenger was $0.0716. Therefore, the outgo per revenue passenger was $0.0212 more than the income.

Every effort has been made by the company to effect economies along the lines laid down by Commissioner Thelen in his address before the University of California. The skip stop was established as early as June 1, 1916, and has now been carried to the point where 625 stops have been reduced to 486, a reduction of 139. Considering 636 as the number of total stops possible, there had been eliminated 150 by July 1 or a little more than 23 per cent. The average probable stops eliminated is two and one-half per trip for all of the lines where skip stops have been installed. By means of the "Economy" watt-hour meter, a number of tests were made with both a center-entrance car and a California type car which was typical of those converted to one-man operation. These tests indicated that the skip stop would save 350,600 kw.-hr. a year. The saving, however, is by no means proportionate to the reduction in energy requirements. Labor and certain fixed items are not affected at all. Fuel and water, however, can be reduced in direct proportion, and it may be assumed that this would also hold true of lubricants and miscellaneous power-plant supplies. It is estimated that during 1919, the total output of the San Diego plant will amount to 11,040,000 kw.-hr., while the cost of fuel, water, lubricants and miscellaneous items will amount to say $116,395, making the cost per kilowatt-hour $0.0105. Therefore, the 350,600 kw.-hr. saved mean only a net saving of $3,681 on the power-house end.

> THE electric railway is no different from any other industrial enterprise as regards the relation between cost of manufacture and selling price. In this case the commodity produced is transportation. When the cost of manufacturing transportation advances, the selling price must also advance if the quality of the commodity is to be maintained. Yet in the case of street railways, the popular thought is that the selling price of transportation should be the same regardless of increases in the cost of manufacture. How this condition can be maintained without killing the industry has not been explained. Nothing could show more clearly than this the need for a common understanding and co-operation of public, regulators and operators.
>
> —*From San Diego Application*

As early as July 1, 1915, the railway began to eliminate all such unproductive mileage as could be discontinued without hardship to the public.

The privately-owned automobile is making serious inroads in the passenger revenue. Just how to meet this competition is a serious question. There are more permanent residents in San Diego now than in 1913, but the railway is carrying fewer passengers per capita per annum. The advent of the private machine has changed the whole aspect of the electric railway situation as now there is competition. A few years ago a ten-minute headway with an average speed of 9 m.p.h. was considered *de luxe* service, but the public has since been educated to faster and more frequent service. If the electric railway expects to stay in business, it must meet these new conditions. Therefore, care must be exercised in curtailing service. In Mr. Burn's opinion, nevertheless, the time when the automobile will replace the street car is far distant. On this point he quotes from one of John A. Beeler's reports on the Washington traffic situation, in which Mr. Beeler showed that at Fifteenth Street and New York Avenue, for example, it was observed that 1135 autos carried only 2144 persons or an average of 1.89 persons per vehicle whereas 203 street cars carried 7541 passengers or 37,15 per vehicle. Mr. Beeler also found that it takes less than three seconds longer to pass a street car, carrying nearly forty persons, through a given intersection, than it does to pass an automobile carrying less than two. (See ELECTRIC RAILWAY JOURNAL for July 27, 1918, page 147.)

At San Diego, the practice of neighbors picking up friends in their machines had grown greatly. To learn what this kind of competition and other factors were doing, the company made a traffic survey between the hours of 7 and 9 a.m. on Aug. 15, 17 and 21, 1918, at four points with the results shown in Table V.

This survey showed an average of 1.75 passengers per competitive vehicle and 22.61 passengers per street car.

TABLE NO. IV—OPERATING STATISTICS FOR YEAR ENDED DEC. 31, 1917

Total investment (book value) plant and property	$5,193,585 00
Miles of track owned	74 06
Investment per mile of track	$70,126 72
Investment per dollar of business	$5 54
Revenue car-miles operated	3,635428
Revenue Passengers Carried:	
Cash-fare passengers	14,864,600
Revenue ticket passengers	3,913,911
Revenue transfer passengers	3,194,643
Total revenue passengers carried	21,973,154
Income and Outgo per Revenue Car-Mile:	
Income per car-mile, cents	26 04
Outgo per car-mile, cents	36 62
Deficit per car-mile, cents	10 58
***Income and Outgo per Revenue Passenger:**	
Income per revenue passenger, cents	5 04
Outgo per revenue passenger, cents	7 16
Deficit per revenue passenger, cents	2 12

*** Includes cash fare and revenue ticket passengers only.**

TABLE V—VEHICLES COUNTED IN TRAFFIC SURVEY

Class of Vehicle	Number	Passengers
Automobiles	652	1,205
Motorcycles	50	54
Bicycles	42	44
Total of above	744	1,303
Street cars	70	1,583

Operation with one-man cars began as early as Feb. 19, 1916, and at present four lines are so equipped. The cars used at present are 40-ft. rebuilt California type, seating forty-four and weighing 34,100 lb. each. They replaced 48-ft. center-entrance cars seating fifty-two and weighing 43,500 lb. each.

The principal saving effected consists of platform and power expense. This amounts to $27,124.35 per annum or $0.0437 per car-mile, as shown in Table VI.

During September, 1917, the company equipped 100 cars with "Economy" watt-hour meters, which have also been the means of reducing the energy consumption per car-mile. Comparison of the year 1918 with the year 1917 shows a decrease in energy consumption of 3.11 per cent; comparison of 1918 and 1916 a decrease of 8.5 per cent and of 1918 with 1915, a decrease of 15.41 per cent.

It is impossible to trace the power economies through the operating accounts due to the continued increase in the cost of fuel oil. In order to show the relative value of what results have been obtained, Table VII has been prepared, based on the 3,900,000 estimated car-miles for 1919, showing the cost of operation per car-mile based on 2.8 kw.-hr. per car-mile which is the estimated consumption average for the year 1919, and 3.31 kw.-hr. per car-mile, representing the power consumed during the year 1915. By consuming 2.80 instead of 3.31 kw.-hr. per car-mile, the saving in energy would amount to 1,989,000 kw.-hr. At present, 182 kw.-hr. are produced per barrel of fuel oil. On this basis, 60,000 barrels would be needed to produce the 10,920,000 kw.-hr. estimated for 1919. The number of barrels saved by reducing the car-mile consumption from 3.31 to 2.80 kw.-hr. would be 10,928 or $18,796.16. The allocation of the several classes of power saving is shown in Table VIII.

The efficiency of the company's plant is not apparent from a survey of the operating accounts due to the continued increase in the cost of fuel oil. In 1916, the company paid 66½ cents per barrel for fuel, and during 1918 it had to pay $1.45. The increased cost of this item amounts to $39,322.72 or 118.04 per cent. It is now estimated that the price of fuel oil will advance to $1.72 in 1919. Table IX shows the increased efficiency of the power plant, from which it will be seen that in comparing the year 1919 with 1914, the increase in the output per barrel of fuel oil is 15.2 kw.-hr. or 9.11 per cent and the decrease in the cost per kilowatt-hour $0.00086 or 8.34 per cent, a total saving of $10,196.16 in the cost of fuel oil. This saving is attributed to the Merit Automatic Oil Strocking System which was installed the latter part of 1917.

The total economies effected per annum by the company are:

Skip-stop operation	$3,681
One-man car service	27,124
Car economies	14,598
Power plant economies	10,196
Total	$55,519

TABLE VI—ECONOMIES EFFECTED IN THE OPERATION OF ONE-MAN CAR SERVICE PER ANNUM

Item	Route No. 5	Route No. 6	Route No. 8	Route No. 13	Total
Cars operated	4	2	2	2	10
Car-miles per annum	265,400	115,000	99,300	140,525	620,225
Car-hours per annum	28,105	14,200	13,870	13,651	69,825
Car-miles per car-hours	9.44	8.09	7.16	10.3	9.00
Operation of Two-Man Car Service					
Platform expense per annum	$22,192	$11,096	$9,986	$11,095	$54,370
Platform expense per car-mile	$0.0836	$0.0964	$0.1009	$0.0789	$0.0876
Kilowatt-hours consumed per car-mile	2.8	2.8	2.8	2.8	2.8
Cost per kilowatt-hour	$0.015	$0.015	$0.015	$0.015	$0.015
Kilowatt-hours consumed per annum	743,120	322,000	278,040	393,470	1,736,030
Cost of power per annum	$7,802	$3,381	$2,919	$4,131	$18,234
Cost of power per car-mile	$0.0294	$0.0294	$0.0294	$0.0294	$0.0294
Total platform and power expense, per annum	$29,994	$14,477	$12,905	$15,227	$72,600
Total platform and power expense per car-mile	$0.1130	$0.1258	$0.1303	$0.1083	$0.1170
Weight of equipment, pounds	43,850	40,520	40,520	43,850	42,185
Operation of One-Man Car Service					
Platform expense per annum	$12,344	$6,059	$5,767	$5,680	$29,851
Platform expense per car-mile	$0.0466	$0.0526	$0.0580	$0.0404	$0.0481
Kilowatt-hours consumed per car-mile	2.4	2.4	2.4	2.4	2.4
Cost per kilowatt-hour	$0.0105	$0.0105	$0.0105	$0.0105	$0.0105
Kilowatt-hours consumed per annum	636,957	276,000	238,320	337,260	1,488,537
Cost per power per annum	$6,688	$2,898	$2,502	$3,541	$15,629
Cost of power per car-mile	$0.0252	$0.0252	$0.0252	$0.0252	$0.0252
Total platform and power expense per annum	$19,082	$8,957	$8,269	$9,221	$45,430
Total platform and power expense per car-mile	$0.0717	$0.0778	$0.0832	$0.0656	$0.0733
Weight of equipment, pounds	34,100	34,100	34,100	34,100	34,100
Decrease from Operation of One-Man Cars					
Platform expense per annum	$9,847	$5,037	$4,219	$5,415	$24,510
Platform expense per car-mile	$0.0371	$0.0438	$0.0429	$0.0385	$0.0395
Kilowatt-hours per car-mile	0.4	0.4	0.4	0.4	0.4
Kilowatt-hours consumed per annum	106,163	16,000	39,720	56,210	248,090
Cost of power per annum	$1 114	$485	$417	$590	$2,604
Cost of power per car-mile	$0.0042	$0.0042	$0.0042	$0.0042	$0.0042
Total platform and power expense per annum	$10,962	$5,520	$4,636	$6,005	$27,124
Total platform and power expense per car-mile	$0.0413	$0.0480	$0.0471	$0.0427	$0.0437
Weight of equipment, pounds	7,750	6,420	6,420	7,750	8,085

TABLE VII—POWER ECONOMIES UNDER PRESENT ENERGY PER CAR-MILE AS COMPARED WITH THE ENERGY CONSUMED IN 1915

Item	2.80 Kw.-Hr. per Car-Mile	3.31 Kw.-Hr. per Car-Mile	Decrease	
			Amount	Per Cent
Car-miles operated	3,900,000	3,900,000	....	.....
Kilowatt hours consumed per car-mile	2.80	3.31	0.51	15.41
Kilowatt-hours consumhd per annum	10,920,000	12,909,000	1,989,000	15.41
Kilowatt-hours produced per barrel of fuel	182.0	182.0	....	.....
Total barrels of fuel consumed	60,000	70,928	10,928	15.41
Cost of fuel per barrel	$1.72	$1.72	....	.....
Total cost of fuel	$103,200	$121,996	$18,796	15.41
Cost per car-mile	$0.0264	$0.0312	$0.0048	15.38

TABLE VIII—POWER SAVING AT SAN DIEGO

	Kilowatt-hours	Barrels Oil	Money
Skip-stop plan	350,600	1,926.37	$3,313
One-man operation	248,093	1,363.15	2,344
Car efficiency meters	1,390,307	7,639.05	13,139
Total	1,989,000	10,928.57	$18,796

TABLE IX—INCREASED POWER PLANT EFFICIENCY

Item	1919 182.0 Kw.-Hr. per Barrel Fuel	1914 166.8 Kw.-Hr. per Barrel Fuel	Decrease	
			Amount	Per Cent
Kilowatt-hours produced	11,840,000	11,840,000	....	.....
Kilowatt-hours produced per barrel of fuel oil	182.0	166.8	15.2	9.11
Total barrels of fuel	65,055	70,983	5,928	8.35
Cost per barrel	$1.72	$1.72	....	.....
Total cost of fuel	$111,894	$122,090	$10,196	8.35
Cost per kilowatt-hour	$0.00945	$0.01031	$0.00086	8.35

THE ELECTRIC RAILWAY IS THE SICK MAN OF BUSINESS

In summing up the situation, the electric railway might be considered the sick man of business, so sick that the disease is beyond the comprehension of the family doctor. Therefore, it has been necessary to consult a specialist to prescribe the remedy. In this case, the specialist is the Railroad Commission of the State of California. There is nothing to indicate that the San Diego Electric Railway is financially weak, but it is incapable of continuing to maintain its normal strength at present, due to the lack of proper nourishment.

The railway assumed that it had reached during 1913 a stage of development in which the revenue received from its transportation business was sufficient to pay necessary operating expenses, set aside a depreciation reserve, pay taxes and earn 6.5 per cent return on the physical value (book value) which amounted to $3,740,000, as of Dec. 31, 1917. The company considered that it had reached a point determining the soundness of its investment (which conclusions were drawn at that time from the books), and that the promised prosperous future dreamed of by its investors for many years was at hand, but out of a clear sky appeared the following combinations which could not be foreseen and which were entirely beyond the control of the management: (1) The freeze, (2) hard times due to freeze, (3) jitney competition, (4) enormous increase in private automobiles, (5) decreased tourist travel due to war, (6) flood of 1916, (7) increased taxation, and (8) increased operating expenses due to war.

All of these facts had a tendency to raise the cost of manufacturing transportation while there was no corresponding increase in the price paid for the commodity.

The public utility regulations do not permit the railway to earn a sufficient surplus during good times to take care of the poor years. Therefore, when costs go up, rates should likewise go up. The car riders should bear in mind that the relief now asked for should have been requested at a much earlier date.

In an appendix, Mr. Burns gives an extended story of the history and organization of the San Diego Electric Railway.

Cost of Labor Turnover

According to figures cited by the Training Service, Department of Labor, the cost to American manufacturers of preventable labor turnover is $1,250,000,000 a year. Magnus W. Alexander, a recognized authority, is quoted by officials of the service as estimating the cost of hiring a man at from $10 to $200, and the average charge against the employer on this account as more than $50. The number of workers in the United States is reported to be 40,000,000, of whom one-fourth are in the manufacturing industries. On the basis of a turnover of 250 per cent for the nation at large, the number of hirings in the manufacturing industries alone would be 25,000,000 a year, and at $50 each the cost would be $1,250,000,000. A complete elimination of labor turnover would mean the saving of this great sum.

The Detroit (Mich.) United Railway is overhauling and painting from 95 to 125 cars per month. This means that the paint shop force is working on about forty cars at a time. The work will be continued until all rolling stock is in first-class condition.

Portable Stone Crusher Saves Cost Every Year

Omaha Company Crushes 935 Cu.Yd. of Stone in a Period of Six Months at an Actual Saving of $1,500

THE Omaha & Council Bluffs Street Railway, Omaha, Neb., has for the past five years been using in its maintenance-of-way department a portable stone crusher manufactured by the Universal Crusher Company, Cedar Rapids, Iowa. This equipment has been used to crush vitrified brick, old concrete, and other materials formerly considered of no value and hauled to the dump.

Several years ago the railway company was obliged to lay 1 mile of double track in a street already paved with brick. All of the brick removed during the construction, a total of 2,300 cu.yd., was run through the crusher on the job at an average rate of 60 cu.yd. per ten-hour day with a force of ten or eleven men. The crushed brick was used as a coarse aggregate for the new concrete and also as ballast. As ballast the brick has given excellent service during the past four years. During the first six months of 1918 the Omaha Company crushed 935 cu.yd. of material at a cost of 72 cents per cubic yard in place, while at the same time crushed stone in the pile cost about $2.32 per cubic yard. This represents a saving of approximately $1,500. The original cost of the machine was $1,200, so that the outfit has paid for itself many times over since purchased. The average amount of material crushed per year at Omaha is 1,200 cu.yd.

OLD CONCRETE SALVAGED BY PORTABLE STONE CRUSHER AT OMAHA

In Omaha old concrete, brick, etc., when not required for immediate use, is stacked at the yards, and during the winter months when the men have little else to do these materials are crushed. The accompanying photograph shows four men crushing old concrete at the yards. Two men shovel the material from the ground, one is stationed on the platform, and the fourth man, who is the motorman of the work car, acts also as supervisor of the crushing. In the photograph crushed concrete is shown in the process of being elevated to the work car and transferred to another location.

Determining the Characteristics of Metallic-Electrode Arc Welds

By Testing and Inspection of Welds a Reliable Indication of Their Soundness May Be Obtained

BY O. S. ESCHOLZ
Research Engineer Westinghouse Electric & Manufacturing Company

THE four factors which determine the physical characteristics of metallic-electrode arc welds are fusion, slag content, porosity and crystal structure. Some of the other important methods that have been suggested and used for indicating these characteristics are:

1. Examination of the weld by visual means to determine: (a) Finish of the surface as an index to workmanship. (b) Length of deposits, which indicates the frequency of breaking arc and, therefore, the ability to control the arc. (c) Uniformity of the deposits, as an indication of the faithfulness with which the filler metal has been placed in position. (d) Fusion of the deposited metal to the bottom of the weld scarf as shown by the appearance of the under side of the welded joint. (e) Predominance of surface porosity and slag.

2. Chipping the edges of the deposited layers with a cold chisel or calking tool to determine the relative adhesion of deposit.

3. Penetration tests to indicate the linked, unfused zones, the slag pockets and the porosity by: (a) X-ray penetration. (b) Rate of gas penetration. (c) Rate of liquid penetration.

4. Electrical tests, showing variations, due to incomplete fusion, slag inclusions and porosity in: (a) Electrical conductivity. (b) Magnetic induction.

These tests if used to the best advantage would involve their application to each layer of deposited metal as well as to the finished weld. This, except in unusual instances, would not be required by commercial practice in which a prescribed welding process is carried out.

Of the above methods the visual examination is of more importance than is generally admitted. Together with it the chipping and calking tests are particularly useful. The latter test serves to indicate gross neglect by the operator of the cardinal welding principles, because only a very poor joint will respond to the tests.

PENETRATION TESTS MOST RELIABLE

The most reliable indication of the soundness of the weld is afforded by the penetration tests. Obviously the presence of unfused oxide surfaces, slag deposits and blowholes will result in a varying degree of penetration. Excellent results in the testing of small samples are made possible by the use of the X-ray. However, due to the nature of the apparatus the amount of time required, and the difficulty of manipulating the apparatus and interpreting the results, it can hardly be considered at the present time as a successful means to be used on large-scale production.

The rate at which hydrogen or air leaks through a joint from pressure above atmospheric to atmospheric, or from atmospheric to partial vacuum can readily be determined. The equipment, however, would be quite cumbersome, and the slight advantage in time reduction over liquid penetration is not of sufficient importance to warrant consideration for most welds.

Of the various liquids that may be applied kerosene has marked advantages, due to its availability, low volatility and high surface tension. Sprayed on a weld surface kerosene is rapidly drawn into any capillaries produced by incomplete fusion between deposited metal and weld scarf, or between succeeding deposits, slag inclusions, gas pockets, etc., penetrating through the weld and showing the existence of an unsatisfactory structure by a stain on the emerging side. A bright red stain can be produced by dissolving suitable oil dyes in the kerosene. By means of this test the presence of faults has been indicated that could not be detected with hydraulic pressure or other methods. By kerosene penetration a sequence of imperfect structures linked

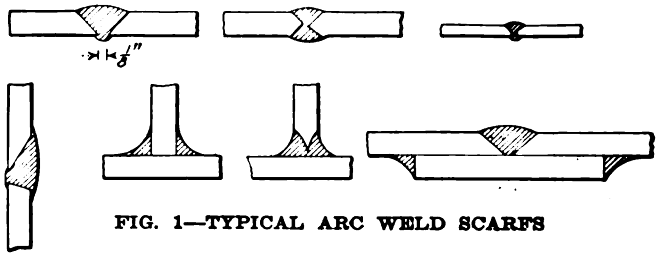


FIG. 1—TYPICAL ARC WELD SCARFS

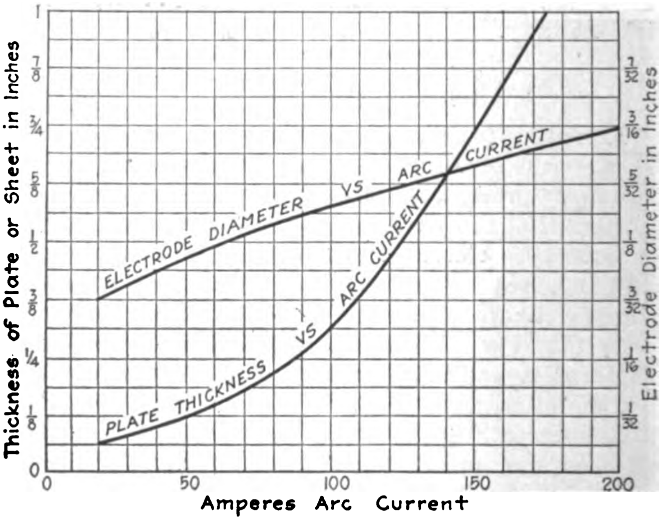


FIG. 2—APPROXIMATE ARC CURRENT AND ELECTRODE DIAMETERS FOR WELDING STEEL PLATE OF VARIOUS THICKNESS

through the weld, which presents the greatest hazard in welded joints, could be immediately located. This method, however, is not applicable to the detection of isolated slag or gas pockets, nor of small disconnected unfused areas, but a weld may contain a considerable number of distributed small imperfections, without affecting its characteristics to a great extent.

If a bad fault is betrayed by the kerosene test it is advisable to burn out the metal with a carbon arc before rewelding under proper supervision. By the means of sand blast, steam, gasoline, etc., large quantities of kerosene are preferably removed. No difficulty, however, has been encountered on welding over a thin film of the liquid.

Electrical test methods by which the homogeneity of welds is determined are still in the evolutionary stages. Some of the difficulties to be overcome are the elimination of the effect of contact differences, the influence of neighboring paths and fields, and the lack of practicable, portable instruments of sufficient sensitiveness for the detection of slight variations in conductivity or magnetic field intensity. No simple tests are possible, except thost which involve subjecting the metal to excessive stresses, for determining the crystal structure. Control of this phase must be determined by the experience obtained from following a prescribed process.

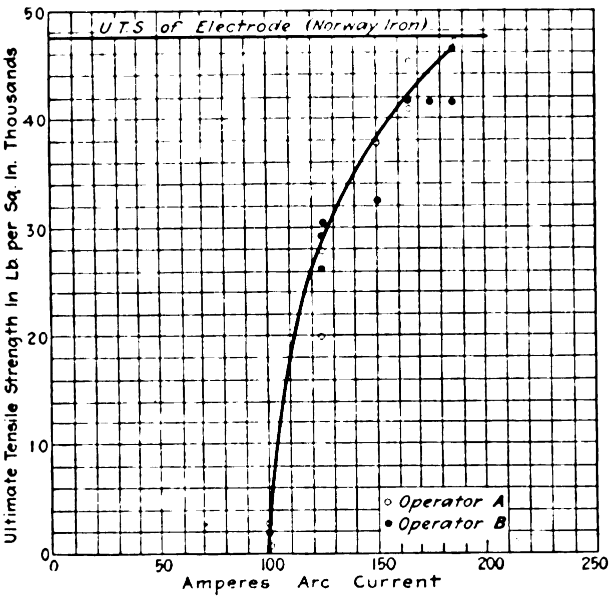


FIG. 3—VARIATION IN WELD STRENGTH WITH CHANGE IN ARC CURRENT

CARDINAL STEPS IN ARC WELDING

In common with all other operations, metallic-electrode arc welding is readily susceptible to analysis. Regardless of the metal welded with the arc, the cardinal steps are: (1) Preparation of weld. (2) Electrode selection. (3) Arc current adjustment. (4) Arc length maintenance. (5) Heat treatment.

Sufficient scarfing is involved in the preparation of the weld, as well as the separation of the weld slants, so that the entire surface is accessible to the operator with a minimum amount of filling. When necessary to avoid distortion and internal stresses due to unequal expansion and contraction strains, the metal is preheated or placed so as to permit the necessary movement to occur. Various types of scarfs in common use are shown in Fig. 1.

The electrode selection is determined by the mass, thickness and constitution of the material to be welded. An electrode free from impurities and containing about 17 per cent carbon and 5 per cent manganese has been found generally satisfactory for welding low and high carbon, as well as alloy steels. This electrode can also be used for cast-iron and malleable-iron welding, although more dependable results can be obtained by brazing, using a copper-aluminum-iron alloy electrode with the aid of some simple flux. Successful results are obtained by brazing copper and brass with this electrode. The diameter of the electrode should be chosen with reference to the arc current used.

Many concerns have attempted welding with too low a value of arc current, and the result has been a poorly fused deposit. This is due largely to the overheating characteristics of most electrode holders which lead the operator to conclude that the current used is excessive.

The approximate values of arc current to be used for given thicknesses of mild steel plate, as well as the electrode diameter for a given arc current may be taken from the curve in Fig. 2. The variation in the strength of welded joints 1 in. square with the strength of welding current is shown in Fig. 3.

Notwithstanding that electrode development is still in its infancy, the electrodes available are giving quite satisfactory results. However, considerable strides can yet be made (with its further evolution) in the ductility of welds, consistency in results, as well as in the ease of utilizing the process. A short arc is usually maintained by a skillful operator, as the work is thereby expedited, less electrode material is wasted, and a better weld is obtained due to improved fusion and to decreased slag content and porosity. On observing the arc current and arc voltage by meter deflection or from the trace of recording instruments the inspector has a continual record of the most important factors which affect weld strength, ductility, fusion, porosity, etc. The use of a fixed series resistance and an automatic time lag reset switch across the arc definitely fixes both the arc current and the arc voltage, and thus places these important factors entirely beyond the control of the welder.

HEAT TREATMENT IS DESIRABLE

The method of placing the deposited layers plays an important part on the internal strains and distortion obtained on contraction. It is possible that part of these strains could be relieved by preheating and annealing, as well as by the allowance made in preparation for the movement of the metal.

The heat treatment of a completed weld is not a necessity, particularly if it has been preheated for preparation and then subjected to partial annealing. A uniform annealing of the structure is desirable, even in the welding of the small sections of alloy and high carbon steels, if it is to be machined or subjected to heavy vibratory stresses.

The inspector, in addition to applying the above tests to the completed joint and effectively supervising the process, can readily assure himself of the competency of any operator by submitting sample welds to ductility and tensile tests or by simply observing the surface exposed on cutting through the fused zone, grinding its face and etching with a solution of one part concentrated nitric acid in ten parts water.

It is confidently assumed, in view of the many resources at the disposal of the welding inspector, that this method of obtaining joints will rapidly attain successful recognition as a dependable operation to be used in structural engineering.

Maintenance of Car Lamps

By Otto Gottschalk

Master Mechanic Richmond Light & Railroad Company, New Brighton, N. Y.

THE maintenance repairs to car-lighting systems consist chiefly of lamp replacements, socket inspections and inspection and adjustment of switches. One of the greatest sources of trouble is the breakage of lamp filaments. The life of tungsten lamp filaments in car service, where they are subjected to severe vibration, is greatest when they are kept burning continuously. Tungsten metal when hot and soft can be subjected to a severe vibration and not become broken. When cold, however, it is very brittle.

I made an investigation and some tests in this connection by keeping a record of lamp replacements in two cars in the same service. In one of these cars the lamps were kept burning continuously while the car was in motion and in the other the lamps were burned only when necessary. After the same length of service it was found that the car which had the lamps burning intermittently developed five cases of broken filaments which resulted in two of the lamp circuits becoming inoperative. In three of the defective lamps the broken filaments had become welded together and so had short-circuited a portion of the remaining sections of filament.

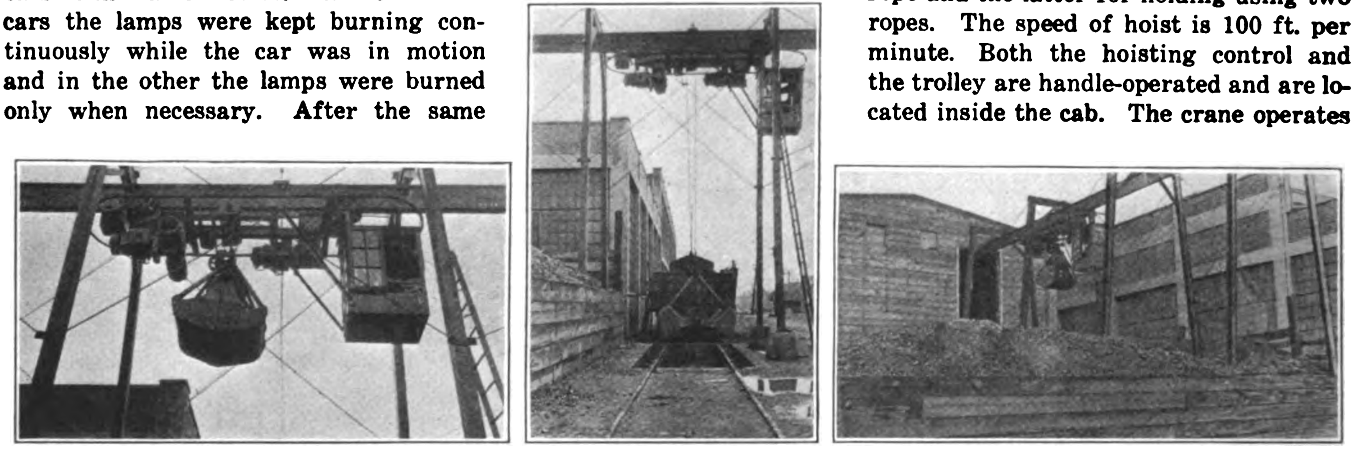
This caused a larger current to flow through the remaining lamps due to the decreased resistance of the circuits and so tended to decrease their life and cause additional trouble and necessitate more lamp replacements. The cars which had the lamps burning continuously did not develop any cases of broken filament. The cost of the additional energy used by the car on which the lamps were burned continuously was 31 per cent less than that of replacing the five lamps with broken filaments. The cost of the extra energy used due to the short-circuiting of the welded filament and the reduction in life of lamps in the circuit where short-circuited filaments were found were not included in the estimate.

Coal Handling for a Shop Power Plant

Detroit United Railway Installs a Monorail Crane to Handle the Coal Supply for a 1000-hp. Boiler Capacity

AT HIGHLAND PARK the Detroit (Mich.) United Railway operates one of the most complete car shop layouts in the country. The furnishing of heat and steam power for these shops requires the use of four boilers each of 250-hp. capacity. These are of B. & W. make and equipped with Detroit stokers. These boilers consume about 12 tons of coal per day and, as at present a storage capacity of only about 9 tons for each battery of two boilers is available in the boiler room, coal has to be continuously handled from an outside pile. This has a capacity of twenty carloads.

For the handling of this coal the company purchased and placed in operation about Dec. 1, a Sprague-General Electric GB-11 monorail crane equipped with a ½-cu.yd. Hayward type-E grab bucket. The crane is capable of lifting a maximum load of 2780 lb. and the height of lift is 25 ft. There are two 6-hp. trolley motors operating at 550 volts direct current and the trolley speed is 350 ft. per minute. The hoisting motors are type M-3, 9 hp. and 6 hp., the former for hoisting using one rope and the latter for holding using two ropes. The speed of hoist is 100 ft. per minute. Both the hoisting control and the trolley are handle-operated and are located inside the cab. The crane operates on an 18-in. I-beam runway with a trolley on each side, and the closed cage in which the operator rides is attached to the truck frame. The net weight without the bucket is 5000 lb., the bucket weighs 2100 lb. and the total shipping weight is 8500 lb.



AT LEFT, MONORAIL CRANE USED FOR HANDLING COAL AT DETROIT CAR SHOPS. IN CENTER, UNLOADING TRACK AND PIT WHERE COAL IS PICKED UP BY CRANE. AT RIGHT, MONORAIL CRANE RUNWAY AND OUTSIDE COAL STORAGE PILE

At present coal cars are handled direct from the steam railroads to the pit shown in one of the illustrations. If the boiler hoppers are, at the time of unloading, partly empty, they are filled by the crane direct from the car and the remainder of the coal is unloaded onto the storage pile. The coal in the bottom of the car, not reached by the bucket is dumped into the pit from which it is picked up by the crane. The crane enters the building on a runway through double swinging doors, the front and rear ends of the truck being equipped with bumpers which strike the doors on steel plates. The runway extends over the hoppers of both batteries of boilers and dumping is effected without any lowering of the bucket.

At present ashes are handled by hand but an endless conveyor is now being installed. The ashes will fall from the stokers onto this and they will be conveyed to a pit just inside the doorway through which the crane enters the building. After this installation is completed the crane, when filling the hoppers from the outside storage pile, will pick up a load of ashes on the return trip and deposit them in a car standing over the unloading pit. Thus the two operations will be accomplished with practically no extra horizontal motion and the crane will be given work for a large part of the day.

Zinc Chloride Versus Creosote for Treating Ties

THE American Wood Preservers' Association met in St. Louis last week and elected the following officers: J. B. Card, president; A. R. Joyce, first vice-president; C. Marshall Taylor, second vice-president; F. J. Angier, secretary-treasurer.

An entire session of the convention was devoted to a discussion of the available supply of chemicals for the preservation of ties and other railroad timbers. Reports from manufacturers of creosote were not at all encouraging as to the present outlook for this material. As a result of the shortage in the creosote oil supply, there has been a notable transition from the use of creosote to zinc chloride in the treatment of ties. While this latter material will not preserve timber as effectively as creosote, nevertheless it increases the life of the ties from two to three times that of the untreated wood.

In this connection it is interesting to note that in the tests of roadbed leakage resistance conducted by the United States Bureau of Standards and described by E. R. Shepard in the ELECTRIC RAILWAY JOURNAL of Jan. 25, it was found that ties treated with zinc chloride showed a very low electrical resistance. Also in the 1916 report of the committee on way matters of the A. E. R. E. A. it was stated that the experience of several electric railway companies indicated that zinc chloride increases the conductivity of timber and in many instances has given impetus to the corrosion of spikes and the rail base. This experience was deemed sufficient reason to make the consideration of zinc chloride as a preservative in the electric railway field undesirable.

Best Way of Stacking Ties

IN DISCUSSING methods of stacking ties at the January meeting of the American Wood Preservers' Association it was stated that the 1 x 9 method of stacking ties in a yard was the best because it allows plenty of air to circulate through the piles, and as this method of piling provides stacks of ten, counting is made very easy whenever that becomes necessary. The 1 x 9 method consists of laying one tie crosswise at the edge of the pile with nine ties on top of this laid lengthwise.

The advantages of the 1 x 9 method over the 2 x 8 method are that with the latter the ties will lie absolutely flat whereas with the former the ties are sloped and thereby give the water a chance to run off and so insure the ties being kept dry and being subject to little danger of decay.

Impulse Gap Lightning Arrester Is Sensitive to High Frequency Discharges

AT THE 1918 convention of the A. I. E. E., C. T. Allcutt of the Westinghouse Electric & Manufacturing Company discussed a new form of spark gap for lightning arresters to which the term "impulse protective gap" was applied. Since that meeting considerable progress has been made by the company with this device. Its principle is shown in Fig. 1 and the actual set-up of the apparatus is as shown in Fig. 2. The principle of the apparatus is that when two gaps, shunted with unlike impedances, are connected in series one of the gaps will break down more readily than the other when high-frequency impulses are received by them. In practice the equipment includes standard porcelain insulators (two of which are used as condensers), an unbalancing resistor, an auxiliary electrode or "tickler," a sphere gap, an auxiliary horn gap, a short-circuiting clip, a charge-and-discharge resistor, and a supporting framework. The framework is equipped with feet which can be mounted upon an existing structure.

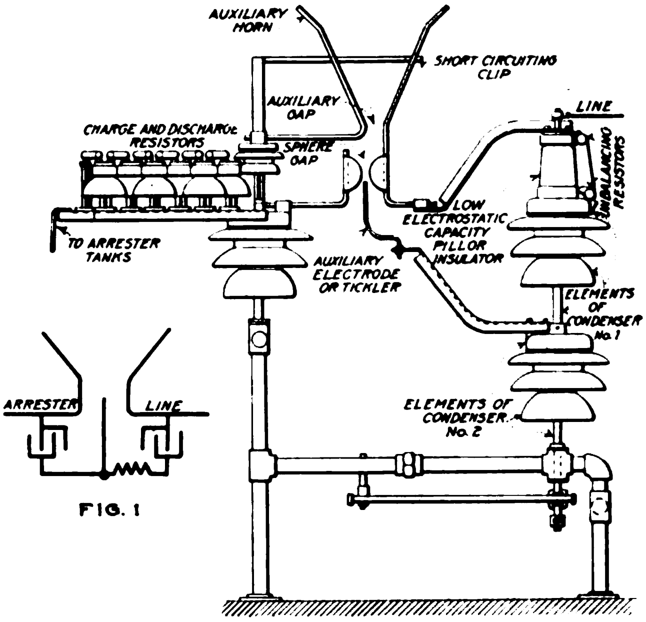

AUXILIARY HORN
SHORT CIRCUITING CLIP
AUXILIARY GAP
LINE
CHARGE AND DISCHARGE RESISTORS
SPHERE GAP
UNBALANCING RESISTORS
LOW ELECTROSTATIC CAPACITY PILLOR INSULATOR
TO ARRESTER TANKS
AUXILIARY ELECTRODE OR TICKLER
ELEMENTS OF CONDENSER No. 1
ARRESTER
LINE
ELEMENTS OF CONDENSER No. 2

FIG. 1

FIG. 2

FIG. 1—SIMPLIFIED DIAGRAM OF IMPULSE GAP ARRESTER. FIG. 2—ACTUAL SET-UP OF APPARATUS

In action the high frequency discharges start from the auxiliary electrode and have but one-half of the gap to jump. This electrode is so shaped that although the gap is one-half the main gap the breakdown voltage is only about one-fourth as great. One important claim for the new type of arrester is the speed at which the arrester operates due to the shorter time needed to build up the field.

A misprint occurred in one of the formulae published with Norman Litchfield's article on page 287 of the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 17, 1918. This formula was for the downward force at the front plate of a truck caused by the turning movement of a couple and should read $P = 0.2625 \, (BW/CL) \times 4$. The figure "4" was omitted previously.

American Association News

Committee Activity Is Revived by the Appointment of Thirteen Committees —Program for the Midyear Meeting Is Announced—Company Sections Resume Sessions after a War Lapse

American Committees Announced

Three New Committees Chosen for National Relations, Readjustment and Zone Systems

PRESIDENT PARDEE of the American Electric Railway Association has announced the appointment of various committees for the coming year. The list includes three new committees—on national relations, on readjustment and on zone systems. The first one will take over the work of the committee on federal relations.

The committee on the award of the A. N. Brady Medal will not be announced until it is decided whether this competition, which is conducted under the auspices of the American Museum of Safety, will be resumed. It was discontinued last year because of the war.

The committee to award the company section medal will be announced later, as will the committee on compensation for carrying United States mail, the convention committee and the transportation committee.

The committees as they now stand consist of the following:

"Aera" Advisory—H. C. Donecker, chairman, Newark, N. J.; B. I. Budd, Chicago, Ill.; Thomas Finigan, Chicago, Ill.; F. W. Hild, Denver, Col.; C. C. Peirce, Boston, Mass.; Daniel W. Smith, Detroit, Mich.; T. S. Wheelwright, Richmond, Va.

Company Membership—Richard McCulloch, chairman, St. Louis, Mo.; F. R. Coates, Toledo, Ohio; J. E. Gibson, Kansas City, Mo.; J. C. McQuiston, East Pittsburgh, Pa.; C. B. Keyes, New York, N. Y.; A. Pizzini, New York, N. Y.

Company Sections and Individual Membership—Martin Schrieber, chairman, Newark, N. J.; W. J. Flickinger, New Haven, Conn.; H. Friede, Toledo, Ohio; Prof. H. H. Norris, New York, N. Y.; Charles E. Redfern, Providence, R. I.

Constitution and By-Laws—Harlow C. Clark, chairman, New York, N. Y.; R. I. Todd, Indianapolis, Ind.; T. A. Cross, Baltimore, Md.

Education—Prof. H. H. Norris, chairman, New York City; Prof. A. M. Buck, New York, N. Y.; Prof. D. D. Ewing, Lafayette, Ind.; Prof. W. L. Robb, Troy N. Y.; Martin Schreiber, Newark, N. J.

Electrolysis—Calvert Townley, chairman, New York, N. Y.; L. D. H. Gilmour, Newark, N. J.; R. P. Stevens, Youngstown, Ohio; J. E. Woodbridge, San Francisco, Cal.

Libraries—L. A. Armistead, chairman, Boston, Mass.; I. A. May, New Haven, Conn.; C. C. Mullen, Pittsburgh, Pa.; R. H. Johnston, Washington, D. C.; C. W. Stocks, Boston, Mass.

National Relations—P. H. Gadsden, chairman, Charleston, S. C.; H. G. Bradlee, Boston, Mass.; Arthur W. Brady, Anderson, Ind.; Britton I. Budd, Chicago, Ill.; L. S. Storrs, New Haven, Conn.; W. V. Hill, Washington, D. C.

Readjustment—P. H. Gadsden, chairman, Charleston, S. C.; H. G. Bradlee, Boston, Mass.; H. H. Crowell, Grand Rapids, Mich.; W. A. Draper, Cincinnati, Ohio; C. L. Henry, Indianapolis, Ind.; P. J. Kealy, Kansas City, Mo.; Myles B. Lambert, East Pittsburgh, Pa.; C. C. Peirce, Boston, Mass.

Social Relations—J. D. Mortimer, chairman, Milwaukee, Wis.; Henry G. Bradlee, Boston, Mass.; E. W. Rice, Jr., Schnectady, N. Y.

Subjects—L. S. Storrs, chairman, New Haven, Conn.; M. R. Boylan, Newark, N. J.; Thomas Finigan, Chicago, Ill.; W. F. Ham, Washington, D. C.; Philip J. Kealy, Kansas City, Mo.; R. E. McDougall, Rochester, N. Y.; James H. McGraw, New York, N. Y.; F. R. Phillips, Pittsburgh, Pa.; R. P. Stevens, Youngstown, Ohio.

Valuation—Philip J. Kealy, chairman, Kansas City, Mo.; Charles E. Bailey, New York, N. Y.; W. J. Harvie, Auburn, N. Y.; Martin Schreiber, Newark, N. J.; W. H. Sawyer, Columbus, Ohio; J. N. Shannahan, Hampton, Va.; B. E. Tilton, Syracuse, N. Y.

Zone Systems—W. H. Sawyer, chairman, Columbus, Ohio; Prof. Thomas Conway, Jr., Philadelphia, Pa.; James F. Hamilton, Rochester, N. Y.; J. H. Hanna, Washington, D. C.; L. H. Palmer, Baltimore, Md.; Prof. A. S. Richey, Worcester, Mass.; R. P. Stevens, Youngstown, Ohio; L. S. Storrs, New Haven, Conn.; C. L. S. Tingley, Philadelphia, Pa.

Program for Midyear Meeting

THE committees in charge of the program for the midyear meeting of the American Electric Railway Association, to be held in New York on March 14, have held several meetings during the past week. Several acceptances from speakers selected for the technical meetings at 29 West Thirty-ninth Street and the dinner at the Waldorf-Astoria in the evening have been received and the full program will be announced shortly. The subjects committee mentioned above, with L. S. Storrs as chairman, is in charge of the technical sessions. The membership of the dinner committee is C. R. Ellicott, chairman; Thomas W. Casey, F. W. Coen, J. J. Doyle, A. Gaboury, F. H. Gale, L. E. Gould, E. A. Maher, Jr., E. D. Kilburn, C. C. Peirce, A. E. Potter and E. F. Wickwire.

Enthusiastic Dinner Meeting of Connecticut Section

AFTER a lapse of some months the Connecticut Company Section resumed activities on the evening of Jan. 28, when 150 members and guests gathered for dinner at the Lawn Club, in New Haven. During dinner an excellent musical program, furnished by company talent was given, and some singing was done by all. As this was the annual meeting, officers were elected, the following being chosen: For president, W. P. Bristol; for vice-president, W. R. Dunham, jr.; for secretary, W. E. Jones; for treasurer, G. H. Crossen;

for director for three years, C. H. Chapman; for director for two years, J. M. Hamilton; for director for one year, A. C. Colby. The name of W. J. Flickinger was reported as that of the director ex-officio. With the exception of the directors these were re-elections as the nominating committee felt that these were warranted in view of the interruptions to the company section work last year.

President Bristol reviewed the work of the past year giving very brief sketches of the several meetings held. He made a strong plea for co-operation between the section members and the company. The membership committee reported a present enrollment of 256 in spite of the withdrawal of 110, largely on account of the war. I. A. May, comptroller The Connecticut Company, explained how the Aetna Life Insurance Company is co-operating with the railway in financing Liberty Bond subscriptions for employees, and he urged the men not to cancel their subscriptions now that the war is over. S. W. Baldwin, assistant attorney, read for the committee on resolutions memorials to three members who had died during the year. These were passed and the men present stood in impressive silence for a time as a mark of respect to the memory of the deceased members.

The first speaker on the program was John W. Colton, executive assistant. The Connecticut Company, who came to the company a few weeks ago from the city editorship of the Springfield (Mass.) *Union*, to take charge of publicity work. He gave statistics to show the need of co-operation between public and utility and said in substance: "The public is with the railway if the service is good, but not if the service is poor." The condition of the electric railways is, he said further, a large economic and civic problem which must be solved in a large way. As an example of what carmen can do to impress the public with the value of railway service he cited a case on one of the company's lines in which a conductor was missed from his accustomed place by the passengers. Inquiry developed that he had been attacked by influenza, and the passengers made up a purse of several hundred dollars to cover his extraordinary expenses.

The final speaker was Capt. L. J. Maloney, who gave a thrilling account of his own experiences on the French front. He related many details of incidents which do not get into addresses usually, and his talk was full of information as well as inspiration. He paid tribute to several men from the Connecticut Company territory who had distinguished themselves by special valor or ingenuity.

Vaudeville Program at Toledo

THREE HUNDRED AND SIXTY members and guests attended the meeting of the Toledo joint company section held on Jan. 29. The program was one of entertainment comprising selections by the joint section orchestra, a sleight-of-hand performance by a conductor in the company's employ, æsthetic dancing and two boxing bouts.

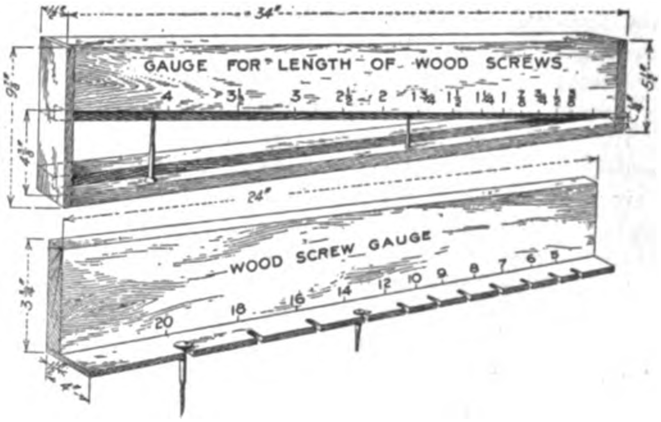
A membership campaign was inaugurated at the meeting, the present members being divided into two competitive groups. The winning side will be entertained by the other in some manner still to be determined. The monthly dance of the section, held on Jan. 15, was attended by 186 persons.

Delegate on A. I. E. E. Conference Committee

J. H. Libbey, assistant electrical engineer Bay State Street Railway, has been appointed to represent the Engineering Association at meetings of delegates of interested associations which may be called by the A. I. E. E. to consider revision of the standard specifications for the stranding of cables and thickness of insulation.

Handy Gages for Sorting Wood Screws

IN THE SHOPS of the New York State Railways, Syracuse Lines, the gages shown in the accompanying sketches are used in sorting wood screws for length and gage number. The devices are made of wood and are intended for wall mounting.



GAGES FOR USE IN SORTING WOOD SCREWS

The advantage of the tapered gage for length is that screws of nominally the same length vary quite a little in actual length. In sorting it is close enough to rate a screw as of the length corresponding to the nearest number on the gage.

Tool Steels Made in Electric Furnaces

THE Carnegie Steel Company is now making five grades of tool steel in its electric furnaces at the Duquesne Steel Works. These contain different proportions of carbon to meet different cutting requirements. The new steels are described in a pamphlet entitled "Tool Steel," which is intended for the actual tool steel user. It contains practical information without discussion of theories of heat treatment. Technical terms which are unfamiliar to many users have been omitted and in place of these reference is made to "line of hardening and minimum grain size" which are the essential points in the heat treatment of steel. Illustrations of full-sized test pieces are shown, together with a chart of heat colors and their corresponding heat-treatment temperatures. Names of colors have been selected to conform to the most general uses and are checked by indications of temperature in Centigrade and Fahrenheit degree. A chart of temper colors is reproduced by color photography from test pieces heat treated to the temperature shown. This affords a means for direct comparison by the blacksmith in the shop.

LETTER TO THE EDITORS

Commutation Tickets Would Help in Several Ways

NEW YORK CITY, Jan. 28, 1919.

To the Editors:

In connection with the discussion on fare systems, I would like to ask: "Why not compromise and use the zone system for cash fares but sell commutation tickets on the straight fare basis?" The monthly commutation tickets might be sold with two rides per day for the working people, at, say, 5 cents a ride, while to those who rode to the city outskirts and paid cash a considerably higher rate would be charged. Such a plan would eliminate the objection that zoning tends to develop the tenement district. On the other hand, the occasional, long-distance rider would be charged for the "readiness to serve" in a territory where service costs more because the travel is less. Under this plan the occasional rider buys at retail and pays accordingly a proper share of the company's overhead charges.

In many cases the electric railways cannot secure urgently needed increased revenue by increasing the fares, even if such fare increases are granted by the utility commission. If fares are advanced so far that many people will walk, the net increase in revenue is *nil*. At least such a condition would result in those cities where the climate permits all-year walking and where there is a well built-up apartment house and residence district not very far distant from the business section.

The 5-cent commutation rate would also take care of the private owners of automobiles. These automobiles transport passengers who expect to patronize the electric cars only when the weather is bad or when they are not invited to ride free. These "rainy day" patrons of the railway expect something for nothing. They expect the electric cars to pass their doors at certain times every morning but they do not expect to pay anything for this readiness to serve. Under the present system of fares, the occasional rider, such as the automobile owner, pays no more for a ride on the electric cars than does the passenger who rides regularly. The result is that the railway, being unable to forecast the weather, has to provide every day a seating capacity sufficient for maximum riding days, and this is not fair.

When service is ordered from the telephone, electric light or water companies, a deposit is first required which guarantees that the customer will pay a stipulated minimum amount each month, whether the service is used or not. The electric railway is as truly a public utility as are those mentioned, and there is no valid reason why it cannot collect a readiness to serve charge if the others are entitled to do so. This same rule of a daily commutation fare should apply to interurban service as well.

The sixty-ride commutation ticket suggested should not be good for more than thirty days; otherwise, those who ride in privately-owned automobiles may extend the use of their tickets over a longer period, say forty days, while the transportation company has provided service to take care of the patrons within the thirty days. The fare charged per ride by the commutation ticket need not be less than that charged in cash for a single short ride, but it should be considerably less than the cash charge for a long ride for the reasons already set forth.

OBSERVER.

Shop Practices of the Glasgow Corporation Tramways

AS THE Glasgow Corporation Tramways do a considerable amount of metal manufacture, American makers and users of the same classes of equipment may be interested in the proportions of the compositions which have been found satisfactory for the rather severe service and weather conditions of that city.

The standard trolley wheel is only 4 in. in diameter with ⅞-in. hub and 2⅜-in. groove, although it is used on a double-deck car weighing 24,260 lb. exclusive of sixty-two possible seated passengers, six standees and the crew. This wheel is composed of 87.75 per cent copper, 10.5 per cent tin, 1.5 per cent zinc, 0.125 per cent phosphorus and 0.125 per cent lead. Its life ranges from 12,400 to 15,600 miles, which is considerably better than the average in this country. Only two 30-hp. or two 35 to 40-hp. motors are used per car. The base tension is 16 lb.

All trolley wheels are fitted with oil-less graphite bushings which may have a life up to 9000 miles. Since this is less than the mileage of the trolley wheels, it is usually necessary to use two bushings per wheel. At the main shops, the bushings are inserted with a tinsmith's press which exerts the necessary pressure over a brass cap which protects the bushing. At the inspection depots, a hand vise serves the same purpose. The frequent American plan of inserting trolley bushings by pneumatic pressure is not possible as no compressed air is available either from air brakes on the cars or air compressors in the shops.

The harps (heads) are composed of 87 per cent copper, 8 per cent tin and 5 per cent zinc; the overhead fittings, including ears and like parts, 88 per cent copper, 10 per cent tin, 2 per cent zinc; the miscellaneous brass castings, as for car fittings, 66 per cent copper. In all cases, the bulk of the copper comes from the melting of discarded trolley wire.

Precautions for Preventing Fires in Carhouses

At a meeting of the Western Association of Electrical Inspectors held in Chicago on Jan. 28, 29 and 30, recommendations were made to the National Electric Code Committee to insure protection against fires occurring in carhouses. These recommendations were that all trolley wires inside of buildings be securely supported on insulating hangers attached to a wood troughing; that feed wires supplying current to the trolley wires have a carrying capacity sufficient for the longest track in the carhouses; that power for light, heat and stationary motors be taken from a commercial circuit where possible; that a line breaker be installed in each track trolley wire entering a carhouse, and that each track trolley wire be fed independently and be controlled by approved cutouts.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Pushing Ahead

Detroit's New Mayor Soaping the Ways for an Early Launching of Municipal Ownership

Street railway matters keep well to the front in the program of the new city administration of Detroit, Mich. It will be recalled that the new Mayor, James Couzens, devoted a considerable part of his inaugural address to the railway matter, advocating a purchase proposal. Since then Abner E. Larned has been appointed by the Mayor to the Street Railway Commission. This was followed by his election as president of the commission. Edward T. Fitzgerald has been named secretary. The commission as now constituted consists of Francis McMath, of the Canadian Bridge Company, and Col. S. D. Waldron, vice-president of the Cadillac Motor Car Company.

As Mr. Couzens views the matter it is the city's business to end as soon as possible "twenty-five years of fighting and brawling with the street railway." He says that with all due respect to engineers and their theories and opinions, "plain business methods will quickly tell you a fair valuation for the property."

In furtherance of his plans Mr. Couzens has obtained the aid of M. M. O'Shaughnessy, city engineer of San Francisco, Cal., and consultant in connection with the building of the municipal lines there, to advise him about Detroit. The Mayor knows that speed is essential. He wants the proposition of purchase to go before the voters at the election on April 5. If this is to be made possible the preliminaries must all be arranged with the railway by March 17, as the Common Council must act at least twenty days before election on any issue that is to go before the voters. In addressing the Street Railway Commission recently the Mayor said:

> I am informed, indirectly but from a reliable source, that the company will not set a price on its property, feeling that to do so might embarrass the company in case the city should start condemnation proceedings. I suggest that this commission take these appraisals, study them all; make up its mind where the differences in valuation are, and what are the fairest valuations and act on that. I am absolutely committed to the idea that the city should pay the railway nothing whatever for franchises, and nothing whatever as a "going concern." I do not know what the company's attitude on that will be, but I believe you men will agree with me when you go into the matter thoroughly.

The Mayor outlined recently the history of the various appraisals of the railway properties, stating that the Bemis appraisal set a figure of about $73,913 per mile; the Cooley appraisal fixed the value at about $102,000 a mile, and the appraisal of Barclay Parsons & Klapp was about $100,000 a mile, made on a basis of 270 miles of railway. There are now 285 miles, the Mayor explained, but it would be possible to carry out the Barclay Parsons & Klapp appraisal for 270 miles of railway, and bring it up to date, by adding a per mile percentage of valuation. The Wyandotte, Harper and Grosse Pointe lines were not included in the appraisals.

The Mayor's reference to the past has served to carry Detroiters of the older generation back to the days of Governor Pingree and Tom L. Johnson about 1899 at which time with the city on the eve of embarking on municipal ownership, the negotiations were broken off, and the ordinance permitted to die. Mr. Johnson then sold out and sought other worlds to conquer.

Some Fine Points Involved

Dispute Over Rights of Lessor to Electrify Leased Line Under a General Electrification Plan

The Legislature of the State of Washington has before it the matter of terms whereby the Chicago, Milwaukee & St. Paul Railroad will be permitted to electrify about 25 miles of line belonging to the Columbia & Puget Sound Railway, which is under a ninety-nine year lease for joint use by the Milwaukee. In the first hearing before the Senate judiciary committee, the Puget Sound won a postponement of the hearing until Jan. 30 on a condemnation bill the Milwaukee is urging.

The Milwaukee came into Seattle over the Columbia & Puget Sound line by a trackage agreement that gives the Milwaukee running rights over the Puget Sound section, between Maple Valley and Black River Junction. The Milwaukee subsequently contended it had a right to electrify this portion of the system to make it fit into the company's plan for operating by electricity west of the Rockies. The question was finally submitted to arbitration, with William H. Taft as the final arbiter. He held that the Milwaukee did not have the right to electrify the line, but added as comment that it might acquire such rights by condemnation.

The Milwaukee officials told the Senate committee that it finally decided that it could not condemn the line, and the two roads still failed to reach an agreement. The Columbia & Puget Sound Railway said that it offered to submit the question of compensation to arbitration, and that this offer was refused. It developed at the hearing that other steam roads might be affected by the legislation, and it was decided to hold a general hearing.

Overrun With Strikes

London Tubes and Suburban Lines Suspend with Grave Consequences to Metropolitan Public

Newspaper dispatches indicate that practically all Great Britain is at grips with labor. There are strikes and rumors of strikes. Under the stress of war necessities, labor had things its own way. At the close of the year signs pointed to the employers being far more at the mercy of their work people than ever they were before the war was declared.

Crises Foreseen

As the London correspondent pointed out in his letter in this paper for Feb. 1, a problem of enormous difficulty was how far the expansion of industry was compatible with steadily increasing wages and large reductions in number of hours worked a day or week. In the light of events now taking place the elastic limit of endurance seems at last to have been reached.

So far as the city transportation industry is concerned the worst stoppage of traffic is reported from London. The subway strike there began on Feb. 3, when Londoners found the entrances to the principal subway stations closed to them, owing to the midnight decision of the employees not to move trains unless a half-hour luncheon interval were allowed in their new eight-hour day.

Buses and Street Cars Going

Six tubes are reported to be affected. They are the Central London tube, which carries a heavy traffic west and east and brings many of the city workers to their businesses; the central tube artery north and south; the City & South London tube, which connects with the chief railway stations and Piccadilly; the Brompton semicircular system, which carries many thousands of travelers daily, and the Highgate and Hampstead subways, which carry traffic between the northern and northwestern suburbs and the West End district of London.

The electric system of the London, Brighton & South Coast Railway, which serves many of the important suburbs, also stopped partly on Feb. 3, and other railways with similar services were threatened with stoppage.

Buses and the street cars still were running on the afternoon of Feb. 3, but on Feb. 4 almost every bus carried a tube striker, and these tube employees were urging the girl conductresses on the buses to join the strikers.

The management of the London Underground Railways in a statement on Feb. 3 said that although the men are demanding a thirty-minute interval for meal time within the eight-hour day, the agreement made when the eight-hour day was granted provided that the eight hours should be exclusive of meal time, but that a special committee should meet on Feb. 12 to deal with any special points that might arise. The Board of Trade, of which Sir Albert Stanley, formerly head of the underground system, is chairman, issued a similar statement.

As this paper goes to press advices from London indicate a satisfactory settlement of the trouble in London. This settlement is understood to include the tubes and all the other London railway systems. Pending consideration of general conditions, the underground men will work eight hours, exclusive of mealtime.

Another Kansas City Strike Chapter

With Conditions Again Practically Normal on Kansas City Railways War Board Orders Reinstatements

An award by the War Labor Board on Jan. 31 orders the Kansas City (Mo.) Railways to restore to duty at once its striking employees under conditions prevailing before the strike, and to prosecute diligently its application for permission to increase fares, upon which increased wages previously awarded by the board were contingent. The board declared:

> It is of the utmost importance that good faith on both sides in dealings between labor and capital should be preserved. We do not hesitate, therefore, to condemn the action of the men in striking as they did, but we cannot be blind to the provoking circumstances which led them to this wrong. The attitude of the company seems to have been that it was content that the men had made the mistake of striking because it would enable them to defeat the union and to avoid the burden of increased wages.
>
> It will be observed that the submission was signed at a time when there was no prospect of ending the war. The men were induced to remain in the employ of the company with the prospect of increased wages during the period of the war. The attitude of the company toward the situation and the interest of the company seem to have changed after the armistice came. The company has announced its purpose to disregard the action of the board taken upon this application on the ground that the board has no further jurisdiction.
>
> It can and should make no difference to the board whether the company may successfully avoid performance of the award, because we have no compulsory judicial process within our control. It is our duty to proceed as if we were dealing with parties who would comply with a lawful award.
>
> Upon that hypothesis we find that the company by its conduct has prevented the performance of the conditions upon which the award was granted, that this conduct has not been in good faith, and that, therefore, the condition is to be treated as if performed and the award shall become effective as from Jan. 6, 1919, when the men offered to return to work, in accordance with our telegraphic order.

When its men walked out six weeks ago the company was left seemingly helpless. Of the 3000 men employed, 2800 left the service. Not 100 were left in the train service. Fifteen men remained in the carhouses. Only half a dozen stuck to their jobs in the shops. Only 10 per cent remained in the power house. Notwithstanding this handicap, the power for the industrial plants never ceased for an hour. Within two days railway service was resumed. Six weeks later train service was normal and shops were running at their full capacity. The track force, which quit to a man, is now doing its regular work. On Feb. 1 there were 2000 men in the train service and the shops had caught up with their work.

In considering the order of the War Board that the railway take back its former employees, the company replied:

> We do not consider that there is a strike. Many of our employees "ceased work" and we were obliged to put on new men whom we have been and are still training in their duties. They are competent, are satisfactory and we have no need for more men at present. This company will employ any of its ex-employees whose records are clear and for whom a vacancy exists. We will not discharge a single one of the present employees whose services are satisfactory, in order to make room for any of our ex-employees. But the latter will be given preference for re-employment.

In reply to the order of the War Board that the men who left the company's employ in December, be returned to work P. J. Kealy, president, issued the following under date of Feb. 3, the day such former employees were to be restored:

> The answer of the Kansas City Railways to the amended order of the War Labor Board is this:
>
> The company does not have the money to pay the increased wages recommended, it cannot obtain it, and therefore will not promise to pay it.
>
> The company cannot, without breach of contract, confidence and good faith, discharge the men employed to take the places of the striking employees, hence, cannot and will not do so.

The Amalgamated Workers met on Feb. 2 and voted to return to work and demanded that they be reinstated. The announcement quoted previously is President Kealy's ultimatum. Of the 2800 who "ceased to work" in December, 250 returned in the meantime and are permanently employed.

The four men who were arrested and confessed to having placed bombs under the cars are still in jail. They were unable to furnish bonds.

Gone, but Not Forgotten

A few years ago, says *Municipal Reference Library Notes*, published by the New York Public Library, the more important editorial offices of this country received regularly, without charge, a cleverly written little publication entitled *Concerning Municipal Ownership*. This magazine was designed for editorial use and the material was so well presented that much of it found its way into the pages of various periodicals. Needless to say, the articles, humorous stories and cartoons all preached the failure and inefficiency of municipal undertakings.

Concerning Municipal Ownership ceased to appear about three years ago and shortly thereafter was announced the formation of the Public Ownership League of America which was put forward as "a non-partisan, educational movement for the advancement of the public ownership and democratic control of public utilities and natural resources" and whose object was stated as being "to secure the efficient operation of public utilities already publicly owned; just and reasonable conditions for all public employees, and the public ownership of additional public utilities as far and as fast as it can be made practical."

The league's offices are at 1439 Unity Building, Chicago. Albert M. Todd, Kalamazoo, Mich., is president, and Carl D. Thompson is secretary.

The publication of a *News Letter* has recently been undertaken and the first issue contains many items about the progress of the municipal ownership movement. Other bulletins are in preparation.

Work, Not Talk, His Motto

Frederick P. Royce, the new general manager of the Brooklyn (N. Y.) Rapid Transit Company, on assuming the duties of his new office made the following statement:

> There is little that I can say at present that would be of interest to the patrons of the properties of which Judge Garrison has appointed me general manager. I have made only a most casual inspection of parts of the lines and know little about the power plants, the operating department and the equipment. When I know more I may have something to say, but at best I shall be a poor talker. I prefer to let my work speak for me.
>
> This much, however, I can say: I have been identified with the management of public utilities, including traction companies, for many years, and I have always found that those companies which served their patrons best paid their stockholders most. And so I have always insisted that properties with whose management I had to do should give the best service possible to the public. What "the best service possible" on these lines means, I cannot say now, but it won't take me a great while to find out. When I do, I hope to be able to help the receiver in giving that sort of service to the patrons of the B. R. T.

Metropolitan District Jubilee

The Metropolitan District Railway, London England, has just completed its jubilee, the first section having been opened in October, 1868. Until the year 1905 its name was anathema owing to the foul atmosphere in the tunnels due to the steam locomotives which were employed. Since the advent of electric traction matters have been altogether different, and the line enjoys an overwhelming popularity. Running from the western suburbs through the heart of the city to the east end, and connecting with other railways, it does a huge business and the trains make almost a procession during the rush hours. Unfortunately the high capitalization prevents any dividend being paid on the ordinary shares. The original cost of construction and payments for land were enormous. One observer expresses the opinion that perhaps some day there will be a reconstruction and readjustment scheme under which some of the capital will be written off.

Making Jobs by Ordinance

Newspaper Defends One-Man Car in Editorial Which Shows Motives of Opposition

In California a bill has been introduced in the Legislature to prevent the use of one-man cars. In Spokane the local union has decreed their death. Muscatine has enacted an ordinance enforcing the use of two men on a car. More recently in Hartford, Conn., have some interests become frightened by thoughts of the return to the tintinnabulation of the bells of horse-car days. The opposition seems to be obsessed with the idea that the new cars are a labor-saving device and nothing more, introduced for war-time use, and that the war being over, the cars should now go. That the labor-saving feature is only one of many points of advantage inherent in the one-man design needs no reiteration here. This fact has not been entirely lost sight of outside the industry, either, as shown by the following extract from an editorial "Making Jobs by Ordinance" in the Marshalltown (Iowa) *Times-Republican:*

> Muscatine has an ordinance enforcing two men on street cars. A street car cannot run in Muscatine without two men to handle it, under the ordinance which has just been upheld by a court and which will be carried to the Supreme Court for decision.
>
> The Council of Muscatine did the community a wrong when it passed such an ordinance. Marshalltown has had a full experience with the one-man car and approves it thoroughly. It is quite as safe as the two-man plan as the records of accidents will show by comparison. The service is excellent. The men themselves like it. There is no good reason to be given for two-man cars in Marshalltown unless somebody wants an unnecessary job. And Marshalltown is a larger and in all modesty may be said to be a better city than Muscatine.
>
> The one-man car may be an eyesore to those who would make two jobs grow where one is entirely sufficient, but it is not to the mass of workmen and employed persons. For the one-man car permits line extensions and the operation of more cars to reach out into the outlying districts to carry more employed persons at a possible profit. Where a two-man car would lose money a one-man car may operate profitably.
>
> Extensions are the poor man's opportunity. It gives him a chance at cheaper lots that will soon be "inside property." "Inside property" means only one thing, that it is easy of access to employment or business. The street car line builds up an addition to the city. Growth is dependent upon transportation and transportation is dependent upon the possibility of transporting passengers with a profit or at least without loss.
>
> Good law is presumed to be good common sense. It is neither good law nor good sense to attempt to enforce upon a public utility the employment of unnecessary and inadvisable employees. So it is fair to presume that the Supreme Court will take a different view of the Muscatine situation than that taken by the court that has passed upon the ordinance.

A Vicious Legal Cycle

The investigation of the methods of certain attorneys in representing men charged with crimes in Cleveland, Ohio, brought out an interesting story from John J. Stanley, president of the Cleveland Railway, as to how a crook was made a street railway checker on the recommendation of an attorney. This attorney afterward defended the man, who was charged with pocket picking and signed his bond of $500, Mr. Stanley testified before a committee of the Bar Association.

It seems this man made it his duty to clear the way for gangs of pickpockets to work the cars and several honest conductors lost their places on complaints made by him before the management learned his character. Where a conductor sought to protect his passengers from the thieves, false charges were brought against him and he was called before the management.

Under this system the criminals became very bold and finally took to picking the pockets of the conductors. Company officials became suspicious, but the culprit learned of the fact in some way and disappeared. He was later arrested for operating on a car and an indictment was found against him, but he had never been brought to trial.

Canada Plans Construction

Sir Adam Beck of the Ontario Hydro-Electric Commission of Canada, announces that work on the proposed hydro-radial electric railway connecting Fort Erie, Ont., with Niagara Falls and Port Colborne will be started within the next few months as one of the Canadian government's post-war plans.

The route was surveyed before the war, when the municipalities passed by-laws, bonding themselves for the amount of the expenditure of the proposed line.

Another project which will be undertaken soon by the Dominion government is the construction of an electric railway between Fort Erie and Hamilton, Ont. Fort Erie is across the Niagara River from Buffalo. Plans are being made by Canadian and American interests for the construction of a vehicular bridge across the river at this point and it is proposed to run the Canadian electric lines into Buffalo via this structure.

The road between Hamilton and Fort Erie is one link in the proposed line connecting Toronto and Buffalo. The Niagara, St. Catharines & Toronto Railway line from St. Catharines to Niagara Falls, Ont., and St. Catharines to Welland and from Port Colborne to St. Catharines are parts of the Canadian Northern system taken over by the Dominion government.

By taking over the Burlington radial, the Hydro-Electric Commission is well started on its line between Toronto and Hamilton. From Hamilton to Beamsville, the Hamilton, Beamsville & Grimsby electric line runs and it is only necessary to connect up the 12.4 miles between St. Catharines and Beamsville to have the completed line between Hamilton and Niagara Falls, Ont.

Bill to Aid Connecticut Company

State aid to the extent of $2,000,000 to the Connecticut Company, which operates most of the electric railways in the State, is proposed in a bill offered in the General Assembly. The Public Utilities Commission would first give hearings to determine the need and decide on the payment of sums as required.

Labor Case Concluded

Only Presentation of Briefs Remains in Case of Washington Company Before War Labor Board

The Washington Railway & Electric Company, Washington, D. C., and its employees completed the presentation of their cases as to the few remaining issues between them at the hearing before the examiners of the National War Labor Board on Jan. 31. The attorneys will present briefs instead of making oral argument.

Former President Taft, joint chairman of the board with Basil M. Manly, expects to be away from Washington for about two weeks, and the examiners advised the parties that the award of the board would not be made earlier than Feb. 20. Meanwhile the changes in working conditions which were agreed to are to become effective at once.

The company and the men agreed that as nearly as possible, 70 per cent of the men should have straight runs, and not more than 30 per cent swing runs. The company is to welcome the co-operation of the men in framing schedules. Extra men reporting for extra work are to receive half pay until actually put to work. Motormen operating snowplows are to receive 60 cents an hour and conductors 55 cents.

Of the points left at issue the most important are: Whether the conductors are to be paid for the twenty or more minutes they spend after coming in from their runs in making out their reports and turning in their receipts; and, whether motormen operating hand-brake cars are to receive 5 cents an hour extra.

Ottawa Would Sell to City

The Ottawa (Ont.) Electric Railway has made an offer to sell to the city at a price of, in round figures, $6,500,000, and has given an option to May 1 at this price. The sale figure covers all the holdings of the company, including Britannic Park and the Rockcliffe right-of-way. The matter has been under negotiation with the Board of Control for some time and took such shape that it was decided on Jan. 30 to make an announcement.

A special meeting of the City Council has been called to authorize the board to "engage such engineering, financial or legal assistance as may be necessary to obtain a full report on the proposition submitted, obtaining the necessary legislation in connection with the purchase of the road and doing other things arising in connection with the sale."

In view of the overwhelming majority in favor of the purchase of the railway and its operation by a commission when the questions were submitted to the electors, it is expected that the City Council will approve of the recommendations.

The company's franchise expires in five years.

Canada Takes Electric Line

The Dominion government, through D. B. Hanna, president of the Canadian National Railways, has purchased the Toronto Suburban Railway system from Sir William MacKenzie, of MacKenzie & Mann, and the Royce estate. The Davenport, Crescent and Lambton lines of Toronto and the Guelph, Ont., radial are included in the deal.

President Hanna announces that the Toronto Eastern, now under construction through Bowmanville, Whitby and Oshawa, will be completed and operated for the present under the existing management. The government is willing to sell the lines within the city to the municipality, and it seems likely that the city will make the purchase in order to extend the small municipal system which has been in operation for several years.

The government took over the line on the basis of inventory cost, which is said to be substantially less than replacement cost under present conditions. It is stated that the Guelph line will be connected with a new road which will be built between Toronto and Hamilton if the federal government does not take over the Grand Trunk system.

What Patrons Should Do

In support of its application for a 6-cent fare the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has issued to its patrons a thirty-page pamphlet describing the various aspects of the transportation problem. For some years, it is said, transportation has been furnished at less than cost, and the public and the investor have both suffered. The present established agencies have failed so far to solve the difficulty, and communities should adopt one of the following plans:

1. Take more thoughtful interest in the local and State agencies set up to control and regulate service and rates and give them intelligent, helpful advice.
2. Appoint public directors to have absolute charge of service, rates and operation and guarantee of a fair return under these conditions on the money the private individual has invested in the service of the public.
3. Or purchase and assume as a public obligation the ownership and operation of electric railway lines.

The company's application for a fare increase was filed on Jan. 20, but the appeal to the public was made before this date. On Jan. 16 the company sent to every city official in its territory a personal letter with a copy of the pamphlet, stating also that every city attorney would receive a copy of the forthcoming petition to the commission and all the exhibits to be used.

On Jan. 18 the company issued a full-page newspaper advertisement asking the consideration of all patrons, and it distributed to them 30,000 copies of the pamphlet. This direct presentation of the company's case to the public was made because the Fort Wayne company believes that the benefits from a fare increase are minimized unless the good-will of the patrons is retained.

The company's petition to the commission asks for an increase in street railway fares from 5 cents to 6 cents in Fort Wayne, Logansport, Lafayette, Wabash and Peru, and an increase in interurban rates from 2½ cents to 2¾ cents a mile. For the last two years the company has defaulted in the payment on its $10,815,000 of 5 per cent mortgage bonds, and it has never paid a dividend on either common or preferred stock.

News Notes

Against One-Man Cars.—A bill has been introduced in the Legislature of California by labor organizations to prohibit the use of one-man cars.

Municipal Ownership Move in Hartford.—The Aldermen of Hartford, Conn., on Jan. 27 voted to ask permission from the Legislature to purchase the Hartford lines of the Connecticut Company.

Attack Spokane One-Man Cars.—The labor unions of Spokane, Wash., are demanding that the Washington Water Power Company and the Spokane & Inland Empire Railroad take off the one-man cars, contending that they are unsafe and that the service which is rendered by them is inadequate.

Wants Opinion from Attorney-General.—Senator Perrin of Norfolk, Mass., has presented in the State Senate an order requesting an opinion from the Attorney-General on the constitutionality of last year's Boston Elevated Railway service-at-cost bill. The order has since been adopted in the Senate upon recommendation of the committee on rules.

Overtime Award Announced.—The Wilmington & Philadelphia Traction Company, Wilmington, Del., has been instructed by the War Labor Board to pay time and one-quarter for hours exceeding ten in a day and to pay men working on snowplows and street sweepers time and a half after ten hours.

Milwaukee Against One-Man Cars.—Mayor D. W. Hoan, of Milwaukee, Wis., has signed the ordinance passed by the Common Council providing that the Milwaukee Electric Railway & Light Company must place two men on all its cars. The ordinance, if enforced, will automatically abolish the one-man stub service in force on a number of outlying lines.

Wage Increase on Ohio Electric Railway.—Reports from Newark, Ohio, are to the affect that the Federal War Labor Board has increased the wages of platform men on the Ohio Electric Railway. On the Newark city line the maximum will be 42 cents an hour, instead of 39 cents. Interurban men will receive a maximum of 45 cents, instead of 35 cents.

Would Require All-Steel Cars.—Steel cars for all transit lines in Brooklyn and the other boroughs of Greater New York are provided for in a bill which Senator Bernard Downing and Assemblyman Dickstein offered on Feb. 5. The bill applies to all surface, elevated and subway lines and the requirement must be effective one year after the law is signed.

New Milwaukee Wages Continue.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has announced that it will continue the payment of the present increased wage scale until March 15. The danger of a strike on Feb. 1 was thereby avoided. The issues involved in this case were reviewed in the ELECTRIC RAILWAY JOURNAL for Feb. 1, page 247.

Toronto Men Accept Award.—When reminded by union leaders that the wage agreement expires in June next, employees of the Toronto (Ont.) Railway concluded to accept the award of a board of conciliation under which they are granted a war bonus of 2 cents to 2½ cents an hour. The company was willing to accept the award, but the men at first were in favor of appealing.

Notice of Termination of Employment.—A bill has been introduced in the Legislature of Iowa making it mandatory for public service corporations to give employees at least ten days' notice before discharging them, or giving them written notice setting forth the reasons for the discharge. In like manner the employees are required to give ten days notice before leaving the service of their employers.

Railway Wants Bus Franchise Reviewed.—A writ of certiorari to review the action of the City Commission of Newark, N. J., in granting a fifteen-year franchise to the General Omnibus Company of New Jersey has been granted by Chief Justice Gummere in the Supreme Court upon the application of the Public Service Railway. The contention of the railway is that the franchise ordinance was adopted by the commission with an insufficient number of votes. The issuance of the writ will act as a stay against operation of the buses.

Extension of Franchise in Lakewood.—The village of Lakewood, suburb of Cleveland, Ohio, has suggested to J. J. Stanley, president of the Cleveland Railway, terms for a ten-year extension of the franchise in that municipality. Continuance of the 3-cent fare in Lakewood, maintenance of the 5-cent fare between points within Cleveland and Lakewood, with provision that the charge shall never be less than that in Cleveland, and laying tracks in the center of Clifton Boulevard, are among the terms mentioned. If the franchise is not renewed by May 1, 1919, the suburb will lose the 3-cent rates within its boundaries, and the company may charge 5 cents.

New River Tunnel Ready on April 1.—The Public Service Commission for the First District of New York is making plans for the opening of the new Clark Street tunnel line to Brooklyn about April 1. This line forms the connection between the West Side subway in Manhattan and the Interborough lines in Brooklyn. It is a two-track subway connecting with the West Side line at Chambers Street, and extending through Park Place and William Street in Manhattan to the new Interborough Rapid Transit Company East River tunnel to Brooklyn, and on the Brooklyn side through Clark and Fulton Streets to a connection with the existing line at the Borough Hall station. At present the line is in operation as far as Wall and William Streets, Manhattan.

Commission Work Can Now Proceed.—The Board of Estimate of New York City has appropriated $315,564 to cover the expenses of the Public Service Commission for the First District for February and March. This is at the yearly rate of $1,952,431, and the administration and rapid transit part of the appropriation was in accordance with the schedules presented by the commission. The commission, however, did not get the $14,246 it wanted for a new bureau to audit the operating accounts of the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company under the dual contracts. The commission wrote to the Governor recently complaining of the board's refusal to grant appropriations for rapid transit work.

Severe Flood Damage.—The heavy downpour of rain in the Puget Sound country during the week ended Jan. 29 caused thousands of dollars of damage to the electric interurban lines, railway systems, and county structures. In many places tracks were under several feet of water, bridges were washed out, and communication entirely cut off. All rail communication between Seattle and Tacoma was severed by 4 and 5 ft. of water submerging the interurban tracks near Tacoma Junction. The main line tracks between Seattle and the East were kept open, and troubles with slides in the mountains were slight. Highway traffic was completely cut off in many places by back wash cutting into the gravel approaches of bridge structures.

New Brooklyn Accident Arbitrator.—Henry W. Taft, brother of ex-President Taft, had been designated to succeed Lindley M. Garrison as the representative of the Brooklyn (N. Y.) Rapid Transit Company on the arbitration commission appointed to arbitrate the dispute between the city and the company over the payment of damage claims arising out of the Brighton line wreck on Nov. 1. The dual subway system contract provides that in the case of a disagreement in regard to items of expenditure, etc., the same may be settled by arbitration, one disinterested arbitrator to be appointed by each of the parties and one by the Chief Judge of the Court of Appeals. Since his appointment to the arbitration commission by the company Mr. Garrison has been made receiver for the company.

New Wage Demand in Des Moines.—Employees of the Des Moines (Iowa) City Railway have asked the company for a very material wage increase in a new scale submitted during the week ended Feb. 1. Increases running from 14 to 16 and 18 cents an hour for men of three months', nine months' and one year's service are demanded by the men. Emil G. Schmidt, president of the company, has told representatives of the men that their demands are matters for the United States Court and the receivers of the railway, rather than for the company. A material increase was granted the men within the past few months. Other demands made by the employees are: better heated cars, an eight-hour day and rearrangement of the schedules to allow a four-minute wait at the end of each run.

Compromise Proposed on Commission Legislation.—After the hearing at Albany, N. Y., on Feb. 5 on the public service bills a compromise measure framed to meet Republican objections is being considered. This would provide for a three-man commission in New York City, two commissioners to exercise quasi judicial and regulatory functions and the third to be known as commissioner of rapid transit construction. The bill would provide for practically complete separation of construction and regulation of rapid transit operations. In this connection it was reported on Feb. 5 that Governor Smith had sent a cable message to William Barclay Parsons, at present a major-general with the American Expeditionary Forces in France, asking him to undertake the task of completing the unfinished portions of New York City's dual subway system.

Joint Operation in New San Francisco.—The development of the residence district beyond the recently completed Twin Peaks Tunnel in San Francisco has called for additional transportation facilities, and the Municipal Railway has extended its system accordingly. About a mile of new double track is being built and arrangements have been completed with the United Railroads for joint operation of about 11,000 ft. of track. The arrangements with the United Railroads include the payment by the city of $100,000 for a half interest in 7000 ft. of track on Ocean Avenue. On this line the city will pay the company 7½ cents per car-mile for power and maintainence of track and overhead. A separate agreement covering operation on the Taravel Street line provides that the city shall reconstruct the track to grade, using the old rails and shall put in the paving, in return for which the city shall own a half interest in the tracks. The maintenance of the line is to be shared and the city is to pay for power used at the rate of 11 cents per kilowatt-hour.

Municipal Ownership Suggested as Way Out.—D. M. McIntyre, chairman of the Railway Board of the Province of Ontario, declaring that the succession of disputes between the city of Toronto and the Toronto Railway was wearing upon him, has proposed to the parties that the city take immediate steps to purchase the system, instead of waiting several years for the termination of the franchise. Counsel for the city and for the company each contended that the first step should come from the other party. The issue under discussion was the company's plea of inability, on account of war conditions, to comply with a board order of April, 1918, calling for the purchase and operation of 200 new cars on the Toronto system, before Jan. 1, 1919. When the penalty for default had reached $24,000 the company appealed to the Supreme Court without success, and thereupon returned to the Ontario Railway Board to ask for time. It was explained that efforts are being made to purchase supplies with which to build the cars in the railway company's own shops.

Programs of Meetings

National Safety Council

The National Safety Council has announced the selection of Cleveland, Ohio, as the meeting place for the next National Safety Congress, which will be held in the fall.

Central Electric Railway Association

The Central Electric Railway Association calls attention to the change in the place of its annual meeting to be held on Feb. 27 and 28. The new meeting place is the Hotel Cleveland, Cleveland, Ohio, "The Hotel on the Square." The program will be announced later.

Central Electric Railway Accountants' Association

The detail program has been announced for the thirty-third meeting of the Central Electric Railway Accountants' Association, to be held at the Hotel Anthony, Fort Wayne, Ind., on Feb. 15. The executive committee will meet at 8.30 a.m.

The regular sessions of the association will begin at the hotel at 10 a.m. Following the address of the president and the report of the executive and standing committees, C. B. Kleinhaus, auditor of the Toledo & Indiana Railroad, Toledo, Ohio, will make an address on "Where the Money Comes From."

At the afternoon session J. D. Meek, vice-president of the Electric Supply Company and president of the Simplex Account Company, Indianapolis, Ind., will make an address on "Trade Acceptances."

Financial and Corporate

B. R. T. Loses Money

Falls Back $3,595,000 in Net Income During 1918—Directors Give Reasons for Receivership

The Brooklyn (N. Y.) Rapid Transit Company for the calendar year 1918 showed a falling off of $3,595,492 in net income as compared to 1917. A total of $2,628,238 of this decrease, or more than two-thirds, was the result of operation during the second six months of the year. The accompanying detailed tables show the full effect of the higher operating expenses and fixed charges.

These figures, which are supplementary to the latest annual report of the company, published in the ELECTRIC RAILWAY JOURNAL of Oct. 26, 1918, were presented at the annual meeting of stockholders on Jan. 31. At this meeting officials presented a report on behalf of the board of directors explanatory of the receivership and the circumstances that led to the placing of the property under the protection of the court.

INCOME STATEMENT OF BROOKLYN RAPID TRANSIT COMPANY FOR CALENDAR YEARS 1917 AND 1918

	1918	1917	Change
Gross revenues	$30,982,034	$30,085,287	+ $896,747
Operating expenses.	20,035,790	17,211,885	+ 2,823,905
Net operating revenue....	$10,946,244	$12,873,402	—$1,927,158
Other income	414,566	406,187	+ 8,379
Total income.	$11,360,810	$13,279,589	—$1,918,779
Taxes......	$2,613,750	$2,257,292	+ $356,458
Interest and rentals...	7,263,244	5,942,989	+ 1,320,255
Total....	$9,876,994	$8,220,281	+ $1,676,713
Net income...	$1,483,816	$5,079,308	—$3,595,492

INCOME STATEMENT OF BROOKLYN RAPID TRANSIT COMPANY FOR LAST SIX MONTHS OF 1917 AND 1918

	1918	1917	Change
Gross revenues	$15,937,475	$15,461,938	+ $475,537
Operating expenses.	10,691,087	8,767,103	+ 1,923,984
Net operating revenue....	$5,246,388	$6,694,835	—$1,448,447
Other income	216,862	210,025	+ 6,837
Total income.	$5,463,250	$6,904,860	—$1,441,610
Taxes......	$1,323,210	$1,153,112	+ $170,098
Interest and rentals...	4,128,524	3,111,994	+ 1,016,530
Total....	$5,451,734	$4,265,106	+ $1,186,628
Net income...	$11,516	$2,639,754	—$2,628,238

It was said that the company joined in the application for the appointment of a receiver because the directors felt that while the necessity for a receivership might temporarily be avoided by borrowing the amounts needed to meet the obligations now payable, the ultimate result could not be long postponed or averted unless sufficient funds were provided to carry on existing construction and equipment contracts and to complete the plans for rapid transit enlargement to which the system was committed.

The raising of these large amounts was found to be impossible under the financial conditions then prevailing, and especially in view of the general disinclination of the public to invest new capital in traction properties so long as the abnormally high costs of operation, due to the war, must be borne without a compensatory fare increase.

COMPANY SOUGHT GOVERNMENT AID

In December, the urgency becoming great, the matter of an additional loan by the War Finance Corporation was taken up informally at Washington, but information was received that in view of the policy of the War Finance Corporation to restrict the exercise of its powers following the signing of the armistice, it was not in a position to consider an application for an additional loan. Inquiries through regular banking channels made it evident that the time was not favorable either for the sale of securities or for large borrowing, and the directors therefore felt that the best interests of the properties would be subserved by permitting them to be placed under the protection of the courts.

The report recited the system of temporary financing of capital requirements conducted by the company which included large borrowing from banks and trust companies and from the constituent companies of the system. It stated that so long as the system was earning substantial profits, such temporary financing presented no serious embarrassment and in the judgment of the directors was preferable to selling long-term securities at sacrifice, but when war conditions overtook the company and net earnings were largely reduced, there was no available source of capital funds except from the United States government, and "the cash became so depleted that even moneys earned for fixed charges had to be used temporarily for capital purposes."

FLOATING INDEBTEDNESS A PROBLEM

The important problem now before the company, it was pointed out, is the provision for the floating indebtedness and for the program of improvements worked out during the last six years which in the directors' opinion are essential to adequate transportation for the community and will be a source of profit to the companies. The city's work, the report says, is not less than four years behind time. The company has expended more than $60,000,000 in performing its part of the contracts, at least half applying to facilities not yet in operation.

Rhode Island Receiver in Charge

Indications Point to Simplification of Corporate Structure as Ultimate Outcome of Receivership

The appointment by Chief Justice Tanner of the Superior Court of Frank H. Swan of the law firm of Swan & Keeney receiver of the Rhode Island Company, which operates all the electric railways of the State, was the culmination of a series of incidents pointing plainly to receivership as the ultimate fate of the company. The prediction is made that the outcome will be a reorganization along lines similar to that of the Boston & Maine Railroad, with a new parent company which will own outright the complete system.

The officers of the New York, New Haven & Hartford Railroad, which owns the entire capital stock of the Rhode Island Company and the United Traction & Electric Company, the principal lessor corporation, conferred several times before the petition was filed in the Superior Court. The federal trustees acquiesced.

The first subject of major importance to engage the attention of the receiver after his appointment was a payment of the second installment of back wages due on Feb. 1 to the employees under an amended decree of the War Labor Board. Inasmuch as the court's instructions to the receiver contained no provision for such a payment, a petition was filed by Mr. Swan in the Superior Court on Feb. 3 asking that he be allowed to make the payment. The amount due totals about $72,000 in which about 2000 employees participate. No action has yet been taken by the court.

The Rhode Island Company at the present time owes the United Traction & Electric Company $47,500, representing a part of the rental payment due on Dec. 24. Another payment of $180,000 falls due on Feb. 24.

The receivership petition was filed by John J. Orr, a contractor employed by the Rhode Island Company. It recites the facts that the company at the close of business on Jan. 29 had a cash deposit of $131,228 and the only securities owned, aside from those pledged, totaled $74,000 par and are regarded as of doubtful value.

The company has paid no dividends upon its stock since June 13, 1913. The deficit for the eleven months ended Nov. 30, 1918, was $699,628.

The total amount payable by the company each year on account of guaranteed dividends on stock was $886,364; interest on bonds was $267,280; rentals, $7,550; organization expenses, $300; total $1,161,494. The net amount payable (less interest and dividends from bonds and stocks held) amounted to $1,053,915.

Demand notes held by the New York, New Haven & Hartford Railroad total $3,746,037. This with the interest unpaid, amounting to $325,143, totals $4,071,180. Other obligations overdue and unpaid amount to $393,841 and the company will be called upon to pay before April 1, 1919, the sum of $480,212 representing State and city taxes, second and third installments of back wages due employees and rentals.

There is no intention at the present time of Mr. Swan making any changes in the directing personnel of the road.

$24,346,113 Is Minneapolis Valuation

Council Committee Accepts This Figure in Connection with Negotiations for Franchise Renewal

The committee on street railway matters and extensions of the City Council of Minneapolis, Minn., on Jan. 21 fixed the valuation of the Minneapolis Street Railway, included in the system of the Twin City Rapid Transit Company. The figure set was $24,346,113. This was the valuation determined by C. L. Pillsbury, Minneapolis consulting engineer, engaged by the city to check and revise the valuation report of City Engineer F. W. Cappelen.

The valuation was accepted in connection with the proposal for the renewal of the franchise of the company, which expires in 1923. The motion for acceptance of the Pillsbury report provided that the company be allowed a 7 per cent income on its investment. Valuations also submitted to the committee were those of the company's engineer for $30,712,101; the central franchise committee's majority report of $22,156,951, and the franchise committee's minority report of $15,470,360.

In the comparative figures submitted by Mr. Pillsbury and Mr. Cappelen the marked difference is in the "going concern value." The reports of the central franchise committee allowed nothing for this item. Mr. Cappelen placed the company's water-power leases at $491,857, while Mr. Pillsbury places them at $513,172. The central franchise committee reports allowed nothing for these items.

F. W. CAPPELEN

	Jan. 1, 1916	Jan. 1, 1919
Total physical property....	$21,152,222	$37,856,032
Development costs.......	4,270,230	4,270,230
Water-power leases.......	491,857	491,857
Total value............	$25,914,309	$42,618,119

C. L. PILLSBURY

	Jan. 1, 1916	Jan. 1, 1919
Total physical property....	$21,057,292	$37,486,959
Development costs.......	2,775,649	2,775,649
Water-power leases.......	513,172	513,172
Total value............	$24,346,113	$40,775,780

COMPANY VALUATION

	Jan. 1, 1916	Jan. 1, 1919
Total physical property....	$24,105,758	$43,144,005
Development costs.......	5,311,462	5,311,462
Water-power leases.......	1,294,881	1,294,881
Total value............	$30,712,101	$49,750,348

On interest during construction Mr. Cappelen allowed $2,131,554, as against Mr. Pillsbury's $1,440,742. The other reports gave a lower figure. The Pillsbury total was $24,346,113, as compared to $25,914,307 by Mr. Cappelen. The central franchise committee's majority report gives a total of $22,156,951, but provides, as the other reports do not, for a reduction of this total at the rate of $438,509 per year after Jan. 1, 1916, the basis of the report.

Under this consideration the going concern value on Jan. 1, 1918, was to be $2,411,802, and on July 1, 1923, when the company's present franchise expires under contract, the going concern value would be zero.

A 5½-cent fare was advocated by A. L. Drum, consulting engineer for the railway.

In presenting the company's valuation figures, Mr. Drum declared that the $25,914,309 valuation placed by Mr. Cappelen now would be $42,618,119 if the increased costs in material and operation were considered. The Pillsbury valuation, if given for Jan. 1, 1919, would be $40,775,780. The company's valuation of $30,712,101, as of Jan. 1, 1916, would be $49,750,348 as of Jan. 1, 1919.

A comparison of the various valuations is given in the accompanying table.

Railway Delinquent

Failure of Rhode Island Company to Pay Franchise Tax of $125,000 Referred to the Attorney General

Richard W. Jennings, general treasurer of Rhode Island, as required by law, has notified Attorney-General Herbert A. Rice of the failure of the Rhode Island Company, Providence, R. I., to pay its franchise tax. This tax approximates $125,000 and was due on Oct. 1 last. In consequence the railway is a delinquent corporation and subject to prosecution.

Attorney-General Rice, however, is extremely loathe to start proceedings against the company as insistence upon payment of the tax would probably result in bankruptcy. It is expected the Rhode Island General Assembly will take the subject under consideration soon and attempt to solve the problem. Meanwhile Mr. Rice, it is expected, will mark time.

The federal trustees of the Rhode Island Company at a meeting on Sept. 27 considered the question of paying the State tax, but it was decided to file a record of the earnings and defer payment of the tax indefinitely. On Sept. 30 the trustees again met and reaffirmed their decision of Sept. 27.

The certificate of gross earnings filed with the General Treasurer showed them to be $6,085,125, upon which a tax of 2 per cent, amounting to $121,702, became due on Oct. 1. Accrued interest at 8 per cent for the ensuing four months amounts to $3,245, making the total amount due on Jan. 1, $124,947.

General Treasurer Jennings on Jan. 8 wrote to the federal trustees of the Rhode Island Company calling attention to the fact that the tax had not been paid and asking what the company proposed to do about meeting its obligation.

Abandoned Lines Must Resume

By order of the State Public Service Commission, the Washington Water Power Company, Spokane, has resumed service on three of its lines which it desired to abandon. The commission will keep a check to determine whether the business justifies permanent service.

Corporation Counsel Geraghty told the City Council that there is no question, in his opinion, that the city could compel the railways of Spokane to live up to their franchises as to fares and service. According to Mr. Geraghty, the 5-cent fare must stand and the companies must provide service on all lines, in accordance with the terms of the franchises.

Mayor Fassett believes that the consolidation of the lines of the Washington Water Power Company and the Spokane Traction Company, operating the city lines of the Inland Empire System, is the correct solution of the problem of the financial difficulties of the companies. The Mayor said:

> I am at work on a report to be submitted to the Council which will give my ideas on the problem. Consolidation must be preliminary to any satisfactory adjustment. Data are being obtained from other cities, particularly from Cleveland where the city is represented on the board of directors of the railway. In any event what we want is the right of the city confirmed to regulate to a greater extent the operations of the companies. The city and its people have an interest in the matter and should be heard.

Receiver for Hocker Line

The Kansas City, Lawrence & Topeka Railroad, Kansas City, Mo., on Jan. 30 was placed in the hands of P. W. Goebel, president of the Commercial National Bank, Kansas City, Kan., and former president of the American Bankers' Association, as receiver, by Federal Judge Pollock. Foreclosure was asked by the Commerce Trust Company, Kansas City, Mo., acting as trustee for bondholders. The proceeding was begun when the railroad failed to pay the interest on its bonded indebtedness.

Fare Results Disappointing

Operation of the United Railways, St. Louis, Mo., city and county lines, during the fiscal year of 1918, resulted in a deficit of $1,576,125 on a valuation of $60,000,000 at 6 per cent according to a report made to the Public Service Commission of Missouri by Richard McCulloch, president of the company.

The deficit on city lines was $894,165 and on the country lines $681,959, according to the figures submitted.

A statement of results of the 6-cent fare plan for seven months also was sent to the commission. It shows that the 20 per cent increase in fare on city lines has increased revenue only 10.32 per cent. The loss in passengers has been 7.82 per cent. In addressing the commission, President McCulloch asked that body to take cognizance of the conditions, so that the revenues of the company may be adjusted to insure good service, necessary betterments, and a fair return upon the investment.

San Francisco M. O. Declines

City-Owned Lines, Without Tax and Other Comparison Charges, Have 87 Per Cent Loss in Net

The latest complete report of the Municipal Railway of San Francisco, for the two years ended June 30, 1917, shows that the net profit of $74,768 for 1916 was converted into a deficit of $103,908 for 1917. The details of this decline are shown in Table I.

The foregoing showing is made after the inclusion of certain "comparison" charges, which are used in order that the municipal line may be considered upon the same basis as privately owned lines. As a matter of fact, the Municipal Railway pays no taxes, and in some instances it pays nothing for services rendered by other departments of the municipal government.

ELIMINATION OF CERTAIN FIXED CHARGES IMPROVES SHOWING

Thus, by taking the net profit of $74,768 shown for 1916 and adding the comparison charges of $166,714 for taxes and $9,182 for legal and clerical services, the "true net profit" is shown to be $250,663. Similarly for 1917 the loss of $103,908, when combined with comparison charges of $125,576 for taxes and $9,416 for legal and clerical services, becomes a "true net profit" of $31,084.

The comparison charges decreased from a total of $175,896 in 1916 to $134,992 in 1917, but this did not affect the main showing of decline in the later period. The net result of operation still showed a falling off of $219,579 or 87 per cent.

The poorer showing in 1917 was due mostly to the decrease in passenger revenue. The total passengers decreased from 47,886,784 to 36,234,723, the loss in 5-cent fare traffic being from 39,295,429 to 29,230,644. As a result the passenger revenue fell off $500,284, while the operating expenses dropped only $285,594.

The passenger revenue per car-mile for the year ended June 30, 1916, was 30.99 cents, and per car-hour $2.6729. In the following year, however, the revenue figures dropped to 27.65 cents per car-mile and $2.5317 per car-hour. The operating expenses declined from 18.32 cents per car-mile to 18.17 cents, while per car-hour they rose from $1.5798 to $1.6637. Miscellaneous statistics are given in Table II.

TABLE I—INCOME STATEMENT OF MUNICIPAL RAILWAY OF SAN FRANCISCO FOR YEARS ENDED JUNE 30, 1916 AND 1917

		1916		1917	
Passenger revenue		$1,970,477		$1,470,193	
Miscellaneous revenue		12,327		7,717	
Total operating revenues			$1,982,804		$1,477,910
Ways and structures		$40,457		$50,977	
Equipment		77,744		69,703	
Power		258,163		211,506	
Conducting transportation		731,508		596,446	
Traffic		219		293	
General and miscellaneous		56,527		37,213	
General and miscellaneous—comparison charges		9,182		9,416	
*Depreciation, and injuries and accidents		352,075		264,727	
Total operating expenses			1,525,875		1,240,281
Net operating revenue			$456,929		$237,629
Income from municipal bonds owned			24,039		22,108
Gross income			$480,968		$259,737
Taxes (comparison charges required by charter):					
State franchise 5½ per cent on gross revenue		$103,854		$78,500	
Municipal franchise 3 per cent on passenger revenue		59,149		44,121	
Municipal car license		2,955		2,955	
Federal income tax, 1 per cent on net income		755		......	
		$166,714		$125,576	
Interest on funded debt	$259,330				
Less amount capitalized	19,844	239,486		238,069	
Total deductions			$406,200		363,645
Net profit for the year after inclusion of comparison charges			$74,768		†$103,908

*The reserve for depreciation and renewals is computed at 14 per cent of the gross operating revenues, instead of on annual percentages of physical value of the property. The rate of 14 per cent is arbitrary, being based on Chicago experience as reported by Bion J. Arnold (12 per cent) and the opinion of Delos F. Wilcox as expressed in a paper on "Elements of a Constructive Franchise Policy."

There is an added 4 per cent of the gross revenue for injuries and accidents, this percentage being based on the experience of United Railroads of San Francisco. The total reservation is thus 18 per cent of the gross operating revenues.

† Deficit

TABLE II—STATISTICAL DATA OF MUNICIPAL RAILWAY OF SAN FRANCISCO FOR YEARS ENDED JUNE 30, 1916 AND 1917

	1916			1917		
	Total Amount	Per Car-Mile	Per Car-Hour	Total Amount	Per Car-Mile	Per Car-Hour
Total passenger revenue	$1,970,477	$0.3099	$2.6729	$1,470,193	$0.2765	$2.5317
Total operating expense	$1,164,617	$0.1832	$1.5798	$966,137	$0.1817	$1.6637
Operating earnings (taxes, depreciation charter charges not deducted)	$805,860	$0.1267	$1.0931	$504,055	$0.0948	$0.8680
Ratio of earnings to passenger revenue	0.4089			0.3428		
Total taxes and charter charges	$175,896	$0.0277	$0.2386	$134,992	$0.0254	$0.2325
Ratio to passenger revenue	0.0893			0.0918		
Operating expense, taxes and charter charges	$1,340,513	$0.2108	$1.8183	$1,101,130	$0.2071	$1.8962
Ratio to passenger revenue	0.6803			0.7490		
Depreciation	$352,075	$0.0553	$0.4776	$264,727	$0.0498	$0.4558
Ratio to passenger revenue	0.1787			0.1800		
Operating expense and depreciation	$1,516,692	$0.2385	$2.0573	$1,230,865	$0.2315	$2.1195
Operating expense, depreciation, taxes and charter charges	$1,692,589	$0.2662	$2.2959	$1,365,857	$0.2569	$2,3520
Ratio to passenger revenue	0.8589			0.9290		
Net income from operation (after deducting depreciation, taxes, charter charges, etc.)	$277,888	$0.0437	$0.3769	$104,335	$0.0196	$0.1797
Ratio to passenger revenue	0.1410			0.0710		
Passenger car-mileage	6,358,543			5,317,269		
Passenger car-hours	737,213			580,716		
Total platform expense (37½ cents per hour, eight hours per day)	$500,297	$0.0944	$0.8143	485,851	0.0914	0.8366
Total number of cars owned	198			198		
Track owned and operated (single track)			45.59			43.44
Track owned and operated cojointly with United Railroads			1.04			1.04
Total single-track mileage operated			46.63			4448

$3,000,000 at Once for the B. R. T.

Federal Judge Julius M. Mayer on Feb. 1 appointed former Judge E. Henry Lacombe as special master in chancery to pass upon claims against the Brooklyn (N. Y.) Rapid Transit Company and subsidiaries that are in possession of Lindley M. Garrison as receiver. In a supplemental order the court fixed March 15 as the date on which all claims must be in.

On the same day an order was signed authorizing the receiver to borrow $3,000,000 with which to meet the pressing obligations of his companies. No action was taken on the petition of the receiver to be permitted to borrow more than $16,000,000 on receiver's certificates.

Another order gave leave to the receiver to negotiate with bankers who have loans of more than $3,000,000 to the company outstanding. The receiver will pay interest as it comes due and arrange to pay the principal, the lenders to hold their collateral from sale in the meantime. This order was agreed upon after a number of lawyers representing various banks had discussed it. They objected to an order restraining their clients from putting Brooklyn Rapid Transit collateral for loans in the market without giving notice of their intention to the receiver, but were in agreement that evil effects would follow the wholesale selling of the company's securities.

The receiver said he would not pay interest and then have the collateral sold in the open market.

The matter, as finally ordered, leaves the question of loans and their collateral to adjustments between the receiver and the various creditors of the company.

Financial News Notes

Oklahoma Railway Notes Offered.—The Mississippi Valley Trust Company, St. Louis, Mo., is offering Oklahoma (Okla.) City Railways' $375,000 bond-secured 8 per cent gold notes, dated Sept. 1, 1918, due March 1, 1921.

New American City Director.—At a meeting of the American Cities Company in New Orleans, La., on Jan. 20 Lynn H. Dinkans, president of the Interstate Trust & Banking Company, New Orleans, was elected a director to succeed Walter C. Weiss, resigned.

Valuation at St. Louis to Proceed.—The Supreme Court of Missouri having decided the authority of the Public Service Commission with respect to fares, the commission announced on Jan. 27 that a valuation of the physical property of the United Railways, St. Louis, will be begun within sixty days.

Abandonment Case Heard.—The Southern New York Power & Railway Corporation's application for approval of the abandonment of the normal school line in Oneonta, N. Y., was submitted to Public Service Commissioner Cheney on Dec. 27, briefs to be filed, after which the commission will make determination.

Foreclosure Sale on Feb. 15.—Richard C. Swing, special master commissioner, will sell the property of the Cincinnati & Columbus Traction Company, Cincinnati, Ohio, at public auction at Cincinnati on Feb. 15, without regard to a minimum price. The sale will be made in accordance with the decree of foreclosure of the $600,000, 5 per cent mortgage of 1905 and the $250,000, 5 per cent mortgage of 1907.

Tax Indicates Large Gross Earnings.—The increase in electric railway business in Seattle, Wash., in the year 1918, is shown in the check for 2 per cent tax on gross earnings forwarded to the city by the Puget Sound Traction, Light & Power Company. The check was for $92,728 as compared with $72,272 for 1917, or an increase of 28 per cent. Total gross earnings on which the tax was computed were $2,312,010 in 1917, and $4,212,670 in 1918. Every line in the city showed an increase. The Fort Lawton line's gross earnings almost doubled.

Representatives of Public on Board.—At a special meeting of the Selectmen of Plymouth, Mass., recently Edward R. Belcher, Ellis W. Brewster, George B. Howland and Michael D. Welch were nominated to represent the town on the board of directors of the Brockton & Plymouth Street Railway. Each of the other towns along the line of the railway has nominated one director; the bondholders and Stone & Webster, who operate the road, will nominate one director each, and it is anticipated that these men will do their best to work out a plan by which the road may be kept in operation.

Merger Approval Refused.—Approval of the proposed merger of the Bridgeton (N. J.) Electric Company with the Electric Company of New Jersey has been refused by the Board of Public Utility Commissioners. The floating debt of the Bridgeton company, the commission decided, should be funded before any merger is effected. The commission rejected also, in part, the application of the Bridgeton company for the right to transfer 500 shares of its preferred capital stock at par to the American Railways, but authorized the transfer of 400 shares. Of the proceeds, the commission will allow $35,000 for working capital and $5,000 for construction work in progress as of Dec. 31, 1917. The American Railways also controls the Bridgeton & Millville Traction Company.

Into Hiding for the Winter.—The Portsmouth, Dover & York Street Railway, Portsmouth, N. H., has quit for the winter. The road expects to resume on April 30. Last winter the road fell a victim to snow for a spell. This winter the operation of the relentless law of economics has done just as thorough, although less spectacular, a job as was done a year ago by the physical elements. There is one untoward factor this time, however. The roads are open and the auto bus has come in. It is getting whatever traffic there is. How far the railway will be able to regain this business remains to be seen. The pessimists think it will be lost almost entirely and forever. Among the apostles of despair is the York *Transcript*. That paper said recently: "It is the opinion of a great many people that the present move is simply the beginning of the end of the road here. W. A. Meloon, the receiver, says that there is no intention of junking the road, although there has been considerable talk among the owners to that effect. When the time comes to pull up the rails and tear down the trolley wires, and sell the whole business to the junk man, it will be done. Just how near that time is we have no means of knowing."

Two Additional Columbus Directors.—In order to insure its slate of directors at the annual meeting of the stockholders of the Columbus Railway, Power & Light Company on Jan. 28, the proxy committee secured an increase of two members in the personnel of the board. The new board consists of W. C. Willard, W. A. Gill, Normon McD. Crawford, Charles L. Kurtz, D. Meade Massie, A. S. Hammond, Walter B. Beebe, Samuel Ungerleider, Emil Kiesewetter, F. R. Huntington, Harry S. Holton, B. W. Marr, E. A. Reed and Frank P. Hall. The last four are new members nominated by the proxy committee. One of them succeeds E. K. Stewart, recently resigned, and another takes the place of R. H. Platt, who was elected at the reorganization meeting on Jan. 10, but could not serve because of pressure of other interests. The other two are the additional members, making fourteen in all instead of twelve. The board is now fully in the hands of the stockholders' protective committee, which will soon pass out of existence, since its purpose has been accomplished. The board organized by the election of the following officers: President, Charles L. Kurtz; vice-president and treasurer, Norman McD. Crawford; vice-president, Samuel Ungerleider; secretary and auditor, P. V. Burington; assistant secretary and auditor, H. M. Burington; executive committee, Charles L. Kurtz, F. R. Huntington and Walter B. Beebe. Harold W. Clapp was retained as manager. On Dec. 31, 1918, the company showed a surplus balance of $247,810 as compared with $191,819 for 1917. Against the 1918 amount, however, is charged a contingent liability of $142,152 for the rebate slips issued to passengers who paid the 5-cent fare for the period during which the company disregarded the franchise rate. After a deduction for this a balance of $105,658 remained.

Electric Railway Monthly Earnings

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$13,371	$24,945	†$11,574	$510	†$12,084
1m., Dec., '17	12,450	23,250	†10,800	473	†11,273

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$51,441	*$31,203	$20,238	$16,084	$4,154
1m., Nov., '17	41,816	*28,012	13,804	11,635	2,169
11m., Nov., '18	511,629	*339,706	171,923	136,552	35,371
11m., Nov., '17	496,163	*309,912	186,251	128,473	57,778

* Includes taxes. † Deficit. ‡ Includes non-operating income. § Includes accruals under rapid transit contracts with city, payable from future earnings.

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$3,782,224	*$2,567,286	$1,214,938	$1,509,382	‡§$431,887
1m., Dec., '17	3,740,927	*2,076,032	1,664,895	1,102,031	‡§768,433
6m., Dec., '18	19,953,159	*14,007,725	5,945,434	8,739,865	‡§871,850
6m., Dec., '17	19,669,015	*11,094,712	8,574,303	6,482,085	‡§3,534,231

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$178,818	*$139,564	$39,254	$35,917	$3,337
1m., Nov., '17	142,814	*102,922	38,892	35,149	3,743
11m., Nov., '18	1,988,688	*1,443,106	545,582	397,030	148,552
11m., Nov., '17	1,618,439	*1,103,339	515,100	381,998	133,102

Traffic and Transportation

Oshkosh Willing to Help

After Frank Description of Railway Situation, Local Public Is Trying to Give Relief

A loan of $100,000 for the purchase of fifteen new cars, relief from paving obligations and city support of a 6-cent fare application—these are the pressing needs of the electric railway situation in Oshkosh, Wis. Such an outline of the situation was presented to a group of seventy-five representative professional and business men on Jan. 10 by Raymond H. Smith, vice-president and general manager of the Eastern Wisconsin Electric Company. The local public is showing a spirit of willingness to aid the company, and steps along the lines mentioned are now being taken.

Mr. Smith analyzed the electric railway situation in a frank, clear-cut and exhaustive way. He pointed out that during the year ended Aug. 31, last, the company fell $6,201 short of meeting operating expenses on the city and interurban lines, with no allowance for depreciation. Mr. Smith emphasized strongly the interest the public should take in the property, saying that anyone is wrong who thinks that the company can rub a magic lamp and thus secure the power to continue operation at a loss and the ability to mesmerize investors. Continuing, he said:

> In the past, the public and the companies have endeavored to obtain the greatest possible advantage for their respective interests, without considering the ultimate effect upon the industry or the community. There must be a recasting of the relationship which has existed between public utilities and the communities served.
>
> The Eastern Wisconsin Electric Company fully recognizes its responsibilities, is aware of the condition of the present rolling stock and admits that the public has a right to expect adequate service in comfortable cars. The company, however, must be permitted to charge a sufficient fare to make possible the service and equipment desired by the public.
>
> The public should realize that their interest in the continued efficient operation of a public utility is such that it becomes imperative that they should recognize some responsibility for financial results. Such recognition may very properly lead to putting the credit of the public back of the utilities, when necessary, in return for the class of service demanded.

According to Mr. Smith, the great needs at present are these:

1. That the city finance the purchase of twelve or fifteen modern city cars, under a plan whereby these cars will be leased to the company, with an agreement on the part of the company to repay the city the purchase price of the cars, with interest, over a period of time to be agreed upon.
2. That the city relieve the company of the present obligation to pave between its tracks and 1 ft. outside.
3. That the city join in the application for a 6-cent fare, to be made effective at the earliest possible date, and that it recognize the principle that adequate and dependable service, to which the public is entitled, must be accompanied by a fare sufficient to make this possible.

As a result of the conference a committee of seven men was appointed to formulate plans of aid. The present indications are that the city authorities will furnish the relief from paving taxations and that citizens will finance the purchase of the cars. The city itself cannot legally finance the purchase of new cars.

The determination of a higher fare will in all likelihood be left to the Wisconsin Railroad Commission, before which a 6-cent application is now pending. During the hearings the city took the position that it would not object to a 6-cent fare if new cars were purchased. The city authorities, however, are still holding out for a special workingmen's rate between 6 and 7 a.m. and 6 and 7 p.m. The railway insists upon a straight 6-cent fare.

Zone System on Boston L

James F. Jackson, chairman of the board of trustees of the Boston (Mass.) Elevated Railway, announced on Feb. 4 that either late in March or early in April the trustees expect to introduce as an experiment a system of two zones, each with a 5-cent fare, the inner zone to cover territory between Boston City Hall and a distance of 2.5 to 3 miles therefrom, in place of the present flat fare of 8 cents.

The zone system to be tried resembles that proposed by Albert S. Richey in a recent report to the trustees, abstracted in these columns, with the exception that the boundary between the two zones is likely to be located nearer the business district than was suggested in the earlier studies, chiefly as a matter of operating convenience.

Professor Richey discussed the possible combinations of fares and zone boundaries necessary to produce stated revenues, and the trustees, after considering this report and also going over short reports of Peter Witt, Cleveland, decided to try the straight 5-cent fare unit instead of using odd-cent fares.

The tentative zone limits proposed include such traffic points as Harvard Square, Cambridge; Coolidge Corner, Brookline; Brighton Avenue and Commonwealth Avenue, Boston; Wellington Bridge, Fellsway; Main Street and Broadway, Somerville; Brookline Village, Egleston Square, Boston; Everett elevated terminal; Uphams Corner, Dorchester, and others. Beyond these points the fare into and out of the business center will be 10 cents. Prepayment areas may be established at some of the zone boundaries.

It is estimated that about half the entire population in the territory served by the system, all of Charlestown, Chelsea, East Boston and South Boston, will be included in the inner zone. In the meantime the 8-cent fare unit will be maintained.

Service Department Started

Dallas Railway Appeals to Its Patrons for Advice and Help in Managing Its Lines

The Dallas (Tex.) Railway has opened a service department. It is in charge of Homer Fisher, with title of assistant general manager. Mr. Fisher will receive all complaints and suggestions for the betterment of the service, and will explain all shortcomings and defects of the company.

The company will encourage the general public to visit the office of Mr. Fisher and make known all complaints and suggestions for improvements in the service. At the same time a campaign of newspaper advertising has been started to educate the public in the problems of operating a city railway system. In large display ads causes and reasons for irregular or delayed service is being set forth. In discussing the new department, Richard Meriwether, general manager said:

> We want the citizens of Dallas to feel that they can come here and make reports of any sort that will help us to improve the railway service. This department is open to receive suggestions and criticisms of all kinds. Constant courtesy and careful attention to little things is the rule to follow in giving good service. This is our aim, but we need the help of the public.
>
> It would be amazing if everything were handled to the satisfaction of the public as it is almost impossible to eliminate mistakes where so many workers are employed. We are doing our best, but the public will have to aid us by making suggestions through our service department.

One of the ads announcing the new service department follows:

Your
STREET RAILWAY
—SERVICE—

In the Street Car business we are all salesmen—we are selling Street Car rides at Five Cents each.

This Company is simply a big specialty department store, having for sale only one article—Street Car Service.

It would be amazing if all the sales were being handled to the complete satisfaction of the customers, and if some errors, some inexcusable mistakes, were not being made by some of our large army of salesmen.

It is the purpose of the Dallas Railway Company to serve in the best possible way by furnishing first-class, dependable Street Car Service at all times.

We want to please our patrons, and while we believe we do please the greater part of them, nevertheless we want to please all of them, if it is possible. We want to reduce to a minimum opportunities for reasonable criticisms. We have, therefore, established a

SERVICE DEPARTMENT

We want every citizen of Dallas to feel that they can go to this department and make reports of any sort that will help us to improve the street car service. It is open to receive suggestions and criticisms of all kinds. Constant courtesy and careful attention to little things is the rule to follow to give good service. This is our aim. We need your help. If you write your criticisms address them to Service Department, Dallas Railway Company, Room 221 Interurban Building. If you telephone just call Main 8080 and ask for the Service Department of the Street Railway.

What suggestions have you to make to-day?

DALLAS RAILWAY COMPANY
Interurban Building.

The Dallas Railway operates 86 miles of line. It is the consolidated Strickland-Hobson lines and operates under the model franchise enacted several years ago.

Fare Bill in Washington

Measure Would Insure Home Rule for Cities With Respect to Local Electric Railway Fares

The Phipps bill, introduced at the present State Legislature at Olympia, Wash., would authorize city councils to raise city railway fares above 5 cents. The present law fixes 5 cents as a maximum charge for fares, but there is some question as to whether this rule could be enforced. Tacoma, for example, authorized a 7-cent fare.

As the Phipps bill is drawn, only city councils could grant permission to increase fares. An effort is being made, however, to give the Public Service Commission, a disinterested party, authority to legalize a fare increase.

Some members of the Senate point out the possibility that a city council might be willing to increase fares where the city has an interest to promote, but might, for political reasons, refuse to give relief in other cases.

U. E. Harmon, city attorney of Tacoma, Mayor C. M. Fassett and Corporation Counsel J. M. Geraghty of Spokane, contend that municipal authorities should be authorized to grant necessary fare increases. They assert that municipalities stand closer to the people than a state commission, and would be more apt to give proper relief.

Chairman E. F. Blaine of the Public Service Commission declares that unless the commission has authority over rates, it should not be expected to control service. He pointed out that the commission, in considering demands for improved service, had to take into consideration the ability of the company to pay taxes, interest charges, wages, franchise obligations, and meet the expense of improved service. If the commission was expected to order service that would increase operating costs, the commission should have power to see that the earnings were sufficient to meet expenses.

The bill has been returned to the Senate from the public utilities committee in exactly the form in which it was presented to the committee by Don Kaiser, Spokane, attorney for the Spokane & Inland Traction Company.

Des Moines Case Being Argued

The hearing on the petition of the Des Moines (Iowa) City Railway for relief in the matter of fares was started before Judge Martin J. Wade the afternoon of Feb. 3. Practically all of the first two days were devoted to arguments by opposing counsel, and little headway was made on the case itself.

Attorneys for the city of Des Moines attempted to go back to the campaign leading up to the granting of the franchise three years ago to show that Emil G. Schmidt, president of the railway, had opposed acceptance of a franchise calling for a sliding scale of fares and had said that he preferred to take his chances with a straight 5-cent fare. Advertisements used by the company during the campaign were also introduced.

Attorney William Chamberlain, Cedar Rapids, appearing as a witness for the company told of the receipts during the past year and of the deficit of $375,000. The company's counsel also sought to show that these deficits accrued in spite of the franchise provisions that the company was guaranteed a sufficient fare to meet interest charges, operating and other expenses.

In the arguments between opposing attorneys Judge Wade finally advised both sides to confine their testimony to the terms of the franchise and not to the merits of the rate dispute and stated that he would not admit figures from either side.

There was every indication at the close of the session on Feb. 4 that the hearing would continue another day or two.

City Club Opposes Fare Increase

A protest against any increase in rates on the city rapid transit lines in New York City has been made by the committee on public service of the City Club of New York. At the same time it recognizes that war conditions have so increased the prices of labor and materials that some or all of the railway companies may not now be able to meet operating expenses and existing fixed charges with their present earnings.

It suggests the following steps as the most feasible solution not requiring constitutional changes:

(a) The companies to accept a modern franchise and agree to operate as one company, and

(b) The city to cancel paving and special charges and permit the discontinuance of certain lines or portions of lines and the reduction of service on other lines.

If the companies are unwilling to accept these suggestions, the committee sees no solution to the existing difficulties except through the process of insolvency or condemnation proceedings looking toward ultimate municipal ownership of all lines, although it points out that municipal ownership does not mean municipal operation, but as the city must have the power to operate as a last resort it recommends the following:

> The constitutional and statutory changes necessary to enable the city to condemn, own and operate, if necessary, all types of transit lines.
>
> The necessary legal steps to enable the city to issue income bonds as a first lien against the net revenue of the lines which it may acquire.
>
> Steps to procure legislation permitting the city to operate surface lines in the same manner it now has the power to operate rapid transit lines.

The members of the committee on public service of the club are Henry C. Wright, Delos F. Wilcox, John P. Fox, Harry G. Friedman, Charles V. Halley, Jr., and Milton B. Ignatius.

The recommendations of the committee were embodied in a letter sent to Mayor Hylan and the Board of Estimate of New York City.

Fare Increases in 348 Cities

176 Cities of More Than 25,000 Population Are Paying More—Only Six States Unrepresented

In 348 cities in the United States and Canada electric railway fares have been increased, according to the information bureau of the American Electric Railway Association. With the exception of Florida, Idaho, Kansas, Nevada, Tennessee and Wyoming every state in the Union is represented. Of the 277 cities in the country having a population of 25,000 or more, 176 are paying an increased car fare. Of the remaining 101 cities the electric railways of fifty-three are seeking relief of some sort.

	Where Effective	
Character of Fare	Cities	States
Unit fares:		
10-cent fares	27	*5
8-cent fares	18	3
7 cents, plus 1 cent for transfer	17	1
7-cent fares, with 10-cent charge for owl service	13	*2
7-cent fares	57	*19
6-cent fares	155	*34
5 cents, plus 1 cent for transfer	7	3
5 cents, with 10-cent charge for owl service	6	*5
Reduced rates eliminated	49	*22
Zone systems:		
7 and 5-cent zones, 10 cents between	1	1
6-cent zones	3	1
Two or more 5-cent zones	5	1
6-cent central, 2-cent outside zones	1	1
5-cent central, 7-cent outside zone, overlapping central zone	1	1
5-cent central, 2-cent outside zone	4	2
5-cent central zone, 3 cents per mile outside	1	1

* Includes Canada, or District of Columbia.

Twenty-seven cities in five states are now paying a 10-cent fare, the list having been swelled by the addition of the cities served by the Bay State Street Railway. Thirteen cities are operating under a zone system of some sort, the length of the zones and the amount of the fare varying greatly.

By far the greater number of increases have been from a 5-cent to a 6-cent fare, although fifty-seven cities are paying 7 cents and eighteen are paying 8 cents, sixteen more are paying 7 cents, with an additional charge of 1 cent for a transfer, and thirteen are paying the 7-cent fare, with a 10-cent charge for owl service.

The urban population of the United States is estimated at between 42,000,000 and 43,000,000, of which approximately 23,000,000, or more than half, is paying increased fares.

An analysis of the information made public by the association is contained in the accompanying table.

War Veterans Replace Women

The women conductors employed exclusively on the Kingston (Ont.) Street Railway during the war are to be relieved of their duties and replaced by war veterans. The women have been popular with the patrons of the road. They will receive ample notice of intention to dispense with their services, "or its equivalent."

Houston Voters Upheld

The City Commission of Houston, Tex., has enacted an ordinance repealing the 6-cent fare ordinance and restoring the 5-cent fare. This action was taken immediately after the Sixty-First District Court had disposed of the petition of the Houston Electric Company, seeking mandamus to compel the City Commission to permit the railway to collect 6-cent fares as provided in the city ordinance adopted last September.

Soon after the 6-cent fare ordinance was adopted, on petition from the required number of voters, the commission submitted the measure to the people, and the proposal was overwhelmingly rejected. The railway then filed suit, contending that the City Commission had no authority to delegate its rate-making powers to the people, and that the referendum election on the 6-cent fare ordinance was illegal. This case the court has just decided adversely.

The railway is now confronted with the alternatives of trying to prove to the court that the 5-cent fare is unjust and confiscatory, or of carrying its case against the action of the City Commission to the higher courts on appeal.

Transportation News Notes

Birney Cars in Portland.—The first of twenty-five Birney safety cars have been put into service by the Portland Railway, Light & Power Company, Portland, Ore.

Fare Increase in Houghton.—The Village Council of Houghton, Mich., has voted favorably on the petition of the Houghton County Traction Company to increase its fare from 5 cents to 6 cents.

Skip Stops at Dayton to Be Abandoned.—The City Commission at Dayton, Ohio, has decided to amend the skip-stop ordinance in such a way as to abolish it. The commission has received many personal requests and petitions protesting against the plan as being unsatisfactory.

Douglas Wants Seven Cents.—The Douglas Traction & Light Company, Douglas, Ariz.. has filed a petition with the Corporation Commission of Arizona, asking that it be granted the privilege of increasing fares in Douglas from 5 cents to 7 cents on cash fares and to 6 cents on ticket fares.

Thirty-Ride Book Authorized.—The Public Service Commission of Illinois has authorized the Chicago & West Towns Railway, Chicago, Ill., to put in a thirty-ride ticket book, good between La Grange and regular stops East of Riverside, for bearer, to be used within one year from date, for $2.75.

Against Jitneys in Trenton.—The City Commission of Trenton, N. J., has refused to grant an application of a company to operate jitneys along the line of the Trenton & Mercer County Traction Corporation. The commissioners believed the jitney would increase the traffic congestion in the center of the city.

Presents Employees with Insurance Policies.—Each conductor and motorman employed by the Columbus, Delaware & Marion Electric Company, Columbus, Ohio, has been presented with a life insurance policy for $1,000 by the company. So long as the men are in the railway's employ the premiums on this insurance will be kept up by the company.

Wants to Use One-Man Cars.—The Middlesex & Boston Street Railway, Newtonville, Mass., has petitioned the Public Service Commission for permission to operate one-man cars on its line on Commonwealth Avenue, from Lake Street to Auburndale. The company says that it plans to equip the cars with safety devices which have been approved by the commission.

No Loading Platforms at Present.—Loading platforms, as recommended by John A. Beeler in his report on ways for improving traffic conditions in Dallas, Tex., will not be installed at once, according to M. N. Baker, supervisor of public utilities. Mr. Baker said he believed the city should solve several other traffic problems before building the loading platforms.

Says Road Is in Contempt.—The city attorney of Monroe, Mich., on Jan. 24 filed an affidavit of contempt against the Detroit, Monroe & Toledo Short Line, claiming that the company had violated the terms of an injunction issued some time ago, wherein the court sustained the contention of the city that the company could not charge more fare between Detroit and Monroe than was provided for in a Monroe city franchise.

Zone Collection Discontinued.—The Public Service Commission of Illinois has authorized the discontinuance of the zone system of collecting fares by the Peoples' Traction Company and authorizing rates on basis of 2 cents per mile between Galesburg and Abingdon. The commission has also authorized the discontinuance of commutation tickets and has directed the company to redeem the outsanding tickets. The new rates are to be in effect until Oct. 1, 1919.

Six-Cent Fare Asked at Akron.—An ordinance was introduced in the City Council of Akron, Ohio, on Jan. 27 which provides for a 6-cent fare for the city lines of the Northern Ohio Traction & Light Company. The firm which recently submitted a financial report on the situation to the City Council will be asked to have representatives at a conference on Feb. 6 to discuss the matter. Additional time has been granted to the local committee which is investigating non-essential car stops.

Inter-Company Transfers in Force.—Inter-company transfers at important intersections and points of contact of the lines of the Capital Traction Company, Washington Railway & Electric Company and Washington-Virginia Railway were issued beginning on Feb. 1. This is in accordance with the recent order of the Public Utilities Commission directing establishment of a comprehensive system of inter-company transfers between the various lines. No transfers are issued on inter-company transfers and vice versa. Inter-company transfers are issued only to persons paying a cash fare.

Express Service on Municipal Line.—The Seattle Municipal Railway has started a limited express service on the municipal railway between the northern terminus at Ballard and the central business section of the city during rush hours. Beginning at 7 o'clock, three limited cars leave the north terminus at intervals of fifteen minutes. These cars do not stop to take on or discharge passengers between the corner of Twentieth Avenue Northwest and Leary Avenue, and the corner of Third and Stewart Street. Five limited cars will be employed to care for the afternoon rush. The limited cars cut the ordinary running time of each trip about six minutes.

Metal Tokens in Baltimore.—On Feb. 1 the United Railways & Electric Company put into circulation in Baltimore a metal check which will be accepted as a 6-cent fare on all its lines, including the Blue Bus line of the Baltimore Transit Company. All paper tickets still in the hands of the public are being accepted as heretofore, but no more will be sold, nor will the paper tickets be accepted on the Blue Bus line. The metal fare checks are being sold by all conductors in reasonable quantities. They may be obtained in any quantity at the various places where paper tickets have been on sale, including general office of the company, at the department stores and newspaper offices.

Tokens of Appreciation.—Two employees of the San Diego (Cal.) Electric Railway, W. H. Barrett, inspector, and W. M. Ziegler, motorman, were conducted to the office of W. Clayton, vice-president and managing director, by M. J. Perrin, manager of transportation, recently. They were introduced with the remark by Mr. Perrin that he had been talking rules and regulations to these men for so long a period, in fact a matter of twenty years, that he considered the time ripe to bring them before the chief operating official for a hearing. The occasion for the visit, however, proved to be the presentation of solid gold Howard watches and gold monogrammed fobs, the reward for twenty years' continuous service with the San Diego Electric Railway.

Courtesy First in Brooklyn.—With a view to affording the maximum courtesy and efficiency in handling the rush-hour crowds, Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company has asked Traffic Manager Dempsey to advertise for men qualified physically and temperamentally to serve as members of the special squad of platform men. This squad will be composed chiefly of ex-soldiers, thoroughly accustomed to discipline and self-restraint. An advertisement, which is to be placed in the cars of the system, will call for exceptionally tall men of unusual physical strength. Candidates accepted will be trained to qualify in cool-headedness, courtesy and intelligence in the handling of crowds, and to equip them for the exercise of firmness in quelling disturbances and suppressing the street car rowdy whenever occasion arises.

City of Toledo Appeals.—On Jan. 30 the City of Toledo, Ohio, appealed from the United States District Court (Judge J. M. Killits) to the United States Courts of Appeals at Cincinnati in the case enjoining the municipality from enforcing its franchise ordinance in which a fare rate of 3 cents was stipulated. The appeal was in the suit filed in the United States District Court against the Toledo Railway & Light Company and the city of Toledo by Henry L. Doherty & Company. The action was based on a judgment for about $84,000 obtained in a county court against the company, from which payment could not be obtained because of the restrictions placed on it by the franchise and fare-rate ordinances being enforced against the company by the city. In his injunction order, issued in August, 1918, the court restrained the city from interference with the company in the collection of fares of 5 cents and 1 cent for transfers and a 1-cent fare for children under eight years of age.

Worcester Case Presented.—The case of Worcester (Mass.) Street Railway for a 7-cent fare was started before the Public Service Commission on Feb. 4. Bentley W. Warren, representing the company, which is now charging 6 cents, presented figures to show the company was unable to pay taxes or interest without dipping into its surplus account; that it could no longer borrow from the banks and could not sell any bonds to procure funds, or even to dispose of short-time paper. Increased wages was the chief item accounting for need of greater revenue, according to Mr. Warren. He said the company earned $112,603 in 1918, which was only 1¼ per cent on the stock. This amount was exclusive of a proper depreciation account. There remains $947,000 of loans and notes payable on the balance sheet, for which at present the company has no prospect of making any provision unless an increased fare is allowed. H. R. Whitney, engineer for the company, estimated the gain from a 7-cent fare for 1919 to be $405,450, allowing for a decrease in traffic of 10 per cent to 15 per cent. The hearing will be continued. The books of the company were recently thrown open to the city accountants.

Legal Notes

CALIFORNIA.—*Injury from Platform Appliance Gives Presumption of Negligence.*

Where plaintiff showed that she was injured when alighting from defendant's street car through the catching of her skirt upon a knob which served as a bumper to stop the sliding platform gate of the car, she was entitled under the doctrine of *res ipsa loquitur* to presumption of negligence. The fact that the claim agent of the company had received no report of prior accidents of this character would not be a complete defense to the charge of negligence. (Sander *vs.* Los Angeles Ry. Corp., 175 Pacific Rep., 901.)

ILLINOIS.—*Where Railway Maintains Pavement, It Can Be Sued Directly When Accident Occurs.*

Where a street railway, in consideration of its license to construct its road on the street, has agreed with the city to keep the pavement in repair, persons sustaining injury through its failure may maintain suit directly against the company to avoid circuity of action. (Fowler *vs.* Chicago Rys., 120 Northeastern Rep., 635.)

ILLINOIS.—*After Tracks Are Elevated Obligation to Pave Ceases. Lots Used for Railway Purposes Are Subject to Usual Assessments.*

The duty of a railroad company imposed by ordinance to pave streets between the tracks and for 2 ft. beyond the rails ceased when the road was elevated.

Lots owned by a railway company and used for railway purposes are subject to assessment for benefits when the streets on which they abut are paved. (Village of Oak Park *vs.* Chicago & West Towns Ry., et al., 120 Northeastern Rep., 761.)

MASSACHUSETTS.—*Company Not Responsible for Unusual Accidents.*

Where the conductor of a street car, facing to the rear, rang up a transfer, and his elbow struck the glasses of a passenger, who had risen behind him to be near the door at his stop and the glasses broke and cut the passenger's eyes, the injury was purely an accident, not avoidable by rational care required by a common carrier respecting its passengers. (Nichols *vs.* Boston Elevated Ry., 120 Northeastern Rep., 847.)

MISSISSIPPI. — *Release to One Joint Tort-Feasor Does Not Release Other Except Pro Tanto.*

A telephone lineman while engaged at work came in contact with the wire of a power company and was killed. His heirs settled with the telephone company for $7,500 and then brought a suit against the power company. Negligence of the latter being shown, the court held that the payment received from the telephone company was a release for the power company only *pro tanto* and is to be considered only as part payment for the damages adjudged by the court against the power company. (Bogdahn et al. *vs.* Pascagoula Street Ry. & Power Co., 79 Southeastern Rep., 844.)

MISSOURI.—*Duty to Pay Fare First.*

A person has no right to remain on a street car without paying his fare when asked to do so by the conductor, or to tender the fare only on condition that a transfer is to be issued, even though he is legally entitled to such transfer. (Green *vs.* United Rys. of St. Louis, 206 Southwestern Rep., 237.)

NEW YORK. — *Injury Arising Out of Employment Under Workmen's Compensation Act.*

An elevated railway guard having two hours off, who stayed on the train to ride to the office for pay and thence to a dentist, and was injured in a collision, was not within the workmen's compensation act, and could recover in a civil action. (Pierson *vs.* Interborough Rapid Transit Co., 172 New York Sup., 492.)

New Publications

The Fusibility of Coal Ash and the Determination of the Softening Temperature

By A. C. Fieldner, A. E. Hall and A. E. Field. Bulletin 129 of the United States Bureau of Mines. Washington, D. C. One copy free from the Bureau of Mines, extra copies 20 cents each from the Superintendent of Documents, Government Printing Office.

A very complete, scientific and practical treatise on the subject, containing not only the laboratory methods of procedure but also many data obtained from experiments.

Arbitration and Wage-Fixing in Australia

Research Report No. 10. National Industrial Conference Board, 15 Beacon Street, Boston, Mass. Sixty pages. Paper, $1.

This explains how state regulation of wages and of industrial disputes has become firmly established as a public policy in Australia. Australian experience, it is said, clearly establishes the value of conciliation and of some form of arbitration as a means of reducing industrial friction.

Economical Operation of Steam Turbo-Electric Stations

By C. T. Hirshfield and C. L. Kerr. Technical Paper No. 204, United States Bureau of Mines, Washington, D. C. One copy free from Bureau of Mines; extra copies

5 cents each from Superintendent of Documents, Government Printing Office, Washington, D. C.

This little pamphlet should be put into the hands of every intelligent power-plant employee. It is non-mathematical in style, and especially in these times of expensive fuel will conduce to more careful power plant operation.

The Eight-Hour Day Defined

Research Report No. 11, National Industrial Conference Board, Boston, Mass. Ten pages, 50 cents.

In this report, which is one of a series issued monthly by the board, a clear distinction is drawn between the purposes and effects of the straight eight-hour day and the basic eight-hour day. The former discourages and usually prohibits overtime; the latter allows it and even encourages it, so far as the workers are concerned. The two are therefore diametrically opposed to each other. No opinion is expressed as to what constitutes the proper number of hours for a working day.

Uniform System of Accounts for Electric Railroad Corporations

Public Service Commission for the Second District of N. Y., Albany, N. Y.

This 143-page pamphlet gives the complete text of the uniform system of accounts for electric railways which became effective on Jan. 1, 1919. The classification is an adaptation of the uniform Interstate Commerce Commission classifications, with certain modifications for use in New York. In most cases the difference lies in subdivision of the Interstate Commerce Commission accounts.

It is worthy of particular mention that depreciation accounts for way and structures, equipment, power-plant buildings and power-plant equipment are provided, and while each corporation may determine for itself the amount to be reserved annually, the commission will "necessarily, in deciding rates and other cases, have to pass upon the adequacy or the inadequacy of such charges."

In this connection the commission suggests that a depreciation charge amounting to not less than 2 per cent or more than 5 per cent per annum on the average cost of all ways and structures or to not less than 2 per cent or not more than 10 per cent per annum on the average cost of all equipment will under normal operating conditions be generally less open to question than rates which fall above or below these limits. It also suggests that depreciation rates be stated in terms of a percentage of the cost of depreciable property, since this form of statement is on the whole believed to be the clearest and simplest way of expressing the normal depreciation charge and furnishes the readiest basis for comparison between companies. It is not necessary that separate reserves shall be set up for each unit of depreciable property or even for each separate class of property owned by a corporation.

Personal Mention

J. A. Martin has been elected president of the Cheyenne (Wyo.) Electric Railway to succeed A. T. Young.

O. E. Grim has been appointed chief engineer of power station of the York (Pa.) Railways to succeed L. J. Freed.

F. M. Fritchman has been elected president of the Indiana County Street Railway, Indiana, Pa., to succeed James B. Phelan.

Sedgwick Kistler has been elected president of the Susquehanna Traction Company, Lock Haven, Pa., to succeed Jacob Scott.

G. McCabe has been appointed claim agent of the Seattle & Rainier Valley Railway, Seattle, Wash., to succeed John C. Higgins.

E. H. Derricott has been appointed secretary and treasurer of the Lethbridge (Alta.) Municipal Railway to succeed D. Donald.

Bert Gray has been appointed claim agent of the Galveston-Houston Electric Railway, Galveston, Tex., to succeed C. B. Fisher.

W. E. Pearson has been appointed auditor of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., to succeed H. E. Yost.

Harry Croyle has been appointed chief engineer of power station of the Johnstown (Pa.) Traction Company, to succeed Norris Orms.

Mary R. Armstrong has been appointed treasurer of the Susquehanna Traction Company, Lock Haven, Pa., to succeed Jacob Scott.

Paul Stark has been appointed auditor of the Eastern Wisconsin Electric Company, Sheboygan, Wis., to succeed William E. McGovern.

O. S. Lamb has been appointed superintendent of the Union Depot Bridge & Terminal Company, Kansas City, Mo., to succeed C. C. Sherk.

Emil Albe has been appointed engineer of power station of the Milwaukee Northern Railway, Cedarburg, Wis., to succeed Harry Shaver.

W. H. Bathinay has been appointed purchasing agent of the Walla Walla Valley Railway, Walla Walla, Wash., to succeed W. N. Voegtly.

W. B. Trier has been appointed assistant auditor of the Eastern Wisconsin Electric Company, Sheboygan, Wis., to succeed Simon Kurtz.

George W. Kuntz has been appointed purchasing agent of the Northwestern Pennsylvania Railway, Meadville, Pa., to succeed F. C. Yockey.

Ed Jacobs, son of the late W. B. Jacobs, the founder of the Shreveport (La.) Railways, has been elected secretary of that company.

E. A. Roehry has been appointed general superintendent of the Cairo Railway & Light Company, Cairo, Ill., to succeed W. F. Crossley.

L. Coatsworth has been appointed purchasing agent of the Chicago & Interurban Traction Company, Chicago, Ill., to succeed C. S. White.

E. E. Smith has been appointed claim agent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., to succeed C. R. Innis.

C. E. Gilmore has been appointed a member of the Railroad Commission of Texas, effective about Jan. 15, 1919, to succeed C. H. Hurdleston.

Harold A. Crane, who has been treasurer of the Connecticut Valley Street Railway, Greenfield, Mass., since February, 1916, has resigned.

W. H. Pickard has been appointed auditor of the Jamestown, Westfield & Northwestern Railroad, Jamestown, N. Y., to succeed A. B. Crossley.

E. W. York has been appointed chief engineer of power station of the Citizens' Traction Company, Oil City, Pa., to succeed Charles Monks.

E. B. Smith has been appointed purchasing agent of the Monongahela Valley Traction Company, Fairmont, W. Va., to succeed A. T. Watson.

M. Leahy has been appointed superintendent of overhead construction of the United Traction Company, Albany, N. Y., to succeed L. Calligan.

F. W. Potts has been appointed treasurer of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., to succeed H. C. Kochersperger.

A. C. Crandall has been appointed claim agent of the Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., to succeed J. W. Graham.

Ralph Fox has been appointed master mechanic of the Monongahela Valley Traction Company, Fairmont, W. Va., to succeed George H. Hudson.

Robert E. Williams has been appointed chairman of the State Corporation Commission of Virginia to succeed Christopher B. Garnett.

E. Watson has been appointed purchasing agent of the Reading Transit & Light Company, Reading, Pa., to succeed H. H. Reigel, resigned.

H. B. Stubblefield has been appointed purchasing agent of the Nashville Railway & Light Company, Nashville, Tenn., to succeed J. M. Davidson.

E. W. Gross has been appointed treasurer of the Seattle & Rainier Valley Railway, with headquarters at Chicago, Ill., to succeed Edgar Peck.

J. M. Luna has been appointed a member of the State Corporation Commission of New Mexico, effective Jan. 1, 1919, to succeed M. S. Groves.

C. C. Cash has succeeded E. H. Rechberger as auditor and assistant treasurer of the Northwestern Ohio Railway & Power Company, Toledo, Ohio.

C. C. Hogshead has been appointed chief engineer of power station of the Roanoke Railway & Electric Company, Roanoke, Va., to succeed E. C. Barnes.

Jesse B. Kremer has been appointed secretary and treasurer of the Shamokin & Edgewood Electric Railway, Shamokin, Pa., to succeed Manfred H. Barr.

A. E. Patterson has been appointed roadmaster of the Montreal & Southern Counties Railway, with headquarters at St. Lambert, to succeed W. H. Maxwell.

J. E. Shinn has been appointed superintendent of power of the Lehigh Valley Transit Company, Allentown, Pa., to succeed Howard H. Duff, deceased.

William Milnes has been elected vice-president of the Frankford, Tacony & Holmesburg Street Railway, Philadelphia, Pa., to succeed C. Bradford Fraley.

Winthrop Coffin, Brookline, has been nominated by Governor Coolidge of Massachusetts as a trustee of the Boston Elevated Railway to succeed Galen L. Stone, resigned.

C. S. Johnson has been appointed secretary of the Vicksburg Light & Traction Company, Vicksburg, Miss., to succeed I. C. Elston, who has been elected president of the company.

F. E. Lyons was appointed claim agent over the lines of the New York, Westchester & Boston Railroad, New York & Stamford Railway and the Westchester Street Railroad of White Plains, effective on Jan. 1.

P. H. Gadsden, president Charleston Consolidated Railway & Lighting Company, Charleston, S. C., has been appointed a member of a committee of three of the Chamber of Commerce of the United States to further the plan of a League of Nations. The other members are Edward A. Filene, Boston, and George E. Roberts, New York.

H. J. Dressel has resigned as superintendent of transportation of the New Orleans Railway & Light Company, New Orleans, La. Mr. Dressel has been connected with the company for more than twenty years. The duties of the office of superintendent of transportation have been transferred to Nelson H. Brown, manager of the railway department.

H. J. Jumonville, formerly auditor of the New Orleans Railway & Light Company, New Orleans, La., and more recently auditor of the American Cities Company, with headquarters at New Orleans, has been appointed manager of the office opened on Feb. 1 in New Orleans by Haskins & Sells, certified public accountants, New York. Mr. Jumonville was born on July 29, 1879. He entered business with the Edison Electric Company, New Orleans, in 1896. All of his business career up to the present time has been with public service corporations.

John S. Bleecker, manager of the operating companies for Stone & Webster at Columbus, Ga., which includes the Columbus Railroad, has been appointed general manager of the New Orleans Railway & Light Company, New Orleans, La., by J. D. O'Keefe, receiver of that company. This is a new office with the company at New Orleans. All of the present departmental heads of the corporation will, it is announced, continue with the company, Mr. Bleecker assuming general charge of operation under Mr. O'Keefe. As at present organized, the company has separate managers for its railway and light departments. Mr. Bleecker has long been connected with Stone & Webster. He was born in Washington, D. C., on April 8, 1878. He is the son of Rear Admiral J. V. B. Bleecker, United States Navy. Mr. Bleecker was graduated from the English High School at Boston, Mass., in 1894 and from the Massachusetts Institute of Technology in 1898. He was employed in the mechanical department of the American Bell Telephone Company at Boston immediately after graduation and remained with that company until 1900, when he entered the service of Stone & Webster Engineering Corporation. In the interests of this large holding system he has filled various positions at Boston, Seattle, Houghton, Blue Hill, Paducah and Columbus, the duties covering a very wide range of activity.

J. S. BLEECKER

W. E. Coman, vice-president and general manager of the Northwestern Electric Company, Portland, Ore., has been elected vice-president and general manager of the Washington Water Power Company, Spokane, Wash., to succeed Harry L. Bleecker, deceased. He will assume his duties at Spokane about March 1. Mr. Coman is one of the best known electric lighting and power men in the Northwest. He began his career as a clerk with the Oregon-Washington Railroad & Navigation Company. He rose quickly in the freight department through his grasp of transportation essentials and was made in succession chief freight clerk, assistant general freight agent and then general freight agent of the merged Harriman line. In 1910 the new Spokane, Portland & Seattle Railway opened with Mr. Coman as its general freight and passenger agent. In 1912 he accepted the position of vice-president and general manager of the new Portland power company, the Northwestern Electric Company.

Frank H. Swan, appointed receiver of the Rhode Island Company, operating all the electric railways in Rhode Island, is the senior member of the law firm of Swan & Keeney, Providence. The firm was established in 1916, and for eleven years prior to that time Mr. Swan had been a member of the firm of Edwards & Angell, one of the most widely known law firms in the State. The receiver was born in Windham, Me., forty-five years ago. He received his primary education at Friends School, now the Moses Brown School, Providence, and was graduated from Bowdoin College, Me., in the class of 1898. He entered Boston University and completed the law course at that institution in 1901. After leaving Boston University Mr. Swan took up the practice of law in Portland, Me., and was chosen city solicitor of Westbrook, a city about 5 miles from Portland. He then served as assistant to United States District Attorney Isaac Dyer at Portland for three years, following which he removed to Providence. Mr. Swan has had extensive experience in corporation law and has specialized in public utilities.

Gardner F. Wells, who has until recently been manager of the division of transportation of the United States Housing Corporation, has resigned to enter the consulting engineering field with particular reference to public utilities. For fifteen years, from 1901 to 1916, Mr. Wells was with Stone & Webster. For the first five years of this period he was engaged in property management and in engineering and construction work. For the remainder of the time he was an appraisal expert, making office and field examinations and preparing reports and appraisals of public utilities. This work covered the entire country and included the public utility properties belonging to the New York, New Haven & Hartford Railroad. Before joining Stone & Webster Mr. Wells spent ten years with the Thomson-Houston and General Electric Companies on engineering, construction and management work in connection with electric railway and other utility properties, going with the first-named property from the Massachusetts Institute of Technology where he spent a year in engineering study. Since March, 1916, he has been head of the corporation bond buying department of Arthur Perry & Company, Boston, and during the war period served first as major in the Ordnance Department of the army and later joined the staff of Otto M. Eidlitz, head of the government Bureau of Industrial Housing and Transportation.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

White-Cedar Pole Business Outlook

Slow Readjustment of Values to Follow Price Changes for Commodities Used by Producers

The twenty-third annual meeting of the Northern White Cedar Association was held at the Hotel Radisson, Minneapolis, Minn., on Jan. 20, 21 and 22. In his address President Gerich said: "The year 1919 will develop a readjustment of values much greater in some commodities than in others. Our industry should work with cautious optimism, knowing its cost, watching its expenses, and it would seem to me that with a gradual readjustment of values, not only of our own products but of those we use so heavily in producing poles, the cedar industry should have a gratifying peace future of prosperity."

Among other topics discussed by the various committees and the delegates were the railroad freight rates, insurance, the labor situation and the substitution of metal and other commodities for forest products.

The following officers were elected for the ensuing year: President L. L. Hill of the Page & Hill Company, Minneapolis; vice-president, L. A. Furlong of the Valentine-Clark Company, Minneapolis; treasurer, W. B. Thomas of Manistique; secretary, H. B. Boucher of Minneapolis; directors, F. Finch of Duluth and M. J. Bell of Minneapolis.

Paints and Varnishes Quiet

Consuming Trade Shows Little Activity —Drop in Price of Materials Brings Slight Improvement

At this time of year traction companies might well consider the question of the application of paint, enamel and varnish to rolling stock. Probably never before in the history of the electric railways have cars gone so long without attention of this character as they have in the last four years. It is true that the materials entering into the manufacture of paints, enamels and varnishes have been scarce and high in price, but now their supply is ample and prices have begun to decline.

The consuming trade is disposed to hold back as much as possible waiting for lower prices, but the possibilities of quoting very much lower prices on the finished product are not as yet presented by any material decrease in the costs of production. There has been a gradual yet steady improvement in the situation, however.

The manufacturers of brushes are having considerable difficulty in securing materials, and say they cannot see how prices can very well be lower.

The reductions in price of containers, both tin and wood, are so slight as to have little appreciable effect on the price of the delivered covering material.

Bituminous Coal Output Falling

Anthracite Production, However, Still Showing Gain—Daily Average Shows Increase for Coal Year to Date

A considerable decrease occurred in production of bituminous coal during the week ended Jan. 25, the output declining to the low level of 9,159,000 net tons, according to the regular weekly report of the Geological Survey. This production which falls approximately 750,000 net tons below the preceding week, and approximately 1,000,000 net tons below the corresponding week of last year, is at the rate of 475,000,000 net tons per annum and is considerably below present consumption.

Many consumers are now using coal accumulated during last summer, and the present good weather enables certain consumers to await the outcome of the raising of the zone and price restrictions by the United States Fuel Administration before placing their orders.

The daily production of bituminous coal during the current week estimated at 1,526,000 net tons is 19 per cent below the daily average for the coal year to date and 13 per cent behind the daily average for the same period of last year. The total production for the period April 1 to Jan. 25 is now estimated at 485,656,000 net tons and is 34,855,000 net tons or 7.7 per cent in excess of last year's production for the same period of time.

The production of anthracite increased considerably during the week ended Jan. 25, and was slightly in excess of the average weekly production for the coal year to date. Preliminary estimates place production of anthracite for the current week at 1,886,000 net tons as against 1,786,000 net tons during the week of Jan. 18, and as against 1,719,000 net tons during the week of Jan. 25, 1918. The daily average during the current week, estimated at 314,000 net tons, is a slight increase over the daily average for the coal year to date, and but 3000 net tons, or 1 per cent behind the daily average for a similar period of last year.

Conditions in Track Supplies Market

Drop in Price Noted On Standard Hardware, But Track Specialties and Ties Unchanged

So much labor is figured in the production of crossings, frogs, switches, etc., that the price of these track specialties has not decreased recently.

Standard track hardware has, however, shown some changes since the signing of the armistice, railroad spikes have come down from 4.5 cents to 3.9 cents per pound, while screw spikes hold at 8 cents. One quarter of a cent has come off the previously reported 3¼ cents for tie plates, both flat and brace, fish plates, angle plates and angle bars, while tie rods have held at 7 cents. Rail bolts and nuts continued at 4.9 cents per pound, while steel bars have dropped from 2.9 cents to 2.7 cents.

The supplying of cross-ties for steam roads has been taken out of agents' hands. It is reported that the government regional directors in the different sections of the country issue bulletins stating the price they will pay for ties delivered on their right-of-way, this price being in general higher than that which agents would have stated. However, a good maintenance business has been carried on with the electric lines.

Most of the Southern tie camps were worked by negroes. So many of these laborers have been taken into service that production has been materially curtailed. There has been no change in price reported.

Fare Boxes and Registers Especially Active

Many Traction Companies Taking Steps to Safeguard Income—Jitneys Required to Register Fares

A very active field, both during the war and since the armistice, has been found to exist for fare boxes and fare registers. With the increase in price of all railway maintenance equipment, traction companies apparently have realized the safeguarding of every cent of income to be a most important item.

The increased operating and maintenance expenses were in many cases met by increased fares, either straight increases or the adoption of the zone system. In either case accurate collection and registration of fares was sought in order to safeguard the traction company not only through its employees but also through the traveling public.

Many cities are requiring jitneys operating within their limits to accurately record all fares received from passengers, so that a certain return can be made to the city based on the number of fares paid. The cities in many cases are co-operating with the jitneys in this matter in that the necessary equipment is being bought by the city and sold to the jitney owners on the installment plan.

Copper Drops to 18½ Cents

Action of Big Producers Brings Market to Life with 7,000,000 Lb. Buying

Copper was offered Thursday by the big producers at 18½ cents a pound, a reduction of 4½ cents a pound from the 23-cent level which prevailed after the first of the year when the government price fixing ended. The 23-cent price was quoted for foreign trade by the Copper Export Association and thereupon became the price at which the producers held the metal for domestic trade. The price of 23 cents brought little or no buying into the market and the industry was stagnated with the copper mined piling up as a big surplus.

The smaller producers have, for the last week, been selling copper at 18½ cents and on Wednesday the large producers began offering the metal at the same figure.

John D. Ryan, chairman of the board of the Anaconda Copper Mines Company, declared that the action of some of the companies in cutting the price had cleared the copper situation to some extent at least. He said that he felt more confident about the situation now than he had before, and declared that a "substantial market" had been opened by the price cutting action.

The immediate effect of the cut was the bringing about of sales of approximately 7,000,000 lb. of copper or more than six times the volume of sales of any day in January.

It was asserted that, relatively speaking, demand was lacking. The fact that actual sales were being consummated however was taken as a hopeful sign by some observers.

New Process Gear Corporation Changes Hands

John N. Willys has purchased outright the New Process Gear Corporation of Syracuse, N. Y., taking over all of the $3,000,000 capital stock of the concern. There is no change contemplated in the nature of the product the company will manufacture, although it is naturally expected that material expansions in the old field will result. It is the intention of the company to solicit gear business of all kinds, and particularly in so far as the manufacture of gears relates to differentials and transmissions for the automobile trade. Thomas W. Meachem and other members of the Meachem family connected with the corporation have retired, having sold their interests to Mr. Willys. On the latter's part this step represents complete acquisition of a plant in which he previously had been partially interested. No change of active management has been intimated, immediate control of the enterprise being in the hands of J. Allan Smith. The new officers of the company are: J. N. Willys, chairman; J. Allan Smith, president; J. E. Kepperley, vice-president; C. A. Neracher, vice-president; E. J. Quintal, treasurer and assistant secretary.

Rolling Stock

Denver & Interurban Railway, Denver, Col.—Fort Collins branch, has just been taken over by the city of Fort Collins. W. B. Cheek, city engineer, has written that the old cars, although in excellent shape, are considered too heavy for local conditions and will be sold, light-weight cars to be operated in their place.

Brooklyn (N. Y.) Rapid Transit Company is placing an order for fifty center-entrance trail cars with the J. G. Brill Company, Philadelphia, Pa. The dimensions and specifications for these trail cars are the same as those given in the ELECTRIC RAILWAY JOURNAL for July 8, 1918, referring to an order for fifty of these cars placed with the Jewett Car Company. This latter order has not been filled.

San Francisco-Oakland Terminal Railways, Oakland, Cal., in addition to the ten cars purchased from the Street Railway Company at Spokane, Wash., as noted in these columns of Nov. 12, and the ten steel center entrance trailers under construction in their own shop, as noted in these columns of Sept. 28, is reconstructing thirteen old California type open cars, the first of which is in operation.

New Advertising Literature

Wayne Oil Tank & Pump Company, Fort Wayne, Ind: Booklet dealing with storage and distribution systems for oils, varnishes, gasoline.

Ajax Metal Company, Philadelphia, Pa.: Two booklets, "A Text Book on Babbitt Metals" and "A Text Book on Ajax Ingots." The first tells the way to pick the right babbitt, how to pour babbitt, etc. The second gives interesting facts of the methods of producing and using Ajax ingots.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa: Reprint No. 71, "The Advantages of Railroad Electrification"; Reprint No. 73, railway motors, acceleration of cars and economical car operation; Reprint No. 74, "Dipping and Baking"; Reprint No. 75, "Trolley Transports"; and Reprint No. 77, "The Success of the Safety Car."

Trade Notes

C. N. Barney, 115 Broadway, New York City, has been appointed to act as local representative for the Worthington Pump & Machinery Corporation.

C. F. Lamont has recently been released from the navy and resumed his position as Northern representative of the Electric Service Supplies Company, Chicago, Ill.

G. H. Knutson, member American Society of Civil Engineers, who, for the last eight years, has been a partner in the Fargo Engineering Company, consulting engineers, Jackson, Mich., is now associated with the corporation department of the Harris Trust & Savings Bank of Chicago.

Roller-Smith Company, New York City, has appointed Frank R. Ryan to the sales force of its Chicago office in place of C. H. Nicholson, now in charge of the Detroit office. Mr. Ryan has been with the Commonwealth Edison Company, the Krehbiel Company, and the United States Signal Corps.

H. W. Johns-Manville Company is reported to have purchased a tract of 255 acres on the lake shore at Waukegan, Ill., upon which it intends to construct a three-million-dollar plant to manufacture asbestos and magnesia products. The plant is to have a capacity of 35,000 cars yearly, and it is understool that it will employ 2500 to 3000 people.

Ohio Brass Company, Mansfield, Ohio, states that prior to the signing of the armistice the mill supplying brass for O-B extruded trolley ears was so loaded up with government orders that commercial orders were virtually unobtainable. The situation is now, however, clearing up rapidly and the company states that the usual stock shipments of extruded ears can now be expected.

Paul Campbell has been appointed factory manager of the Electric Service Supplies Company of Philadelphia, Pa. Previously he was production manager for James Cunningham Son & Compay of Rochester, N. Y.; and superintendent of the F. B. Stearns Company, of Cleveland, Ohio, where he originated the manufacturing methods used in the first successful commercial production of the "Silent-Knight" motor car in America.

P. W. Jenkins, lieutenant, U. S. N. R. F., has been appointed manager of railway sales of the American Rolling Mill Company, effective Jan. 4. Previous to the entry of the United States into the European war, Mr. Jenkins was in charge of sales of castings and forgings for this company. When the war broke out he was given indefinite leave to re-enter the navy from which he had resigned in 1913. Lieutenant Jenkins served as an engineering officer on a navy transport throughout the war. Upon cessation of hostilities he was released from active duty.

Franchises

Quincy, Mass.—The Massachusetts Highway Service Company has asked the City Council of Quincy for a franchise to operate a trackless trolley line in Quincy from the Braintree line along Quincy Avenue to the Fore River plant, thence into the housing development.

Trenton, N. J.—The Trenton & Mercer County Traction Corporation has asked the City Commission of Trenton for an ordinance to extend its West State Street line through the tunnel under the Delaware & Raritan Canal to a connection with the Trenton Junction line and also for permission for the removal of its tracks along Sullivan Way.

Buffalo, N. Y.—In order to relieve congestion in the downtown section of the city and comply with an order of the Public Service Commission for the Second District of New York, the International Railway has applied to the City Council of Buffalo for permission to lay a single-track loop around the Soldiers' and Sailors' monument in Lafayette Square, together with the necessary switch tracks in Washington Street. It is planned to turn back several east side car lines at Lafayette Square instead of operating the cars over the Washington Street route through the badly congested heart of the retail shopping district. The City Council will investigate the situation, but it is believed the franchise will be issued.

Track and Roadway

Chickasaw Utilities Company, Birmingham, Ala.—After July 1, the Chickasaw Utilities Company, a subsidiary of the Chickasaw Shipbuilding Company, will take over, maintain and operate its own car line between Prichard and Chickasaw, with current from its own station now under construction. The line is now operated under contract by the Mobile Light & Railroad Company, George Gordon president.

Montgomery Light & Traction Company, Montgomery, Ala.—Repairs and improvements have been begun by the Montgomery Light & Traction Company on its street railway system and cars.

San Francisco - Oakland Terminal Railways, Oakland, Cal.—As soon as weather conditions permit, the San Francisco-Oakland Terminal Railways will reconstruct its tracks on Telegraph Avenue south of Fortieth Street, at a cost of $104,685.

United Railroads of San Francisco, San Francisco, Cal.—The Board of Supervisors of San Francisco has approved the expenditure of $45,000 by the United Railroads of San Francisco for the reconstruction of the company's tracks on Taraval Street, between Twentieth and Twenty-third Avenues.

Kensington (Md.) Railway.—A report from the Kensington Railway states that it will probably construct a 3-mile extension to North Sandy Spring during 1919.

Columbus Railway, Power & Light Company, Columbus, Ohio.—Plans are being made by the Columbus Railway, Power & Light Company to improve its tracks on High Street, from Poplar to Fifth Avenues; Broad Street, from Anson to Sandusky Streets; Third Street, from Naghten Street to Livingston Avenue; Main Street, from Allen Street to Alum Creek; Goodale Street, from High to Henry Streets and Livingston Avenue, from High Street to Parson Avenue.

Evansville & Ohio Valley Railway, Evansville, Ohio.—The lines of the Evansville Railway, recently taken over by the Evansville & Ohio Valley Railway, will be improved and extended during the coming summer. The extension from Henderson to Owensboro, which has been surveyed, will be pushed to completion. The company will form a subsidiary company to erect a traction and wagon bridge across the Ohio River, provided the necessary bill is passed by the Legislature.

Grand Trunk-Wabash Railway, St. Thomas, Ont.—It is reported that the lines of the defunct London & Lake Erie Traction Company between Thomas and Lake Erie are being reconstructed and operation will soon be begun by the Grand Trunk-Wabash Railway.

Dallas, Tex.—The construction of an electric interurban line from Dallas to Wichita Falls, a distance of about 180 miles, is being advocated by business men of both cities and of the towns along the proposed route. The development of the oil fields about Wichita Falls is one of the chief reasons for the proposed interurban line. Several routes have been proposed, but the one most favored would touch the following towns: Carrollton, Lewisville, Denton, Decatur, Alvord, Sunset, Bowie, Bellevue, Henrietta and Wichita Falls, and scores of smaller towns along the route. The proposition is being supported by J. F. Strickland, president of the Texas Electric Railway, the Dallas Railway and other traction and electric light and power interests in Texas; C. W. Hobson, general manager of the Southwest General Electric Company; J. A. Kemp and Frank Kell of Wichita Falls, and by other business men of Dallas and other cities in this part of the State.

Virginia Railway & Power Company, Richmond, Va.—Rails are being distributed by the Virgina Railway & Power Company on Liberty Street and Berkley Avenue, Berkley, for the double-tracking and rerouting plan which is to be put into effect early in the spring. The line on Liberty Street will be double-tracked and a single-track line will be laid on Berkley Avenue, The tracks on Pearl, Walnut, Clifton, Patrick, Second Streets and Walker Avenue, will be taken up.

Power Houses, Shops and Buildings

San Francisco - Oakland Terminal Railways, Oakland, Cal.—A new car overhauling shop has been completed by the San Francisco-Oakland Terminal Railways at a cost of $10,455.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.—Application has been made by the Washington, Baltimore & Annapolis Electric Railroad to the Public Utilities Commission of the District of Columbia for permission to construct a terminal station in Washington. The site is adjacent to the line of the company at New York Avenue between Eleventh and Twelfth Streets Northwest. The proposed building will have larger waiting rooms, ticket offices, baggage rooms, etc., than those in the present station at New York and Fourteenth Streets.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Trenton & Mercer County Traction Corporation is constructing two additional repair pits at its carhouse on Lalor Street and has just completed a new slate roof on the building at a cost of $12,000. The company has also contracted for a grinding machine to be used in grinding the flat parts of car wheels.

Sand Springs Railway, Tulsa, Okla.—A report from the Sand Springs Railway states that it will construct a new station building at Tulsa during the present year.

Peterboro (Ont.) Street Railway.—The Hydro-Electric Power Commission of Ontario, which operates the Peterboro Street Railway, advises that it proposes to construct a new 1500-kw. rotary substation.

Seattle, Wash.—The Light Department has asked for the sale of $750,000 in bonds out of the total issue of $1,755,000 authorized last fall to provide for the following construction work during the present year: Substation on Spokane Street at Whatcom for the purpose of operating the elevated railway, to cost $165,000; completion of Ballard substation to furnish electricity to the northwest part of the city and to operate the north end of the municipal railway, $30,000; for strengthening the present distributing system, $50,000; for general construction work within the city limits, $100,000; for completing sealing operations at the Cedar River dam, $200,000; construction of a new 6-ft. pipe line from the dam to the power house at Cedar River, $125,000; for an interconnection with the lines of the Puget Sound Traction, Light & Power Company, $75,000. The remainder of the $1,755,000 will be expended during the next three years in building a substation at the north end costing about $250,000 and another at the south end, to cost about $200,000, and in other additions to the lighting system to take care of the power to be secured from the Skagit project.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, February 15, 1919 *Number* 7

Welding Processes Have a Wide Field of Usefulness

ALL METHODS of welding received a tremendous impetus from the conditions which resulted from the recent war. The great demand for steel and iron, the difficulty of obtaining labor for maintenance repairs and the necessity for rapid repairs to equipment in order to keep the output up to the maximum were contributing causes. The electric railways of this country were hard hit by these conditions and have been extending the use of the various welding and cutting processes. Much of the repair work which was undertaken chiefly to keep cars and equipment in service has been found to result in real economies. Many of the methods, devised in war time, will be continued. Thus on one electric railway contact shoes which had always been scrapped when excessively worn have been repaired by cutting out the worn portion and welding in a new wearing plate. The cost of this method of repair was found to be approximately $1 less per shoe than the price originally paid for the new shoes, and this method of repair can be repeated several times before it is necessary to scrap the shoes for wear at other points. This railway will continue repairs of this class even should steel and iron prices reach the low level of prewar times.

In this accelerated development of welding the manufacturers of apparatus have joined with the practical men in a study of the problems, and the Emergency Fleet Corporation through its welding committee has assisted greatly. Some form of association for those interested in this art is highly desirable. As this issue goes to press we are advised that the formation of such a welding association is contemplated. It certainly would find much to do, as engineers in many fields are interested in advancing the welding art.

Any Eight-Hour Bill Should Exempt the Electric Railways

THIS is the open season for corporation baiting in the state legislatures. We are not surprised, therefore, to note that the perennial demand for an eight-hour day is being pressed by union labor lobbyists in various sections of the country. While the proposed legislation has no special reference to electric railway employees, we think it proper to remind the companies of this class to be on their guard. Nine-in-twelve or ten-in-twelve laws are baneful enough when applied to electric railway companies, but an eight-hour law which does not exempt utilities of this class will be a most serious matter for the average electric railway property. It will mean one of two things. If such legislation contemplates that eight hours work is the maximum that should be performed by any employee, the result for a utility corporation with its peak loads separated by more than eight hours will be a greatly augmented force of trainmen. Where these men are guaranteed a minimum day's wage the financial burden is likely to prove disastrous.

It appears, however, that the unions want a basic eight-hour day as the basis for a full day's wages with time and a half or double time for "overtime." The effect of such a measure on the hard-pressed electric railways would be no less distressing. Such legislation is not intended to meet the demands of reformers who are looking to the conservation of human energy. Its real purpose is to give a bonus to those employees whose duties cannot be properly performed in eight hours.

We do not here argue for or against a general eight-hour day. We simply call the attention of electric railway interests to the possible menace in the pending bills. The industry is already carrying its limit of the wage burden, and until its revenues are in better shape the public must be warned to block such legislation or any other measures which may add to the constantly growing list of electric railway receiverships. The public cannot afford to have these essential utilities crushed.

Good Salesmanship Needed in Promulgating Association Standards

THE most important task which lies before the American Electric Railway Engineering Association is in capitalizing the very considerable investment of time and money which has been made in preparing various association standards. This would seem to require the services of a vigorous committee, which would follow up the work of a similar committee appointed some years ago for the same purpose. In this work it should be borne in mind that standardization accomplishes its full purpose only when it does these three things: Fixes upon such devices as represent the best development in the art with due regard to the harmonizing of theoretical perfection with practicability. Secures the acceptance of the standards by the users of similar material. Secures the protection of the standard material by the manufacturers in place of a large number of similar devices.

Complaint has been heard to the effect that the manufacturers' catalogs of supplies for electric railways contain few references to A. E. R. A. standards in the way that M.C.B. and A.S.C.E. standards are referred to in the fields covered by the Master Car Builders' Association and the American Society of Civil Engineers respectively. This is, of course, due largely to the fact that electric railways seem not to want A. E. R. A. standard materials; otherwise the manufacturers would "play up" the fact that certain products comply with the association's standard specifications.

As a matter of fact, in many cases the stock designs of all the well-known manufacturers come well within the standard limitations. Under the circumstances such designs might well be cataloged as A. E. R. A. standard. If this were done many companies would be impressed by this heading, because they would know that the designs represent the best combined judgment of manufacturer and railway engineers.

Assuming then that the selections so far made for standardization have been wise ones, it behooves us all to push them so that the past work of the committees of the association may be conserved and future committees be encouraged to do even better work because sure of a better appreciation. Let's make them standards in fact as well as in name.

This Idea Is Not New But It Is Timely

EVERY electric railway needs one man, preferably the president or the general manager, who will spend a large part of his time studying the needs of the public, adapting the resources at command or obtainable to meet these needs, and explaining to the public the elements of the local transportation problem. A manager said to the writer recently that when he was in a subordinate position his chief criticism of the managers whom he knew was that they tried to do too much of the work that their subordinates were employed to do, while neglecting to get out among their patrons for the purpose of developing cordial relations between the railway and the public, individually and collectively. When he was appointed to a position in which he had a chance to apply his theory, he realized that it was "up to him" to do what he thought others should have done, and he has endeavored to carry out this policy, apparently with excellent results.

The above incident suggests that the duties of managers and other executives have changed in recent years. Time was when the head of an electric railway could know much of the detail of all departments, but as the complexity of the equipment and the organization has increased this condition has gradually become less and less practicable. At the same time the relations with the public have become more intimate and more difficult to maintain in a satisfactory condition. The result is that the situation in some cases is beyond the control of those in active charge because they continue to perform duties that should have long since been delegated to others.

The work of the modern manager is twofold: First, organizing the working force, with competent direction, so that the several departments will function effectively, severally and as a whole; second, personifying the utility to the public by word and deed in a way to win such confidence as is deserved. With the first of these duties accomplished the manager will have time for the second and can present the case of the railway as a business man to business men, through chambers of commerce and other business associations, clubs, etc., and by means of congenial personal relations with leading business men and public officials. The railway manager ought to be a welcome speaker at dinners and other gatherings of representative men, and the experience of many has shown that this can be so if he will first take the trouble to establish a point of contact with the public and will then give a presentation of the transportation situation that shows a broad grasp of the essential economic factors and a fine public spirit.

It Is a Good Time to Start Safety Work

THE PRESENT is an appropriate time to revive the safety campaigns which were such a feature of electric railway operations in 1913 and 1914. During the past four years there have been many reasons why popular interest could not be greatly attracted to the needs of safety. In the first place, there were many other demands on the popular attention because of the war. Liberty Loan drives and Red Cross and other campaigns for the benefit of our men in the service as well as international matters of various kinds made a stronger bid on the public mind. Then, the term "safety first" seemed somewhat incongruous in time of war, in spite of the fact that the best interests of our military forces abroad required the reduction to a minimum of casualties from industrial accidents at home.

The railway companies have also been handicapped during the last four years in carrying on an effective safety campaign because of the shortage of labor. This has tended to increase accidents, both because inexperienced trainmen had to be used and also because it was not always possible to give to equipment its proper inspection and maintenance. Yet it is a notable fact that in spite of these adverse conditions the accidents from surface cars in New York City have shown a constantly decreasing trend, and if the Malbone Street accident of the Brooklyn Rapid Transit on Nov. 1 of last year is disregarded, the same statement is true of the rapid transit lines in Brooklyn. This lessening of the casualty record in New York City is due largely, in the opinion of the Public Service Commission, to a greater use of safety devices and methods.

Now that the war is over the public should be receptive in a notable degree to the revival of safety precautions. It is the duty of all, after our tremendous but necessary sacrifice of life, limb and money in the war, to conserve to the uttermost these foundations of national wealth and prosperity. Safety is a duty which we owe to those returning from the battlefields of France, because where this country has to support the dependents of those injured through accidents at home it is unable, by just so much, to give to the families of those crippled or killed in its defense.

The time is appropriate for pushing safety campaigns also because inventors are paying more attention than ever to safety devices. The safety car itself is a notable example, but the trend toward safety has been equally marked in other types of cars and in other branches of the work. Finally, it ought to be more easy than formerly to interest the employees in the safety movement. They are receiving far higher wages than ever before and they can make it easier for the companies to pay these wages if they keep down the accident expenses.

The Safety Car Is Primarily a Frequent-Service Car

IT SEEMS STRANGE that when the electric railway industry desires to introduce so promising an improvement as safety car service, there should be so much opposition to this improvement in many quarters. The employees seem to feel that because one man per car is required rather than two the total number of men employed will be reduced. Another objection, we might almost say the other objection, to the operation of a car by one man is based on the fear that accident hazards will be increased. As a consequence of these two misconceptions a lot of ill-advised agitation is going on which, in so far as it is effective, will hamper the electric railways in giving the improved service which must be given if electric railway operation is to be profitable.

In the meantime, however, the safety car is making steady progress, and the year 1919 will show many service betterments due to its introduction. Attention was directed in this paper last week to the inauguration of safety car service on one line in Bridgeport, Conn., and in the current issue further information is given of the preparation for and introduction of the new service. The Bridgeport case is typical and, like others which are available for unbiased study, furnishes facts which controvert the objections mentioned.

The primary purpose of the safety car is not to reduce the working force of the electric railway but to permit it to be used to better purpose. The lesson of the jitney has been that the public wants frequency and speed in urban transportation. The safety car is the railway's answer to the public's question: "What can you do to save our time in getting around town?" This answer means that the company must have plenty of cars and must move them as rapidly as traffic conditions will permit.

It is ridiculous to insist that two men be kept on a car if only one is needed, particularly if the employer is willing to provide another car for the displaced operator, with higher wages for both. It is as useless to protest against the use of a labor-saving car as it is to object to the introduction of a machine which can perform some manufacturing operation with less labor. If the machine or the car is a success in accomplishing its purpose the worker as well as the public benefits. As far as safety is concerned, the small car will prove an accident reducer rather than an accident producer. It is under such perfect control, its momentum is so small and the safeguards which surround its operation are so many that fear on the public part for the safety of foot passengers and riders is not justified.

While the above is true, electric railways which operate safety cars or contemplete such operation should plan to utilize to the full the inherent virtues of these cars. In the first place the cars must be used in liberal numbers, thus furnishing as they glide by a constant reminder to the public of the service provided. Again, all slack must be kept out of the schedules so that the schedule speed may be maintained at the maximum value. Third, co-operation with the municipalities must be secured to give the cars as far as possible the right-of-way, avoiding traffic blocks. Above all, the little cars must be taken seriously by the management in spite of their insignificant appearance.

Good Maintenance Is Economy of the Wisest Sort

WE BELIEVE that electric railways are warranted this year in expanding their purchases on purely economical grounds. Before the war sent the prices of labor and materials skyrocketing, this was the season of the year when electric railway engineers and transportation men were busy preparing budgets for the approaching summer. During the past two years there has been a patriotic reason as well as an economic one to induce the railways to keep their budgets down to the minimum. Every ounce of material and hour of workmen's time available in this country were needed by the government in the work of national defense, so that all except the most essential work had to be abandoned. This condition has now changed. The bar against the employment of labor is removed; in fact, it is a patriotic act now to place orders and thus help to solve the non-employment problem. Hence the question of what policy should be adopted toward purchases is one which must be faced.

It may be said that railways have not enough money to begin an extended plan for improvements, and if they had they might better wait until prices are further reduced. As regards the first point, we are not advocating extensions at this time. Until the fare question is settled much new construction is out of the question. But every company should plan this year to put its operating equipment in as good working condition as it can and thereby save money on the principle that "a stitch in time saves nine." Translated into the language of the railway this means that insufficient paint on cars invites their rapid deterioration, neglect in track maintenance means rapidly mounting repair bills for a car equipment, and a few dollars spent in safety equipment will often protect against an accident costing many thousand dollars. Again, better facilities in the way of more comfortable service will often reconcile the public to an extra cent or 2 cents in fare. The physical condition of railway equipment is worse now than it has been for a long time because much of this work had to be omitted last year and the year before. But it is obvious that while cars continue to operate they must be maintained.

Finally, there is the question of prices. Are not they coming down? Perhaps so and perhaps not, or, if so, probably not so very much. Copper and some of the other metals have already decreased in price, and probably will go even lower within the next month or two. In fact, some metals, like copper and lead, are now close to the prices charged just prior to the war. Indications are, however, that producers are feeling out the market and that the low prices of this spring will be succeeded by considerably higher quotations as industrial expansion opens up. But no matter what the price situation may be, the real question is whether the deterioration which will result in equipment from lack of attention during this time, and the traffic which will be driven away because some inexpensive improvement is lacking, will not more than outweigh the saving to be effected by a slight drop in cost of the material required.

We believe that in most cases it will, and in any event the gain made by the change is definite and absolute while the saving from the drop in cost is entirely problematical.

Tie Renewal Cost Reduction Deserves Serious Study

BY R. C. CRAM
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Brooklyn Rapid Transit System

TIES MAINTAINED LIKE THIS HAVE A LONG LIFE

The Place to Begin Is in Specification and Maintenance — Other Factors Are Use of Suitable Preservatives, Provision of Good Drainage, Liberal Spacing, Prompt Removal of Defective Ties and Insuring Full Life From Ties in Use

TIE RENEWALS represent the largest single item of cost in open track maintenance, if the general item of maintenance labor is excepted. When this fact is considered it becomes evident that every possible step should be taken which will tend toward economies in tie consumption. The force of this statement will be appreciated by those whose duty it is to purchase tie timber at the present time. In 1915 the total number of wooden ties purchased in the United States was 97,106,651. The electric railways bought nearly 9 per cent of these, or 8,607,996 ties. This was a decrease of nearly 300,000 from the number purchased in 1911. The 6-in. x 8-in. x 8-ft. tie contains about 32 ft., board measure, hence the electric roads used about 275,545,600 ft., board measure, which, at the prevailing price in 1915 of about $15 per thousand feet, represented an estimated expenditure of $4,131,840. Recently, tie timber has been quoted as high as $55 per 1000 ft., board measure, which represents an increase of more than 300 per cent in about three years. If this price prevails and consumption is anywhere near what it was in 1915 we may assume that electric railways will have to spend over $12,000,000 for wooden ties this year, unless maintenance is greatly restricted.

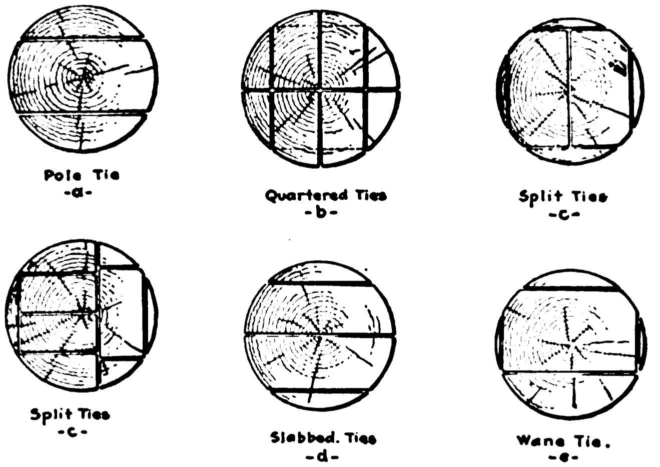
Aside from war conditions the exhaustion of local supplies had begun to force the cost of ties upward, and a peculiar form of blight had practically forced the abandonment of chestnut as tie timber in the northeastern part of the country where this timber has been fairly abundant and largely used. In order to overcome the increasing shortage of tie timbers, a few of the steam roads started tie plantations some years ago, but it is understood that so far the results obtained have not been entirely satisfactory, although the experiment has not been continued long enough to warrant very definite conclusions. In any event, the electric railways cannot afford to entertain the tie plantation proposition.

It will be seen that the existing supply of tie timber should be conserved and protected by all possible means and it is very certain that, while numerous substitutes for wooden ties have been tried, we shall continue to use a vast number of such ties for many years to come. Through the use of mechanical means to protect ties from wear, with preventatives and other means for protection against decay, the life of ties may be increased to a degree which warrants considerable extra expense in that direction.

It is not economical to use an inferior tie simply because it is comparatively cheap. Inferior ties when used should be protected in ways which will add to their life. It costs just as much to handle and install a cheap and inferior tie as it does a first-class tie, while inferior ties will cause more frequent disturbance to track, as they require more attention to spiking conditions and more frequent renewals.

WHAT ARE "HEART" TIES, "SLAB" TIES AND "CULLS"?

The manner in which the tie is cut out of the tree is generally the basis for defining its kind. A tie cut from a tree from which not more than one tie can be produced from a section is called a "pole" tie and it is hewed or sawed on two parallel faces. When made from a tree of a size that two or more ties can be made from a section by splitting, the tie is called a "split" tie. An inferior tie, named a "slab" tie, is sometimes made from the first or outside cut of a log. A sawed tie has the two sides and two faces sawed. The upper or lower plane surface is called the "face." A "quartered" tie is one made from a tree of a size to yield four ties per section. A "slabbed" tie is one sawed on only two faces. If the two faces are of equal width, a slabbed tie is also a "pole" tie but should the lower face be wider than the upper, it is called a "half-round" tie. A "hewed" tie must be hewed on at least two surfaces other than the ends.



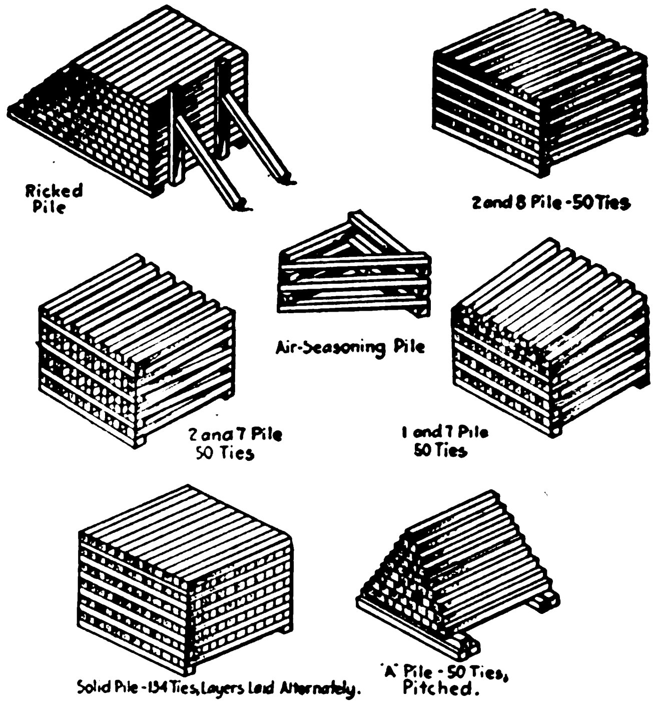


FIG. 1—TYPES OF TIES (WILLARD). FIG. 2—METHODS USED IN PILING TIES (WILLARD); UPPER TWO ROWS, UNTREATED TIES; LOWEST ROW, TREATED TIES

Tie specifications always limit the amount of sapwood, and if the section shows more than the specified amount the tie is called a "sap" tie. If the specified amount of sapwood is exceeded on only one or two corners, but does not measure more than 1 in. on either corner measured diagonally across the tie, it is classed as a "heart" tie. An "all-heart" or "strict-heart" tie has no sapwood. A "wane" tie is made from a tree too small to make a pole tie, by allowing the original surface of the tree to show on one or more corners. When a tie has been made from a tree from which the resin or turpentine has been extracted before felling, it is called a "tapped" tie.

Ties which do not conform to the specifications are "cull" ties. Those used under rail joints are called "joint" ties, and they are generally selected for this particular use because of size and other features which make them particularly suitable for the heavy duty at joints. "Intermediate" ties are those between joint ties. The tie or group of ties which is used to support switch operating mechanisms, is called a "head-block" and is usually of greater length than an ordinary tie. "Switch" ties are those used to support turnouts and are usually of special lengths and sizes for this purpose. A "treated" tie is one which has been subjected to some process intended to prevent decay. "Shakes" are separations of the wood fibers due to action of wind upon the standing tree. "Checks" are cracks in the wood usually caused by seasoning.

White-oak timber is by far the best for use as ties and is the most largely used. (See Table I.) It is but seldom treated and it has been stated that it is scarcely economical to do so, owing to its very high resistance to decay. The average life of white oak under heavy steam-road traffic is about nine years, while this is extended to from twelve to fifteen years for moderate traffic. Bur oak, rock oak, and chestnut oak will last from six to eight years. Other species of oak, such as black and red oak, pin or swamp oak and water oak are inferior woods and have a life of from four to five years if untreated. The several species of pine are used on steam roads in quantities second only to oak, but chestnut has taken second place on electric lines and the pines take third place. While it is a soft wood as

TABLE I*—PROPORTIONS OF DIFFERENT SPECIES OF WOODS PURCHASED FOR TIES BY ELECTRIC RAILWAYS IN 1915

Kind of Wood	Per Cent of Total Purchased
White oak †	26.7
Chestnut	21.8
Cedar	11.6
Southern pine ‡	10.3
Red oak †	10.3
Douglas fir	7.4
Redwood	3.3
Western yellow pine ‡	2.5
Cypress	1.2
Eastern tamarack	1.0
All others	3.9
Total	100.0

* Rearranged from a similar table in *Electric Railway Journal* for May 19, 1917, page 942.

† Total oaks combined equivalent to 37 per cent of total purchases.

‡ Total pines combined equivalent to 12.8 per cent of total purchases.

compared with oak, pine is quite slow in decaying and long-leaf heart pine life will average seven years and has been known to last twelve years. Some pines, if high in pitch, will check badly, but long-leaf yellow pine is much to be preferred for bridge timbers and bridge ties, since it does not warp as much as oak.

Chestnut is not used much for bridge timber because of its tendencies to split and check, but for ties it is nearly as durable as oak, having a life untreated averaging seven years. Cedar is a durable species of soft wood and will resist decay for from twelve to fifteen years, but it is apt to fail from spike driving and nail cutting. Cedar takes fourth place as to use by electric roads, and has an average life of ten years. Hemlock is a soft wood and is very short-lived when untreated, averaging not over four years. Its use continues to a considerable degree because of its cheapness. Tamarack and spruce have characteristics quite similar to hemlock and cost about the same but have an average life of from five to six years. Red and black cypress are soft woods, largely used in the South, and they decay rather slowly. Cypress has an average life of nine years. In California, redwood is used to a large extent. It is classed as a soft wood which resists decay quite well, lasting five years untreated and without tie plates and twelve years when used with tie plates and treated.

Specification for Cross-Ties*

Quality—All ties to be cut within ten months prior to the time of delivery; from sound, straight, live and thrifty timber, free from loose or rotten knots, dry rot, wind shakes or any other imperfections affecting the strength or durability of the timber.

Dimensions—6 in. thick, 8 in. width of face, and 8 ft. long. The allowable variation from the above dimensions may be obtained from the following table:

	Hewed	Pole	Sawed
Ties known as No. 1.			
Depth not less than....	6 in.	6 in.	6 in.
Face not less than......	7½ in.	6 in.	8 in.
Length	8 ft. to 8 ft. 2 in.	8 ft. to 8 ft. 2 in.	8 ft.
Ties known as No. 2.			
Depth not less than....	5½ in.	5½ in.	5½ in.
Face not less than......	6 in.	5½ in.	7½ in.
Length	7 ft. 10 in.	7 ft. 10 in.	8 ft.

Ties that do not conform in size to No. 1 or No. 2, or have any other defects, will be classed as cull ties and will not be accepted.

White and Bur Oak and Chestnut—Hewed ties must be stripped of bark, hewn smooth and clean of all splinters, deep scar marks, and must be straight, with faces true and parallel, and of uniform thickness with ends sawed off square. Ties hewn from one-half or one-quarter logs, or sawed from large timber, will not be accepted.

Yellow-Pine Heart Tie—Ties must be of good long-leaf Southern yellow pine and must be hewn smooth on all sides with faces parallel, and of uniform thickness with ends sawed off square. Ties must be free from rot, worm holes, wind shakes, loose or unsound knots, red heart and other defects that will impair their strength and durability.

Ties should be hewn so that the heart will be at or near the center of the tie and must not have over 1 in. of sap on each corner, which means the tie must show 6 in clear heart on the 8-in. face and 4 in. of clear heart on the 6-in. face.

No short-leaf yellow pine ties will be accepted.

Sound and Square-Edge Yellow Pine—Ties must be of good long-leaf Southern yellow pine, or, in other words, must have the same qualities and must pass the same inspection as the heart pine ties regardless of the sap.

Cypress—Hewn cypress must be free from wave, rot, dote, honey-comb and other defects, to show one heart face; allowance, 1 in. sap on two opposite corners.

Ties must be hewn smooth on all sides with faces parallel and of uniform thickness and saw butted at both ends.

Inspection—All ties shall be subject to the inspection of an agent of the maintenance of way department at the point of shipment.

The expenses of the inspection shall be equally apportioned between dealer and railway companies.

Freight must be prepaid on all shipments.

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*From 1910 report of committee on way matters, American Electric Railway Engineering Association.

The foregoing information on life of ties is based on steam road conditions and experience and it may be stated that very few woods other than those mentioned are of much value as ties unless treated. The Chicago, Burlington & Quincy Railroad has found from its experience in eight different states that practically all untreated ties which it uses reach the end of their life in seven years for all species except white oak, chestnut and cypress. The percentage of these species removed after seven years of service were 10 per cent, 37 per cent and 51 per cent respectively.

Authoritative information as to the life of the several species of ties used by electric railways is very meager, but it is safe to estimate that for open track conditions the steam road data will apply, with some modification where traffic conditions are less severe. The following from a report on untreated ties for electric railways, presented before the American Wood Preservers' Association and published in the ELECTRIC RAILWAY JOURNAL for Jan. 22, 1916, has some bearing:

1. *Untreated Ties in Interurban Lines.* The following estimates were secured from officials of six companies operating in the Middle West:

Cedar	Untreated	No tie plates	7– 8 years	Michigan
			9–10 years	Michigan
Cedar	Untreated	With tie plates	12–15 years	Michigan
			15–16 years	Michigan
Cedar	Untreated	No tie plates	11–12 years	Illinois
White oak	Untreated	No tie plates	7– 8 years	Michigan
			10–12 years	Michigan
White Oak	Untreated	No tie plates	6– 7 years	Indiana

2. *Untreated Ties in Unpaved and Macadam Streets.* Officials of several companies operating in the Middle West supplied the following estimates:

Cedar	Untreated	11–12 years	Illinois
White oak	Untreated	8–10 years	Illinois
Oak and beech.	Reported as badly decayed and removed after two years from track laid on gravel ballast in Illinois.		

3. *Untreated Ties in Paved Streets.* A third and important condition under which ties are used is in tracks in paved streets. The situation is complicated not only by lack of authentic data, but by the variety of types of construction in use. Some light is thrown on the service secured from untreated ties in these types of track by the following tabulation of opinions expressed by officials of a number of companies operating in the Middle West:

Locality	Species	Life Untreated Years	Remarks
Michigan	White oak	12–15	Life of tie equal to life of rail
Michigan	White oak	20	Life of tie equal to life of rail
Michigan	White oak	10	
Illinois	White oak	20–25	Equal to life of rail, provided tie is not disturbed
Indiana	White oak Hemlock	20	Life of tie equal to life of rail
Illinois	Tamarack Cedar	15–20	Life of rail

Further, in regard to life of ties in tracks in paved streets, cedar ties have been reported as having a life of eighteen years or more in such streets in Milwaukee, and long-leaf heart-pine ties have been reported as having an average life of eighteen and six-tenths years in paved streets in Brooklyn. In the latter case the information was given in 1914 and the ties then reported on were replaced in service so they now average more than twenty-two years.

It is apparent that the life of tie timber will vary greatly under the conditions of service. Even the same kind of timber, cut from the same forest, will act differently on different parts of the same road. Ballast conditions and average moisture content as controlled by rainfall will create widely varying results. The following are some of the factors which affect tie life: (1) Kind of soil, ballast or foundation upon which the tie is placed; (2) size of tie and species of wood; (3) whether the tie is treated or untreated; (4) whether tie plates are used or not; (5) kind of spikes used; (6) care taken of ties while in service; and (7) mechanical wear due to traffic. Consequently it is almost impossible to make even a general statement as to the kind of timber which makes the best ties for universal service. Local conditions largely control and it might be better to use a cypress tie in one part of the country rather than an oak or yellow pine tie. Meanwhile, the utmost attention should be paid to the continued maintenance of proper shape of the ballast section between the ties, as a longer tie life will result if the ballast is arranged so as to provide ample drainage. This should be assisted by adequate ditching and cross-drains.

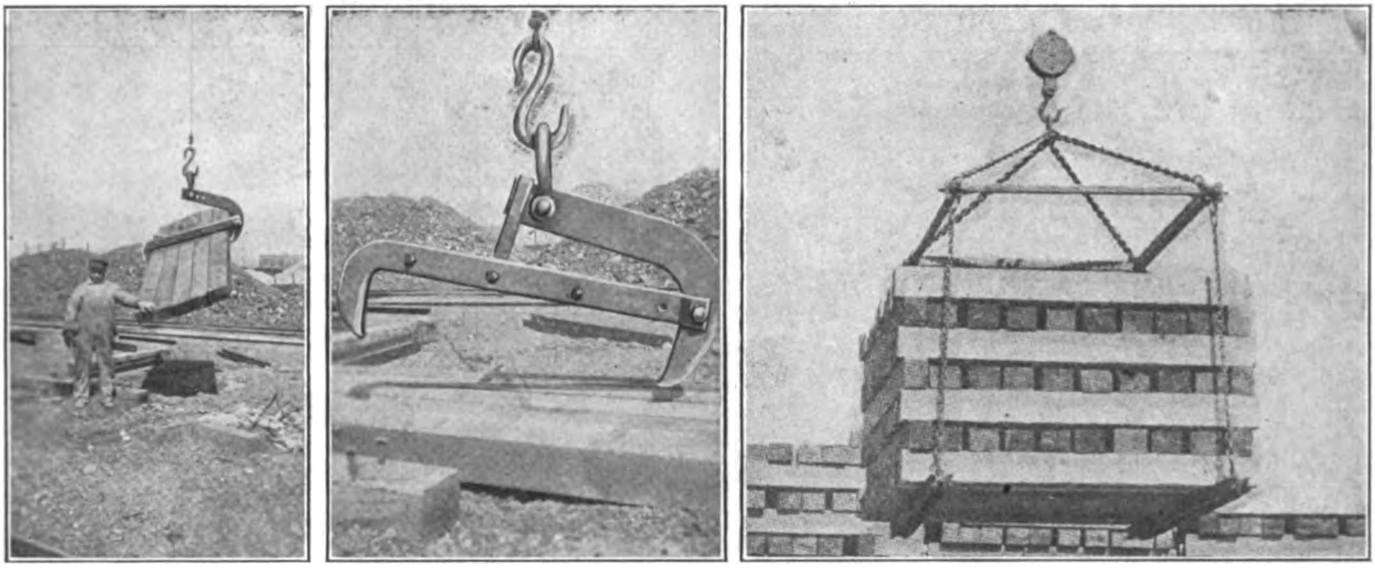


FIG. 3—DEVICES WHICH ARE EFFECTIVE IN DECREASING COSTS IN TIE HANDLING

CLASSIFICATION OF WOODS FOR USE AS TIES

Notwithstanding the long period during which wooden cross-ties have been used there is no standard rating of woods which are suitable for this service. It is apparent that different species will vary in natural durability and in capacity for preservative treatment, but aside from these qualities there are three important characteristics which the wood should possess: (1) It should be sufficiently strong to withstand ordinary strains due to center binding, etc.; (2) it should be sufficiently dense to resist spike pulling and lateral pressure on the spikes, and (3) it should be sufficiently hard to furnish a proper resistance to rail wear.

It is desirable that a classification of the different species of woods as ties be established on a basis of their relative mechanical properties, and the United States Forest Products Laboratory has suggested such a classification based upon a composite figure involving the following mechanical properties: Static bending, impact bending, compression parallel to grain, compression perpendicular to grain, and hardness. Such a tentative classification is given in Table III. Meanwhile the C. B. & Q. R.R. has adopted a classification based on its experience with treated timbers and some tests which it conducted for determination of the spike holding power of different woods. (See Table IV.) This railroad now broadly divides woods into two classes: hardwood and softwood. Each class is subdivided into those for use without a preservative and those to be used only when treated. This classification is given in Table II and is fairly representative of the use of woods, treated and untreated, on the important steam roads. Generally the electric roads follow

TABLE II—C., B. & Q. R.R. CLASSIFICATION OF TIE TIMBER ON BASIS OF HARDWOOD AND SOFT WOOD AND FOR USE TREATED AND UNTREATED

HARDWOODS

UNTREATED: 1 white oak, 2 bur oak, 3 chestnut, 4 locust, 5 black walnut, 6 mulberry, 7 sassafras.

TREATED: 1 red oak, 2 black oak, 3 pin oak, 4 water oak, 5 turkey oak, 6 Spanish oak, 7 black-jack, 8 beech, 9 hickory, 10 ash, 11 elm, 12 hard maple, 13 cherry.

SOFTWOODS

UNTREATED: 1 cedar, 2 cypress.

TREATED: 1 short leaf pine, 2 loblolly pine, 3 lodge-pole pine, 4 Douglas fir, 5 tamarack, 6 hemlock, 7 tupelo, 8 birch, 9 sycamore, 10 soft maple, 11 hackberry, 12 butternut.

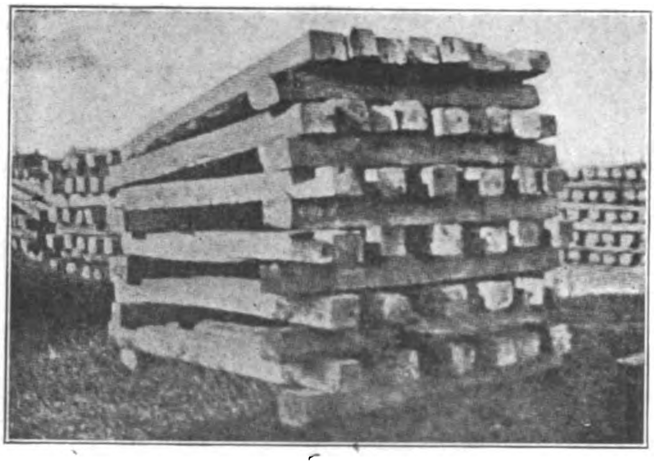
TABLE III—TIMBERS ARRANGED IN ORDER OF THEIR MECHANICAL VALUE AS TIES

Species	Average Composite Value
Black locust	1,666
Sugar maple	1,140
White oak	1,050
Red oak	972
Beech	955
Long-leaf pine	914
Red gum	825
Short-leaf pine	800
Western larch	790
Tamarack	740
Eastern hemlock	700
White fir	610
Lodgepole pine	590
Western yellow pine	560
Northern white cedar	420

NOTE.—Figures are for average forest-grown material, and individual prices may vary 30 per cent above or below the average. [illegible] the same practice in this respect for their open tracks. Redwood, untreated, is used extensively in the West, and long-leaf heart yellow pine is often used untreated although better service is obtained when treated, at least for open tracks in ballast.

SIZES AND SPACING OF TIES

The proper sizes and spacings of ties are functions of condition of track and traffic. An easier-riding track will result from the use of smaller ties spaced close together than from larger ties spaced farther apart. Hence, spacing should be considered as of more importance than size. Two advantages are obtained by decreasing the spacing: (1) The unit pressure on all track material is decreased, and (2) the carrying capacity of the roadbed is increased correspondingly. There are so many controlling elements that it has so far been impracticable to follow any fixed rule for spacing ties, but the minimum spacing should not be less than the width of track shovels used. The usual spacing varies from sixteen to eighteen for a 30-ft. rail or eighteen to twenty for a 33-ft. rail, indicating a variation of from 2640 to 3200 per mile.



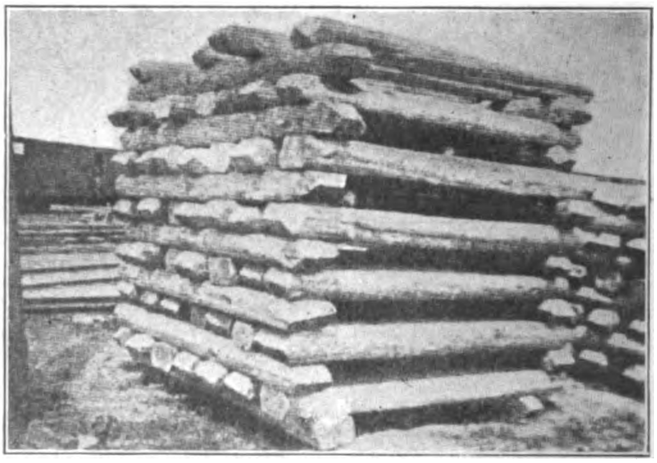


FIG. 4—SQUARED TIES PILED TO SHED WATER DURING SEASONING. FIG. 5—POLE TIES PROPERLY PILED FOR SEASONING

The thickness of ties used varies from 6 to 8 in.; the width from 6 to 12 in. and the length from 8 to 10 ft., the greater length being for bridge ties and tracks over marsh land. Electric railways use a size of 6 in. x 8 in. x 8 ft. almost universally while 7 in. x 9 in. or 7 in. x 8 in. x 8 ft. to 8 ft. 6 in. long are sizes being used more and more by steam roads. Bridge ties are usually 8 in. x 8 in. x 10 ft. spaced from 12 in. to 16 in. centers.

TIE RENEWALS SHOULD BE CAREFULLY CONTROLLED

Aside from the recent sharp rise in cost of tie timber due to war conditions there have been other causes at work which have increased the cost of tie renewals in recent years. Some of these causes are: (1) The constantly increasing price of ties, due to the steady rise in price of timber as the supply decreases, and the increased length of haul due to greater remoteness of sources of supply; (2) the use of the best grades of lumber for other purposes, leaving the inferior qualities for use as ties; (3) carelessness in drawing specifications and making inspections, causing acceptance of inferior material; and (4) increased mechanical wear due to inferior timber and heavier traffic which result in excessive rail-cutting and spike-killing.

Careful attention to item No. 3 will repay the trouble several times over. Both the purchasing agent and the engineer should realize that a tie is something more than "just a tie," and the fact that all ties of a species look more or less alike is no warrant that they are all equally serviceable. The quality of the wood is of much more importance than exact sizing, and an undersized all-heart tie is usually more durable than an oversized sap tie. For many reasons it is just as necessary to buy ties in accordance with strict specifications and to inspect them rigidly thereunder as it is to buy rails under a specification. The inspections should preferably be made at the points of shipment, as the dealer will avoid freight charges on "rejects" and the tendency to accept inferior material by the purchaser, because much-needed ties are on the ground, will be absent. This applies more to ties obtained from distant sources, since dealers who deliver along the railway lines generally know the specification and what will pass inspection. A specification for untreated oak, chestnut, yellow pine and cypress ties is presented on page 310.

It is obvious that the inspections should be made by men thoroughly versed in lumber, and in the tricks of the trade, and if the railway has no such person available it can well afford to hire the services of an expert in this line. The purchase and inspection period is the

TABLE IV—SPIKE-HOLDING POWER OF VARIOUS WOODS *

Kind of Wood	Maximum Resistance to Pulling, in Pounds Untreated	Maximum Resistance to Pulling, in Pounds Treated	Resistance in Per Cent of That of White Oak Untreated	Resistance in Per Cent of That of White Oak Treated
White oak	7,870	.....	100	...
Water oak	.....	6,780	...	86
Black oak	.....	7,230	...	92
Red oak	6,460	7,730	82	98
Bur oak	.....	9,210	...	117
Ash	.....	7,730	...	98
Chestnut	5,190	5,200	66	66
Elm	7,290	7,500	93	96
Beech	8,180	8,900	104	113
Poplar	4,920	5,670	62	72
Loblolly pine	3,630	4,210	46	55
Sweet gum	5,040	5,300	64	67
Hemlock	5,633	4,200	72	53
Soft maple	6,513	5,887	83	75
Hard maple	10,177	8,960	129	114
Hickory	10,153	10,433	129	133
Cypress	3,163	2,840	40	36
Birch	6,337	5,907	80	75
Cottonwood	2,810	2,743	36	35
Northern hard maple	10,393	.....	132	...
White cedar	1,467	.....	19	..

* From *Railway Age Gazette*, June 16, 1911.

first place to exercise the true principles of economy.

The actual cost of tie renewals is divided into three principal elements, as follows: (1) cost of new ties delivered along the track; (2) cost of removing and disposing of old ties, and (3) cost of placing new ties in track. Items Nos. 2 and 3 are labor costs and have a most important relation to total expense. Together these two items will run from 20 to 60 per cent of the first item, depending on the kinds of tie and ballast used. The lower the first cost of the tie, the higher is the ratio of the labor cost to the first cost of the tie. Hence it is easy to see that the actual labor cost of tie renewals will be greater with inferior ties than with ties of first grade because renewals will be more frequent on account of the shorter life. By the use of tie plates and treated ties, the life of inferior ties can be greatly increased and labor costs reduced in consequence.

With untreated ties and no tie plates the yearly renewals on steam roads average from 250 to 350 per mile of track. Some trackmen consider that normal tie renewals should average two ties per 30 ft. rail yearly under moderate traffic. This would require about 700 ties per mile or about 30 per cent annually. There is no doubt but that the practice of making single renewals ("spotting in") is more advantageous in the long run than the practice of renewal "out of face" or in continuous stretches. The trackmen should be instructed in proper methods of piling ties for seasoning and as to the proper time for making renewals; the proper places to use hardwoods, softwoods and treated ties and where to use culls and second-hand ties. The yardmen in storage yards should also be advised as to methods of piling ties. Some of these are shown in an illustration on page 309. For instance, untreated ties should be piled in a way which will allow free circulation of air about each tie, after the manner shown in Fig. 2. The ricked pile so often used for large quantities of untreated ties should be avoided as it prevents or retards air seasoning and is apt to assist in growth of fungi because of the greater percentage of moisture retained by timbers in contact.

The tendency of certain woods to check in the seasoning process may be largely overcome by the use of "S" irons driven into the ends. Season checks are serious defects, in that they permit moisture to reach the interior of the tie, thus assisting in promoting decay and causing a liability to split when spikes are driven. The type of ties known as "split" ties check badly because the heart is exposed on one face. For this reason trackmen should be instructed always to place the heart face downward in the track.

Ties should not have any bark on them when placed, as the bark holds water and loose bark offers little frictional resistance to ballast, thus rendering the tie liable to shift readily. Hewn ties are generally considered better for use untreated because the hewing process closes the pores of the wood and tends to prevent absorption of moisture. Untreated sawed ties decay more rapidly because the saw cut cannot be kept parallel to the grain and a larger end area of fiber is exposed than in hewed ties. Decayed ties should be disposed of as soon as possible to prevent spreading of fungi to sound ties.

Ties should not be removed from the track until it is certain that not another year of safe life remains. Nevertheless it is poor economy to leave badly decayed ties in service because they make the adjacent good ties do more than their share of work and cause more rapid failure. The decision as to just what ties present conditions requiring renewal requires experience and judgment. More waste can be caused at this point than at any other. The objects of proper tie inspection for renewals are to secure uniform practice, to prevent unwarranted removals before safe service is past and properly to distribute renewals. Tie inspection for renewals is too often left to the sole judgment of the section foreman. He likes to use up all the ties on hand regardless even if some of the ties removed would have lasted a year or more longer. The best way to inspect for renewals is to have the work done by one man who is thoroughly versed in the work. His work should be checked by the roadmaster, and the engineer should give close attention to this work also. A fair check can be had by comparing average renewals over a series of years, combined with personal inspection of sections here and there. In no case should ties be removed without orders and they should be piled near by for inspection by proper authority before disposal. It may be well to quote here the observations of W. F. Carr, engineer of maintenance of way, Chicago, Ottawa & Peoria Railway, on tie renewals. He said in an article in the JOURNAL for March 31, 1917:

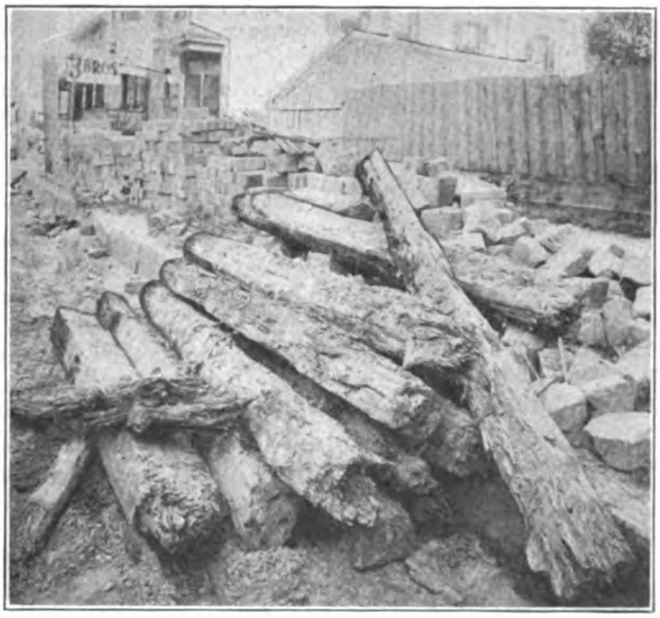


FIG. 6—TREATMENT WOULD HAVE MADE THESE CEDAR TIES LAST LONGER

> Ties, according to our experience, cannot be too carefully inspected. Untreated red oak, black oak, beech, elm or gum ties had better be left out of the track than put in. They will decay inside of three or four years, and, in the case of elm or gum, will check so badly in a short while that they are unfit for use. An undersized tie should not be bought. It is not capable of performing its proper duties as a bearing surface. Pole ties or ties cut from young white oak should have a width of face not less than 6 in.; otherwise the sapwood portion of the tie will rot off in a couple of years and the result is a fence post about 4 in. in diameter.

> Another point that should be watched very carefully is

that treated ties are cut from live, sound wood. I have seen well-treated ties which were so brashy that, when they were thrown from the car to the ground in unloading, they broke like sticks of punk. Just as good ties are needed for sidings as for main track, because a siding usually cannot and does not receive the same amount of attention that main tracks do, and when a siding is tied up it should be tied up with good, sound timber.

It is well to bear in mind that the life of a tie is always determined by the length of time that it will hold a spike. This life may be prolonged by pulling the spike when it begins to work up, driving in a tie plug and redriving the spike. It is worth while to do this in a great many cases, and in every case where a railroad is well maintained, as it will prolong the life of ties for a year or two. Economy in maintenance forbids the removal of a tie that will give service for six months, except at public or private road crossings. This rule can be adhered to in ordinary maintenance without any risk, because the average track foreman is too much inclined to make a clean sweep of tie renewals, and a check like this should be placed upon him.

When inspection tests are made for soundness, the ties should not be mutilated more than is necessary. Ties should not be tested on top except for decay around spikes and tie plates. To test a tie for strength, one end of a pick should be inserted under the end and used as a lever. A broken tie will usually show up under this method. Sap rot alone should not condemn a tie for service. Removal for rail cutting need not be done as a rule unless the cut extends more than 1 in. into the face. The most careful attention should be paid to red oak, pin oak and all other woods which decay from the heart as these are apt to leave a hard shell which tends to hide the true condition of the tie.

In connection with inspection for renewals, those interested will find an excellent set of rules governing this work, as done by the Buffalo, Rochester & Pittsburgh Railway, in Willard's "Maintenance of Way and Structures," page 78. These rules furnish a guide from which rules for use under electric railway administrative conditions may be readily adapted and used with beneficial results.

MAINTENANCE CAN BE GREATLY REDUCED BY USE OF TREATED TIES

The use of treated ties has been increasing quite rapidly on the steam roads, but the electric railways have not paid as much attention to this subject in the past. The last available statistics (1911) indicate that only 15 per cent of the ties purchased by electric railways were treated while the steam roads treated 24 per cent. That more attention is being given to treatment is evidenced by the recent installation of a treating plant by the Boston Elevated Railway. Only two or three other companies have their own treating plants. Generally it is not economical for them to make the investment, but this fact should not prevent a far greater use of preservatives, since there are many private plants which do this work. Where companies do not feel able to afford either a plant of their own or to purchase treated ties from commercial pressure treating plants, the open-tank method is available, and although the results from open-tank treatments are not considered equal to those from pressure treatments, they will provide a preservative treatment which will amply repay the investment. Where treated ties are purchased, a good specification covering the treatment may be found in the report of the way committee in Proceedings of the American Electric Railway Engineering Association for 1916. There is no longer any question as to whether tie treatment is an economical measure for greatly prolonging the average life of ties, thus reducing maintenance charges. The report of the way committee above mentioned indicates this clearly. Table V is taken from that report and gives information as to estimated life treated and untreated and annual cost reductions due to treatment.

TABLE V—ESTIMATED AVERAGE LIFE OF TIES

Kind of Timber	Estimated Life of Untreated Years	Estimated Life Treated With 10 Lb. Creosote per Cu.Ft. Years	Annual Charge Untreated	Annual Charge Treated
Longleaf pine	7	20	$0.159	$0.108
Chestnut	7	15	.145	.13
Spruce	6	14	.175	.13
Tamarack	5	15	.187	.123
Hemlock	5	15	.169	.115
Red oak	4	20	.240	.101
Beech	4	20	.214	.094
Maple	4	18	.240	.107
Gum	3	15	.338	.134
Elm	5	20	.196	.101
Loblolly pine	2	15	.381	.109
Sycamore	4	15	.239	.127

This table was taken from H. F. Weiss' book on "The Preservation of Structural Timber," and it must be borne in mind that the durability of untreated timber of any species is influenced by a great variety of factors. Among the most important of these are the species and quality of wood used, climate, soil, drainage, ground cover, etc. Since different combinations of these factors will occur in different cases, the durability of a given species cannot be expected always to be the same. Any estimate on the durability of timber must, therefore, be judged with considerable latitude.

The results of seven years service tests by the Chicago, Burlington & Quincy Railroad also clearly show the comparative results in tie life between treated and untreated ties, with a comparison of results obtained with the three principal treatment processes in use. These results are summarized in Table VI. The several treatments mentioned in this table include the straight creosote process, whereby creosote oil is forced into the wood under pressure until the absorption is from 5 to 10 lb. of oil per cubic foot of timber. The Card process consists, briefly, in the use of a mixture containing about 80 per cent zinc-chloride solution and 20 per cent creosote, injected to an absorption of about ½ lb. dry zinc chloride and 2 or 3 lb. of creosote per cubic foot of timber. The Burnett process involves the use of zinc-chloride solution alone applied under pressure, after preliminary subjection to vacuum, until the wood refuses to absorb more, the absorption ranging from ¼ to ½ lb. of dry zinc chloride per cubic foot of timber.

In connection with timber treatment it is absolutely essential that fuel specifications covering the kind of tie to be used be strictly enforced, and it is very important to have adequate inspection at the treating plant. When the purchaser has no one available for this service the commercial inspection bureaus will supply inspection at a very reasonable cost.

It should also be noted that the way committee states in the 1916 report that while zinc chloride is an effective wood preservative the experience of several companies indicates that it increases the conductivity of the timber and gives an impetus to the corrosion of spikes,

TABLE VI—INFLUENCE OF TREATMENT ON LIFE OF TIES AS SHOWN BY C., B. & Q. R.R. SERVICE TESTS

Treatment	Total Ties Placed 1909-10	Total Ties Removed Up to 1917	Per Cent Removed Up to January, 1917
Creosote	3,264	16	0.5
Card process	15,817	455	3.0
Burnett process	2,488	100	4.0
Untreated	3,270	2,626	80.0

tie plates and rail bases. The recent article in the JOURNAL by E. R. Shepard on leakage resistance of electric railway roadbeds also states that the use of zinc chloride and similar preservatives should be avoided where escape of stray currents is objectionable.

SOME OF THE PRINCIPAL COST-REDUCING FACTORS SUMMARIZED

The foregoing matter has been compiled from many sources, principally from the reports of appropriate committees of the American Railway Engineering Association and the Electric Railway Engineering Association; Willard's "Maintenance of Way and Structures," and the files of the ELECTRIC RAILWAY JOURNAL. It may be well to summarize as follows:

1. The first place to secure tie economy is in connection with purchases. These should be made only on proper specifications and adequate inspection.
2. The utmost care should be exercised when inspecting for tie renewals and regularly qualified tie inspectors are to be preferred to the section foremen.
3. Methods of placing, piling, handling and seasoning ties should be covered by proper instructions.
4. Great care should be exercised to see that ties are adequately drained in the ballast.
5. The use of preservatives presents the best field for reducing tie renewal charges, and the present cost of ties, even of inferior grades, almost forces the adoption of preservative treatment as the chief measure by which costs may be reduced. Care must be taken to see that tie plates are used with all treated ties and with all inferior untreated ties.

Maintenance of Edison-Type Storage Batteries

BY OTTO GOTTSCHALK
Master Mechanic Richmond Light & Railroad Company, New Brighton, N. Y.

WHEN Edison batteries were first used by the writer in connection with low-voltage control equipments serious conditions developed. Cells were found short-circuited due to the metal containers bulging so as to come in contact with adjacent cells. The trouble was found to be due to the depositing of the alkali in the solution around the vent caps. This deposit would build up in sufficient quantities and develop sufficient density to prevent the vent caps from opening, thus preventing the gas from escaping.

If it had been possible to give the batteries attention each day this condition would not have occurred, as the opening and closing of the vent caps would have broken the deposit. These batteries, however, were maintained on a mileage basis and in consequence from six to ten days elapsed before they received attention.

To overcome this trouble it was suggested to the company's representatives that they develop an oil for use in the vent caps which would not be destroyed by the electrolyte or prove injurious to the same. The Edison Company's chemists accordingly developed this oil, which was spread on the surface of the metal inside the vent caps so that the oily surface would not hold the globules of solution containing alkali which rise with the bursting gas bubbles. When this oil was used it was found unnecessary to clean the batteries oftener than four times per year.

In connection with the maintenance of this type of battery some further details may prove interesting. At each inspection distilled water was added to the cells to bring the solution up to the prescribed height. A check of the specific gravity of the solution was made once a month. I found that the length of time that the solution could be continued in service before complete renewal was necessary depended on the work which the batteries were required to do. It was found possible to use the same solution in some instances for three years. To determine when it should be renewed various readings of specific gravity were taken and when the gravity was found as low as 1130, it was found best to replace the solution.

As it is essential that all water used for filling batteries should be pure, where any uncertainty existed as to the purity of the distilled water employed I used the following simple tests with entire satisfaction: The material used in carrying out the tests comprised a 10 per cent solution of silver nitrate to which a few drops of nitric acid had been added, a 10 per cent solution of barium chloride and two test tubes about ½ in. in diameter by 5 in. long. The silver nitrate solution should be kept in opaque or amber glass bottles. The reagents can be obtained in any drug store.

In the test for sulphites the test tubes were rinsed out thoroughly several times with the water to be tested. Finally, one tube was two-thirds filled with water and three or four drops of the barium chloride solution were added. After thorough mixing this solution was compared with a sample of the same water in another tube to which no reagent had been added. A white cloud or precipitate indicated the presence of sulphites.

To apply the test for chlorides, the tubes were thoroughly rinsed out as already described. After two-thirds filling one tube with a sample of the water to be tested, three or four drops of the silver nitrate solution were added and the mixture was thoroughly stirred. This as before was compared with a sample of water to which no solution had been added. A white cloud or precipitate indicated the presence of chlorides.

Boston Transit Commission Issues Report

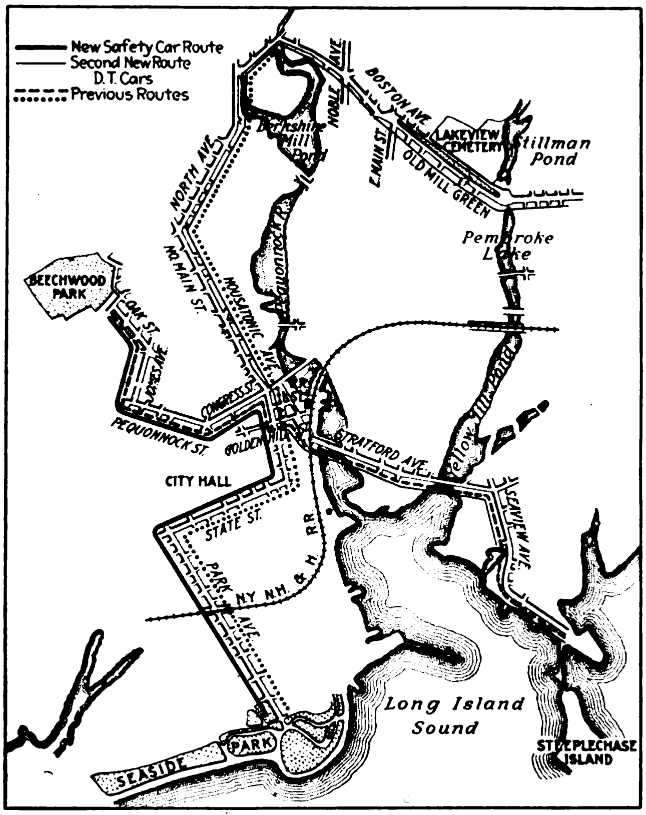
The Boston Transit Commission has issued its twenty-fourth annual report for the year ended June 30, 1918. In view of the expiration of the term of office of the commission and the taking over of its powers by the City of Boston, this report is also the final one for the commission. Since March 28, 1895, this commission built the following subways and connections: Tremont Street Subway, 1.68 miles; East Boston Tunnel, 1.42 miles; Washington Street Tunnel, 1.16 miles; Cambridge connection, 0.47 mile; Boylston Street subway, 1.50 miles; East Boston Tunnel extension, 0.41 mile, and Dorchester Tunnel, 2.26 miles. The approximate total cost involved was $34,954,000.

It is reported that the Vienna municipal authorities are much worried by a daily loss of $9,000 in electric car receipts due to the fact that the conductorettes are entirely unable to collect from those who crowd the buffers and footboards of the cars. The authorities hope that this crowded condition on the surface cars will be speedily relieved when the subways are reopened.

Bridgeport Well Pleased with Safety Cars

Pioneer Safety-Car Service in East Was Inaugurated on Feb. 2 on Nine-Car Line Through Business Section of City—Special Precautions Were Taken to Safeguard Initial Service to Insure Freedom from Interruption

BRIDGEPOFT, CONN., is a center of very great manufacturing activity and is the seat of a number of industries which were especially important in the prosecution of the war. The local electric railways, which form part of the system of the Connecticut Company, were greatly overtaxed by the influx of munitions and other industrial workers. As the Connecticut Company was not in a position to finance track extensions and increase in rolling stock necessary to care for the augmented traffic, the United States Housing Corporation undertook to do this. The corporation, among other things, purchased twenty one-man safety cars for the Connecticut Company, and of these eleven were assigned to the Bridgeport division. These cars were put into service on Sunday, Feb. 2, and since then have been operating very satisfactorily. Nine of the cars are used in regular service and two are held in reserve for emergency operation. With the new cars at its disposal the problem before the management of the Connecticut Company was so to use them as to produce the greatest relief for the congestion at Bridgeport (and elsewhere on the system). No one existing line in the city seemed exactly adapted to the new cars so that parts of two lines were selected and combined to produce a new route, the one over which the cars are now operating. The accompanying map has been prepared to show just how the rerouting was done as an incident to the inauguration of safety-car operation. Previous to the rerouting one route (dotted line on map) was from the end of Park Avenue at Seaside Park via South Park Avenue, State Street, Main Street and North Avenue to Boston Avenue. A second line (shown by dashes on the map) traversed Seaview Avenue, Stratford Avenue, Housatonic Avenue, Golden Hill Street, Main Street, Congress Street, Pequonnock Street, Jones Avenue and Oak Street to North Avenue.



OUTLINE MAP SHOWING SAFETY-CAR LINE IN BRIDGEPORT TOGETHER WITH THE ROUTING CHANGES INCIDENT TO ESTABLISHING NEW SERVICE

In selecting the route for the safety cars the object was to avoid as far as possible such sources of possible delay as would prevent the cars from demonstrating their real capacity for service. The new line is shown on the map by a heavy solid line. It connects Oak Street with the Seaside Park end of South Park Avenue, traversing Main Street, which is the principal business street of the city for several blocks. The other new route is indicated by the light solid line on the map. For sake of completeness it should be stated also that coincident with the rerouting a track extension on Boston Avenue, constructed with funds furnished by the Housing Corporation, was put into commission. This track extension played an important part in the preparation for the new service, as will be explained later in this article. The new safety car line taps two residence sections of the city, connecting them with the business center, and in the past the traffic between these sections and the business center has not been sufficient to warrant very frequent service with the large standard double-truck cars of the company. On one part of it, indeed, only fifteen-minute headway was considered warranted with the large cars during a considerable part of the day. The consequence was that much possible traffic was lost through lack of frequent service and experience has already demonstrated that the small cars are picking up this traffic. On the Oak Street line, the one just referred to, fifteen-minute service was given for nine hours and ten-minute service for the balance of the day. This line has now five-minute service all day. On the other former line, the South Park Avenue line, there was a straight ten-minute headway. This line has now, of course, five-minute service also.

In preparation for inaugurating the new service, J. K. Punderford, general manager The Connecticut Company, laid out a threefold program. This included first, the selection and training of the car crews who were to operate the new cars together with instruction of the supervisory and shop forces; second, the acquainting of the public with the changes in the lines to minimize inconvenience to patrons and at the same time to explain the characteristics of the new cars so as to obtain the full advertising value of the improvements; and third, the testing and inspection of the cars, track and overhead so as to avoid the occurrence of preventable interruptions to service. These three parts of the program are discussed in the following paragraphs which also include comments upon the results secured. In carrying out this program Mr. Punderford has had the hearty co-operation of Joseph S. Goodwin, manager, and F. L. Kibling, superintendent of the Bridgeport division, who are in direct charge of operation and who have been untiring in their efforts to make the new service a success.

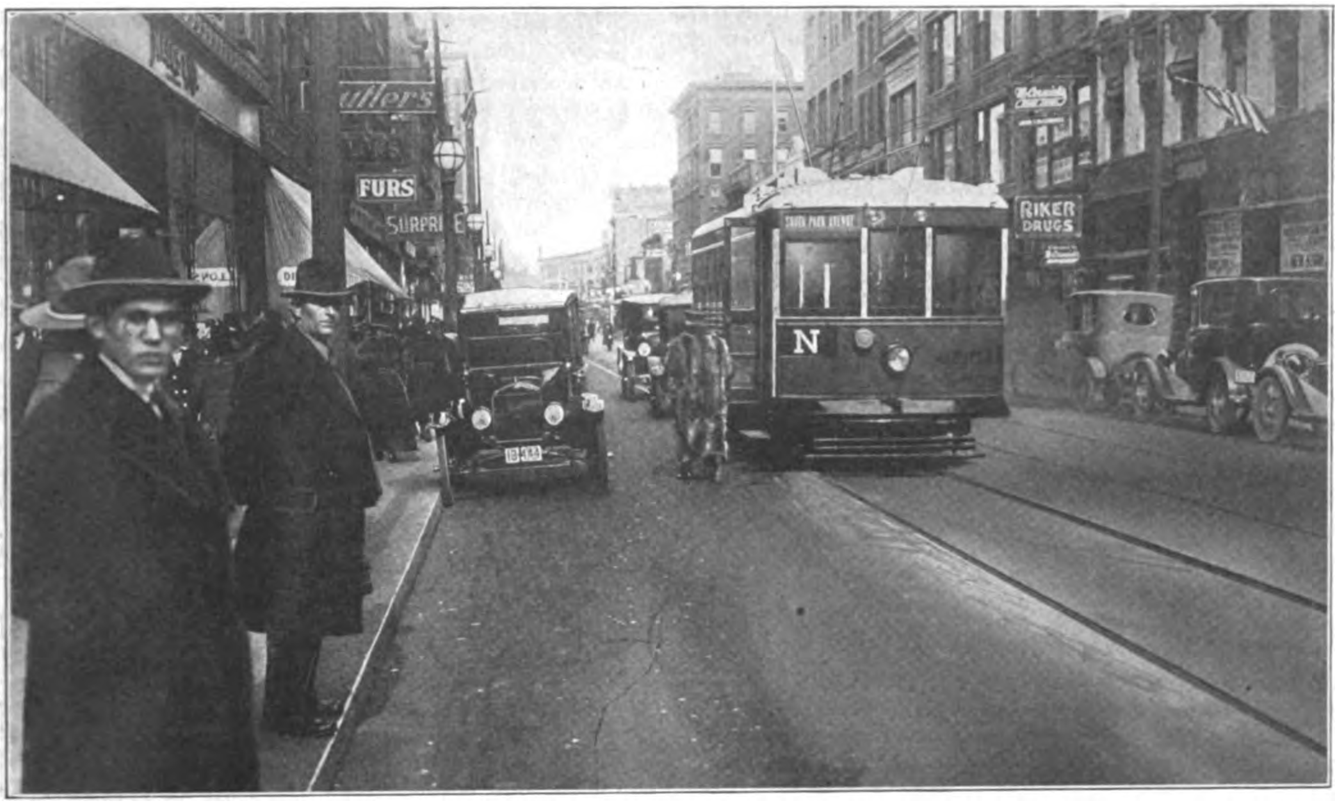
The first task was the selection and training of the car crews. It was decided to train twice as many men as would be needed for the operation of nine cars, a total of thirty-six, in order that there might always be available a supply of men competent for the purpose. A list of 100 men was selected by the management from those considered well suited for the new work, including both motormen and conductors. This was arranged in order of seniority and posted to give the men an opportunity to "bid in" the runs. The statement was made that the safety car operators would be paid 5 cents per hour more than the regular rates and if enough men were not secured from the first list a supplementary list would be posted. The new work proved popular and the runs were promptly bid in.

The men were broken in on the North Avenue extension on Boston Avenue, previously referred to. This track was put in to provide transportation for workers at the Remington Arms plant and it was possible to defer putting it into commission until after the safety car training period had been completed. Regular service began over this track on the day on which the safety cars were first operated.

After preliminary instructions on the special track the men received training on the through route after 1 a.m., when no regular cars were in operation. Finally, on Friday, Jan. 31, the cars were put on the new route in the daytime, sandwiched in among the regular cars and carrying "No Passengers" signs. The safety cars followed the regular cars and were operated by the day men from 10 a.m. to 2 p.m. and by the night men from 3.30 p.m. until after 6.30 p.m. It should be stated that while on the test track the training consisted in operating the cars in turns, the men not so engaged playing the rôle of passengers. In the training special attention was given to fare collection, particularly the developing of skill in making change.

Prior to the starting of operation in Bridgeport, in addition to the above the managers and superintendents of all divisions on which it is proposed eventually to operate safety cars were called into Mr. Punderford's office for general conference so that there might be unanimity of information and enthusiasm. Sets of instruction sheets were also made up for the guidance of all men who would be engaged in the operation and maintenance of the new cars so that the experience of manufacturers and other railways which have these cars in operation might be available to all. Credit is due particularly to C. H. Beck of the Westinghouse Electric & Manufacturing Company, for compiling this material. The full information was furnished to master mechanics, starters and instructors, while a condensed set of rules was prepared for the guidance of the car operators.

The result of all this preparation was that on Sunday when the cars went into operation everything worked smoothly and, then and since, no accidents of any moment have occurred.



SAFETY CAR ON MAIN STREET IN BRIDGEPORT, CONN.

In preparing the public for the new service change-in-route signs, as reproduced on a small scale herewith, were posted in the cars some days in advance of the change. Advertisements, of which a sample is reproduced also, were run in the papers, and the local newspaper men were invited to accompany the inspection party which went over the line in special cars on the day preceding the formal opening.

For the purpose of enlisting the co-operation of the city officials and demonstrating to them the improvement in service which would result from the use of the new cars, the traffic committee of the city was invited to study them during the instruction period. This was done and the chairman of the commission personally operated a car. On the afternoon of Feb. 1, Mayor Clifford B. Wilson, who is also lieutenant-governor of the State, together with members of the Board of Alderman and representatives of the press, made a trip over the route and expressed themselves as well pleased with the rapid acceleration and stopping of the cars. They were particularly impressed with the shortness of the time needed for making emergency stops and with the lack of jar to the passengers when such stops were made.

PLEASE HAVE EXACT CHANGE FOR YOUR FARE

IT MAKES THE SERVICE FASTER AND GETS YOU TO YOUR DESTINATION QUICKER

THIS NOTICE WAS CARRIED ON THE CARS

LIMBERING UP THE EQUIPMENT

To insure smooth working of the physical equipment no pains were spared to have everything connected with the new line in perfect operating condition. Mr. Beck, already mentioned, W. G. Kaylor and E. G. Deso of the Westinghouse Traction Brake Company, and J. C. Thirlwall of the General Electric Company, gave personal attention to the cars, and every car was given an exhaustive operating test before it went into service. In order that there might not be any trouble at switches, special attention was given to seeing that all electric track switches and signals were in first-class order so that the car operators would not be obliged to leave their cars. Of course some little attention had to be given to the matter of drawing sufficient current to operate track switches with the light cars. The switches are set up so that the lighting and heating currents of the ordinary cars will not trip them. As the safety cars draw very small current normally it is necessary to cause them to draw somewhat more than normal in order to trip the switches. The overhead was also carefully inspected to provide against trolley wheels leaving the wire and thus causing traffic delays. As 14-ft. poles were used on these cars, whereas the standard on the large cars is 12 ft., there was a possibility that the "overhead," adjusted for the shorter poles would not be suitable for those on the safety cars. The track was also inspected to be sure that tangents, curves and special work were adapted to the 26-in. wheel. Extra sand boxes were provided along the route as it was expected that the new men would use sand very liberally, which proved to be the case. In fact, free use of sand is necessary with the safety cars on account of the very rapid rate of acceleration and braking which are used.

CHANGE in SERVICE

Beginning Sunday, Feb'y 2, 1919

The North Bridgeport line will run through Golden Hill Street, Stratford Avenue and Seaview Avenue

TEN-MINUTE SERVICE WILL BE GIVEN ALL DAY

Passengers will greatly help in maintaining this improved service by having the exact fare ready when they board the cars

---

THE CONNECTICUT COMPANY

CHANGE in SERVICE

Beginning Sunday, Feb'y 2, 1919

The Oak Street line will run through Main and State streets to South Park Avenue

FIVE-MINUTE SERVICE WILL BE GIVEN ALL DAY BY THE NEW SAFETY CARS

Passengers will greatly help in maintaining this improved service by having the exact fare ready when they board the cars

---

Please ask for transfer when LEAVING Safety Car

THE CONNECTICUT COMPANY

CAR POSTERS USED IN ADVERTISING CHANGES IN ROUTING

As described in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 7, 1918, the new cars were purchased from the American Car Company and they are equipped with the full complement of now-familiar safety devices. The cars are 27 ft. 9½ in. over all in length and 8 ft. wide. The height from rail to top of roof is 9 ft. 9⅝ in. The platform floor is on the same plane as the body floor, and air-operated folding doors and steps are provided. The equipment includes two 25-hp. motors, ten pairs furnished by the Westinghouse Electric & Manufacturing Company, and ten by the General Electric Company. The armature bearings are of the Gurney ball-bearing type. The total weight equipped, but without load, is about 7¼ tons. The general appearance of the car is similar to those used in other parts of the country, but the trolley pole is mounted directly on the roof instead of upon a light framework as has been customary. The outside finish is the standard Connecticut Company's yellow, and except for the length and height there is no striking difference in appearance from the company's double-truck cars.

Safety Car Service Begins Tomorrow in Bridgeport

This Improvement by The Connecticut Company means faster, better trolley service for Bridgeport.

Safety cars will be operated every five minutes all day long on the new Oak Street-South Park Avenue line.

Passengers will facilitate this service by having the exact fare ready when they board the cars.

The North Bridgeport line will be changed to run through Seaview Avenue, giving 10-minute service all day.

The co-operation of the public in making this new service effective is solicited.

THE CONNECTICUT CO.

TYPICAL NEWSPAPER ADVERTISEMENT EXPLAINING ADVANTAGES OF SAFETY CAR

RESULTS SECURED TO DATE

As this article goes to press the safety cars have been in operation more than ten days. During this period the service has been remarkably good, cars being kept very close to schedule. As they are obliged to go through a congested section of Main Street, which is quite narrow, a few traffic delays have occurred, but these were not of great moment. As the safety line is double-tracked throughout, the cars have had excellent opportunity to make up time, and by stationing starters at the ends of the line the company was able to keep them fairly well distributed. Some bunching occurred at first as would be expected in view of the short headway. The management was especially anxious to have the first day's operation perfectly smooth, which was the reason for selecting Sunday as the day. At this time of the year the Sunday travel is lightest and there is little vehicular traffic to interfere with smooth operation.

The cars are now making a schedule speed of about 8½ m.p.h., and it is hoped later slightly to increase this. The average daily mileage on Sunday is slightly more than 120, and on week days more than 130. Receipts the first day were about 20 cents per car-mile and this gradually increased to more than 22 cents.

By means of special posters, used in all cars on the division, the company asked the co-operation of the public in having exact change ready as far as posible. As a result comparatively few passengers have asked for change on the safety cars. Both management and public are pleased with the cars, as on the one hand they are proving their ability to develop business, and on the other hand they are furnishing a service impossible under former conditions. The cars in Hartford and New Haven have not yet been placed in operation but they soon will be. Of course in those cities results as striking as those obtained at Bridgeport are not to be expected, because only a few cars are available in each place, and complete lines cannot be equipped with them.

SAFETY CAR OPERATION ON A BUSY STREET IN BRIDGEPORT, CONN.

In the second monthly news letter of the electric railway section of the National Safety Council, H. B. Adams, safety supervisor Chicago, Aurora & Elgin Electric Railroad, Aurora, Ill., makes a constructive suggestion. This is that when electric railways get out printed matter along safety lines 150 copies of each piece be sent him for distribution to the members of the section with the monthly letters. This will conduce to economy in mailing expense and will greatly facilitate the safety work of members.

Treatment of Loose Railway Drum Controller Cylinders

BY R. S. BEERS
General Electric Company, Schenectady, N. Y.

THE body castings of all K-type railway controllers are made of brass. This is to prevent as far as possible the distortion of the magnetic blowout field. For the same reason the older types of controllers, without the individual finger blowout, have a brass cap plate. In drum controllers for direct current at lower voltages, as well as in those for alternating current, cast iron has been successfully used for the body castings.

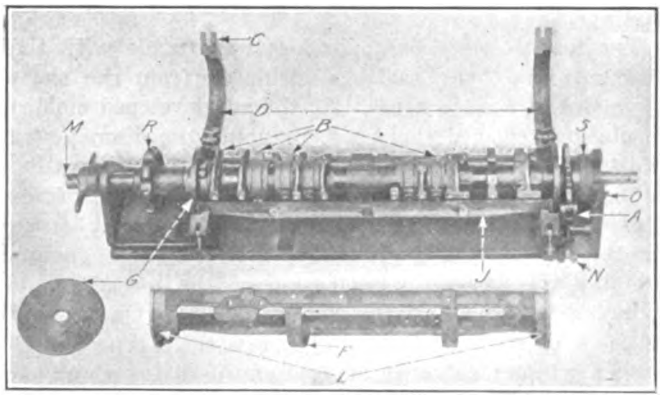
The first K-controller cylinders were made with the segments and body castings insulated from the shaft by means of a wood drum. As the art developed molded insulation replaced the wood, reducing the diameter of the cylinder casting and allowing a better separation of adjacent fingers and segments by the arc deflector plates. Cylinders made in this manner eventually loosen on the shaft from the hammer blow of the segments striking the fingers, as well as from the jar when the cylinder is turned to the "off" position. On account of the body castings becoming loose a third type of controller cylinder has been devised and used for a number of years. This is known as the "hexagon-shaft type," and is now furnished with all K-type controllers. It consists of a hexagon steel shaft wrapped with a tough insulation that is molded to the shape of the shaft. The body castings are provided with a hexagonal hole and are held firmly to the shaft by set screws and keys. This type of construction effectually prevents the body castings from becoming loose.

When cylinders of the hexagon-shaft type are assembled it is essential that a felt or cloth washer be used at each end of the body casting, as otherwise small particles of copper from the fingers and segments will work their way between the body castings and shaft and eventually cause a short-circuit between two adjacent body castings.

When the body castings on a cylinder of the round-shaft molded-insulation type become loose, either one of two methods may be used to correct it. The first is to replace it with a cylinder of the hexagon-shaft type and prevent a repetition of the trouble. While this is the most expensive method it is urgently recommended, particularly where there are but few cylinders to be repaired. Where there are many controllers to be repaired and a man can be well trained in the repair work the second method of reinsulating the old cylinders is the most economical. While reinsulating old cylinders costs little for new material, since only the the insulation has to be purchased, a considerable original expense for a heating fixture must be incurred, and skill in manipulation must be attained by long practice before satisfactory results can be expected.

The usual practice is to heat the old cylinder sufficiently so that the body castings can be easily removed; then all the old insulation is cleaned from the shaft and body castings. The new insulating bushings and keys are put on the shaft and the body castings are slipped over the bushings, enough bushings are used to give an over-all length of about 2½ in. more than the length of the insulation on a completed cylinder.

Referring to the accompanying illustration which is for a K-28 controller, it will be noted that the cylinder is put in the lower half of the cradle *J* and turned until the off-position star-wheel notch is approximately in line with the parting line of the cradle. Then the body castings are shifted until the segment screwholes register with similar holes in the cradle, and the body castings are fastened to the cradle by screws through these holes. The clamps *B* should be put on the cylinder and screwed up tight. These clamps form a solid wall between the adjacent body castings so that pressure can be applied to force the compound into all the space between the shaft and body castings. When sufficient compound has been forced in this is indicated in a general way by its squeezing out through the cracks between clamps and body castings. The disk *G* and the collar *S* should be put on the shaft and the cylinder and cradle placed in the fixture.



HEATING FIXTURE FOR REINSULATING K-28 CONTROLLER

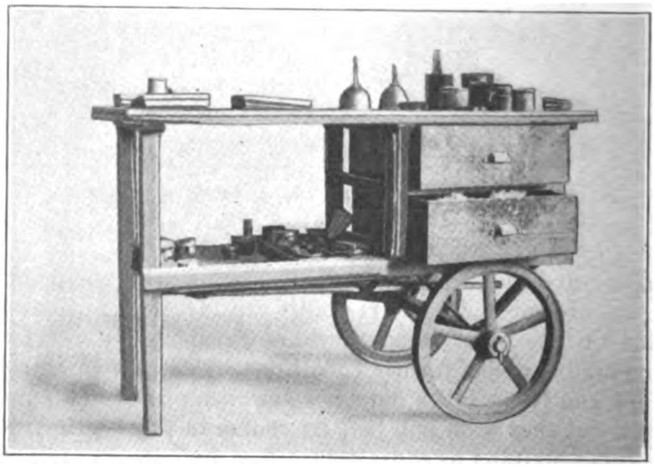
The shaft should then be centered by means of screw *M* which will bring the star wheel in line with the pawl *A*. The pawl should be placed in the off-position notch of the star wheel, and the wing nuts *N* and *O* tightened to hold the shaft firmly in place. The upper half of the cradle *F* is now put on, the halves of the cradle are fastened together, and the cradle and castings on the insulation are turned until pins *D* register with holes *L* in the cradle *F*. The clamps containing the pins should then be fastened. This completes the setting up operation and the cylinder is ready for heating.

Originally a gas fixture was used for heating. This has the disadvantages of poor heat control and the likelihood of overheating the compound on the outer surface without softening it around the shaft. The best heating device is a simple electric oven made of sheet steel lined with asbestos and in the shape of a controller cover. If its dimensions are about 13 in. long, 13 in. high and 13 in. wide, and the ends are open, it can be easily placed over the heating fixture and the ends closed with loose pieces of sheet steel or transite. An oven of these dimensions will cover about half the cylinder as it should because the compound cannot be forced to the far end of the cylinder with sufficient pressure if the entire cylinder is heated on account of the leaks between the clamps *B* and the body castings. For this reason the section nearer the star wheel and farther from the pressure wheel *R* should be heated first.

The heating element can be made up of resistance wire wound like a coiled spring and cleated to the inside of the oven. Five or 6 ft. of flexible lead should be used to connect the oven to the current source so that it may be moved readily. The resistance should absorb about 1600 watts, or 3 amp. from a trolley circuit. The oven should have a small hole in the top near the center so that a thermometer can be put in, and a temperature of between 90 and 110 deg. C. (195 and 230 deg. F.) maintained while heating the cylinder. This temperature will soften the insulation in from ten to fifteen minutes so that it will readily flow when pressure is applied by the handwheel *R*. Pressure should be applied gradually until the compound is forced out between the clamps and body castings. The oven should now be moved over the lower half of the cylinder and this section heated and pressure applied. As the cylinder is thoroughly warm only about ten minutes will be needed before the insulation is soft enough to flow under pressure. With this operation the pressure wheel *R* should be turned up until the disk *G* strikes the clamping ring *C*. This completes the heating operation, but the cylinder should remain in the heating fixture for fifteen or twenty minutes so that the compound may cool and harden sufficiently to hold the body castings in place when the fixture and cradle are removed.

Handy Portable Table for Car Painters

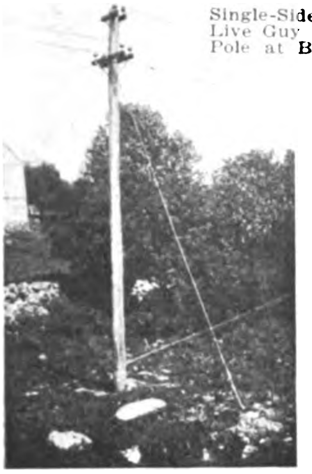
THE accompanying picture shows a form of table which has proved to be a great convenience to the finishers in the paint shop of the Rhode Island Company, Providence, R. I. The top is covered with a heavy glass plate, and the shelf and drawers provide convenient receptacles for waste, sand paper, etc.



PORTABLE WORK TABLE FOR CAR FINISHER OR SIGN PAINTER

The tables are run into the oil room or the sign room at night, where they are out of the way and always available for immediate use.

The Sheffield (England) *Daily Telegraph* recently printed results of an interview with the city surveyor who paid a tribute to the electric welding process in enabling the Sheffield Tramways to maintain track through the war period. Upward of 8000 joints have been made and these have stood up very well.

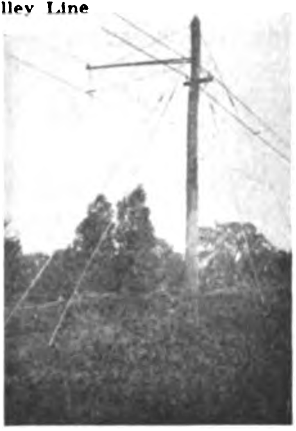


Single-Side Storm Guy; Live Guy from Next Pole at Base

Examples of Pole Guying from Other Fields

This Article Deals Especially with Protection Against Strains Due to Storms—It Refers Also In An Introductory Way to the Subject of Pole Preservation

BY CHARLES RUFUS HARTE
Construction Engineer, The Connecticut Company, New Haven, Conn.



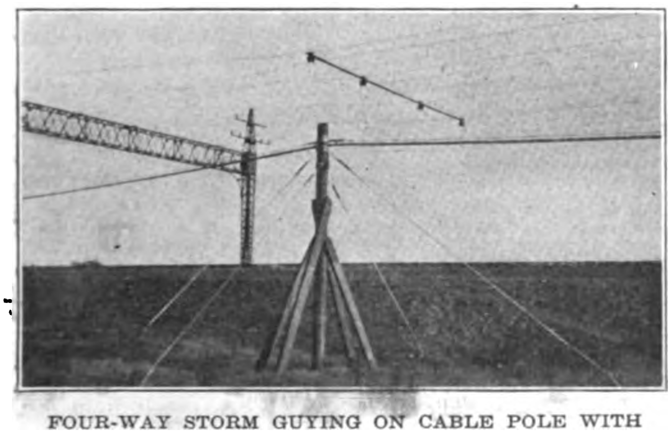
Four-Way Storm Guy on Trolley Line

THE reader of this series of articles, on observing the title of the present one, may be inclined to ask as did the man who fell asleep in the midst of a curtain lecture, and was waked for further words by the angry lady, "Yet or again?" but the subject is of sufficient importance to warrant considerable attention, particularly since, although it has been carefully worked up and standardized by the oldest and largest users of pole lines, very little of the details seems to be known outside of telegraph and telephone circles. That any considerable body of men follow a given practice does not necessarily prove that it is right, but where question of its correctness does arise the fact of such general use is helpful evidence that it is not a previously untried and therefore questionable procedure; while the fact that it has been continued for some time is at least reasonable ground for the presumption that it is successful. It frequently happens that the authorities having jurisdiction possess ideas of their own as to what is proper construction, or that the owner of a paralleling line or an abuttor becomes concerned over possible dangers from the line, or it may be that the line has a neighbor dangerous because of scanty guying. In such times knowledge of what "the other fellows" do is invaluable, for to the average commission or court actual satisfactory practice is worth any amount of calculations.

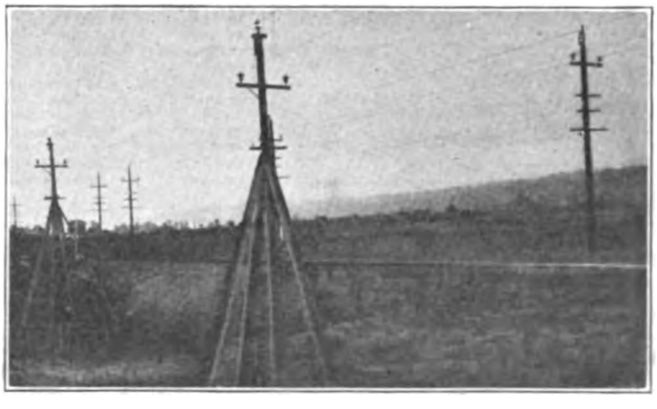
Storm guying, to protect the line from damage by wind and sleet storms, is in general applied to straight sections, or to curves so gradual as to require no guying to meet the "pull;" it is in addition to such guying as has been discussed heretofore, and while primarily intended to meet the special stresses of storms, it also serves to strengthen the line very materially against other disturbances.

It is evident that there are three factors in the effect of a given storm on a line: (1) The length of the section between main anchor points, (2) the lengths of the individual spans in the section and (3) the number of wires in the line. The first two are constant for any given line, practically throughout its life. The third is quite likely to be materially increased in the course of time with the development of business, particularly in the case of the communication companies. As will be seen by reference to the accompanying table the Western Union and the American Telephone & Telegraph companies provide for this contingency by reducing practically by half the distances between existing storm guys as soon as the number of wires carried increases beyond certain limits. In a few instances in addition the guying at the old points is increased.

Storm guys do not in any way differ from other guys in make-up, except that it is considered desirable to give them independent anchors, and not to attach them to the butts of other poles of the line; for the same reason, that is, that they may be unaffected by storm troubles, they should not be attached to trees. The Western Union employs 4000-lb. strand for lines of 12-wire capacity, carrying at least seven wires, 6000-lb.



FOUR-WAY STORM GUYING ON CABLE POLE WITH LARGE SHOE



A GOOD EXAMPLE OF STORM BRACING OF A TRANSMISSION LINE strand for larger lines carrying from eleven to fifty wires, and 10,000-lb. strand for lines carrying from fifty-one to eighty wires, except that, if the increase in loading normally would require 10,000-lb. strand on a pole already guyed with 6000-lb. strand, these latter are not disturbed, but are reinforced by additional 6000-lb. strand guys. The A. T. & T. Co. uses 6000-lb. strand, as a rule, on lines of from 40- to 60-wire capacity but employs 10,000-lb. strand on such lines if the guy "lead" is limited to one-fifth or less of its "height," and it also employs the stronger strand on all seventy and eighty-wire lines.

In the point of attachment there is a little difference between the practice of these two companies. The Western Union places all storm guys for 12-wire lines under the first (the top) gain, but for lines of greater

Storm Guy Spacing, Telephone and Telegraph Practice

Poles per Mile	Spans, Feet	Size of Line, Wires Ultimate	Size of Line, Wires Present	No. of Spans in Section	Length of Section in Feet	Location of Storm Guys Spans Apart	Location of Storm Guys Feet Apart	Limits of Odd Group Spans	Limits of Odd Group Feet
					WESTERN UNION				
Under 40	Over 132	40	10 or fewer	Unlimited	Unlimited	None required			
			11 to 20	63 or fewer	8,316 or less	None required			
				64 or more	8,448 or more	Every 32	4,224	17 to 48	2,244 to 6,336
			21 to 30	31 or fewer	4,092 or less	None required			
				32 or more	4,224 or more	Side every 16; full every 32	Side 2,112; full 4,224	9 to 24	1,188 to 3,168
			31 to 40	31 or fewer	4,092 or less	None required			
				32 or more	4,224 or more	Every 16	2,112	9 to 24	1,188 to 3,168
40 to 49	132 to 107	60	10 or fewer	Unlimited	Unlimited	None required			
			11 to 20	79 or fewer	10,428 or less	None required			
				80 or more	10,560 or more	Every 40	5,280 to 4,280	21 to 60	2,247 to 7,920
			21 to 30	39 or fewer	5,148 or less	None required			
				40 or more	5,280 or more	Every 20	2,640 to 2,140	11 to 30	1,177 to 3,960
			31 to 50	19 or fewer	2,508 or less	None required			
				20 or more	2,640 or more	Side every 10; full every 20	Side 1,320 to 1,070 Full 2,640 to 2,140	6 to 15	642 to 1,980
			51 to 60	19 or fewer	2,508 or less	None required			
				20 or more	2,640 or more	Every 10	1,320 to 1,070	6 to 15	642 to 1,980
50 or more	106 or less	80	10 or fewer	Unlimited	Unlimited	None required			
			11 to 20	111 or fewer	11,766 or less	None required			
				112 or more	11,872 or more	Every 56	5,936	29 to 84	3,074 to 8,904
			21 to 30	55 or fewer	5,830 or less	None required			
				56 or more	5,936 or more	Side every 28; full every 56	Side 2,968; full 5,936	15 to 42	1,590 to 4,452
			31 to 40	55 or fewer	5,830 or less	None required			
				56 or more	5,936 or more	Every 28	2,968	15 to 42	1,590 to 4,452
			41 to 50	27 or fewer	2,862 or less	None required			
				28 or more	2,968 or more	Every 14	1,484	8 to 21	848 to 2,226
			51 to 80	13 or fewer	1,378 or less	None required			
				14 or more	1,484 or more	Side every 7; full every 14	Side 742; full 1,484	5 to 11	530 to 1,166
					A. T. AND T.				
46	130	40	10 or fewer						
			11 to 20	Fewer than 80	Less than 10,400	None required			
				80 to 96	10,400 to 12,480	Middle pole	5,200 to 6,240		
				97 or more	12,610 or more	Every 40 from each end	5,200	9 to 48	1,170 to 6,240
			21 to 30	Fewer than 31	Less than 4,030	None required			
				31 to 60	4,030 to 7,800	Middle pole	2,015 to 3,900		
				61 or more	7,930 or more	Every 20 from each end	2,600	11 to 30	1,430 to 3,900
			31 to 40	Fewer than 16	Less than 2,080	None required			
				16 to 30	2,080 to 3,900	Side only on middle pole	1,040 to 1,950		
				31 or more	4,030 or more	Side every 10; full every 20	Side 1,300; full 2,600	11 to 15*	1,430 to 1,950
46	130	50	21 to 30	Fewer than 80	Less than 10,400	None required			
				80 to 96	10,400 to 12,480	Middle pole	5,200 to 6,240		
				97 or more	12,610 or more	Every 40 from each end	5,200	9-48	1,170 to 6,240
			31 to 40	Fewer than 31	Less than 4,030	None required			
				31 to 60	4,030 to 7,800	Middle pole	2,015 to 3,900		
				61 or more	7,930 or more	Every 20 from each end	2,600	11-30	1,430 to 3,900
			41 to 50	Fewer than 16	Less than 2,080	None required			
				16 to 30	2,080 to 3,900	Middle pole	1,040 to 1,950		
				31 or more	4,030 or more	Side every 10; full every 20	Side 1,300; full 2,600	11 15*	1,430 to 1,950
46	130	60	21 to 30	Fewer than 112	Less than 14,560	None required			
				112 to 124	14,560 to 16,120	Middle pole	7,280 to 8,060		
				125 or more	16,250 or more	Every 56 from each end	7,280	7 to 62	910 to 8,060
			31 to 40	Fewer than 46	Less than 5,980	None required			
				46 to 62	5,980 to 8,060	Middle pole	2,990 to 4,030		
				63 or more	8,190 or more	Every 28 from each end	3,640	7 to 45	910 to 5,850
			41 to 50	Fewer than 20	Less than 2,600	None required			
				20 to 34	2,600 to 4,420	Middle pole	1,300 to 2,210		
				35 or more	4,550 or more	Every 14 from each end	1,820	7 to 17	910 to 2,250
			51 to 60	Fewer than 10	Less than 1,300	None required			
				10 to 17	1,300 to 2,210	Side only on middle pole	650 to 1,105		
				18 or more	2,340 or more	Side every 7; full every 14	Side 910; full 1,820	7 to 9 †	910 to 1,170
53	100	70	21 to 30	Fewer than 112	Less than 11,200	None required			
				112 to 124	11,200 to 12,400	Middle pole	5,600 to 6,200		
				125 or more	12,500 or more	Every 56 from each end	5,600	7 to 62	700 to 6,200
			31 to 40	Fewer than 46	Less than 4,600	None required			
				46 to 62	4,600 to 6,200	Middle pole	2,300 to 3,100		
				63 or more	6,300 or more	Every 28 from each end	2,800	7 to 45	700 to 4,500
			41 to 50	Fewer than 20	Less than 2,000	None required			
				20 to 34	2,000 to 3,400	Middle pole	1,000 to 1,700		
				35 or more	3,500 or more	Every 14 from each end	1,400	7 to 17	700 to 1,700
			51 to 70	Fewer than 10	Less than 1,000	None required			
				10 to 17	1,000 to 1,700	Side only on middle pole	500 to 850		
				18 or more	1,900 or more	Side every 7; full every 14	Side 700; full 1,400	7 to 9 †	700 to 900
59	90	80	21 to 30	Fewer than 112	Less than 10,080	None required			
				112 to 124	10,080 to 11,160	Middle pole	5,040 to 5,580		
				125 or more	11,250 or more	Every 56 from each end	5,040	7 to 62	630 to 5,580
			31 to 40	Fewer than 46	Less than 4,140	None required			
				46 to 62	4,140 to 5,580	Middle pole	2,070 to 2,790		
				63 or more	5,670 or more	Every 28 from each end	2,520	7 to 45	630 to 4,050
			41 to 60	Fewer than 20	Less than 1,800	None required			
				20 to 34	1,800 to 3,060	Middle pole	900 to 1,530		
				35 or more	3,150 or more	Every 14 from each end	1,260	7 to 17	630 to 1,530
			61 to 80	Fewer than 10	Less than 900	None required			
				10 to 17	900 to 1,530	Side only on middle pole	450 to 765		
				18 or more	1,620 or more	Side every 7; full every 14	Side 630; full 1260	7 to 9 †	630 to 810

The odd group is kept within the limits marked * or † by omitting nearest guys if these reduce it too much, or by putting side guys on middle pole, if otherwise it would be too long.

capacity puts the first head guys under the first gain, the first side guys under the second gain, the second set of head guys, if such are required, under the third gain, and the second side guys under the fourth gain. The A. T. & T. Co. places all guys under the second gain, except at terminal poles taking two 6000-lb. guys, where the second guy goes below the fourth gain.

Where it is difficult or impossible to place side guys for storm protection, if the nature of the right of way permits, "H" fixtures consisting of two matched-as-to-size poles are often employed, the Western Union in general limiting their use on 41- to 60-wire lines to points where the side-guy lead would be less than one-quarter the height, and on 61- to 80-wire lines to points where the lead would be less than one-third the height. The Western Union sets the poles vertical and 6 ft. 3 in. apart center to center, and braces the crossarms with one strap from each pole, located on the inside. The A. T. & T. Co. sets the butts about 7 ft. apart, center to center, and rakes the tops toward each other to about 18 in. apart. The crossarms have a single strap brace from each pole, all but those on the bottom arm being on the outside. The bottom arm is braced inside. The crossarms themselves take standard spacing. If the poles are vertical, standard arms can be used, although the pole pins are apt to be too close; with raked poles there is almost certain to be interference unless special arms are employed, or unless where two are close together one is not used.

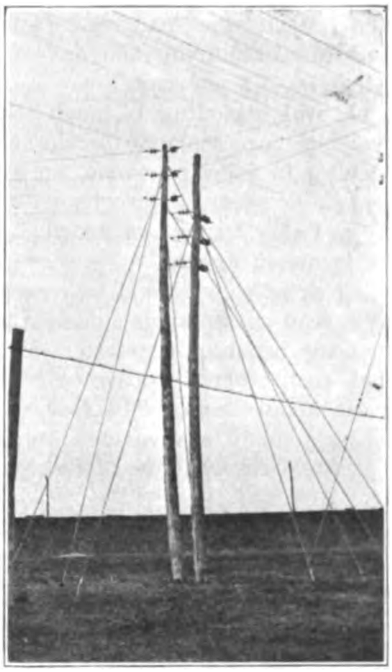
The H-frame is considered the equivalent of side guys in both directions; if it requires head guys these, if in both directions, are attached to the same pole. If there are two or more adjacent fixtures the head guys are placed on alternate poles, right and left.

Coming now to practice, the Western Union does not storm guy 12-wire lines, except on gradual curves eight or more spans in length on which the average pull is between 2 ft. and 5 ft. (between 1.6 ft. and 3.9 ft. A. T. & T. basis) and then only when more than six wires are installed. With such a curve, between eight and fifteen spans in length, the middle pole is side guyed away from the curve; with a length of more than fifteen spans, every eighth pole, counting from one end, takes such a side guy away from the curve, except that if the last eighth pole leaves only three or fewer spans to the end it is omitted. On lines of more than twelve wires capacity storm guys are employed only upon straight sections and upon curves, the poles of which have a pull not in excess of 3 ft. (2.3 ft. A. T. & T.). The first pole of heavier pull, however, is considered in counting as belonging to the section.

Although at first glance at the storm-guy table there would seem to be marked difference between the Western Union and the A. T. & T. practice, this is largely due to the different classifications of the two companies. The actual results in the main are much the same, the chief difference arising from the fact that the Western Union counts through from one end to the other, making the further end group the old one. unless the section contains just an even number of groups, while the A. T. & T. Co. counts in from both ends, making the middle group the odd one. On lines carrying nearly their ultimate capacity, if laying off the prescribed groups leaves the center group too small, the nearest guys are omitted; if too large, the middle pole is given side guys. The particular limits for both companies are shown in detail on the guying table. The Western Union omits the nearest guy if the odd end group is otherwise too short.

A FEW WORDS ON POLE PRESERVATION

Up to now we have considered elements common to all kinds of overhead construction and before taking up cross arms and pins, which differ according to the nature of their use it may be well to turn back to the subject of preservative treatments for poles.



COMBINED STORM AND ANGLE GUYS

A comparatively few poles are destroyed by fire or by mechanical injury, but by far the most important agent for mischief is decay, in which fungi play the leading part, although bacteria also are involved, but in a way as yet but little understood. Different species of fungi have different methods and results, but in general the spores, which correspond to the seeds of the higher plants, get into the sap wood through some mechanical injury, and, getting the air, moisture and heat without which they cannot develop, extend the thread-like "hypæ," which form the real fungus between the cells forming the wood. In life these cells, the walls of which are cellulose, are first filled with fluid, which gradually dries out while various substances are deposited which tend to color it and to make it waterproof while at the same time it is being covered with increasing thicknesses of newer cells. As time goes on, therefore, these cells become less and less subject to decay, other things being equal, their walls resisting the action of such hyphæ as may extend to them while the layers of cells outside help keep the hyphæ out. Under favorable conditions, however, the hyphæ force their way between the cells, and feeding first upon the sugars, starches and oils in the cells, presently attack and break down the cell walls, converting them into a structureless mass with no strength at all. Bearing in mind the fact that this action can occur only when the fungus has air, moisture and heat, it is obvious that the best way to prevent decay is to keep the fungi out; that next to this would be the elimination of air, moisture and heat, so the fungus could not attack the cell contents; and finally so to treat the cell or the cell contents that the fungus would be poisoned or at least prevented from causing trouble.

Whatever may be the form of the offensive against the fungus, it is clear that reducing the amount of food is a good defensive step and this is effected by "seasoning," or the drying out of as much as is practicable of the fluids, which, however, must not be done too rapidly, for in that case the wood is apt to split and "season check" very badly. The actual time required, and the percentage of moisture which can be removed depends upon the kind of wood, and to a lesser extent, to the time when cut, and the character of the soil in which it grew. Spring-cut wood gets the benefit of all the hot weather; fall-cut wood goes through the winter with but a fraction of the seasoning obtained in the same length of time in the summer, Government records showing that chestnut, spring-cut, reduced its moisture content from 83 per cent to 51.7 per cent in 180 days, while winter-cut stock in the same length of time had reduced its moisture content from 85.6 per cent to 56.8 per cent, and fall-cut stock had gone from 85.4 per cent to 62.2 per cent, requiring 360 days to reduce the moisture content to 47.8 per cent.

Where time permits, natural seasoning is much the best, but it is not infrequently necessary to accelerate the work by artificial drying in kilns or ovens, or by steaming. Wood so treated, however, reabsorbs moisture very rapidly and is liable to be weakened by overheating, particularly in steam drying.

If the poles are to be air dried they should be peeled free of all bark and then spread out on skids sufficiently high to keep them clear of any brush or vegetation, and the poles should not touch each other, in order to give free circulation of the air about them. The Government found that under such conditions various kinds of poles at different points required the following periods in which to season air-dry:

		— Months Required to Season —			
Kind of Pole	Place of Test	Spring Cut	Summer Cut	Autumn Cut	Winter Cut
Chestnut	Parkton, Md	5	4	8	7
Southern white cedar	Wilmington, N. C	3	3	8	5
Northern white cedar	Escanaba, Mich	12	9	7	6
Western red cedar	Wilmington, Calif	4+3	5+6	3+7	3+4
Western yellow pine	Madera County, Calif.	5	3	9	6

(From Forestry Service Bulletin 84.)

With this brief introduction the subject of pole preservation will be left for the time. In a later article it will be taken up in some detail.

Important Committee of C. E. R. A.

THE following committee on interurban freight and motor-truck competition has been appointed in accordance with the resolution adopted at the Indianapolis meeting of the Central Electric Railway Association on Nov. 22, 1918 (see issue of this paper for Nov. 30, page 953): Indiana members—Bert Weedon, Interstate Public Service Company, Indianapolis; J. A. Greenland, Fort Wayne & Northern Indiana Traction Company, Fort Wayne; James H. Drew, Drew Electric & Manufacturing Company, Indianapolis. Michigan members—W. S. Rodger, Detroit United Lines; F. W. Brown, Michigan Railway, Kalamazoo; F. N. Root, Root Spring Scaper Company, Grand Rapids. Ohio members—F. R. Coates, Toledo Railways & Light Company; E. F. Schneider, Cleveland, Southwestern & Columbus Railway, Cleveland; S. D. Hutchins, Westinghouse Traction Brake Company, Columbus.

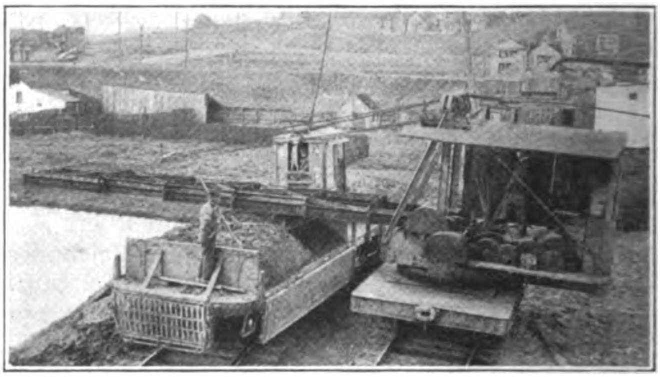
Unloader Empties a 22-Cu.Yd. Car in Fifteen Minutes

An Unloading Machine Made From an Ordinary Five-Ton Portable Crane Is Also Used to Level Off Dirt at the Dump

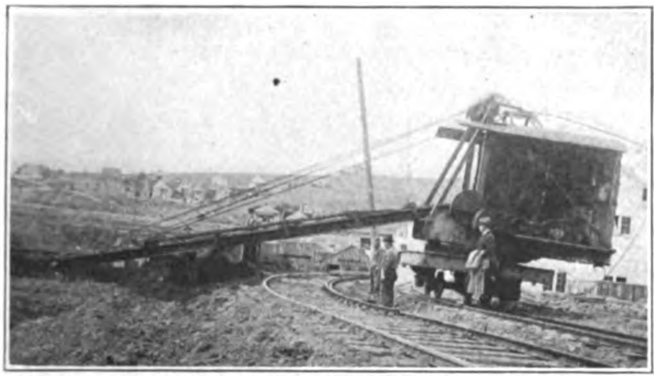
BY W. D. CHAMBERLIN
Assistant Chief Engineer United Railroads of San Francisco

THE United Railroads of San Francisco operates several types of construction cars, including hopper-bottom, side-dump and flat-bottom, the last-named being largely used on track reconstruction jobs for hauling earth from the track trench to the dump. The same dump has been used for several years and is located in the low marsh lands of the city, where a track is run along the edge of a bank about 15 ft. high over which the debris from the car is dumped. Up to about eight months ago the cars were unloaded by hand, a crew either being stationed at the dump all day or being taken to and from the dump on the car. The expense of unloading was considerable, as a gang of six to eight men was usually employed at this work.

The cost of unloading has been greatly reduced by the introduction of an unloading machine designed and built by the United Railroads' engineering department several months ago. This unloader is illustrated in the photographs reproduced herewith. An ordinary 5-ton portable crane, which this company converted into an electric shovel in 1907, is used. The shovel, boom and bucket were removed and replaced with a special 30-ft. boom equipped with a "pusher plate" which rolls along the full length of the boom on four wheels. This pusher plate is actuated by two steel cables attached to the top and bottom of the crane drum which give the plate a forward and backward motion along the boom as desired. The boom and "pusher" are made of two 9-in., 106-lb., steel rails, old cable-slot rails and other second-hand material, the general design being shown in the photographs. The inside base flange of the 9-in rails forms a track on which the "pusher" wheels run. The boom can be raised or lowered and swung in a complete circle as is found necessary. It is attached to the main drum shaft of the crane.


UNLOADING A CAR BY USING THE CAR UNLOADER

Two parallel tracks are located along the dump, the car to be unloaded being placed on the track nearest the edge of the bank and the unloader being placed on the other track opposite the car. The car shown has a cab in the middle. Other cars have a cab at each end, and either type can be used. To unload a car the side boards are dropped and the unloader boom is swung across the car in a horizontal position with the "pusher" at the crane end. The "pusher" is moved forward over the edge of the car floor and the boom is then lowered until the plate rests firmly on the floor. The "pusher" is then moved forward, pushing off one-sixth of the load or nearly 4 cu.yd. The crane is then moved to a new position. Six movements usually unload a 22-yd. car in about fifteen minutes.



LEVELING OFF THE EARTH AT THE EDGE OF THE DUMP

When five or six cars are unloaded each day, the car operator and two helpers handle the car to and from the construction job and also do the unloading. If more cars are handled it is necessary for the operator to stay at the dump all day.

The earth from the car does not immediately roll down the dump bank, as the track is usually too far from the edge. It is forced over the bank by lowering the boom after the car has been removed and moving the "pusher" forward as shown. As the track is 300 ft. long it is necessary to do this only when earth has been dumped all along the track, which may require several days. The dump can be used several months without moving the track nearer the bank, as the 30-ft. boom makes it possible to use the dump with the car track 20 ft. from the edge of the bank, thus also reducing track moving expense.

The device is also used successfully to assist in moving the track out on the new embankment after the material has been scraped off to the proper level. This is done by putting a chain around a tie and thence to the "pusher plate." The boom is then raised slightly and the pusher plate is advanced toward the end of the boom. With usual track spacing and with the unloader on the inner track the outer track can be moved out on the embankment 10 ft. or 12 ft. at a single lift. Recently 120 ft. of track was so moved in several consecutive lifts, the entire operation taking only about twenty minutes. This same work done by the usual hand methods would have taken a crew of six or seven men at least a half day.

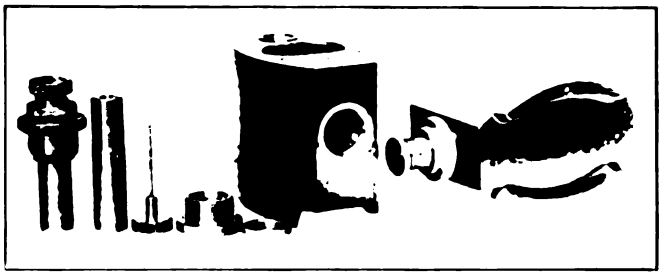
The unloader has also been used for shifting the track on which it stands. This is accomplished by putting the pusher plate at the extreme end of the boom and chaining it to a tie. The boom is then swung sidewise. The track can be moved 2 ft. or 3 ft. at a single operation and this process is repeated as the unloader moves along the track. This operation, however, leaves the track in such shape that the unloader cannot again operate on the moved rails until the track has been worked down to its new bed.

There may be questions as to why the unloading process could not be as successfully done by hopper-bottom cars or side-dump cars. Hopper-bottom cars require that the materials be afterwards spread by hand; side-dump cars often require that the men shoveling into the cars lift the material 7 to 9 ft. Even with the side dump cars it is still necessary to level off the dumped material by hand. The flat cars shown in the pictures are only 3½ ft. to 4 ft. above the rail.

The cost of work at the dump has been reduced by the new apparatus to about one-third of the former cost by hand labor. The crane is still available for shovel work if desired, as the unloader boom can be replaced by the shovel boom in a short time.

Device for Use in Measuring Dielectric Strength of Oils

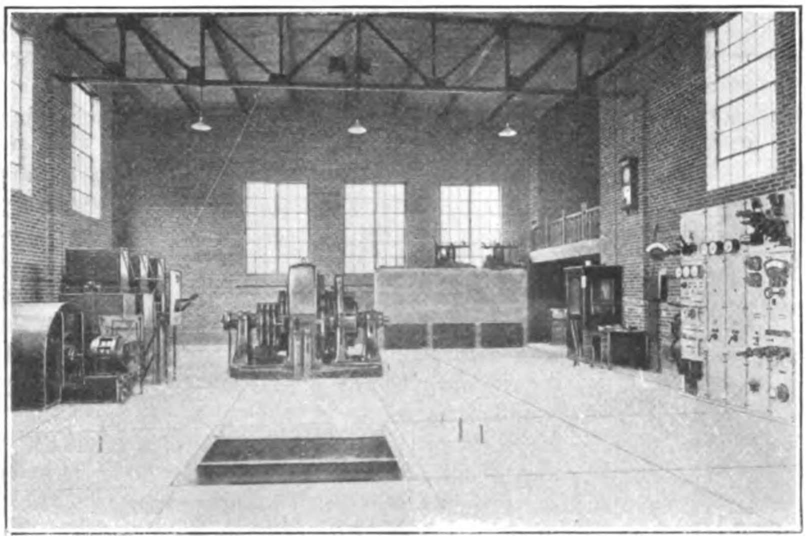
IN MEASURING the dielectric strength of oil it is necessary to immerse a spark gap in the oil. To do this ordinarily requires a large sample of oil and a high voltage for use across the gap. The Westinghouse Electric & Manufacturing Company has just developed a device for the purpose of securing reliable indications with a minimum sample of oil and a relatively low testing voltage. It consists of a molded cup in one piece, with brass electrode bushing threaded to receive packing glands. Electrodes are made from brass cylinders 1 in. in diameter, threaded at one end to receive a lock nut, with a binding post on the outside end for connection to the transformer leads. A steel feeler gage for setting the gap at exactly 0.1 in. is provided and is attached to one of the binding posts when not in use.



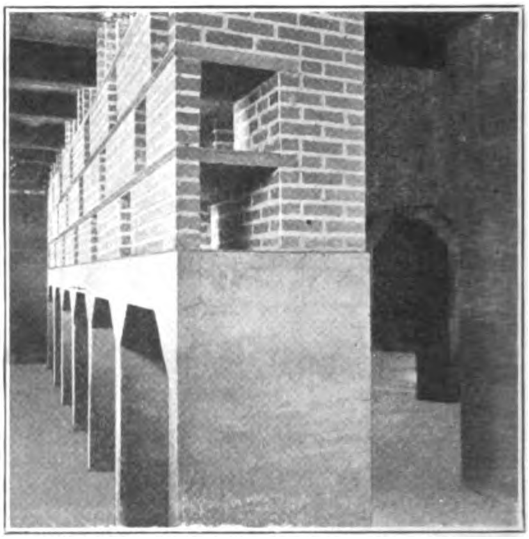
PARTS OF OIL TESTING CUP AND COMPLETE CUP FOR USE IN MEASURING DIELECTRIC STRENGTH OF OIL

The testing cup weighs 6½ leb. net and requires a 4-oz. sample of oil. A voltage of 25,000 is sufficient for reliable testing, and seldom more than 30,000 volts would be required to discharge across the standard gap (0.1 in.) through any insulating oil.

The subways in New York are not the only railways which have trouble in handling the crowds at the rush hour. In reply to complaints of congestion on the London Underground Railways and the London General Omnibus Company, H. E. Blain, operating manager, stated that the Underground Railways are carrying 30 per cent more passengers than in the pre-war days. To insure public safety it has been necessary at times to limit the rate at which passengers are admitted to the underground stations.



INTERIOR VIEW—NOTE PROVISION FOR ADDITIONAL UNITS.



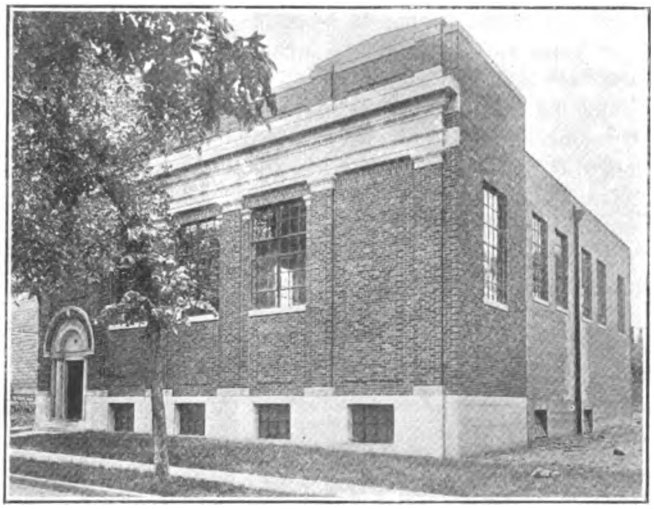
HIGH-TENSION BUS STRUCTURE ON CONCRETE BENCH

A Well-Lighted and Well-Ventilated Substation

New Substation of Kansas City Railways Is Fourth in Rehabilitation Program, Is of Pleasing Architecture and Has High-Tension Equipment and Oil Switches Advantageously Located

By S. H. GRAUTEN
Electrical Engineer Kansas City (Mo.) Railways

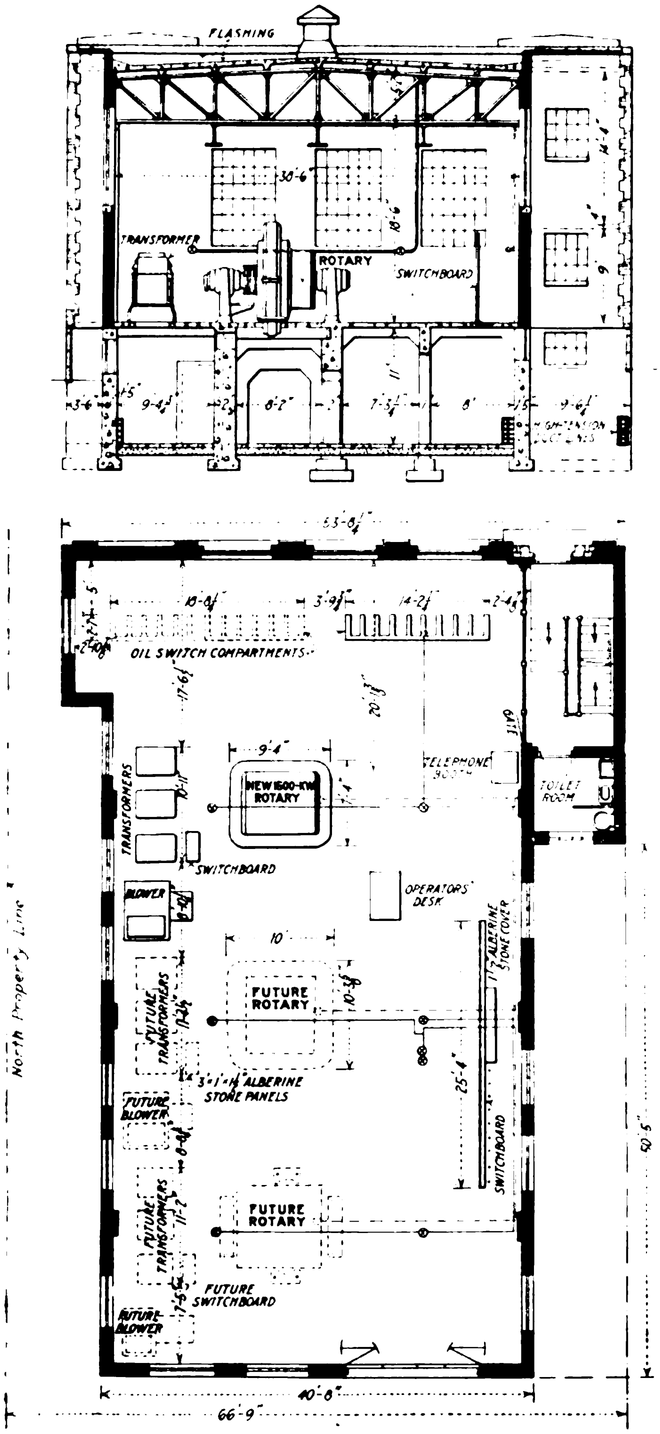
THE Kansas City Railways recently placed in commission a new substation located at Thirty-first Street and Montgall Avenue, in the rapidly growing southeast section of the city. It is the fourth of seven substations included in the rehabilitation program of the distribution system of this company. It is within 300 ft. of the intersection of the Thirty-first Street and Prospect Avenue car line, which intersection was the theoretically best location. Considerable expense was saved, however, by selecting a lot around the corner from this intersection, back to back with the ideal site.



A SUBSTATION SUITED TO A RESIDENCE DISTRICT

The substation is designed for three units with ample space for the largest units manufactured. The initial installation consists of one 1500-kw. unit, which is the first unit of less than 3000-kw. capacity purchased by this company in several years. The use of the smaller unit is, however, in line with the tendency to locate substations at more frequent intervals. As the building is located on a residential street it was necessary to provide an exterior which would harmonize with the immediate surroundings. The services of an excellent firm of architects were secured to insure an attractive building facade. The general plans were prepared by our draftsmen. The front of the building is shown in the accompanying elevation. The front and the returns are of brown matt-finished brick of mingled shades, with cornice, coping, sills and entrance details of Carthage limestone. The sash are of steel with maximum ventilator sections. The roof slab is of concrete carried on steel trusses. The shape of the building insures light and air regardless of the building up of the adjoining property, and at the same time is well suited to the future development of the site. The entrance is located in the southeast corner of the building, one short flight leading up to the main floor and a slightly longer flight down to the basement from the landing on the entrance level. In the same wing is located the toilet, and the room directly below is used as a battery room. A gallery is installed in the area above the entrance and toilet and this will serve for lightning arresters for future overhead high-tension lines. A feature of the layout is the location of the high-tension equipment and oil switches at the front end of the building instead of the usual position back of the transformers. This arrangement has the advantage of removing the high-tension equipment from the confines of the air chamber and also places the oil switches within easy vision of the operator. The air chamber is thus left clear of the equipment which usually largely fills it, the only high-tension equipment in the chamber being an end bell under each bank of transformers and the leads to the transformer terminals.

The substation was laid out with a view to providing ample operating space, light and ventilation. The rotary foundations, instead of being the usual solid walls, are constructed of heavy columns and girders, allowing free circulation of air to the machines. The main floor is sufficiently above grade to permit the use of windows in the basement for the entrance of light and air while the windows on the main floor have been placed unusually high. Three ball-bearing ventilators are installed on the roof. There is thus provided a definite natural circulation of air, the cool air, entering through the basement windows, rises through the rotary openings and passes out through the upper sash and ventilators.



VERTICAL SECTION AND FLOOR PLAN OF NEW SUBSTATION

The oil switches used are the General Electric type H-3 with sub-cell disconnect switches. As the arrangement places all of the operating equipment on the main floor—there is no need for the operator to go to the basement during switching operations. This saves time and cuts down the risk of mistakes. The high-tension bus structure, of gray pressed brick with horizontal slabs of reinforced concrete, is built on a concrete bench 5 ft. 5 in. high, raising the bus from the floor and shortening the leads to the oil switches located directly above.

The rotary at present installed is of the latest design General Electric 1500-kw., six-phase, 25-cycle machines, with commutating poles. It is arranged to start from a single tap with resistance grids in the starting leads to limit the starting current. The transformers are of the single-phase air-blast type, wound for both 6600 and 32,000 volts with two 2½ per cent taps and four 2½ per cent taps below these voltages. They have an inherent reactance of about 12 per cent. The transformers are at present operated at 6600 volts, the 13,-200-volt winding being provided for future increase in transmission voltage.

The switchboard consists of the usual rotary alternating-current and direct-current panels, high-tension panels, a battery panel and 600-volt feeder panels. The feeder panels are equipped with an auxiliary bus and double-throw switches, allowing cleaning of breakers or repair without interruption of service, and without the use of jumpers on the back of the panels. The oil-switch control circuits are supplied from an Exide D-7 control battery, which is of sufficient capacity to carry the emergency-lighting circuits. The battery is arranged to charge nominally from a 4-kw. motor generator set but may be charged through a fixed resistance from the 600-volt bus. The control circuits may also be carried on the motor-generator set. An automatic throw-over switch is provided, which, on failure of usual 600-volt lighting, automatically energizes the emergency lights from the battery. This switch also protects the battery from discharging back into the feeders, should the battery happen to be on charge at the time of loss of 600-volt power by opening the 600-volt charging circuit to battery.

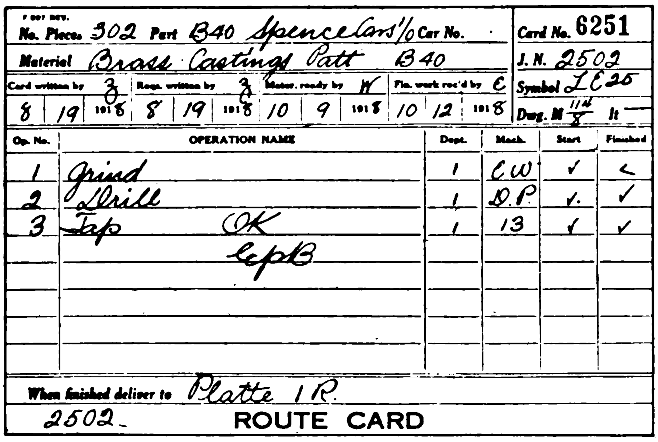
The 600-volt feeders now leave the building overhead through the alley at the rear although provision is made so that they can be taken out underground in the future.

The Engineering Experiment Station of the University of Illinois, Urbana, Ill., maintains a number of research graduate assistanships in engineering in connection with which there is an annual stipend of $500 with freedom from all except matriculation and diploma fees. One-half the assistant's time is available for graduate study, and the assistantship must be accepted for two consecutive collegiate years at the end of which period the degree of master of science will be conferred if earned. Additional information can be secured by addressing the director of the station.

Routing a Job Through the Shop

The Denver Tramway Develops a New Plan for Making an Accurate Comparison of Costs on Shop Work

IT IS an essential to every railroad company to know accurately the cost of every repair and manufacturing job put through the shop. It is not sufficient to determine the daily cost by adding the cost of material used to the wages of the force plus a certain percentage for overhead charges. Certain methods of doing a piece of work may be so costly as to make it advisable, in the case of manufacturing small equipment, to purchase the finished article and in the case of repair jobs, either to find a new method of doing the work or to have it done outside. There is no way to determine these facts without some systematic record of every job, and incidentally this checks on the work of each man and enables the superintendent or foreman to "separate the sheep from the goats" as it were, and know what men are in line for promotion and higher pay. The Denver Tramway has developed such a systematic record in the form of a work-order route card, the first cause of its origination having been the trouble experienced in properly making charges against unauthorized work. This route card, a sample of which is here reproduced, offers protection against lost charges, gives an accurate record of the cost of any piece of work, and makes it possible to compute operating expenses covering any certain period. It also gives a method for comparing costs, and for determining whether it is cheaper to buy or to manufacture a given article.



F 997 REV.

No. Pieces 302 Part B40 Spence Cars 1/0 Car No. Card No. 6251

Material Brass Castings Patt B40 J. N. 2502

Card written by Z 8 19 1918 | Reqs. written by Z 8 19 1918 | Mater. ready by W 10 9 1918 | Fin. work rec'd by C 10 12 1918 | Symbol LC25

Dwg. M 114/8 It —

Op. No.	OPERATION NAME	Dept.	Mach.	Start	Finished
1	Grind	1	CW	✓	✓
2	Drill	1	D.P.	✓	✓
3	Tap OK	1	13	✓	✓
	CPB				

When finished deliver to Platte 1 R.

2502. ROUTE CARD

DENVER TRAMWAY SHOP ROUTE CARD

When any department or person wants work done, a detailed description of the work and number of pieces wanted is sent to the mechanical department office. Here the clerk writes out the card in duplicate, filling in the number of pieces to be manufactured or repaired and, if it is some part of a car which is to be worked on, the number of the part and the number of the car are given. A complete description of the part follows and below this the clerk initials the card, giving the date. If the same clerk makes the requisitions he writes his initials under that heading, also giving the date. On the card the clerk fills in a list of the operation for completing the work, and in the upper right-hand corner he places the card number, job number, storeroom symbol under which the finished product is listed, and the drawing number, "M" distinguishing the mechanical department from the engineering department, and "It" indicating the item, as more than one item is often shown on a blueprint. Material is prepared by the stockroom, and whoever moves the card to the "material-ready" files initials that space with the date. The original card is then filed in the office.

NO WORK CAN BE DONE WITHOUT A CARD

The duplicate route card with the material is sent to the department doing the work, where it is assigned to a workman by the foreman. Before a workman can start any job he must have such a route card for that particular piece of work. When the workman is ready to start the job he takes his route card to the shop telephone and reports the route-card number, his department number and his name to the time clerk. The time clerk enters this on the time card, together with the route-card number, a description of the work and the job number, stamping the card "Start." The workman in turn fills in his duplicate with department number, his own initials, and checks the column "Start." When the workman has finished the job he again calls the time clerk, who stamps the card "Finished," and places the exact time it has taken to do the work on the time card. The workman in turn checks his card in the "Finished" column. This process follows for each operation through which the piece, or pieces of material must go to complete the work.

At the end of the day, the time cards are checked up and sent to the timekeeper in the auditing department and from these the payroll is made up. When the timekeeper has finished with the card, he forwards it to the cost clerk in the cost department, where the total costs of material and labor are entered on the job sheet.

When the finished work is turned into the storeroom the column "Fin. work rec'd. by........" is checked and the date given, and when the workman calls in "finished" the time clerk writes a move slip which is turned over to the move gang. The finished product is then moved to the destination indicated at the bottom of the route card, and the card is sent to the office where the original is filed for future reference. This card was recently described in the *Tramway Bulletin* by T. H. H. Zebal, chief clerk at the Broadway shops in Denver.

A recent issue of the *New York Railways Employees' Magazine* contains a very interesting report by the head nurse of that company and of the Interborough Rapid Transit Company on the practice followed in fighting the Spanish influenza epidemic in New York last fall. Great hardship was suffered throughout the city because of the lack of nurses but a number of former nurses were found among the company's female employees and they and other employees volunteered to help. During four days of the epidemic, the welfare department had 100 new cases a day among the employees, but after the organization mentioned had been effected, it was possible to handle every case. The great handicap was the inability to get outside assistance, but through volunteers this was taken care of.

Some Mysterious Car Ailments

Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD

A Car That Showed a Preference for 600 Over 1200 Volts

A CERTAIN railway property located in one of the Southwestern states received a shipment of newly equipped cars. Among them was one which gave trouble. This road used both 600 volts and 1200 volts for operating. The car referred to operated all right on 600 volts but as soon as it passed over to the 1200-volt section everything "went dead" (lights, compressor and control), although the dynamotor was running and apparently in good condition. These circuits were fed from the dynamotor through a relay which acted as an overload circuit breaker. This relay would close as the dynamotor started up but would drop out almost immediately. There was a momentary brilliancy of the car lights just before the relay dropped out which indicated a heavy rush of current with corresponding overload.

The equipment manufacturer's engineer, who was assisting in the initial operation of the equipment and following its performance, set out to solve the difficulty. There was no wiring diagram of the circuits available so all control, compressor and lighting circuits were "rung out" for grounds. This proved to be a long, tedious task and was without any beneficial result in solving the trouble. Next the connections on the dynamotor were carefully checked over and it was discovered that some of these were reversed. This mistake in connections caused the voltage for the circuits to be stepped up to 2400 instead of being stepped down to 600 as was intended. This high voltage had caused the overload which made the relay drop out.

A Peculiar Combination that Caused Erratic Operation

A MOTORMAN on a high-speed electric line employing train operation reported his train for irregular functioning. The equipment would operate smoothly for a considerable distance when suddenly the power would die out, and after a short interval the control equipment would suddenly pick up again and operate satisfactorily. He arrived at the terminal several minutes late and the train was taken out of service and turned over to an inspector for examination.

The inspector found one of the receptacles for the train-line jumpers with the cover open and the interior partly filled with snow. There had been a driving snowstorm the night previous and the receptacle cover, which was provided with a closing spring, had not closed due to rust on the hinge pin and an accumulation of ice. One of the receptacle contacts was also found to be bent so that there was barely $\frac{1}{16}$ in. clearance between the contact and the receptacle casting. As the snow melted, the water ran down the inside of the receptacle casing and caused a momentary short-circuit from the bent contact. The cover in its open position also touched the buffer iron at the end of the car and thus grounded the casing, which was ordinarily insulated by bushings. The combination of all these various elements caused a momentary grounding of the control line, which would thus drop off the power from the motors. The ground immediately cleared as the water ran away and normal operation was again restored.

To prevent a recurrence of the trouble all terminal men were instructed to make frequent inspections of receptacles during stormy weather and to be sure the covers were closed properly. A periodic oiling of the hinge pins prevented rusting. The operating department was also cautioned to use more care in inserting and removing jumpers.

How One Class of Circuit-Breaker Trouble on Multiple-Unit Equipments Was Remedied

ON ONE large system in this country, considerable trouble was experienced with the circuit breakers used with multiple-unit equipments. This control equipment was so arranged that the circuit breaker opened the motor circuit every time the controller was shut off. Due to the large motors which it was necessary to use on this equipment, the service on the circuit breakers was very severe and a great deal of trouble was experienced with the contact tips becoming loose. These tips were fastened to the stationary and movable head in the circuit breakers by means of countersunk head screws, and when the contacts would become loose severe arcing and burning resulted. It was then extremely difficult to remove the screws and fit on new contacts as the screws became welded to the bases and the heads were often burned away. In many cases contacts were blown entirely off the bases, and even those which remained in place until worn out had to be replaced every three or four months. These conditions resulted in a number of breakers being badly damaged and burned every month, and at times as many as four or five circuit breakers would be burned out in a week. These had to be entirely rebuilt.

To eliminate this trouble it was proposed that the contact tips be soldered to the fingers in addition to being held by means of the screw. The objection was immediately raised that this would make it a great deal more difficult to replace the contacts and would require additional help and facilities to carry on the extra work. The man who made the suggestion of soldering maintained that with the good contact the tips should wear for many months, and while there would be more work in renewing a tip when worn out the number to be renewed would be reduced to such an extent that no more help would be required in the long run and the number of breakers burned up would be greatly reduced. After careful consideration the plan was put into effect and its value was clearly demonstrated within a few weeks. Instead of replacing contact tips in the inspection houses every three or four months, these tips now run for an entire overhauling period, and have to be renewed only when the car comes into the main shop for overhauling. The annoyance of loose tips has been eliminated and the destruction of one of these circuit breakers is now a very rare occurrence.

Some Uncommon Causes for Blown Fuses

FUSES are the safety-valves of electrical equipment and when they blow the cause is usually sought as a short-circuit or ground in the circuits which they protect. The following cases of fuses blowing occurred on a large railway property using a third-rail contact system. The cars were equipped with multiple-unit control and were operated in trains. A bus line of No. 00 cable ran throughout the train and a 750-amp. copper ribbon fuse on each car was connected in series with the bus line.

Considerable trouble was experienced due to these fuses blowing. In several cases the leads to the fuses were blown out of their terminals. The number of such troubles was greatest during the rush hours when there was a heavy peak load. Tests made on the equipment showed everything in normal condition with no signs of grounds or short-circuits that would be expected to cause such trouble. A further investigation was made by installing an ammeter in the bus line and by taking frequent readings of current while the train was in service. It was found that the bus line frequently carried current far in excess of that taken by the car equipment and greater than the capacity of the 750-amp. fuses. This excess current came from the bus line carrying part of the third-rail current due to its being connected in parallel with the third-rail. Overloads were also caused by the bus line bridging sections of third-rail which were fed from different substations.

After discovering the cause a remedy was applied in the form of a high capacity low resistance which was installed in the bus line so as to limit this current to a safe value.

Another peculiar case of fuses blowing was experienced due to these same conditions. The shoe fuses were blown on a line of fourteen cars which were out of service at the time due to a track laborer accidentally dropping a crowbar across the third-rail and running rail. The tremendous current that followed found an easy path through the car wiring in which the fuses were installed and the blowing of the fuses resulted.

A Train That Insisted on Going in the Wrong Direction

A TRAIN fully loaded with passengers was waiting at the terminal for the signal to proceed. The starting gong rang, the motorman threw his master-controller handle to the starting position and the train started, but in the opposite direction from that expected. It was moving rapidly toward the bumping block and a serious accident impended when the motorman threw off his power and gave an emergency application to the brakes. After bringing the train to a sudden stop the motorman blew his whistle for an electrician. This worthy personage came on the run and looking up at the number of the first car of the train recognized it as a "jonah." This car had been reported for several days previously as giving trouble, but nothing wrong could be found with it. The electrician first looked at the reversers on the train and found them thrown to the reverse position. Next he opened up the controller, which was of a multiple-unit type, on the head car which had previously been reported for trouble. On examining the interlocks he found one four-point interlock short-circuited by a washer at the end of the interlock contacts. This particular interlock governed the operation of the reversers and was the immediate cause of the trouble. By operating this interlock by hand the electrician found that the fingers were "stubbing." The contacts did not move to their proper position and the cylinder to which they were attached rebounded. The electrician bent the ends of the fingers slightly with a pair of pliers to overcome the immediate trouble and then allowed the train to go into service.

As a result of this and similar troubles with this type of interlock it was found necessary to redesign the contacts and fingers. The point of support for these latter was moved out so as to decrease the danger of stubbing and the length of the fingers and their shape were changed to provide easier approaches for the contacts and greater flexibility in their movement. These remedies effectually eliminated trouble of this class.

The Banner Mystery Solved by a Green Inspector

THE length of the long line of stalled cars was increasing rapidly. The passengers were beginning to show their uneasiness at the duration of the detention and employees of the railway were running around endeavoring to locate the source of the trouble. A green inspector ran up the line and found an old single-motor car at the head of the string. The motorman said he did not know what the trouble was, but the car would not start. The inspector looked underneath and seeing but one motor said: "Sure it won't run, you've dropped a motor."

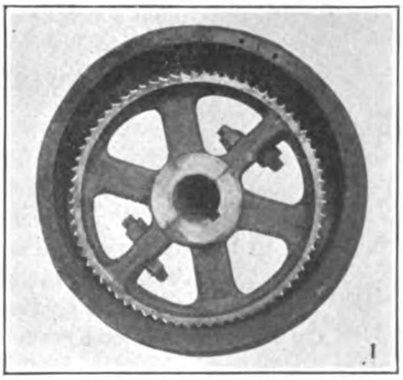
Moral: "Appearances are sometimes deceptive."

Making Emergency Gears to Keep Cars in Service

Gear Was Constructed by Shrinking a Steel Rim Made from Car Wheel Tires On Center Portion of Wornout Gears

By W. C. Butler
General Manager, Pernambuco Tramway & Power Company, Ltd.

NEVER in my experience with electric traction has it been so difficult to keep the wheels turning, as during the last twelve months. This has been especially true with South American railways where the limitation placed on exportation, the present difficulty of ocean shipment, and the attendant delays, have made it exceedingly difficult to obtain any material at all. The Pernambuco Tramways have been subjected to particular hardship, as when the war broke out in 1914 they were in the early stages of construction, with only a few miles of track in actual operation, and with practically no maintenance material on hand. Some construction material had been imported before the war, and due to this we have 65 miles of track, 100 motor cars and fifty trailers in operation. There are still some 20 miles of track to be constructed and additional rolling stock is badly needed, but this must wait until conditions become more nearly normal. Due to our shortage of material while maintaining the equipment in service, we have had to resort to all sorts of schemes and ideas to help us through the emergency. Scrap heaps which have lain for years and had been considered entirely useless have been returned to life and usefulness in a way that would never have been considered a few years ago. The manufacture of home-made gears from worn-out material was one of the things to which we resorted in order to keep our cars in service. Accompanying illustrations show the various stages of manufacture and the construction that was necessary in this work.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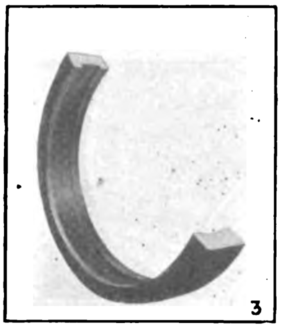
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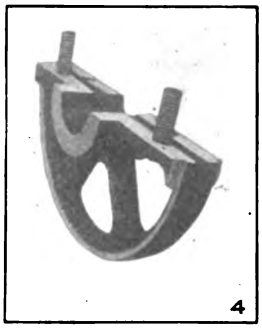
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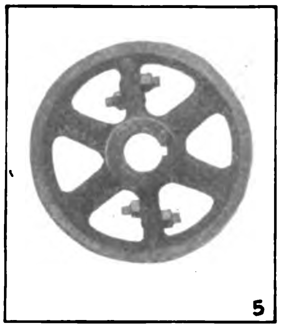
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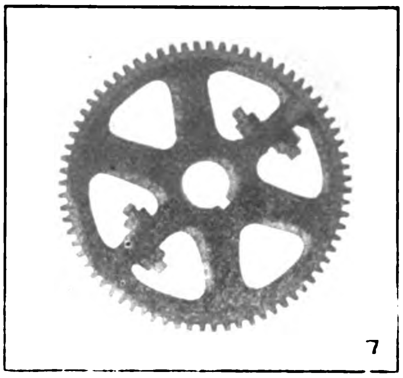
No. 1—Worn-out gear and locomotive tire.
No. 2—Locomotive tire in lathe for turning.
No. 3—Half rim made from locomotive tire ready to shrink on center casting.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No. 4—Half center ready to receive rim.
No. 5—Completed blank ready for milling teeth.
No. 6—Gear in machine having teeth cut.
No. 7—Finished gear.

We were fortunate in having a number of scrapped locomotive tires available from a defunct steam railway, which had been eliminated by electrification. These tires, together with the worn-out gears removed from our equipment, constituted the raw material which we used. The locomotive tire was first roughed out in a wheel lathe to the approximate dimensions necessary for the new gear rim. After this rough turning the tires were cut into two pieces and reduced in the blacksmith shop to the proper radius for gear rims. After this they were turned inside to finished dimensions ready to be shrunk on the half center portion.

The old teeth were turned off from the worn-out gear and arranged with a dovetailed construction for receiving the band. In assembling the half bands were heated uniformly to a cherry red, and put into a vise, when the cold half center was slid into the dovetail and the band was allowed to shrink on. The rim thus gripped the center by means of the dovetail section in such a way as to render it impossible for it to loosen. By referring to the illustration showing a completed blank it will be seen that the ends of the band are machined off to conform to the split of the gear, which prevents the slipping around of the rim in service. A well finished stop-plate is put in these ends, as shown in the illustration. The completed blank was next taken to the milling machine where the teeth were cut. Our milling machine was not intended for such heavy work, and had to be blocked up to take the gear and several cuts had to be taken off before the finishing tool was put through to avoid straining the machine.

No attempt was made at heat treatment for fear of destroying the fit and grip of the band on the center. The old tires used were of very good quality steel and so far these gears have given excellent results with no more appreciable wear than our factory-made cast-steel gears. While home-made manufacture of gearing would not be considered under normal conditions, it was absolutely necessary with us in this case, as by this expedient we were able to keep our cars in service, which would otherwise have been laid up.

Copper-Clad Wire for Use as Span Wire

BY G. H. MCKELWAY
Engineer of Distribution, Brooklyn Rapid Transit System.

THE use of galvanized iron or steel wires for spans has for so many years been universal practice that when anyone hears span wires spoken of the thought of material other than galvanized iron or steel being used does not enter his mind. There have been good reasons for this, as the galvanized wire has, almost without exception, been satisfactory for ordinary service and so cheap that a more expensive wire, even with a longer life, would not be considered because the greater first cost could not be offset by lessened maintenance cost.

The war, however, has changed so many of our ideas that it is possible that, if present prices for material and labor continue long, it will be advisable to substitute another material for the galvanized-iron or steel wire.

The writer became interested in the use of copper-clad wire for spans several years ago when he had the opportunity to observe its use on the lines of two different companies. In both cases the wire was used at points where galvanized wire had not been entirely satisfactory owing to the severe conditions that had to be met. In one location damp, salt air was very hard on the wire while at the other the life of the wire was greatly reduced owing to corrosive fumes in the air.

Accurate information in regard to the performance of the new type of wire can be given for only one of these lines. There the wires have been up for eight years in a location where iron or steel wires would have rusted so badly as to need renewal several years ago. A recent inspection of the copper-clad wire showed it to be in perfect condition and with no signs of rusting.

While the ultimate life of the wire cannot be determined from an eight-year test it seems certain that the life will be more than twice that of galvanized wire under the same conditions.

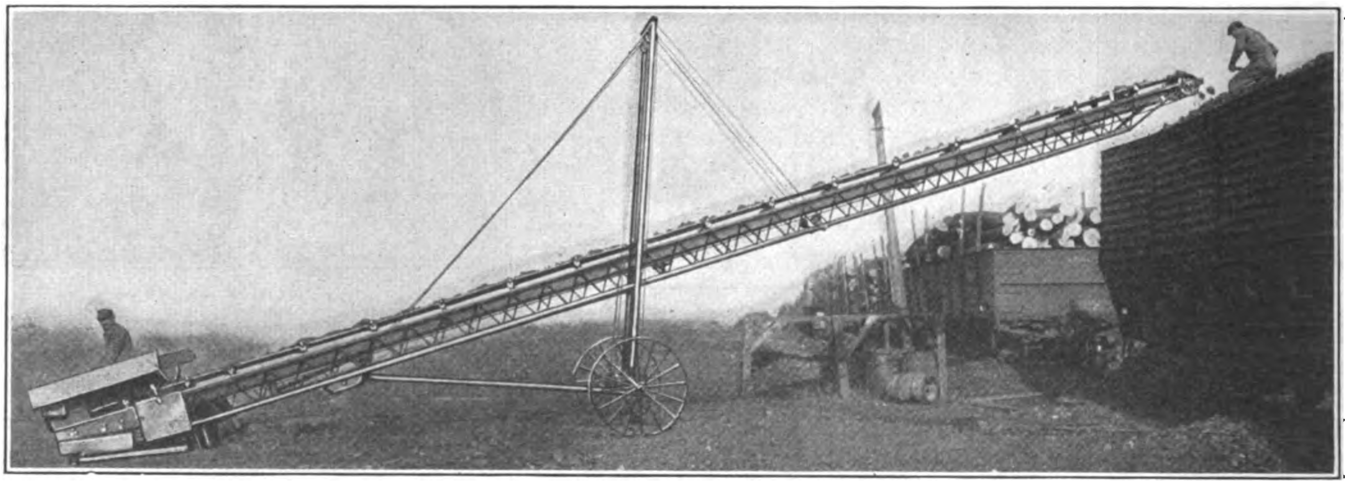
At the time that these installations were made the writer did some figuring on their cost as compared with ordinary span wire, and came to the conclusion that a more extensive use of the copper-clad wire could not be justified except where abnormal conditions existed. Since then, while prices of both kinds of wire have gone up to record figures, a much greater increase has occurred in the labor cost of installing the spans, so that recent figures would appear to justify the use of the copper-clad wire. As conditions and the prices of both labor and material vary so much in different sections of the country, it would be best for each engineer to make sure for himself as to whether or not the installation of the new wire would pay. But it would be well to look into the matter, as the writer is convinced that in many places considerable money could be saved by the adoption of the higher-priced wire.

In conclusion it should be said that the manufacture of the wire referred to in this article is not confined to any one company, as it is produced by at least two manufacturers. The suggestion as to its possible field of usefulness is made only for the reason that it may help someone else to learn of a way to save money.

Portable Belt Conveyor Used for Coal Unloading

IN AN ARTICLE on equipment of the Harvard Avenue yard of the Cleveland Railway, printed in a recent issue of the ELECTRIC RAILWAY JOURNAL, mention was made of a portable belt conveyor which is used there for various loading and unloading operations. In this connection a similar equipment, made by the Barber-Greene Company, Aurora, Ill., and used by the Western United Gas & Electric Company for coal unloading, etc., will be of interest. This equipment is shown in the accompanying halftone and is in use at the Joliet, Ill., plant of this company. The statement is made that with the outfit the company is able to load a car with coke in from two to four hours depending upon the type and size of the car, where formerly it was impossible to load a car in less than from seven to ten hours. At the same time the cost of loading per ton has been reduced approximately 50 per cent.

This particular conveyor utilizes a boom 18 in. square and 51 ft. long and is operated by a 5-hp. electric motor. As shown in the illustration the conveyor is loading cars from the coke stock pile. A more frequent use for the same conveyor is the reverse of this process, in receiving coal direct from the car hoppers and discharging it at the storage pile.



PORTABLE CONVEYOR IN USE FOR LOADING COKE; ALSO USED FOR UNLOADING COKE AND FOR UNLOADING AND RELOADING COAL

LETTERS TO THE EDITORS

Dr. Wilcox on New York City Situation

NEW YORK CITY, Feb. 11, 1919.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 8 a statement appears with respect to the action taken by the City Club of New York in the matter of the local transit problem. A synopsis is given of what purports to be a protest by the committee on public service of the City Club embodied in a letter sent to Mayor Hylan and to the Board of Estimate and Apportionment. My name is mentioned as one of the members of the committee. In order that there may be no misunderstanding of my position in the matter, I wish to make the following explanation. The questions of public policy involved in the application of the local transit companies for increased fares were referred by the board of trustees of the City Club to the committee on public service for a report. After a good deal of deliberation the committee submitted a report which was then modified by the board of trustees in certain important respects and embodied in a letter from the president of the club to the Mayor. Upon two important points covered by the summary published in your JOURNAL, my views are at variance with the recommendations of the City Club.

1. It is pointed out that "municipal ownership does not mean municipal operation." Personally I believe that the logical result of municipal ownership is municipal operation. The difficulties of effective public control over a private operator using public property are in some respects even greater than the difficulties of control where the private operator is using his own property for public service. In advocating municipal operation I do not mean that the utilities should be thrown to the political wolves, but that some special form of administration must be worked out that will be directly responsive to the will of the community which it serves. My philosophy of municipal ownership and operation is not the philosophy of the last resort. I believe that urban transit is a public function and that if we are not ready to attend to our own business it is time for us to get ready; that our efforts should be not to postpone the inevitable as long as possible but rather diligently to set about the necessary preparation for doing what has already been too long postponed.

2. The City Club recommends, among other things, "the necessary legal steps to enable the city to issue income bonds as a first lien against the net revenue of the lines which it may acquire." The committee's report was to the effect that these income bonds should be a first lien against the *gross* revenue. It was the committee's opinion, in which I shared, that a security based upon net revenue would be wholly insufficient to provide a market for municipal transit bonds. This is obviously true in the case of a city which adopts the fundamental policy of the New York subway contracts, by which a low fare is guaranteed on account of the social and civic benefits believed to be involved in cheap transportation at uniform rates. The use of public utility certificates secured by a first lien on the gross revenues of the utility, is, I believe, an invention of the State of Washington. Everything possible should be done to give security to the bonds issued for the purpose in order that the necessary cost of capital may be kept down to a minimum. One of the stock arguments in favor of municipal ownership has been the superior credit of the cities as compared with private companies, and now that the problem of financing the street railway business upon any terms has become most acute, it is this possibility of utilizing public credit where private credit has failed that is driving many men who were formerly staunch advocates of private ownership into the municipal ownership camp. To make municipal utility bonds dependent upon the net earnings of the utility would be to give them even less security than the bonds of conservatively financed public service corporations now have, for under this scheme the entire cost of the property would be represented by municipal utility bonds, whereas under conservative private management the bonds outstanding represent only a percentage of the total investment. For these reasons, I believe that municipal bonds issued to provide funds for the acquisition or construction of public utilities should either be a lien against the general credit of the city on a par with all other bonds or else should be a first lien against the gross earnings of the particular utility, leaving the deficits, if any should occur, to be made up from taxes. DELOS F. WILCOX.

Bangor Chamber Urges Study of Utility Question

BANGOR CHAMBER OF COMMERCE

BANGOR, ME., Feb. 8, 1919.

To the Editors:

The following is a copy of resolutions adopted by our organization.

RESOLUTIONS ADOPTED BY THE BANGOR CHAMBER OF COMMERCE

Whereas, the Bangor Chamber of Commerce feels that the country is facing a grave situation in regard to public utilities,

And, Whereas, they feel that all citizens are vitally interested in the wellbeing of the public utilities,

And, Whereas, they feel that on their organization and on similar organizations throughout this entire country rests a grave responsibility in this regard,

Now, therefore, Be it resolved:

That the Bangor Chamber of Commerce, realizing that their duty is to study the question both in the State of Maine and elsewhere, desires to make known to their members and to the citizens of this community the result of their study.

That as a result of such study the Bangor Chamber of Commerce finds that a substantial part of the funds of the savings banks is invested in bonds of public utilities; that the depositors of Mutual Savings Banks are in reality part owners of every such investment. That the same is true of the life insurance companies both as to investment and ownership. That the present and future wellbeing of every community is directly dependent upon the successful running and further development of the public utilities operating in their locality. That every such community should be anxious to see that the conditions under which such public utilities are operating are such as to allow the companies sufficient revenue to properly protect the public from accidents, to keep their lines in good condition, to render efficient service to the public, to make further needed developments, and to safeguard the property ownership of the investing public.

The Bangor Chamber of Commerce feels that a much graver responsibility rests with the Public Service Commissions; that their sworn duty is to see that the public utilities are properly and efficiently run; that they are responsible for the credit, continuity and general wellbeing of the public utilities. That every public service commission should be upheld and backed where they have recognized such responsibility. That where commissions have not so recognized this duty the public should insist that they do so.

The Bangor Chamber of Commerce urges every board of trade in the State of Maine to start at once a study of this question, to urge the National Chamber of Commerce at Washington to give space in *The Nation's Business* to this question, to ask the National Chamber of Commerce to urge every member of the National Association to study this question and to make known through publicity in the same channels the result of this study.

The Bangor Chamber of Commerce also urges the Bangor Rotary Club to take this up with their National Association in the same manner. The Bangor Chamber of Commerce feels that an intelligent study of this question by the business men of the country, with a campaign of publicity as to the result of this study, will aid greatly in solving rightly this very grave problem.

Our principal desire is to aid in getting people generally to study this question. We are sending copies of this resolution to similar organizations throughout the United States. The Bangor Rotary Club is sending them to all Rotary Clubs throughout the States. We have also taken this up with the United Commercial Travelers. JAMES Q. GULNAC, President.

AMERICAN ASSOCIATION NEWS

Speakers for Mid-Year Meeting

AT THE DINNER to be held in connection with the mid-year meeting of the American Association in New York City on March 14 the speakers will be Hon. Warren G. Harding, United States Senator from Ohio; Hon. Lindley M. Garrison, former Secretary of War, and now receiver of the Brooklyn Rapid Transit System, and B. A. Hegeman, Jr., representing the manufacturer members of the association. J. H. Pardee, president of the association, will preside. The dinner will be held at the Waldorf-Astoria at 7 p.m., preceded by a half-hour reception.

Progress is being made on the list of speakers for the technical sessions, who will cover the topics given in the outline program on page 215 of the issue of this paper for Feb. 1.

Lieut. Frank Roszel Speaks at Newark

AN ENTHUSIASTIC "get-together" meeting of the Public Service company section was held in Newark, N. J., on Feb. 14. The speaker was Lieut. Frank Roszel, an employee of the Public Service Railway, who had just returned from the western front in France. The lieutenant was range-finder for a big gun, having served in an advanced position with the heavy artillery. The meeting was enlivened with music, and refreshments were served,

Panama Canal Construction Reviewed

THE Rhode Island Company section held a meeting on Feb. 3 in its new gathering place, the Pythian Temple. The feature was a "movie" film showing the building of the Panama Canal. The remainder of the program was of an entertainment character, principally instrumental and vocal music.

Transportation and Energy Transmission Are Intimately Related

Inclusion of Power Lines Among Common Carriers Is Recommended by the Smithsonian Institute as an Economic Necessity

THE Smithsonian Institute of the United States National Museum is issuing a series of bulletins prepared by the division of mineral technology. Several relate to fuel and the power situation, and one shows how the problems of transportation are tied in with those of electric power transmission. Among the conclusions reached the following are significant.

Transportation difficulties are threatening to throttle the economic life of the country. If unrelieved the situation will entail a deterioration in the standard of living. The issue cannot be adequately met by furthering the development of the railways alone, but the logical way to correct the transportation unfitness of this country is to attack the matter through improvement in power usage. The three principles of transportation which underlie industrial growth are (1) the employment of suitable facilities for transportation, (2) the advance elimination of superfluous weight, and (3) the full utilization of the material transported. National experience has shown (1) that a transportation system of countrywide scope serving a comunity interest must be of a common-carrier order subject to public regulation; such has been the lesson of the railways; (2) that in the realm of production, which has to do with the advance elimination of superfluous weight, competition is desirable and should be as unhampered as possible; (3) that in the field of manufacture and consumption the attainment of full utilization stands in need of constructive help.

Applying these conceptions to power we find that the situation is at fault, because (1) there is no common-carrier system for the transmission of energy, although the development of electricity permits the power materials to be freed of weight at the source and enables the energy of water power to be utilized; (2) the presence of the railways, in the absence of special facilities for electric transmission, has prevented competition from becoming effective in the direction of the advance elimination of weight; and (3) the failure of this country to recognize the principle of multiple production and vitalize its latent force has held private initiative impotent to use fully the energy materials provided.

The provision of a common-carrier system of transmission lines, in brief, is the key to the whole problem. Its establishment will remove the retarding influence of high interest rates and antagonistic misunderstanding that has blocked water-power development, and will afford the point of departure from precedent in favor of coal-field generation of electricity.

Specific action in respect to establishing a common-carrier system adapted to the power needs of the country will not only go far toward solving the problem of transportation, but it will improve the fuel supply, correct the economic fallacy of drawing upon capital resources while neglectful of income, contribute to the recovery of the values now lost in the consumption of raw coal, and constitute a potent contribution in the stimulation of a constructive economic policy.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Seattle Lines Stopped

General Strike Results in Complete Suspension of Privately Operated City Lines

The sympathetic strike on Feb. 6 of approximately 130 unions in Seattle, following the walk-out of 25,500 shipyard workers on Jan. 21, involved more than 60.000 union employees and tied up the city's industries.

The electric railway system of the city was completely paralyzed, with the exception of the two lines of the municipal railway. The trainmen of the Puget Sound Traction, Light & Power Company voted unanimously to join in the general strike, and no cars were operated from Feb. 5 until Feb. 10.

Following the announcement of Mayor Ole Hanson that every city employee was regarded as a civil service employee, and that if such workers joined in the general strike their positions would be filled by others, and would not be open to them upon the cessation of the strike the trainmen of the municipal lines reconsidered their decision to strike and remained at work. The trainmen are affiliated with the local trainmen's union, and the union would not grant them exemption. A. L. Murphine, Superintendent of Public Utilities, and Mayor Hanson had announced that if the trainmen walked out the municipal cars would be operated with outside help, but that they would be kept going.

The interurban lines of the Puget Sound Traction, Light & Power Company did not cease operation. A statement made by the Pacific Northwest Traction Company and the Puget Sound Electric Railway, the former operating interurban lines between Seattle and Everett, and the latter between Seattle and Tacoma, Seattle and Renton, Tacoma and Puyallup, was as follows:

> This company operates interurban cars between Puget Sound points. The trainmen are members of steam road organizations, Order of Railway Conductors, Brotherhood of Locomotive Engineers, and Brotherhood of Railway Trainmen. The operation of our cars is analogous to the steam roads, and as long as the steam roads operate, we anticipate no cessation of our operation.

The city jitney men also voted to join the general strike. In consequence the Seattle public from the morning of Feb. 5 until railway service was restored were dependent solely upon private automobiles for transportation, with the exception of the Lake Burien and Ballard districts served by the municipal lines.

The strike was exceptionally orderly, with complete arrangements by the union officials to feed the public, and precautions taken in the way of police co-operation.

The sympathetic strike was ended Feb. 11 by official order of the general strike committee. The end of the general strike was virtually assured on Feb. 9 when trainmen of the Puget Sound Traction Light & Power Company, Seattle & Rainier Valley Railway and Municipal lines returned to work.

An ineffectual attempt was made on Feb. 10 by the general strike committee to have the trainmen walk out a second time and return to their jobs on Feb. 11 with the remainder of striking unions. The trainmen were influenced in refusing by notice served by the traction company officials and city authorities, who stated that trainmen striking a second time would be dropped from the payroll permanently.

The street railway operators violated the agreement with the traction company by striking, as they had agreed to arbitrate all disagreements, remaining on the job in the meantime. Railway service in Tacoma has also been resumed.

Service on the Municipal lines was interrupted for only twenty-four hours. Service on the traction company lines was at a standstill from the morning of Feb. 6 until the afternoon of Feb. 8, when company officials operated cars on several important lines from 3 o'clock until midnight. Service was restored to normal on all lines on Feb. 9. It is generally admitted that the return of electric railway trainmen was the most important factor in breaking the general strike.

Texas Bill Reported Favorably

Passage of the public utilities bill, now pending before the House and Senate of the Texas Legislature, is indicated by favorable committee reports on the measure. The bill, introduced by Senator Dorough of Texarkana, proposes to place electric interurban lines, city railways, electric light systems, and other public utilities under supervision of the Texas Railroad Commission, with the exception of those utilities owned by municipalities and companies having the so-called service-at-cost franchises. The local lines in Dallas would not be included, as the company operates under a service-at-cost franchise. The right to fix rates, service rules and regulations and practices is delegated to the Railroad Commission. An appeal may be taken from the ruling of the Railroad Commission to the District Court of Travis County. Such appeal may be taken by either the city or the utility affected by such decision. City authorities are opposing the bill on the ground that it will interfere with the rights of cities.

For Unified Power Supply

Secretary Lane Recommends Investigation for District between Boston and Washington—Of Use to Railways

Secretary Lane of the Interior Department has sent to Congress requests for two appropriations for special investigations and reports on the power supply. One of these is a request for an appropriation of $50,000 for a survey of the power resources all over the United States. The other is for an appropriation of $200,000 for a report on the power supply for the industrial region of the northern Atlantic seaboard, extending in general from Boston to Washington. The latter has been approved by the Secretary of the Treasury and has been forwarded to Swagar Sherley, chairman of the House committee on appropriations. The power capacity in this territory now aggregates for central stations and railway plants about 4,000,000 hp. and for industrial plants about 4,500,000 hp. In a letter to Mr. Sherley explaining the necessity for this appropriation, Secretary Lane says, in part:

> I believe the investigation will form the basis for a constructive national policy of the highest economic and industrial significance. In a few months, and especially in the regions mentioned, I anticipate a greatly increased demand for energy, for which present facilities are inadequate. If the country is to reap the full benefit of this returning wave of activity it must be prepared to furnish industry and transportation with an adequate, dependable and economical power supply.
>
> This result will be accomplished through the interconnection of existing power centers by means of a trunk-line transmission system of high efficiency. Into this trunk line energy will be fed from hydroelectric plants and steam power stations located at tidewater and near the coal mines. From it will be taken the power required for each principal industrial center and for the electrification of trunk-line railroads and of such branch lines as may be located in metropolitan districts.
>
> Such a comprehensive system of power supply, making use as it would of unutilized or undeveloped water power and of fuel now wasted at the mines, will result in large savings in coal. A very large amount of coal now consumed by steam power plants can be replaced by the development of water power. Fuel power can be developed near the mines and the wasteful transportation of coal by railroad to that extent avoided. I am reliably informed that as a conservative estimate 50 per cent of the fuel now used by the railroads in this territory can be saved through the operation of trains by electricity instead of by steam locomotives, because of the much higher efficiency that can be obtained in the economical central station in comparison with the wasteful steam locomotive.
>
> The transmission of this energy as electricity instead of the hauling of coal by rail will relieve the railroads of this territory of an enormous freight burden, thereby making available transportation for the hauling of other commodities. This is a matter of far-reaching importance. Not only would the railroads in the immediate territory be relieved of hauling the coal for their own locomotives but other railroads supplying them with coal would be relieved proportionately. This easing of the present strain on trackage and equipment would result automatically in an increase in transportation facilities, the necessity for which the country is now facing.

Developing Latent Talent

Suggestion Made that Government Use Its Machine-Tool Equipment for Industrial Training

If the bill introduced by Representatvie Charles Pope Caldwell, New York, on Feb. 4 becomes a law, every high school in the United States may be equipped with a first-class machine shop for industrial training. The machines with which to equip these schools are now in the possession of the War Department, and Mr. Caldwell proposes that "the Secretary of War shall lend them to trade and technical schools, universities and other recognized educational institutions, which in the discretion of the Secretary of War should have such equipment." It is provided, however, that each institution so equipped shall be responsible to the government "for the proper care and safe return of such equipment when demanded, ordinary wear and tear excepted." The plan has the indorsement of the *American Machinist*, the leading machine tool paper.

There is estimated to be between $200,000,000 or $300,000,000 worth of government-owned machine tools. bought on account of the war, of which amount perhaps one-third may be absorbed by existing arsenals. The remainder, according to the terms of the appropriation bill under which they were bought, must be sold to bring the greatest possible returns to the government. There is no ready market for these tools at the present time, machine shops throughout the country being overstocked on account of their expansion during the war. Therefore, the sale of these tools unless made at a considerable loss will be strung over a number of years which will have the effect of demoralizing the machine-building industry and also entailing the storage of these tools at the government expense, and storage charges on this class of machinery approximate 20 cents per square foot per annum.

One of the leading legislators has said of this proposal: "The government can well afford to give this machinery outright to schools that will put it in good use, as it then would go back to the use of the people who have paid for it in the first place."

Fair Play for the Home Buyer

In connection with the recent strike of the employees of the Kansas City (Mo.) Railways there is a feature which the public does not generally understand, although many of the employees do. In the interests of its workers the company some years, ago organized a building association which purchased comfortable homes for the men and allowed easy payments without interest. There were originally about 800 in the association and all but about 300 have paid up and have their homes free. None of the latter, who are among those who "ceased work," have been dropped from the list. Their homes are secure if they keep up their payments, even if they never return to the railway.

Another feature is the pension system. Any worker who has been with the company a few years and is obliged through disability to retire, receives a pension, small, of course, if he has been employed a short time. The minimum, however, is $240. If he remains twenty years he receives 40 per cent of his wages; if twenty-five years, 50 per cent; and if thirty he receives $750 to $800 a year.

"Co-operate!" Says Public Trustee

Earle P. Carlton, a trustee of the Eastern Massachusetts Street Railway, which will succeed the Bay State Street Railway, Boston, Mass., in a statement relative to the electric railway situation lays stress upon the necessity of the public aiding the work of rehabilitation by the trustees. He said in part:

> The trustees may be depended upon to do their best for the railway and the public. Whatever they decide to do, the public should understand will be done because the trustees fully believe it needs to be done. The public should accept the fact that the trustees will act for their best interests. It should support them. If fares are increased it will be because the trustees find it necessary to secure money absolutely required for operating and maintaining the service. If fares are raised, they will be reduced again as soon as returns from the traffic make it possible. The public is going to get the best treatment that is possible and it can help by not knocking.
>
> The present condition of railway service in the State is undoubtedly due in part to mismanagement. State control has been proposed as a remedy, but State control would mean increased cost, whether or not it brought the remedy needed. Corporation management is preferable and corporation management under trustees such as has been decided upon should bring about the improvement needed.

Random English Notes

The London County Council is in a state of virtuous indignation against the Ministry of Munitions because the latter has subsidized a privately owned service of ombnibuses in the southeast of London. The subsidy was temporary in order to increase facilities for workmen in Woolwich Arsenal getting to and from their work. The war being over, the subsidy has ceased, but the bitterness of it was that some of the subsidized ominbuses ran over tramway routes.

G. W. Halford, general manager of Salford Municipal Tramways, has been appointed Honorary Secretary of the Municipal Tramways Association, in succession to Mr. Clough, who has left the tramway industry to become manager of a paper-making business. The extremity of the transition from one industry to another of a leader like Mr. Clough in his field of effort is more characteristic of the United States than of England.

The question of nationalization of British railways is still being agitated, W. Churchill, Minister of Munitions, having indicated that the late government is in favor of that course.

Minneapolis Draft Presented

Proposed Franchise Provisions Will Be Considered in Weekly Meetings

An outline draft of the service-at-cost franchise for the Minneapolis (Minn.) Street Railway has been submitted to the committee of the City Council on street railway matters by City Attorney C. D. Gould and Stiles P. Jones, who were retained by the city as franchise experts. The basis of the proposal is service at cost, starting with a 5-cent fare with universal transfers plus a division of earnings between the city and the company and complete city supervision over service and extensions.

The proposed franchise provisions will be considered by the committee in a series of weekly meetings. At its last meeting the committee decided to take the C. L. Pillsbury valuation of $24,346,113 on the company's property, and allow the company 7 per cent earnings on that valuation, instead of on the $25,914,307 figure fixed by City Engineer F. W. Cappelen.

The fundamental purposes of the franchise grant, as stated by Messrs. Gould and Jones, are as follows:

> To furnish the Minneapolis public with adequate railway service at all times, at a rate of fare sufficient to provide the facilities for such service, meet the legitimate costs of operation, maintain the property continuously in first-class condition and pay the company its fixed minimum return upon investment.
>
> To provide for effective public control of service and extensions.
>
> To provide for such public supervision of the property as will assure honest. efficient and economical management in the public interests.
>
> To provide for an equitable division of the surplus earnings between the city and the company.
>
> To provide for the purchase of the property by the city. and the terms, times and conditions thereof.

Important provisions of the grant as proposed are as follows:

> The company shall surrender its present franchise and waive all rights thereunder upon the taking effect of this ordinance.
>
> The city shall have the right to purchase upon agreed valuation and subsequent additions giving one year's notice of its intention to purchase, at expiration of any five-year period.
>
> The fare shall be 5 cents. with universal transfers; children under six years of age, free. Policemen and firemen may ride at reduced rates, as provided by the State law.
>
> The company may adopt reasonable regulations governing the use of transfers. subject to the approval of the City Council.

Safety Device Inquiry Put Off

Officials of the Brooklyn (N. Y.) Rapid Transit System who are under indictment on account of the Malbone Street accident have declined to take the stand in the investigation undertaken by the Public Service Commission for the First District involving the proposed installation of safety devices on elevated and subway lines of the system. Until the criminal proceedings in which they are involved have been concluded these officials decline to appear as witnesses in any proceeding of this sort. The company has asked for a delay in the proceedings, and the commission adjourned the hearing to consider the company's application.

Government Placing Men

For the first time in the history of America's development, employers have an opportunity of selecting from a large and varied list of highly educated and experienced men those individuals especially equipped to meet their particular requirements. Engineers, executives, men of college training and practical experience in business and technical fields are now being released from the Army, Navy and war work. The professional and special section of the United States Employment Service, a branch of the Department of Labor, has been organized for the benefit of employers in need of these men. The service is entirely free of charge. I. W. Litchfield, the head of the professional and special section, was one of the organizers and directors of the United States Public Service Reserve which supplied high-grade engineers and business men to the government for war work.

The United States Employment Service is now divided into two great zones for the purposes of the professional and special section. The New York office, headquarters for the Eastern zone, at 16 East Forty-second Street, is in charge of the following states: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Ohio, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida and Alabama. The Chicago office, headquarters for the Central zone, at 63 East Adams Street, is in charge of all remaining states. Later zone offices will be established to take charge of part of the territory now in the Chicago zone. The employment service is also represented in each of the forty-eight states by the federal director for that state. The United Engineering Societies, composed of the four great engineering organizations, are co-operating with the professional and special section in placing men in the engineering professions.

The types of men and women registered in the professional and special section are indicated by the following partial list: statistical workers, stenographers, accountants, advertising and publicity workers, auditors, bankers and brokers, cost experts, draftsmen, electrical engineers, executives, librarians, mechanical engineers, purchasing agents, real estate and insurance workers, safety engineers, social workers, traffic managers and inexperienced college graduates.

Ottawa States Its Position

The city of Ottawa is buzzing with talk of the offer of sale made by the Ottawa Electric Railway, referred to briefly in the ELECTRIC RAILWAY JOURNAL for Feb. 8, page 298. So that there may be no misunderstandings Mayor Fisher has made this statement:

> Toward the end of last year some negotiations were entered into in connection with the purchase of the railway. The railway expressed a willingness to fix a price and the board of control intimated that they were willing to have an offer from the company.. Beyond this no further progress was made.
>
> We now have an offer from the company which means that we are to pay for the assets of the Ottawa Electric Railway, the par value of the shares of the Ottawa Traction Company—that is, according to the letter received—$5,630,700. We also are to assume the outstanding obligations. I understand we are to assume that there are outstanding $400,000 of 4 per cent bonds. There is also a fluctuating liability to the bank, amounting now, as per the statement of the Ottawa Electric Railway, to $370,000.
>
> The board has no opinion to express as to the price. As a matter of fact, there is no one outside of the officials of the company who is in a position at present to say what the value of the road is. I think it would be well if we all abstained from expressing any views on this subject until we have full information.
>
> A special meeting of Council will be held in order that authority may be given to the board to obtain the necessary advice. When we have a report from the persons employed, it will be for the Council to say whether the offer of the railway is at such a figure that it should be submitted to the people. If they think the price at which the railway is offered is reasonable, then a vote must be taken.
>
> In the meantime it may be necessary to go on with legislation so that it may be available if action is taken later.

The company was asked for a price by Dec. 13, but a definite offer was not received by the representatives of the city government till Jan. 29.

Examiners Interpret Chicago Award

The questions arising from a dispute over the meaning of the terms of the wage award in the case of the Chicago (Ill.) Surface Lines which were submitted by the officers of Division 241 of the Amalgamated Association to the examiners of the National War Labor Board for decision, have been decided by Arthur Sturges and M. Joseph Chiesa, examiners for the board, who found as follows:

> 1. The receivers are to get an increase of 23.07 per cent over the hourly or monthly rates in effect at the time of the submission of the case.
> 2. Men operating night cars are to receive an increase of 23.07 per cent over the rate of $3.25 a day of eight hours or less fixed by the contract between the company and the association.
> 3. The day and night foremen of car repairers are to receive an increase of 23.07 per cent above their rates in effect at the time of the submission of the case for adjustment.
> 4. The tunnel and bridgemen are to receive an increase of 23.07 per cent above their rates in effect at the time of the submission of the case, and if this does not bring any adult male employee in this classification up to the minimum rate of 42 cents an hour, he is to receive said minimum of 42 cents an hour for the actual number of hours worked up to ten hours a day.
> 5. Employees who are incapacitated from doing a normal day's work by reason of age or physical disability may be paid a special rate, less than is granted by the award, by agreement between the representatives of the company and of the association. In case the parties are unable to agree, any specific case may be referred to the examiners of the National War Labor Board for a decision, which decision is subject to appeal to the arbitrators as provided in the award.
> 6. About half of the flagmen and crossing tenders employed by the company at steam railroad crossings are under the jurisdiction of the United States Railroad Administration. The arbitrators did not intend to interfere with the wages of these men and therefore all the flagmen and crossing tenders employed by the company at railroad crossings should be paid in accordance with the rates prescribed by the aforesaid United States Railroad Administration, beginning as of Aug. 1, 1918.

The original award in this case was handed down some months ago.

Merchants for Private Control

The Merchants' Association of New York has reaffirmed its position in opposition to government ownership and operation of public utilities and has declared emphatically in favor of private ownership under government regulation. This declaration was made in accordance with the recommendation of a special committee appointed by President William Fellowes Morgan in pursuance of action taken by the board of directors for a re-examination of the question of government ownership and operation in view of the prominence that the matter has assumed since the beginning of the war. The special committee consisted of Frank R. Chambers, chairman; James G. White, Otto H. Kahn, Frank H. Sisson, H. H. Porter and Prof. Joseph French Johnson. The gist of the findings of the committee is contained in the following extracts from the report:

> While we are not unmindful of the defects that not infrequently characterize the operation of corporations of public utilities, we do not believe that these defects can be cured by substituting another method which in every respect of efficiency is much below the standards that generally prevail under private management. In so far as the evils which are popularly assumed to exist in private management are found to exist in fact, other remedies than the substitution of methods abounding in greater evils should be found.
>
> We believe that the public can best be served by utilizing the efficiency, enterprise and energy of private corporations for the continued operation of public utilities, under such public control as shall protect the public in its right to efficient service and fair rates; and at the same time assure to private capital invested in public utilities a fair return upon such capital.
>
> We do not find any change of conditions resulting from the war which warrant or require the previous position of the association, in opposition to government ownership and operation, to be modified.

On Feb. 5 the Merchants' Association adopted resolutions favoring the return of the railroads and the telegraph and telephone systems to private control and operation under such conditions as will render them as serviceable to the public as when the government took possession of them.

Must Carry Out Improvement Program

The City Commissioners of Dallas, Tex., have granted to the Dallas Railway an extension of nine months in which to carry out the provisions of the franchise involving the expenditure of $1,200,000 in improvements and betterments.

The company asked an extension of twelve months, but Mayor Lawther and the members of the commission held that a year's extension was not necessary and that the company should be required to carry out its agreement at an earlier date in order to provide employment for many discharged soldiers.

Under the original agreement, as embodied in the franchise, the Dallas Railways agreed to expend $1,000,000 in improvements by April 1, 1919. In consideration for the extension asked, the company made a voluntary commitment and agreed to spend $200,000 more in improvements, making the total amount $1,200,000. Under the agreement embodied in the extension granted, this amount must be spent during 1919. The company will make a new bond to insure the carrying out of this agreement.

The improvements called for include extensions of several lines, two new lines, laying of heavier steel in connection with paving on several streets and betterments in the service in various respects. The new lines will be the Oakland Cemetery line and the Oak Lawn and City Hospital extensions.

News Notes

Boston & Worcester Award Announced.—Trainmen employed by the Boston & Worcester Street Railway, Boston, Mass., have been awarded a base pay rate of 42 cents an hour by the War Labor Board. The pay was fixed at 44 cents at the end of three months in service and 47 cents after one year. Employees other than carmen were awarded a minimum of 42½ cents an hour.

Bloomington Wages Must Stand.—The War Labor Board has dismissed without prejudice the complaint of the employees of the Bloomington & Normal Railway & Light Company, Bloomington, Ill., who asked an increase in the wages now paid the men under a contract between their union and the company. As the wages are definitely fixed by the contract for its full term the board could not make a change over the objection of the company.

Forty-two Cent Maximum in St. Joseph.—The War Labor Board, in the case of the St. Joseph Railway, Light Heat & Power Company, St. Joseph, Mo., has fixed the wages of motormen and conductors at 38 cents an hour for the first three months of service, 40 cents an hour for the next nine months and 42 cents thereafter. Existing working conditions and differentials paid for special services will be continued. The award is retroactive to Nov. 27, 1918.

Viaduct Agreement.—The contract between Kansas City, Mo., Kansas City, Kan., and the Kansas City Railways for the use of the inter-city viaduct awaits the signatures of officials of the city and officers of the company. Under the terms of the contract the agreement is effective until December, 1922, the time of the expiration of the franchise on the Kansas side, providing the city in the meantime acquires the inter-city structure by January, 1920. If the city has not acquired the viaduct by that time the contract ends. The Kansas City Railways is said to be ready to begin operating cars over the viaduct.

Unemployment on Increase. — The seriousness of the unemployment situation is again emphasized in figures made public on Feb. 8 by the United States Employment Service, based on official reports from its agents throughout the country on conditions of employment and unemployment. Figures based on the last information available show a much heavier increase in the area of unemployment than that shown in the reports for the previous weeks. The reports for last week showed the total unemployment amounted to nearly 265,000. During the current week this number has increased to 290,831. The total labor shortages reported amount to only 8000.

Mr. Allison Retained by International Railway.—James E. Allison, Jr., St. Louis, Mo., has been selected by the International Railway, Buffalo, N. Y., as its representative on the board of arbitration which will pass upon matters of finance in dispute between the city and the company as a step in the series of negotiations to bring the International Railway under the control of the municipal authorities similar to the plan in operation in Cleveland. The city's member of the board has not been designated by the City Council, but will probably be Harry D. Sanders, a former member of the staff of the city law department. Mr. Allison is an appraisal engineer. He was formerly on the Public Service Commission of Missouri.

Seven-Cent Wage Increase in Louisville.—Wages of men on city lines of the Louisville (Ky.) Railway are to be increased under an award of the War Labor Board to 41 cents an hour for men three months in the service; 43 cents for men six months employed, and 45 cents for men employed nine months. For the men on country lines wages are to be increased to 42, 44 and 46 cents an hour for those in service three, six and nine months, respectively. The board also recommended granting to the railway the right to increase fares. Increases in wages are to be effective and retroactive as of Aug. 12, 1918, and are to continue until the end of the war is formally declared by executive proclamation. The company has until July 17, 1919, to meet the back pay due under the award. The raise amounts to a straight increase of 7 cents an hour.

Looking for a Way Out.—Railway matters are again the center of interest in Norfolk, Va. This has come about through the recent reported willingness of those who control the Virginia Railway & Power Company to sell to the city and the more recent prospects for a renewal of the franchise negotiations. Officers of the company and city officials met recently in the City Manager's office to discuss the terms of the new franchise. Those in the conference were the City Manager, E. Randolph Williams, general counsel for the Virginia Railway & Power Company; W. H. Venable, local counsel for the company; I. Walke Truxtun, City Attorney R. W. Peatross, George Pilcher, former city attorney; H. H. Rumble and C. B. Buchanan, vice-president of the company. Mr. Williams stated that he saw no reason why the franchise could not be framed to the satisfaction of both parties to it.

Board of Estimate Relents.—The Public Service Commission for the First District of New York has received from the Board of Estimate & Apportionment an additional appropriation sufficient to enable it to re-employ practically all of the engineers on subway construction work who were laid off by the failure of the Board of Estimate & Apportionment to appropriate a sufficient sum for their salaries and expenses for the year 1919. It is now expected that much of the new subway work in process of construction which it was believed would have to be held up can be advanced. Plans are being made by the commission for the letting of several new contracts in the near future. However, the delay which has been occasioned by the practical cessation of work because of lack of supervision through January may be serious enough to carry over into 1920 the completion and beginning of operation of certain of the new lines which it was believed would be ready in 1919.

Program of Meeting

Central Electric Railway Association

The program has been announced for the annual meeting of the Central Electric Railway Association at the Hotel Cleveland, Cleveland, Ohio, on Feb. 27 and 28. The session will be opened at 9.30 a.m. At 2 p.m. the executive committee will meet. There will be an address by Mayor Davis, Cleveland, and F. W. Coen, president of the association and vice-president and general manager of the Lake Shore Electric Railway, Sandusky, Ohio, will make his annual address. There will be a business session and reports of committees, followed by a paper "Ethical Aspects of the Street Railway Situation," by R. T. Sullivan, general manager of the Mahoning & Shenango Railway & Light Company, Youngstown.

The session on Feb. 28 will open at 9 a.m. The business meeting and presentation of reports of committees will be followed by the presentation of a paper "Power House Economics," by G. H. Kelsay, electrical engineer of the Union Traction Company of Indiana, Anderson, Ind., and a paper "Development of Freight Traffic on Interurban Lines," by A. B. Cole, assistant to the manager of the department of publicity of the Westinghouse Electric & Manufacturing Company, East Pittsburgh. The presentation of these papers will be followed by a general discussion by members of the association. The meeting will be concluded with the reading of the annual reports of the secretary and treasurer and the election and installation of officers for the ensuing year.

Financial and Corporate

P. R. T. Net Earnings Fall

Traffic Revenues Gain in 1918, but Burden of Operating Expenses and Taxes Is Too Heavy

The results of operation of the Philadelphia (Pa.) Rapid Transit Company for the year ended June 30, 1918, reflected the tremendous industrial and economic developments of this country concentrated upon the prosecution of the war. The larger gross revenues indicated the expansion of the shipbuilding, munition and other essential or contributory war industries located in Philadelphia and vicinity, while the greater increase in operating expenses was the result of the war-time costs of labor and material.

GROSS EARNINGS INCREASE 6.62 PER CENT

The gross earnings for the year ended June 30, 1918, showed an increase of $1,890,336 or 6.62 per cent. The passenger earnings rose 6.60 per cent and the receipts from other sources 7.26 per cent. The increase in operating expenses and taxes amounted to $2,578,410 or 16.1 per cent. The principal items contributing to this abnormal increase were the higher wages paid, the increased price of coal and other materials, the larger appropriations for maintenance and renewals, and the additional allowances to provide for federal war taxation.

NET EARNINGS DECLINE 5.5 PER CENT

The net earnings from operation, on account of the preponderating increase in operating expenses and taxes, fell off $688,073, or 5.5 per cent. The fixed charges showed a net decrease of $11,189, which was occasioned by the reduction in interest charges on car trust certificates, bonds, etc., maturing during the year or retired through the operation of sinking funds. The resultant surplus for the year, therefore, declined $676,884 or 24.3 per cent.

Two semi-annual dividends of 2½ per cent upon full paid stock of $29,985,800 were declared from the surplus earnings for the year ended June 30, 1918, as follows: Dividend No. 3, payable Jan. 31, 1918, 2½ per cent, $749,645; dividend No. 4, payable July 31, 1918, 2½ per cent, $749,645; total, 5 per cent, $1,499,290.

$4,884,077 IN SURPLUS ACCOUNT

The asset account for "leases, franchises, construction, equipment, advances to leased lines, sinking funds, etc.," showed a balance of $113,478,757 on June 30, 1918, this figure representing an increase of $381,959 for the year. The capital charges for additions and betterments amounted to $755,304.

The surplus of $4,884,077 as at June 30, 1918, represented the undistributed net earnings during the period of the Stotesbury management. Of this total surplus accumulation $2,653,438 was represented by additional cash or cash assets, the balance of $2,230,639 having been temporarily advanced to finance capital expenditures. A total of $1,382,000 of the 5 per cent bonds of the 1912 issue are held by the company available for sale to reimburse the treasury on account of such appropriations from surplus for capital requirements, besides which the abnormally large inventories should ultimately liquidate into much free cash.

During the period to June 30, 1918, $753,880 of the 1910 strike expense of $934,346 (incurred by the former management) was amortized through appropriations from surplus, these charges exhausting the initial surplus of $607,099, as of Dec. 31, 1910, and requiring in addition $146,780 of the surplus acquired during the period.

INCOME STATEMENT OF PHILADELPHIA RAPID TRANSIT COMPANY FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Earnings:				
Gross passenger earnings	$29,318,138	96 30	$27,504,040	96 32
Receipts from other sources	1,125,813	3 70	1,049,574	3 68
Total earnings	$30,443,951	100 00	$28,553,614	100 00
Expenses:				
Maintenance and renewals:				
Maintenance	$3,544,219	11 64	$2,712,121	9 50
Reserve fund for renewals	1,022,373	3 36	1,570,921	5 50
Total appropriation	$4,566,593	15 00	$4,283,042	15 00
Operation of power plant	2,576,845	8 47	1,694,151	5 93
Operation of cars	7,843,021	25 76	7,129,739	24 97
General	1,750,668	5 75	1,498,826	5 25
Taxes	1,845,454	6 06	1,398,412	4 90
Total expenses	$18,582,581	61 04	$16,004,171	56 05
Net earnings from operation	$11,861,370	38 96	$12,549,443	43 95
Fixed charges:				
Interest	$2,268,492	7 45	$2,280,179	7 99
Rentals	7,365,891	24 19	7,365,393	25 79
Sinking fund, city contract	120,000	0 40	120,000	0 42
Total	$9,754,383	32 04	$9,765,573	34 20
Surplus	$2,106,987	6 92	$2,783,870	9 75

Receivership Plea Renewed

United Railways, St. Louis, Again Called Upon to Defend Itself in Receivership Action

The United Railways, St. Louis, Mo., on Feb. 7 filed a general denial of the allegations set forth in the petition of John W. Seaman, New York, a preferred stockholder, who asks that certain directors be ousted from office, the contracts which the company has for Keokuk water power through a distributing company, owned by the North American Company, be canceled or turned over to the company, and that a receiver be appointed for the United Railways to bring about these and other reforms.

The receivership petition had for its chief allegation that the water-power contracts cost the United Railways $400,000 yearly in excess of what a reasonable charge for the power would be and that they already had caused the company to lose in excess of $1,000,000; that certain practices of the legal department, notably in the mill tax case, were wasteful; that the company's claim department was unreasonably expensive and that a system of interlocking directorates make the operation of the company for the sole benefit of the North American Company, which is the holding company for the United Railways.

It is asked that the defendant directors (who are still directors) and the other individual defendants be made to reimburse the company for losses accruing to the company through their alleged mismanagement of the company's funds.

DEFENDANT'S PLEA

The answer of the United Railways either is a clause-by-clause flat denial of the statements of the petition or else a plea that the company is ignorant of the allegations set forth.

It declares that the United Railways has no knowledge of what profits accrue to any other company through contracts which it has for electric energy. It sets forth that the United Railways has no connection with the distributing company and had no interest in that company other than to see that the power was delivered and that the price agreed upon was maintained.

The defendants in the suit are the United Railways, Richard McCulloch, as a director of United Railways in 1908 when the power contracts were made; Henry S. Priest, as director and general counsel in that year; Festus J. Wade, as director; Annie E. Huttig, as beneficiary and trustee under the will of Charles H. Huttig, a director; the Mercantile Trust Company, as executor and trustee of the will of James Campbell, a director, and John I. Beggs, director.

Early in 1918 a similar application was denied by the court on the ground that the allegations did not justify a receivership and showed no cause for action.

Heavy Loss in New York

Lines in Metropolis Lost $4,600,000 or 44 Per Cent of Net Income in Fiscal Year 1918

A falling off of $4,647,964 or 44 per cent in net income was the result of operation for the rapid transit and surface electric railways in New York City for the year ended June 30, 1918. Detailed figures are given in the accompanying statement.

The names of most of the surface operating lines have been omitted from this table, the New York Railways being the only one shown separately. The Third Avenue System is included partly in the totals for the Manhattan Borough surface lines and partly in those for the Bronx Borough surface lines.

INCOME STATEMENT OF NEW YORK CITY ELECTRIC RAILWAYS FOR YEAR ENDED JUNE 30, 1918

Company		Railway Operating Revenue Amount	Railway Operating Revenue Increase	Operating Expenses Amount	Operating Expenses Increase	Railway Taxes	Gross Income	Deductions from Income	Net Corporate Income Amount	Net Corporate Income Increase
Hudson and Manhattan........		$4,679,367	$437,090	$2,226,406	$469,999	$332,562	$3,056,790	$2,449,584	(c) $607,206	D $111,238
Interborough	Subway division.	21,840,447	385,555	9,159,182	1,041,579	1,649,411	18,219,408	13,556,649	(d) 4,662,758	D 4,222,599
	Elevated division	18,657,280	246,026	9,954,154	1,488,463	2,109,171				
Brooklyn Rapid Transit Co.....		30,925,303	884;882	19,532,278	1,375,639	1,897,123	10,596,591	8,745,255	1,851,336	D 857,643
Manhattan Surface Roads......		19,781,436	1,171,762	13,324,064	379,672	1,749,094	6,354,785	6,804,443	D 449,657	607,295
New York Railways..........		11,920,033	425,924	8,131,470	262,660	1,170,223	3,245,457	3,399,091	D 153,633	D 5,580
Bronx Surface Roads (a)........		4,279,892	510,406	3,229,491	166,749	290,100	797,429	917,146	D 119,717	304,984
Queens Surface Roads (b).......		2,258,616	D 321,629	2,194,320	D 127,148	121,845	D 43,546	627,302	D 670,849	D 208,569
Other companies...............		1,977,845	2,311	986,640	95,088	83,012	178,399	278,519	D 100,119	D 160,191
Grand total (a)............		$103,500,189	$3,316,404	$60,606,538	$4,890,043	$8,232,321	$39,159,858	$33,378,901	$5,580,957	D$4,647,964

Note—D indicates a decrease or deficit.

(a) Excluding Yonkers Railroad. (b) Excluding Brooklyn Rapid Transit Company. (c) Balance applicable for adjustment income bonds. (d) Exclusive of $2,508,508 of "deficit accruals under rapid transit contracts.

Most of the loss in net corporate income, it is apparent, came from the decline of $4,222,599 for the Interborough Rapid Transit Company, on account of the operating expenses rising more rapidly than the operating revenues and on account of the taxes and fixed charges increasing substantially. The surface lines in Manhattan and the Bronx, unlike those in Queens, showed a smaller total deficit in 1918 than in 1917, but all the groups of surface lines reported deficits from the operation for 1918.

The total number of passengers carried for the twelve months ended June 30, 1918, was 1,975,511,690, a gain of 56,699,464. This gain was divided generally among the rapid transit lines and the Bronx, Manhattan and Brooklyn surface lines, the Manhattan surface roads coming first in the latter class with 31,348,175. The Brooklyn elevated lines carried 31,699,403 more passengers, but this gain was cut to 18,660,548 by the losses on the surface lines in that borough.

The revenue car-miles totaled 329,538,712, an increase of 2,329,664. The passenger car-hours numbered 28,939,839.

Lackawanna Line Suspends

The Buffalo & Lackawanna Traction Company, Buffalo, N. Y., has suspended the operation of cars over its lines between its terminal in Lafayette Square, Buffalo, and the Lackawanna (N. Y.) city line. Failure on the part of the company to secure from the city the right to charge a higher rate of fare together with the action of the City Council in denying the company's application to abandon its transfer agreement with the International Railway are given as reasons by Harry Evers, receiver for the company, for the company's decision to discontinue service. The receiver says the company's income is not sufficient to pay operating expenses.

The Buffalo & Lackawanna Traction Company owns no rolling stock. It leases its cars from the Buffalo & Lake Erie Traction Company. The latter company will continue to operate half hourly service during the day and hourly service at night over the Buffalo & Lackawanna Traction Company's tracks into Buffalo from Lackawanna and points west.

In a statement notifying the public of the discontinuance of the service, the receiver of the Buffalo & Lackawanna Company says:

> The receiver is wholly without funds with which to meet operating deficits, and has no choice but to suspend the service. If the Public Service Commission or anyone else can show us how to operate the road without loss under the present circumstances, we will run the line.

Tax Case Before State Supreme Court

Argument was heard and decision reserved on Jan. 15 by the Supreme Court of Pennsylvania on the appeals of the Philadelphia (Pa.) Rapid Transit Company from the decision of Court of Common Pleas No. 3, which held it liable in ten cases of its underlying companies for the payment of the income and excess war-profit taxes levied by the government, under the war-revenue and tax measures passed by Congress.

The taxes in controversy amounted to upward of $360,000. As to three of the companies—the Continental Passenger Railway, the Philadelphia & Darby and the Green & Coates Street Passenger Railway—the Philadelphia Rapid Transit Company, which also leased these lines, won the decision of the lower court.

The amount of taxes in these three cases was only about $12,000. The provisions of the leases in the three cases did not specify that the Philadelphia Rapid Transit Company should pay all future taxes levied on the leased lines, as they did in the other ten cases, where it was held by the lower court the provisions of the lease were binding on the Philadelphia Rapid Transit Company.

St. Louis Valuation Plans

Commission Preparing to Carry Out the Work Before Present Six-Cent Fare Time Expires

The Public Service Commission of Missouri is proceeding with its plans for valuing the property of the United Railways, St. Louis. It will be necessary for the commission's entire accounting and engineering departments to remove to St. Louis during the work, and for that reason the men in these departments have been at work cleaning up the audit and valuation of the properties of the St. Joseph Railway, Light, Heat & Power Company at St. Joseph and of companies elsewhere before beginning work at St. Louis.

While the commission's accountants and engineers have never made an audit or valuation of the United Railways, the members of the commission held a hearing upon the valuation made by the city and the company, and the evidence offered by the parties, and put in the 6-cent fare as an emergency measure for a temporary period of one year, in order to enable the railway company to employ labor, purchase supplies and render service under war conditions.

In the emergency just mentioned there was not time for the commission to make an audit and valuation through its own expert departments and it accepted for the purpose of its temporary order the value of $60,000,000 which had been agreed upon between the city and the company, the commission apportioning $52,800,000 to the property within the city and $7,200,000 to the property outside of the city.

The commission's accountants and engineers plan to begin work by Feb. 15 and have their report completed in time for the further hearing proposed to be held by the commission on or before June 1, 1919, the date of the expiration of the temporary 6-cent rate.

In referring to the scope of the present inquiry the commission said:

> The commission feels it is fortunate in having very able accounting and engineering departments which have successfully audited the books and accounts, and valued the property of many large utilities in this State. They are men of long experience in their particular line of work, well qualified to duly classify proper and improper operating charges of any public utility, and their work in St. Louis will be thorough, complete, fair and impartial. The case will also be set down for a public hearing and investigation at St. Louis before the commission of the company's receipts and expenses, and the value of its property, and the commission hopes to be able authoritatively to settle these questions.

Receiver for Indiana Road

Robert M. Feustel, president of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., was appointed receiver of the company on Feb. 10, after a suit had been filed by the Evans Coal Company, asking that such action be taken. The demand of the coal company is for $12,000.

Mr. Feustel stated that for several years past the security holders of the Fort Wayne & Northern Indiana Traction Company have recognized that the earnings of the property were not sufficient to take care of operating expenses, taxes and the necessary fixed charges. For the last two years he said default has been made in the interest on more than 90 per cent of the bonded indebtedness of the company and this interest money has been devoted to operation and betterments.

During this period the security holders have been working on plans for a reorganization of the company, and the appointment of a receiver at this time, it is said, is for the purpose of bringing about some satisfactory reorganization.

Financial News Notes

New Director of Texas Electric Railway.—At the annual meeting of the stockholders of the Texas Electric Railway, Dallas, Tex., the former directors were elected with the exception that T. F. Bush, Waco, succeeds W. W. Seley, who died on Dec. 26.

Authorized to Junk Road.—The Exeter, Hampton & Amesbury Street Railway, Exeter, N. H., was authorized on Jan. 10 by the Public Service Commission to discontinue its lines to Hampton Beach any time after May 1 if a sale cannot be effected before that time which will bring more than the junk value of the road.

Value for Taxation Reduced.—A reduction of $743,662 in the valuation for assessment purposes placed by the Newark, N. J., tax board on cars of the Public Service Railway has been allowed by the Essex County Board of Taxation. The valuation fixed by the city board was $2,888,000. The reduction leaves a total of $2,144,338, upon which the company must pay taxes.

Ottawa Traction Company Report.—The Ottawa (Ont.) Traction Company, Ltd., during the calendar year 1918 received from its subsidiary, the Ottawa Electric Railway, the sum of $260,040 and paid this out in four quarterly dividends of 1 per cent and a bonus of 1 per cent. No figures are presented for the operating company in the 1918 annual report of the parent concern.

Interest Money Available.—A dividend of 50 cents was declared on the stock of the United Power & Transportation Company, Camden, N. J., payable on Jan. 31 to holders of record of Jan. 14. A Philadelphia paper states that this payment, together with other income received by the Inter-State Railways, will provide for the semi-annual interest requirements on Inter-State Railways 4's so that the Feb. 1 coupon could be paid as usual. In January, 1918, dividend of $1.32 was paid and in July $1.20.

A. E. & C. Deficit Increasing.—The deficit of the Aurora, Elgin & Chicago Railroad for 1918 was $251,193 according to a report made by the company to the city of Aurora, Ill. When the Council voted last summer to allow the company a 6-cent fare on the Aurora city lines it was agreed that a monthly statement of the company's finances would be furnished to the city officials. The latest report shows that for the ten months ended October the deficit was $185,898, while for the eleven months ended November it was $218,307.

Wants to Merge Short Line.—The New York State Railways has applied to the Public Service Commission for the Second District, for permission to merge the East Side Traction Company in Syracuse. The petition states that the stock of the East Side Traction Company is owned by the New York State Railways. The East Side Company was leased on Aug. 7, 1899, to the Syracuse Rapid Transit Railway and operated by it until Oct. 31, 1912, when the Syracuse line became a part of the New York State Railways. The road is 6.44 miles in length.

Majority Bonds Deposited. — The committee representing the 5 per cent first consolidated forty-year gold bonds of the Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., F. J. Lisman, chairman, announces that a substantial majority of the bonds has been deposited with the committee, and that the committee has extended the time for the deposit of additional bonds up to and including Feb. 21. Deposits should be made with the New York Trust Company, depositary, or the Mercantile Trust & Deposit Company, Baltimore, agent for the depositary.

Bonds to Settle Damage Claims.—The Southern Cambria Railway, Johnstown, Pa., recently filed a certificate of notification with the Pennsylvania Public Service Commission for the issuance of $100,000 of 5 per cent income bonds, dated Jan. 1, 1919, and due Jan. 1, 1929. The bonds are to be issued in payment of damage claims resulting from a wreck on the company's property in August, 1916. As a result of this wreck the company was placed in the hands of a receiver in 1917, but it is expected that the receivership will be removed as soon as the damage claims are settled.

New American Railways Issue.—The American Railways, Philadelphia, Pa., made a new issue of $3,000,000 of 7 per cent gold notes dated Feb. 1, 1919, due Feb. 1, 1922, $1,672,000 of which has been issued to retire a like amount of notes maturing on Feb. 1, 1919, and the balance for corporate purposes. The major part of the notes maturing on Feb. 1, 1919, was exchanged for the new notes dated Feb. 1, 1919. Newburger, Henderson & Loeb, Philadelphia and New York, and Bioren & Company, Philadelphia, have placed the remainder of the $3,000,000 new issue. These were offered at par and interest.

Two Weeks More for B. R. T. Claimants.—Judge Julius M. Mayer of the United States District Court, has resettled a previous order so as to permit the filing of claims of all kinds against the companies in the Brooklyn (N. Y.) Rapid Transit receivership up to April 1, 1919, an extension of two weeks. It was also provided that claimants need not go before ex-Judge E. Henry Lacombe, the special master, unless their claims have been disallowed by the receiver, Lindley M. Garrison. It was also made clear that no attempt would be made to prevent the bringing of suits for jury trials, a matter regarding which there has been some misunderstanding.

Idaho Deficits for 1917.—During the calendar year 1917, according to the latest annual report of the Idaho Public Utilities Commission, three of the six electric railways operating in the State showed deficits. The companies so reporting were the Boise Valley Traction Company, $534; the Spokane & Inland Empire Railroad, $462,002, and the Ogden, Logan & Idaho Railway (now the Utah & Idaho Central Railroad), $249,717. The Caldwell Traction Company showed net income of $10,959 for 1917, and the Lewiston-Clarkston Transit Company net income of $6,748. The Boise Railroad did not report. During the first half of 1918 two lines, the Sand Point & Interurban Railway, Ltd., and the Twin Falls Railroad were dismantled, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 4.

Seeking Deposits of New Orleans Notes.—A committee of which Clarence L. Harper, Harper & Turner, Philadelphia, Pa., is chairman is soliciting deposits of the one-year 7 per cent gold notes of the New Orleans Railway & Light Company, New Orleans, La. In order that the holders of the notes may have a general knowledge of the affairs of the railway, the committee is distributing a summary of a statement made by Francis T. Homer, president of the American Cities Company, which owns the greater part of the capital stock of the railway, and also a tabulated comparison of valuations placed on the properties of the railway. A bondholders' protective committee for the refunding and general lien 5 per cent gold bonds of the New Orleans Railway & Light Company, has also been formed. The committee is composed of George K. Reilly, chairman; John S. Newbold, Arthur Morton, George A. Colston and Lynn H. Dinkins.

Further Diversifies Its Holdings.—The Washington Water Power Company, Spokane, Wash., has taken over the Spokane Heat, Light & Power Company. It is understood that the deal was put through on a small cash payment, the creditors and security holders of the light and power company, which has been in the hands of a receiver for several months, agreeing to take an issue of $1,400,000 twenty-year unsecured debentures of the purchasing company, which will bear interest at the rate of 3 per cent for the first six years, 4 per cent for the next seven years, and 5 per cent for the remaining seven years. It is also understood that the Washington Water Power Company will continue the operation of the heating company's steam distributing plant and will operate the acquired property as a subsidiary. The Washington Water Power Company has heretofore done a general light and power business and operated 110 miles of electric railway.

Refinancing Progress of United Railroads.—The two committees representing holders of the securities of the United Railroads, San Francisco, Cal., have arranged for a syndicate to take up at par $5,200,000 of underlying bonds of the company. The bonds in question are $1,800,000 of Market Street 6s, $400,000 of Ferries & Cliff House 6s, $2,000,000 of Omnibus Cable Railway 6s and $1,000,000 of Sutter Street Railway 5s. As for the $23,500,000 of United Railroads general mortgage 4 per cent bonds, on which default was made on Oct. 1, 1916, and on subsequent coupons, Jesse W. Lilienthal, president of the company, has always contended that in order to place the United Railroads securely on its financial feet, it was necessary that the fixed charges should be reduced to a minimum, and that either preferred stock or income bonds or both, should be substituted for this issue. It is now understood that the committees have acquiesced in some such arrangement.

$10,000,000 of Notes Offered.—Lee, Higginson & Company, the First National Bank, the Chase Securities Corportion, Ladenburg, Thalman & Company, Montgomery & Company, Hayden, Stone & Company and Kean, Taylor & Company, have formed a syndicate to sell $10,000,000 Philadelphia Company three-year 6 per cent gold notes to be secured by 200 per cent in par value of a new issue of first refunding and collateral trust mortgage 5 per cent bonds. At a special meeting of the stockholders of the Philadelphia Company on Feb. 4 the stockholders authorized an increase in the indebtedness of the company to the aggregate amount of $100,000,000 and authorized a mortgage upon the property and franchises of the company to secure an issue of $100,000,000 of first refunding and collateral mortgage bonds, payable in twenty-five years and to bear interest at a rate not exceeding 6 per cent per annum and authorized an issue of $15,000,000 of three-year 6 per cent gold notes, of which $10,000,000 are to be issued at once.

Want Interest Payment Put Off.—All the receivers of the Pittsburgh (Pa.) Railways have joined in a petition to the court opposing the payment of the semi-annual interest due under the terms of the mortgage covering the Pittsburgh, Washington & Canonsburg Railway, of which the People's Savings & Trust Company is trustee. In opposing the payment the receivers point out that the total estimated net revenue of the company for 1919 would fall far short of paying fixed charges held against the company for rentals and bond and mortgage interest, if none of the net revenue was spent for improving tracks, equipment and service, or in meeting other municipal obligations or in paying the large items of taxes. The court was further informed that the receivers have completed a budget covering the entire railway situation and the problems confronting the receivers, and that they desire to submit this budget for consideration at the time a hearing is fixed by the court on the Pittsburgh, Canonsburg & Washington Railway Company's petition. They accordingly ask that action by the court be delayed until that time.

Public Service Corporation Notes Offered.—Drexel & Company, Philadelphia, Pa., and Bonbright & Company, Inc., New York, N. Y., are offering, at 98½ and interest (to yield more than 7.55 per cent), three-year secured convertible 7 per cent gold notes of the Public Service Corporation of New Jersey, Newark, N. J. The note issue is limited to the $12,500,000, all now to be issued. They are dated March 1, 1919, and are due March 1, 1922, redeemable at the corporation's option in whole or in part on sixty days' notice. The notes are convertible at the option of the holder at any time prior to Dec. 31, 1921, or until and including the date of any earlier redemption, into new 8 per cent cumulative preferred stock of the corporation on the basis of 100 per cent for the notes and 101½ per cent for the stock upon thirty days previous notice. The Fidelity Trust Company, Philadelphia, Pa., is trustee of the issue. The proceeds of the notes and of the preferred stock presently to be subscribed for will pay off maturing notes, discharge floating debt, provide additional working capital and diminish materially the annual interest charges. Approximately $32,000,000 has been expended on extensions and betterments in the last five years; $5,500,000 of this amount has been financed by the sale of bonds, the remainder being represented by $7,500,000 of notes maturing March 1, 1919, $5,000,000 of common stock of the corporation and short-term loans, etc. The present issue is part of the financial plan outlined in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 1, page 250. The notes were all sold in a very short time after they had been offered for public subscription.

Electric Railway Monthly Earnings

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m., Dec., '18	$82,935	*$57,514	$25,421	$20,271	$5,150
1 m., Dec., '17	83,790	*45,341	38,449	19,665	18,784
12 m., Dec., '18	923,122	*596,735	326,387	239,096	87,291
12 m., Dec., '17	886,120	*502,053	384,067	228,442	155,625

CHATTANOOGA RAILWAY & LIGHT COMPANY
CHATTANOOGA, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m., Dec., '18	$177,162	*$134,029	$43,133	$32,683	$10,450
1 m., Dec., '17	132,286	*131,844	442	31,164	†30,722
12 m., Dec., '18	1,843,947	*1,441,613	402,334	376,118	26,216
12 m., Dec., '17	1,356,732	*1,138,693	218,039	360,087	†142,048

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m., Dec., '18	$417,737	*$286,056	$131,681	$63,153	$68,528
1 m., Dec., '17	385,269	*290,974	94,295	49,535	44,760
12 m., Dec., '18	4,264,485	*3,113,068	1,151,417	695,457	455,960
12 m., Dec., '17	4,024,186	*2,943,929	1,080,257	558,589	521,668

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY,
GRAND RAPIDS, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m., Dec., '18	$2,179,221	*$1,405,949	$773,272	$539,771	$233,501
1 m., Dec., '17	1,996,288	*1,338,117	658,171	454,220	203,951
12 m., Dec., '18	21,918,061	*14,929,845	6,988,216	6,037,313	950,903
12 m., Dec., '17	19,723,763	*12,285,005	7,438,731	5,289,106	2,149,625

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m., Dec., '18	$406,855	*$329,466	$77,389	$70,935	$6,454
1 m., Dec., '17	357,987	*243,634	114,353	69,883	44,470
12 m., Dec., '18	4,215,887	*3,303,317	912,570	813,289	99,281
12 m., Dec., '17	3,692,472	*2,481,520	1,210,952	785,382	425,570

GRAND RAPIDS (MICH.) RAILWAY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m., Dec., '18	$117,656	*$91,372	$26,284	$18,911	$7,373
1 m., Dec., '17	117,238	*87,260	29,978	19,945	10,033
12 m., Dec., '18	1,278,348	*1,020,487	257,861	233,087	24,774
12 m., Dec., '17	1,303,860	*910,176	393,684	218,215	175,469

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY,
LEWISTON, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m., Dec., '18	$79,624	*$69,279	$10,345	$19,735	†$9,390
1 m., Dec., '17	62,331	*61,625	706	15,665	†14,959
12 m., Dec., '18	894,784	*791,106	103,678	227,610	†123,932
12 m., Dec., '17	898,378	*683,684	214,689	186,689	†28,000

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m., Dec., '18	$277,227	*$198,661	$78,566	$38,381	$40,185
1 m., Dec., '17	223,117	*136,403	86,714	40,137	46,577
12 m., Dec., '18	2,866,213	*1,896,867	969,346	481,655	487,691
12 m., Dec., '17	2,458,321	*1,589,418	868,903	490,071	378,832

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m., Dec., '18	$744,002	*††$445,324	$298,678	$188,894	$109,784
1 m., Dec., '17	594,020	*479,885	114,135	179,036	†64,901
12 m., Dec., '18	7,669,389	*††4,855,890	2,813,499	2,218,187	595,312
12 m., Dec., '17	6,023,510	*3,576,593	2,446,917	2,152,052	294,865

*Includes taxes. † Deficit. †† For the month $22,545 and for twelve months $230,307 included for depreciation.

Traffic and Transportation

Binghamton Wants More

Despite Claim by City of Fare Limitation Court Instructs Receiver to Apply to Commission

William G. Phelps, as receiver of the Binghamton (N. Y.) Railway, on Feb. 3 applied to the Public Service Commission for the Second District of New York for an order authorizing a 6-cent fare in Binghamton to be continued during "the war in which the United States government is now engaged with the German Empire and for two years thereafter." The petition was signed by Mr. Phelps as receiver. The commission will investigate and order a public hearing.

Mr. Phelps' petition recites that he was appointed receiver under an order of the United States District Court on Oct. 8, 1918, and that he is in possession of the company, which was incorporated on Dec. 6, 1901, by the consolidation of the Binghamton Railroad and the Binghamton, Lestershire & Union Railroad. The receiver says:

> That upon entering upon the duties of said receivership, your petitioner ascertained, and believes to be true, that on account of the changed financial and economic conditions brought about by the war in which the United States Government is now engaged, especially the great increase in the cost of fuel and materials necessary for its operation, the prices of which have increased 200 and in some instances 300 per cent, the advance in wages of labor, increase in taxes and operating expenses generally, together with a falling off in receipts, a surplus in earnings in 1917 was changed to a large deficit, by reason of which the Binghamton Railway Company was unable to pay its operating expenses, interest on its bonds and its outstanding obligations.

The company submits statements of its financial condition in 1914, 1915, 1916 and 1917, and the first half and the first nine months of 1918 and a schedule showing the increase in the prices of materials and supplies. The net corporate income follows:

1914, $51,924; 1915, $79,759; 1916, $102,535; 1917, $81,971; 1917, first half, $60,682; 1918, first half, $18,748 deficit; 1918, nine months, $32,717 deficit.

The road operates in Binghamton, towns of Port Dickinson and Union and Port Dickinson, Johnson City, Endicott and Union, and the receiver alleges that a 5-cent fare is insufficient to yield a reasonable compensation for the service rendered, is unjust and unreasonably low and does not give an average return on the value of the property, is confiscatory and unless the rate is increased to a reasonable and just rate operation of the road must cease. The receivership was brought about to conserve and protect the property and operate the road under the Federal Court until some means can be devised to relieve it from its financial difficulties.

Operating expenses, it is alleged, have increased from $321,473 in 1914 to $446,545 in 1917, and in the first six months in 1918 expenses increased $31,173 over the first six months in 1917. During the first six months of 1918 the road's revenues decreased $27,525, as compared with the corresponding period in 1917, and during the first six months in 1918 the company's deficit was $18,748 as against a surplus of $60,682 for the corresponding period in 1917. Taxes for 1919 will be at least $7,500 more than in 1918. Four increases in wages have been made within the past three years.

Receipts from Oct. 10, 1918, to Oct. 31, 1918, including the lighting plant, were $29,690; disbursements $29,791, a deficit of $100 not including interest on bonds, taxes, insurance or any existing indebtedness, claims for damages, betterments or necessary repairs.

The financial condition of the company, it is stated, has not resulted from waste, extravagance, over capitalization, excessive salaries or bad management.

The receiver says that on Oct. 29 he applied to the United States Court for instruction to apply to the commission for permission to ask for an increased fare, the city contending that the rate of fare was limited by ordinances restricting the fare to 5 cents. The city opposed the application in the United States Court. Trial was had and on Jan. 22 a decree was rendered in favor of the receiver and, it is claimed, is a final adjudication against the city and other municipalities, directing the receiver to make application to the Public Service Commission for the Second District, for an order authorizing an increased rate of fare to be charged by the Binghamton Railway.

The commission will hear the petition in Binghamton on Feb. 21.

Would Repeal Rate Restriction

Governor James P. Goodrich of Indiana in his message to the General Assembly urges the repeal of the 2-cent law. He says:

> The status of the railroads of the country will be determined by Congress in the near future. If the roads go back to private ownership immediately, or in the near future, there is an urgent necessity for action on the part of the states to remove existing statutory rate restrictions. The railroads in Indiana, as in all other states, are now operating under a rate of 3 cents per mile, which was authorized by the federal railroad administration. If federal control should end, and unless prior action is taken, the roads will immediately pass back under the rate restrictions of the several states. Such an action would surely prove fatal to transportation, and to the economic conditions of the country.
>
> Therefore, I recommend the repeal of the present statutory railroad rate restriction in Indiana, and urge that the power of determining such rates be vested in the Public Service Commission of Indiana until the permanent status of the railroad companies is fixed.

Des Moines Fare Unchanged

Citizens, However, Will Get Only Such Service as the Fare Will Support

Judge Martin J. Wade of the Federal Court has denied the application of the receivers for the Des Moines City Railway for an increased rate of fare. While Judge Wade's ruling is regarded by attorneys for the city of Des Moines as a victory, the ruling sets out that if the company's earnings are not sufficient to meet the fixed charges provided for in the franchise and pay for the present service the service must be adjusted to the income.

Immediately upon receipt of the ruling officials of the Des Moines City Railway announced that a general curtailment of service would go into effect within the next two weeks. Owl cars are to be abandoned, lines now on a seven-minute service are to be reduced to ten-minute service and non-productive lines are to be further reduced as to service. There is to be no curtailment of rush-hour service according to the announcement.

Judge Wade holds that the franchise is a contract and that the fares fixed therein are definite and binding and that they cannot be increased. In this connection Judge Wade rules that the terms of the franchise as regards service are as binding upon the people as upon the company. The court said in part:

> The only question involved before the court is whether or not section 17 of the franchise, fixing the fares at six for a quarter, is to be construed with section 7, which provides for the payment from the fares of all costs of operation, including taxes and interest, at not to exceed 5 per cent on the company's indebtedness represented by bond, and not to exceed 6 per cent on the remainder of such indebtedness and the setting aside of a depreciation fund.
>
> It is the contention of the receivers, and for the purpose of this hearing only the contention is assumed to be true, that the income from fares will not pay the cost of operation, taxes, interest and depreciation and continue the present service.
>
> It is here apparent, of course, that if this contention is true, fares will have to be increased or service reduced.
>
> The court cannot close its eyes to the fact that in controversies over franchises for street railway companies, the thing most important in the minds of the people is the rates of fares. Fares touch the people most directly and I have no doubt from all the evidence before the court that so far as the people of Des Moines are concerned they assumed that the fare was definitely and finally determined by this franchise.
>
> Of course the people of Des Moines cannot have service which will not be paid for out of the fares. The receivers are claiming that the service demanded by the city of Des Moines cannot under present changed conditions be rendered from the present income. If this claim is true, of course, it is most unfortunate; and yet these parties have made a contract and the court cannot modify its provisions.
>
> That the contract did not contemplate a change of fares is further emphasized by the omission from the contract of any method of fixing higher fares.
>
> New conditions may render it absolutely impossible for the people to get, under the contract, what they expect in the way of service, but the people are bound by the contract as well as the company, and when they get that service which can be paid for under the provisions of the contract, they must be content.

Emil G. Schmidt, president of the Des Moines City Railway, announces that there will be no appeal from Judge Wade's ruling.

A Small Road's Problem

Three-Cent-a-Mile Charge Under Government Replaced by Seven Five-Cent Zones

As the result of several conferences between the Public Service Commission of Massachusetts and the Grafton & Upton Railroad, the latter has agreed to try out for an experimental period a new fare plan under which the road is to be divided into seven zones, with a 5-cent fare in each. Under this plan the through fare will be the same as suggested by the petitioners, but the 5-cent unit of fare for zones of approximately 2 miles each should prove more convenient both to the company and to the public.

JOINT OPERATION PROVIDED

As the portion of the line between Milford and Hopedale is now operated by the Milford & Uxbridge Company on its own line and under its own tariff, the passenger rates from Milford to Hopedale and other points on the Grafton & Upton Railroad are not included in the local passenger tariffs to be filed by the Grafton & Upton Company. With this exception, all the present workingmen's tickets are to be retained at a rate 40 per cent in excess of that prevailing prior to June 10, 1918, which corresponds with the proposed increase in the cash rates as compared with those in effect prior to the same date.

SYSTEM HAS 18.10 MILES OF LINE

The Grafton & Upton Railroad runs from North Grafton through the towns of Grafton, Upton and Hopedale to Milford. It has a total mileage of 18.10 miles, including a loop 2.73 miles long in the town of Upton which was acquired through purchase of the railway of the Upton Street Railway. This loop line retains the status of a street railway, as the Grafton & Upton Company did not acquire the right to operate a railroad upon that location.

Under the authority of the same statute the Grafton & Upton Company, on Oct. 1, 1902, entered into a contract, which still remains in effect, with the Milford & Uxbridge Street Railway, under which the latter company supplies the cars, car employees, and the power, and maintains the overhead system, for the operation of the passenger service and the transportation of baggage, express and mail matter of the Grafton & Upton Company between North Grafton and Hopedale. The portion of the line between Hopedale and Milford is now used for freight traffic only, the passenger service between these points being performed by the Milford & Uxbridge Company on its own line and under its own tariff. By virtue of this arrangement the Grafton & Upton Company furnishes passenger service through the medium of the Milford & Uxbridge Street Railway between North Grafton and Hopedale by way of the Upton loop, a total distance of 13.60 miles, and directly operates the freight service between North Grafton and Milford by way of the main line, a distance of 15.37 miles. By the terms of the contract between the two companies the Grafton & Upton company receives a stated sum of $9,500 a year plus one-fourth of the gross passenger receipts in excess of $25,000, and the remainder of the passenger receipts go to the Milford & Uxbridge Company.

GOVERNMENT TOOK OVER ROAD

On Jan. 1, 1918, the federal government took over the possession, use, control and operation of the Grafton & Upton Company. At that time, the road was divided into five zones, with a 5-cent fare in each. On June 10, 1918, the United States Railroad Administration established a uniform one-way rate for passenger transportation of 3 cents a mile, with a minimum charge of 10 cents, upon all railroads under federal control. On June 24, 1913, the company was discharged from federal control, but the rates meantime established have remained in effect except as modified by a tariff supplement effective on Aug. 1, 1918, which provided for a reduction of the minimum fare for a ride of 2 miles or less from 10 cents to 6 cents.

The petitioners claimed that the passenger service of the Grafton & Upton Company is essentially a street railway service rather than a railroad service, that the rates should be established according to railway rather than railroad standards, and that upon this basis the existing rates are excessive.

The company contended that its status as a railroad had been established, but suggested that, if the present system of mileage zones is inconvenient to the public, it might be willing to provide for a division of the road into 6 fare zones, with a 7-cent unit of fare. This plan would make no change in the through rate for the entire line, but would result in certain readjustments of fares between intermediate points.

New York's Accident Record

In the second serious accident within ten days on the Third Avenue Elevated Railroad of the Interborough Rapid Transit Company, six persons were hurt, at 8.15 a.m., on Feb. 8, at 120th Street and Third Avenue when a northbound seven-passenger-car local train of wooden cars ran into an empty train, made up of composite cars, standing idle on the tracks.

In the accident on Jan. 30, a rear-end collision on the Third Avenue Elevated at 175th Street, one woman was killed and thirty persons injured.

The number of deaths in accidents on subway and elevated lines in 1918 was greater than in any other year on record. The total of killed was 177. The largest in any preceding year since 1910 was eighty-three in 1914. Of the 177 deaths last year, ninety-nine were due to the Malbone Street accident in Brooklyn in which a train of cars left the track. Aside from this there were seventy-eight deaths, seven more than in 1917 and eight more than in 1916. The number of persons killed in surface car accidents in 1918 showed a marked decrease, dropping from 157 in 1917 to 119 last year, accounted for in part by the decrease in surface line traffic.

An official table showing accidents of all kinds, whether to equipment or to human beings, of casualties of all kinds, and of deaths on the subway and elevated lines in New York City follows:

Year	Accidents	Casualties	Killed
1913	12,435	11,009	71
1914	12,358	11,598	83
1915	11,610	11,336	74
1916	13,572	13,478	70
1917	15,372	15.092	71
1918	12,455	12,692	177

The table of accidents for the same period on the surface lines is as follows:

Year	Accidents	Casualties	Killed
1913	54,854	30,342	155
1914	54,128	29,416	134
1915	48,176	27,142	94
1916	51,535	28,585	116
1917	52,195	28,526	157
1918	41,086	21,643	119

Defines Public's Interest

J. F. Porter, president of the Kansas City Light & Power Company, Kansas City, Mo., was invited to address the Kansas City Chamber of Commerce on Jan. 8 on the subject of the attitude of cities toward their public utilities. Unusual interest attached to the address because of the recent strike of the employees of the Kansas City Railways and the recent fare increase. Mr. Porter said in part:

> The Public Service Commission looks after the interests of the public, the customers, but it also looks after the interests of the investors. If it raises rates it is criticised, but there have been cases where the rate was too low to render a just return to the investor. The company must have a fair return or go broke and the customers suffer. If the situation were understood the commission would be encouraged to fix rates for adequate returns on investment when costs are high so that prices might be reduced when costs decline. If the people who complain were sincere they would say in such times as these; "Those securities are low, I'll make an honest dollar by buying them." If they cannot trust the commission which says the company should have 6½ per cent return for its investors these people should get behind the utilities and make their securities more valuable.
>
> The fundamental basis of utility operation is service. You want service. What do you say to sitting in and helping dictate the company's policies so far as the commission will allow? You who pay for service pay what the commission, after examining our books, says is a fair price.
>
> You are interested in costs, because when anything happens to costs it also affects the rates. A lower rate for yourself may increase your costs of service in another direction. You are interested in every judgment against the company, for every judgment affects rates.
>
> When some one says, "That company or corporation should be stopped from doing such and such a thing," think of your own interest in such an estoppel. Be sure that the thing opposed is not some step necessary for economical and efficient service; the better the service the lower the rates. The less friction there is in the working of the company the easier and cheaper it is for the company to give good service at low rates. Public officials are realizing this and are assisting rather than hampering corporations in improvements required for better operations.

Rome (N. Y.) Hearing Closed

The application of the New York State Railways, to the Public Service Commission for the Second District of New York for a 6-cent fare in Rome, was submitted to the commission on Jan. 15 for determination. Mayor H. C. Midlam and Corporation Counsel M. J. Larkin represented the city. Walter N. Kernan and B. E. Tilton, vice-president and general manager of the Utica and Syracuse lines, appeared for the railroad company. Patrons of the railroad company in Rome protested against present service there and considerable evidence was submitted.

The railroad company, through Mr. Tilton, put in proof as to the financial operations of the Rome road for the first eleven months in 1918. Mr. Tilton said the receipts of the Rome line for the eleven months were $57,490, showing a decrease of 14.2 per cent over the same months in 1917. The expenses for the eleven months were $69,583, or a deficit of $12,092. The fare receipts included all fares in Rome and to Stanwix. The expenses do not include legal expenses, salaries of general officers and fixed charges, including interest on bonds and return on capital invested. Wages of conductors and motormen were increased from 31 cents an hour early in the year to 35 cents and then to 45 cents, the latter rate the result of the War Labor Board's award. Mr. Tilton said the earnings per car-mile in Rome were the lowest of any city he knew.

Mr. Tilton figured that the company, under the proposed increased fare, would receive about a 13 per cent increase in revenue or about $8,317. He estimated a falling off in traffic of 1½ per cent over 1918.

Mr. Tilton told Mr. Larkin that the reduced revenues were not due to the reduced service. He acknowledged that there had been demands for better service. To this Mr. Larkin replied that the company was not entitled to increased fare because of the service given. He was informed by Mr. Tilton that the base schedule in Rome had not been reduced, only the tripper service.

The hearing was declared closed unless either party desires to submit additional evidence after the company's figures are checked up.

Trenton Service Still Unsatisfactory

The Board of Public Utility Commissioners of New Jersey has rebuked the Trenton & Mercer County Traction Corporation for failing to carry out all the recommendations of the commission's order of Nov. 27. The inspectors' report shows that poor service is due mainly to lack of discipline among the crews, inability to maintain proper schedules, inadequate maintenance of rolling stock and an insufficient number of cars. Suggestions made by the inspectors follow:

The company should insist on the obedience of its operating rules by the employees, particularly the car crews.

Greater alertness and general activity on the part of the traffic inspectors on the streets.

Improvement in the repair and maintenance of rolling stock and installation of additional facilities for carrying out this work.

The operation of additional cars during rush hours or the substitution for the present small cars operated during this period of larger cars.

The separation of the system into three divisions, each under the supervision of one or more inspectors of supervisors, each of whom shall be held directly responsible for the operation of his particular division.

At the suggestion of Peter Witt the railway placed an order for twenty one-man cars, each to carry thirty-two persons. The company recently received six of these cars and will experiment with them under an agreement, whereby they may be returned to the manufacturers for large cars if the small ones are deemed to be unsuitable.

Jitneys Reappear in Des Moines

Jitneys made their first appearance in a number of years on the streets of Des Moines, Iowa, during the week ended Jan. 18. City officials state they will arrest all drivers who have not compiled with the city ordinances, which require an indemnity bond and compel the jitneys to follow established routes. The autos in service formerly plied between Camp Dodge and Des Moines.

Denver Retrenching

The Denver (Col.) Tramway is retrenching in every direction in an effort to reduce expenses to a point that can be met with the revenue from the 6-cent fare during the time that the company is waiting for the result of the investigation of the committee of fifty appointed by the city's consumers, labor and commercial organizations. In December the company secured a fare of 7 cents plus 1 cent for transfers from the Public Utilities Commission, but as a result of the ruling by the Supreme Court on Jan. 15 in the telephone case, to which reference was made in the ELECTRIC RAILWAY JOURNAL for Jan. 25, page 206, the company put the fare back to 6 cents. The court held that the Utilities Commission had no jurisdiction over rates in home-rule cities in Colorado. The 6-cent rate had been authorized by both the City Council and the Utilities Commission, whereas the 7-cent rate was authorized only by the Utilities Commission. The 6-cent fare being inadequate to pay the company's bills it reduced service, laid off about 150 employees, stopped all construction and street improvement work and abandoned two lines. These abandonments and the changes in operating schedules were discussed in *Tramograms* for Feb. 1.

Transportation News Notes

One-Man Cars Suggested.—The introduction of one-man cars on the Country Club, Brooklyn, Ingalls Park and Fourth Avenue lines of the Chicago & Joliet Electric Railway has been proposed to the City Council of Joliet, Ill.

Denied Excess Fare Charge.—The Public Utilities Commission of Illinois has denied the petition of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., for permission to charge an excess fare to passengers who fail to purchase tickets before boarding cars.

Another Increase Denied.—The Public Service Commission of Indiana has denied a petition of the Cincinnati, Lawrenceburg & Aurora Railroad, Cincinnati, Ohio, for an increase in intrastate passenger rates. The commission ascertained that the company is losing money, but found that most of this was loss on the Ohio end of the line.

200 Coupon Book for $2.—The New York State Railways, Rochester Lines, on Feb. 17 will put into effect a new tariff regulation providing for the sale by conductors and agents of a 200 coupon book for $2 entitling the holder to $2 worth of transportation on the Rochester lines except in Rochester. The minimum detachment will be five coupons.

Talks to Trainmen in Dallas.—Motormen and conductors of the Dallas (Tex.) Railways are holding regular meetings for the exchange of ideas on how to improve the railway service and to hear addresses from heads of the operating departments. At recent meetings, the men were addressed by the general manager, and by the assistant to the president.

Fare Increase Suspended.—The Public Utilities Commission of Illinois has suspended until Aug. 14 the application of the East St. Louis & Suburban Railway, East St. Louis, Ill., for a proposed increase in passenger fares. The company wanted to advance rates 10 cents between Belleville, Ill., and St. Louis, Mo. Two new collection zones, one additional in Belleville and one additional in East St. Louis, were proposed.

Maintaining Schedules in Dallas.—The Dallas (Tex.) Railway, as a means of improving schedules and making for faster time, has installed markers every six or seven blocks along its lines. These consist of easily discernible signs suspended from the span wires. Each motorman is supplied with schedule cards showing the time due at each of these markers. This system has been put into effect by Dan Fisher, assistant to the president and also in charge of publicity.

Co-operating in Freight Campaign.—Electric railways operating out of Indianapolis united in a full-page advertisement in the Indianapolis papers relative to the annual Indiana Poultry Show. Express service from all parts of the State to Indianapolis, the "Hub of Hoosierdom" is made a prominent feature of the publicity matter. The Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis & Cincinnati Traction Company, Interstate Public Service Company, and the Union Traction Company of Indiana all joined in the advertising.

Short Strike in Wichita Falls.—Conductors and motormen of the Wichita Falls (Tex.) Traction Company went out on a strike recently because the company refused their demands for recognition of the union and for a wage increase from 30 cents to 40 cents an hour, and for a shorter work day. The men have been working twelve hours a day for 30 cents an hour. They now want an eight-hour day with extra pay for overtime. The company was unable to move cars for several days, but finally employed other men and has resumed service.

Two-Mile Line Feels Pinch. — The receipts under the present fare of the St. Louis & Jennings Railway, St. Louis, Mo., are insufficient, according to statements made by officers of the company at a recent hearing before the Public Service Commission of Missouri on the company's petition for an increase of fares. The city of St. Louis has ten days in which to file an answer to the petition. The company operates about 2½ miles of track from the northern terminus of the Bellefontaine Street line of the United Railways, St. Louis, to the town of Jennings, St. Louis County.

Fare Reductions Ordered.—The Public Service Commission for the Second District of New York at its regular session on Feb. 4 ordered George Bullock as the receiver of the Buffalo & Lake Erie Traction Company, beginning on Feb. 6 to charge only 5 cents, with transfers, in the city of Buffalo on all cars where he is now charging 13 cents without a transfer, to reduce to 10 cents, the fare between the city of Lackawanna and the city of Buffalo on such cars as he is now charging passengers 14 cents, and to restore the sale in the city of Lackawanna of strips of seven tickets for 25 cents which he discontinued in January last and charged 5 cents fare.

Relief in Sight in Richmond.—Final vote in the Common Council of Richmond, Va., the city's lower legislative body, on the measure increasing fares on the lines of the Virginia Railway & Power Company in Richmond resulted on Feb. 3 in the passage of the ordinance by a vote of twelve to eight. The ordinance now goes to the Aldermen. The increases are as follows: A straight 5-cent fare to the general public, instead of the six tickets for 25 cents. Labor tickets, now sold at the rate of two for 5 cents, and good from 6 a. m. to 7 a. m., will be sold at the rate of six for 25 cents, and will be good from 6 a. m. until 8 a. m. School tickets will remain as at present.

Seven-Cent Minimum Charge.—The New York, Westchester & Boston Railway, New York, N. Y., on Feb. 1, by special permission of the Public Service Commission for the Second District, changed its tariff schedules affecting local passenger traffic as follows: Local one-way fare between any two points in any one zone, except between points in New York zone, Harlem River to Dyre Avenue, Bronx, inclusive, 7 cents, an increase of 2 cents. Increases varying in amounts from 2 to 5 cents in all interzone fares except between Wykagyl and Quaker Ridge. Commutation ticket fares, sixty and forty-six-trip, increased approximately 10 per cent. Baggage rates canceled and provision made for free transportation of baggage, not exceeding 150 lb. in weight per passenger, between points where the company has baggage facilities.

Service Ordered to Be Restored.—The Public Service Commission for the Second District of New York at its regular session on Feb. 6 ordered the New York State Railways, on or before Feb. 10, to restore service upon its lines in Rochester during non-rush hours so that operation shall conform to recommendations and requirements in the report of Charles R. Barnes, chief of the division of electric railroads, to the commission and to continue the service until further order. In its order the commission decided to enlarge the scope of its proceeding under the "show-cause" order directed to the company so as to include generally the company's service in Rochester. It was also decided to hold further hearing on Feb. 19 on the reports of Mr. Barnes to the commission and upon all questions concerning service on the company's lines in Rochester.

In a Spirit of Mutual Helpfulness.—Receiver Garrison of the Brooklyn (N. Y.) Rapid Transit Company called at the offices of the Public Service Commission on Jan. 21 and conferred for an hour with Commissioners Whitney, Hervey and Kracke; the commission's chief counsel, Godfrey Goldmark, and its special counsel, William L. Ransom, on the subject of increasing the efficiency of the Brooklyn Rapid Transit Company. The commission promised to do what it could to complete the rapid transit system so that trains could begin running, and to assist Mr. Garrison with schedules that would yield the maximum of service with the present equipment. It was also practically agreed that 250 new surface cars should be bought. There is no money available for these cars, but it was suggested that the surface companies could issue certificates of indebtedness, which could be accepted by the Brooklyn Rapid Transit Company and money furnished on them out of sums to be raised on receiver's certificates. There will be other conferences between the commission and Mr. Garrison.

New Publications

Electrical Blue Book

Eighth edition, 1918. Published by the International Trade Press, Chicago. Cloth, 274 pages. Price, $2.

This book contains the national electrical code, as recommended by the National Fire Protection Association, with illustrations and explanatory notes, and with the changes introduced in the latest revision of the rules made conspicuous by being printed in larger type. It also contains a list of inspected and approved electrical appliances and other information of value to the electrical contractor and installer of lighting and power equipment.

What is Fair?

By William G. Raymond. John Wiley & Sons, Inc., New York, N. Y. 172 pages. Cloth, $1 postpaid.

This little book is the attractive presentation of the author's ideas in regard to what is fair in the relationship between the public and utility owners. Mr. Raymond believes that no corporation serving the public should be made to feel that its property is of uncertain value because of intermittent regulation of rates according to no fixed rule. He has developed an equation to express the fair return for a utility under continuous regulation. The book as a whole represents an earnest effort to consider all the equities involved in one of the most complicated questions of the day.

The Financing of Public Service Corporations

By Milton B. Ignatius. The Ronald Press Company, 20 Vesey Street, New York, N. Y. 508 pages. Cloth. $5 postpaid.

The purpose of this work, according to the author, is the presentation of a comprehensive discussion of the important aspects of utility financing, from the inception of the enterprise and the issuance of securities to the expenditure of the proceeds and the recording of the facts. This purpose has been well carried out.

The book is an admirable survey of a field which is no longer of purely private concern, since the advent of the regulatory commissions. The part of the book most striking, because of its newness, is the discussion of the supervisory powers of the commissions over utility securities. Mr. Ignatius hits the nail on the head when he says that the future usefulness of such bodies depends upon the spirit with which they approach the task of outlining, without legal responsibility for results, the financial policies of utilities.

The book is written not only for that part of the general public which is interested in utility financing but also for those directly connected with utility operation. It therefore should be in the libraries of all utility men.

Personal Mention

W. J. Hodgkins has been appointed general superintendent of the Ironwood & Bessemer Railway & Light Company, Ashland, Wis., to succeed F. R. Winders.

Gust Johnson has been appointed engineer of maintenance of way of the St. Paul Southern Electric Railway, Hastings, Minn., to succeed Carl Erickson.

Allen Blanchard has been appointed master mechanic of the Trenton & Mercer County Traction Company, Trenton, N. J., to succeed Benjamin C. Bowers.

F. R. Burns has been appointed superintendent of the Blackstone division of the Worcester Consolidated Street Railway, Worcester, Mass., to succeed C. H. Sanborn.

W. I. Dill has been appointed secretary of the Burlington County Transit Company, Hainesport, N. J., to succeed Armitt H. Coate, who retains his position as treasurer of the company.

James Smith has been appointed master mechanic of the Atlantic Coast Electric Railway, Asbury, Park, N. J., to succeed J. H. Moor, who retains his position as chief engineer.

I. C. Elston, formerly secretary and treasurer of the Vicksburg Light & Traction Company, Vicksburg, Miss., has been elected president of the company to succeed William B. Walter.

Joseph N. McCallum, vice-president of the Vicksburg Light & Traction Company, Vicksburg, Miss., has also been appointed treasurer of the company to succeed I. C. Elston, who has been elected president.

A. G. McMasters has been appointed purchasing agent of the Lincoln (Neb.) Traction Company to succeed C. F. Greenberg, who, as noted in the ELECTRIC RAILWAY JOURNAL, resigned from the company, effective on Oct. 3.

E. Driscoll has been appointed assistant chief engineer of power station of the Tampa (Fla.) Electric Company to succeed L. P. Chaney, who was recently appointed chief engineer of the Pensacola (Fla.) Electric Company.

G. H. Kuhrts, formerly assistant general manager of the Los Angeles (Cal.) Railway Corporation, has been appointed general manager of the company to succeed Howard Huntington, who remains as vice-president.

R. M. Harding, who has been general superintendent and director of transportation of the Columbus (Ga.) Railroad for several years, has been made acting general manager of the company to succeed John S. Bleecker, who, as noted previously in the ELECTRIC RAILWAY JOURNAL, has become connected with the New Orleans Railway & Light Company.

Hartley Le H. Smith, who has been chief of the testing bureau of the Brooklyn (N. Y.) Rapid Transit System, has resigned to take charge of the steam engineering department of the New England Power Company, Worcester, Mass. He will have supervision of the steam-driven power stations of this company which are auxiliary to its hydroelectric power supply. He has been connected with the engineering staff of the Brooklyn Rapid Transit Company for more than sixteen years, having joined it for the purpose of looking after meter, coal, boiler and other testing work. The testing bureau was organized soon after he joined the staff and under his direction has grown to be a large department, with mechanical, electrical and chemical subdivisions each with its staff under competent supervision. The nature of the work done by this department is reflected in the series of articles contributed by Mr. Smith to the monthly mechanical and engineering issues of the ELECTRIC RAILWAY JOURNAL during the past year. Mr. Smith is thirty-nine years of age. He secured his elementary education in Camden, N. J. After leaving high school he attended Drexel Institute in Philadelphia and completed a three-year mechanic arts course and a two-year electrical engineering course. Immediately thereafter he spent one and a half years with the Camden & Suburban Railway as assistant to the electrical engineer who at that time had charge of power stations, rolling stock and lines. He left this company to join the B. R. T. staff as already mentioned. Aside from his direct work for his employers Mr. Smith has taken an active interest in the national engineering societies. He is a member of the American Institute of Electrical Engineers and the American Society for Testing Materials.

H. LE H. SMITH

B. E. Parker, Evansville, Ind., has been appointed general superintendent of railways of the Northern Ohio Traction & Light Company, with headquarters at Akron, Ohio. Mr. Parker occupied a similar position with the Evansville Public Utilities Company, and was superintendent of transportation of the Rockford, Ill., system before that time. He entered electric railway work in April, 1890, as a conductor at Muskegon, Mich. Going to Marion, Ind., some years later, he soon became local superintendent of the Union Traction Company, in which position he remained until 1911, when he went to Rockford.

Clifton W. Wilder, electrical engineer of the Public Service Commission for the First District of New York, and connected with that organization practically since its establishment in 1907, has resigned to join the staff of the New York Edison Company. Mr. Wilder was graduated from the Massachusetts Institute of Technology in 1896. He engaged in general engineering work pertaining to lighting, industrial and railroad properties in Boston and New York until 1907, when he entered the service of the commission as an assistant electrical engineer. In 1909 he was appointed electrical engineer and placed in charge of the equipment inspection bureau. Just previous to the signing of the dual subway contracts in 1913, Mr. Wilder's duties were extended so as to include the engineering matters coming before the commission pertaining to the equipment of the rapid transit lines constructed under the dual contracts and the related elevated railroad certificates. In the past seven years the staff of the bureau under Mr. Wilder's direction has passed upon the plans for and purchase of equipment by the two companies amounting to nearly $100,000,000. Mr. Wilder has also had charge of appraisals of the property of several of the large public utility corporations under the jurisdiction of the commission.

Obituary

Randolph S. Reynolds, secretary of the Curtain Supply Company, Chicago, Ill., died of pneumonia on Jan. 20. Mr. Reynolds became connected with the Curtain Supply Company in 1912. Prior to that time he was with the Western Steel Car & Foundry Company, at Anniston, Ala., and the Pressed Steel Car Company at Pittsburgh, Pa., having been connected with the purchasing departments of these companies from 1905 to 1912. He left the Pressed Steel Car Company in 1912 to accept a position with the Curtain Supply Company and later was made assistant to the general manager. On April 30, 1918, he was elected secretary of the company, to succeed Holmes Forsyth, who on that date became president.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Large Swiss and Swedish Electrification Projects

German Methods Retard Work, But United States Aid Is Sought—Many Millions Involved

Electrification of railroads in Europe, particularly in those countries where quantities of cheap water power are available, did not get far during the war although last fall the subject apparently was revived. In Switzerland and Sweden especially were large projects contemplated, involving the expenditure of millions of dollars for equipment.

Switzerland has been working under extreme hardships in the last four years with reference to the proposed change-over of her railroads from steam to electricity, and for new electric lines. With only one workable iron-ore deposit in the country and little coal she has been dependent for her supplies of these commodities on the Central Powers, as the Allies were unable to provide sufficient for her use. *Commerce Reports* of Nov. 29, 1918, issues a report submitted under date of Oct. 11, 1918, by Commercial Attaché Pierce C. Williams, wherein is shown Germany's control over Swiss supplies of iron and steel for the electrification of Swiss railroads, in its endeavor to keep a grip over its Swiss competitors in the electrical industry.

Switzerland was then engaged in the electrification of a portion of the railway connecting the country with Italy through the St. Gotthard tunnel, and to complete this work there were required great hydroelectric stations, miles of transmission lines, steel poles and locomotives. Swiss workshops were ample to handle all of this work, but with the inability of the Allies to furnish the materials, Switzerland felt the necessity of accepting the German steel. Although Germany at this time was unable to make deliveries, that country succeeded in keeping the Swiss works from receiving as much work as they could handle thereby retarding the work of electrification. It was enabled to hold Switzerland to the bargain made years ago at the opening of the St. Gotthard convention, whereby the right to participate in the tenders with Swiss firms for electrical apparatus was received by Germany.

That the Swiss really desired to import steel and other railway supplies from the United States was shown in a letter which the Attaché had just received from a steel importer in Geneva. Herein it was stated that in his dealings with the Swiss railroads for the importation of steel poles, American licenses, unfortunately, were not being granted at that time and freight conditions were such that the buying of American poles had to be abandoned, thus obligating them to the Germans for poles. He pointed out the importance of the growing Swiss railroads and the large American field for all electrification material.

In a previous *Commerce Reports*, page 524, Vice-Consul R. E. Schoenfeld, writing on Sept. 20, 1918, shows that Switzerland is making every effort to utilize her great sources of water power to provide for the electrification of her railways. The General Director of Swiss Federal Railways has submitted a detailed plan of electrification to the Council of Administration of these railways for approval. On the basis of expenditures outlined, it would be necessary to count during a series of years, possibly up to thirty, on the following expenses of construction: installation of electric traction $5,000,000, construction of new lines $300,000, works of completion $7,200,000, rolling stock $5,400,000. This totals $17,900,000 per year for the first ten years, after which the amount would decrease to approximately $16,000,000 a year for possibly twenty years.

The Federal Direction foresees great difficulty in financing these construction operations with Swiss capital, and looks to the United States for financing part of the construction and supplying the raw material.

200,000 HP. OF WATER POWER NEEDED IN SWITZERLAND

The amount of water power necessary has been estimated at an average of 200,000 hp. at the axis of the turbines. Sufficient water power concessions have already been obtained to supply three-quarters of the system.

As to the electrification of the Swedish railways, translation of an article in the "Social-Demokraten" of September 20, 1918 states:

The Swedish railway committee was instructed by the King of Sweden in the end of 1915 to investigate the practicability of electrifying the railways of the Kingdom.

The potential water power of Sweden is immense, of which 4,000,000 turbine horsepower is now being developed. The great reduction in the supply of coal and the increase in the cost has accentuated the importance of developing Sweden's water power. This development has naturally been hampered during the war by the absence of metals necessary for the manufacture of turbines, dynamos, and other machinery and wires for power transmission.

Current Price Changes for Supplies

Wire, Galvanized Pole Line Hardware and Cotton Tapes Show Decreases

Prices generally remain unchanged. There have been some decreases however.

Rubber-covered wire-base averages 25 cents, a drop of about 3½ cents from last week. One manufacturer quotes on a 28-cent base, one on 27 cents, six on 25 cents, two on 24 cents, one on 22-cent base and two on cost. Those quoting on the high bases apparently figured that business could not be stimulated merely by a change in prices and therefore saw no reason to reduce. Bare wire was reported on a 21-cent base, weatherproof on 22½ to 24-cent base and annunciation on 30-cent and 37-cent bases.

Galvanized pole line hardware has declined approximately 10 per cent.

White cotton tape has been reported by one jobber as off 10 to 15 per cent. Friction tape has been reported as lower in only one instance, and that was about 8 per cent. The drop in cotton brings that commodity to a level which some believe is close to bottom.

Inquiries failed to disclose any drop in the price of rail bonds following the drop in copper last week by the big copper producers.

Pneumatic Door and Step Control Gaining

Further Installations Show Popularity of This Safety Equipment Applied to Both New and Old Cars

While reports show that but few traction companies have ordered large numbers of new cars equipped with pneumatic door and step control, manufacturers report that a large number of roads have either ordered a small number of new cars so equipped or are having some of their old cars remodeled to incorporate this safety feature. The manufacturers are also working on many inquiries for these devices from roads which have not yet entered this field but which are watching carefully the results of cars so equipped on other lines.

Depending upon the class of service to be rendered under different conditions, the safety features are being applied to heavy as well as to light cars. For instance, the inquiries coming from Toronto indicate that the safety control would be incorporated in the new pay-as-you-enter cars of the heavy type, rear end entrance. The majority of the applications, however, appear to be for light cars.

Of the more recent cases which have come to notice, where safety equipments either are under contemplation or have already been ordered, inquiries are under way for 50 cars for Brooklyn, while six new cars of a previous order are already on their way, some of which have been delivered. Boston has the matter up, Erie contemplates fifteen cars, and Milwaukee is remodeling some of its cars to incorporate this feature. Bridgeport has twenty safety cars, Trenton has recently received four new ones and the Richmond Light & Railway Company has received one out of the twenty new safety cars ordered last year. The Third Avenue Railway Company is using twenty-five cars on its Mount Vernon and New Rochelle lines, embracing safety features of its own design.

New Advertising Literature

Unit Railway Car Company, Newton, Mass.: Pamphlet on a kerosene or fuel oil burner, steam operated railway car for railroad, interurban and city use.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.: Six-page reprint of an article in the *Magazine of Wall Street* for September, 1918, by W. H. Easton, entitled "The Advantages of Railroad Electrification."

Heine Safety Boiler Company, St. Louis, Mo.: An eighty-six-page treatise on steam boilers, entitled "Boiler Logic." The topics treated include: (1) Some fundamental considerations in boiler design; (2) practical baffling of water-tube boilers; (3) boilers for different fuels, firing and services; (4) overloads; (5) boilers as pressure vessels, and (6) details of construction of Heine boilers. The pamphlet contains much practical information which should be of use to power station operators and an aid in producing economies in station arrangement and operation.

Rolling Stock

Kitchener & Waterloo Street Railway, Kitchener, Ont., expects within the next six weeks to purchase two 45-ft. pay-as-you-enter four-motor passenger cars.

Nipissing Central Railway has two motor passenger cars on order with the Preston Car & Coach Company and will shortly be in the market for two more cars of similar type.

Decatur Railway & Light Company, Decatur, Ill., is considering the purchase of ten new city cars, to cost approximately $65,000. General Superintendent M. L. Harry has secured the approval of Vice-President Executive H. E. Chubbuck of the Illinois Traction System for the purchase of the cars.

Trade Notes

Edison Storage Battery Company, Orange, N. J., has moved its New York sales office to 247 West Thirty-fifth Street.

Huntly H. Gilbert, who left the service of the Pressed Steel Car Company and Western Steel Car & Foundry Company at the start of the war, to enter the Army as captain in the Ordnance Department at Washington, and later was commissioned major and transferred to the Rock Island Arsenal, has re-entered the service of these companies as assistant manager of sales, Western district, at 425 Peoples Gas Building, Chicago, Ill.

International Register Company, Chicago, Ill., has recently received from the Boston Elevated Railway an order for 275 motor-driven coin registers to take money and metal tokens. These registers will be installed on the new surface cars ordered by the Boston Elevated Railway. The machines to be used are similar to the coin registers previously supplied to the railway by the same manufacturer but have an extra totalizer for registering metal tokens.

Arthur F. Braid has been appointed sales manager of the metal and alloy department of the Metal & Thermit Corporation. Mr. Braid joined the company seven years ago as a traveling salesman, but after a few years of most successful service in this capacity he was appointed assistant superintendent of the Jersey City plant, in charge of the manufacture of carbon-free metals and alloys. When the United States entered the war, he assumed active charge of the metal sales at the New York office of the company. Mr. Braid is a member of the American Iron & Steel Institute, the British Institute of Metals and many other societies and scientific organizations.

NEW YORK METAL MARKET PRICES

	Jan. 30	Feb. 13
Copper, ingots, cents per lb	19	17.50
Copper wire base, cents per lb	28.75	20.75
Lead, cents per lb	5.50	5.00
Nickel, cents per lb	40	40.00
Spelter, cents per lb	7.00	6.80
Tin, cents per lb	†72.50	†72.50
Aluminum, 98 to 99 per cent., cents per lb	†33.10	†33.10

† Government price in 50-ton lots or more' f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Jan. 30	Feb. 13
Heavy copper, cents per lb	15.50 to 16.00	14.50 to 15.00
Light copper, cents per lb	12.00 to 12.25	11.50 to 12.00
Heavy brass, cents per lb	9.00 to 9.50	8.00 to 8.25
Zinc, cents per lb	5.00 to 5.25	5.25 to 5.50
Yellow brass, cents per lb	7.00 to 7.50	6.50 to 6.75
Lead, heavy, cents per lb	4.50 to 4.75	4.75 to 4.25
Steel car axles, Chicago, per net ton	$28.00 to $30.00	$28.00 to $30.00
Old carwheels, Chicago, per gross ton	$24.00 to $25.00	$22.00 to $23.00
Steel rails (scrap), Chicago, per gross ton	$22.00 to $23.00	$16.50 to $17.50
Steel rails (relaying), Chicago, gross ton.	$50.00 to $55.00	$50.00 to $55.00
Machine shop turnings, Chicago, net ton	$6.50 to $7.50	$6.00 to $6.50

ELECTRIC RAILWAY MATERIAL PRICES

	Jan. 30	Feb. 13
Rubber-covered wire base, New York, cents per lb	27	25
Weatherproof wire (100 lb. lots), cents per lb., New York	30.75	31.25 to 33.75
Weatherproof wire (100 lb. lots), cents per lb., Chicago	32.76 to 36.75	30.75 to 35.75
T rails (A. S. C. E. standard), per gross ton	$60.00 to $65.00	$60.00 to $65.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton	$57.00 to $60.00	$57.00 to $60.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$55.00 to $60.00	$55.00 to $60.00
T rail, high (Shanghai), cents per lb	...	3½
Rails, girder (grooved), cents per lb	...	4½
Wire nails, Pittsburgh, cents per lb	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb	4½	3.90
Railroad spikes, screw, Pittsburgh base, cents per lb	3.90 8	8
Tie plates (flat type), cents per lb	3	3
Tie plates (brace type), cents per lb	3	3
Tie rods, Pittsburgh base, cents per lb	7	7
Fish plates, cents per lb	3	3
Angle plates, cents per lb	3	3
Angle bars, cents per lb	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb	4.90	4.90
Steel bars, Pittsburgh, cents per lb	2.70	2.70
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.55	4.55
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.60	5.60
Galvanized barbed wire, Pittsburgh, cents per lb	4.35	4.35

	Jan. 30	Feb. 13
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	77%
Car window glass (single strength, first three brackets, B quality), New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York discount.	79%	79%
Waste, wool (according to grade), cents per lb	15	13 to 20
Waste cotton (100 lb. bale) cents per lb	12	12
Asphalt, hot (150 tons minimum) per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	$43.00	$43.00
Asphalt filler, per ton	$45.00	$45.00
Cement (carload lots), New York, per bbl	$3.20	$3.20
Cement (carload lots), Chicago, per bbl.	$3.34	$3.34
Cement (carload lots), Seattle, per bbl	$3.68	$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.48	$1.48
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.55	$1.55
White lead (100 lb. keg), New York, cents per lb	13	13
Turpentine (bbl. lots), New York, cents per gal	75	71½ to 72

* Government price. † These prices are f. o. b. works, with boxing charges extra.

Recent Incorporations

La Jolla Electric Line, San Diego, Cal.—Incorporated to construct an electric line from San Diego to LaJolla. Capital stock $250,000. Directors: Frank A. Riehle, Lemon Grove; Alice G. Ford, Ed. Twelker, Howard Hopkins and Lila McConnell, all of San Diego.

Franchises

Torrington, Conn. — The Torrington Traction Company has received an extension of time until the next session of the Legislature within which to begin construction on its proposed line between Torrington and Thomaston. [Oct. 9, '15.]

South Weymouth, Mass.—The Massachusetts Highway Service Company has received a franchise from the City Council of South Weymouth to operate a trackless trolley in South Weymouth.

Track and Roadway

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—Work has been begun by the Indianapolis Traction & Terminal Company on the extension of the company's tracks in South Street from Virginia Avenue to Delaware Street.

Frankfort & Shelbyville Traction Company, Shelbyville, Ky.—It is reported that plans are being made to begin construction early in the spring on the proposed line of the Frankfort & Shelbyville Traction Company, between Frankfort and Shelbyville. F. H. Frankland of the engineering firm of Waddell & Son, Inc., New York, N. Y., and Kansas City, Mo., has been elected president of the Frankfort & Shelbyville Traction Company to succeed L. G. Smith of Shelbyville, who now becomes vice-president. F. W. Henkel, Chicago, is secretary and treasurer. [April 13, '18.]

Somers (Mass.) Electric Company.—A bill has been introduced into the House at Hartford, Conn., providing for the Somers Electric Company to purchase all the property and franchises of the Hartford & Springfield Street Railway and property and franchises of any other electric railway company operating in the towns of South Windsor, East Windsor, Windsor Locks, Suffield, Somers and any place in Massachusetts. The Somers Electric Company would be authorized to issue stock to an amount not exceeding $1,000,000 more than the amount under the authority of its charter. The bill was referred to the railways committee.

Worcester (Mass.) Consolidated Street Railway.—Officials of the Worcester Consolidated Street Railway have under consideration plans for improvements this spring and summer which will call for an expenditure of approximately $250,000. The work which the company would like to complete consists chiefly in laying new rails on some of the most important lines of the city. The work planned includes the laying of new rails on Green Street from Temple Street to Vernon Square, at an estimated cost of $40,000. The company also wants to put in new rails on Millbury Street from Cambridge Street to the South Works of the American Steel & Wire Company. A big West Side job is planned on the Tatnuck line and provides for new rails on Pleasant Street between Moreland Street and Mill Street. The company would like to put in new rails on Salisbury Street from Park Avenue to the end of the line. The relocation of the tracks on Belmont Street from Shrewsbury Street to the Lake is also under consideration.

St. Louis, Mo.—The city of St. Louis has decided to operate the passenger car line over the Free Bridge, beginning about March 1. The city will operate cars from Seventh and Gratiot Streets to the east end of the bridge only.

Pennsylvania & Ohio Railway, Ashtabula, Ohio.—A report from the Pennsylvania & Ohio Railway states that it will regrade and reballast 12 miles of track during 1919.

Toledo Railways & Light Company, Toledo, Ohio.—Discussing the requests of the people of West Toledo for a crosstown line and better car service. Frank R. Coates, president of the Toledo Railways & Light Company, said it is impossible for the company to make an expenditure such as this would necessitate without a franchise that would insure operation in the city for a sufficiently long period to warrant it. Mr. Coates has asked permission to extend the Cherry Street line to Stop 4 on Sylvania Avenue.

Brantford (Ont.) Municipal Railway.—The rate-payers of Brantford recently approved a bylaw authorizing the extension of the Brantford Municipal Railway into the Terrace Hill district and the provision of extra rolling stock at a total estimated cost of $125,000.

Fort Erie, Ont.—Announcement has been made by Sir Adam Beck of the Ontario Hydro-Electric Commission of Canada that work will be begun within the next few months on the proposed hydro-radial electric railway to connect Fort Erie with Niagara Falls and Port Colborne as one of the Canadian government's reconstruction plans. Another project which will be undertaken soon by the Dominion Government is the construction of an electric railway between Fort Erie and Hamilton, Ont. The road between Hamilton and Fort Erie is one link in the proposed line to connect Toronto and Buffalo. The Niagara, St. Catharines & Toronto railway line from St. Catharines to Niagara Falls, Ont., and St. Catharines to Welland and from Port Colborne to St. Catharines are parts of the Canadian Northern system which has been taken over by the Dominion Government. By taking over the Burlington radial line, the Hydro-Electric Commission is well started on its line between Toronto and Hamilton. The Hamilton, Beamsville & Grimsby electric line operates from Hamilton to Beamsville and it is only necessary to connect up the 12.4 miles between St. Catharines and Beamsville to have the completed line between Hamilton and Niagara Falls, Ont.

Canadian Northern Railway, Montreal, Que.—The Toronto Suburban Railway which operates 69.53 miles of city and interurban track is being acquired by the Canadian Northern Railway and will be operated as part of the Canadian National Railways. The Canadian Northern Railway is also acquiring the Toronto Eastern Railway Company's charter. This line is projected to run from Toronto to Cobourg, Ont. A contract was let and construction begun in 1914, grading being done from Bowmanville west to Pickering Village, 19.5 miles, and track was laid and ballasting done from Bowmanville to Whitby, 14.5 miles. No overhead or other electrical work was done, and, owing to the war, all construction was stopped.

Power Houses, Shops and Buildings

Athens Railway & Electric Company, Athens, Ga.—The Athens Railway & Electric Company is considering the installation of an additional boiler.

New Orleans Railway & Light Company, New Orleans, La.—The building of the New Orleans Railway & Light Company on Napoleon Avenue was recently destroyed by fire.

United Railways & Electric Company, Baltimore, Md.—Plans are being made by the United Railways & Electric Company for the construction of a steel and concrete passenger terminal and carhouse at Easton Avenue and Fifteenth Street, East Baltimore, to cost about $150,000.

Kansas City, Mo.—The excavation and grading of the site for the interurban station to be built at Tenth and McGee Streets will be begun soon. Contracts for the excavating are to be advertised within the next few weeks. It will take three months to complete the grading of the site and by the latter part of the summer the actual work on the eight-story building will be begun.

Sand Springs Railway, Tulsa, Okla.—Work will be begun in April by the Sand Springs Railway on the construction of a reinforced concrete and brick station and office building, 100 ft. x 40 ft., three stories.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.—Rapid progress is being made by the Charleston Consolidated Railway, Gas & Electric Company on the construction of a new transmission system to Port Terminal, North Charleston. The company is also increasing the capacity of its power plant at Charleston.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, February 22, 1919 *Number* 8

Precedent and Warning in Seattle's Victory

REFUSING to be swayed or intimidated by the rampant element in labor unions, Mayor Hanson of Seattle succeeded in breaking the "sympathetic strike" that for a short time last week paralyzed the city. His act constitutes an excellent precedent for other mayors and at the same time a warning to labor agitators. The case is of national importance as a serious outbreak in America of the evil that has been undermining the organized labor of Europe. Mayor Hanson's proclamation on the second day of the strike urged the people of the city to go about their daily work as usual and guaranteed them "absolute and complete protection." He said, "We have 1500 police officers and 1500 regulars from Camp Lewis and can get the services of every soldier in the Pacific Northwest if necessary to protect life and property. We will see to it that you have food, transportation, water, light, gas and all necessities. The anarchists in this community shall not rule its affairs. All persons violating the laws will be dealt with summarily." Unless the decent, honest members of labor organizations refuse to be lead by I. W. W., radicals and anarchists, labor unions will sink to a low level in public esteem and will lose the right to respect and consideration. What has been done in Seattle could and should be done vigorously and promptly wherever labor organizations are so mismanaged that violent methods are resorted to, industry is paralyzed and propaganda is carried on urging labor to "take over the operation" of industries.

The Accountants Should Certainly Keep Moving

SHOULD the accountants continue their association work? This question, it is said, is in the minds of some members of the Central Electric Railway Accountants' Association, which after a period of inactivity enforced by war conditions reconvened for the first time in Fort Wayne last week. By all means continue, we say. We quite agree with the conclusion expressed by A. C. Van Driesen in his presidential address to the effect that the opportune time for the association to show its mettle is now and that it should get into the reconstruction period with vim and do all in its power to solve the various problems as they appear.

The work of standardizing accounts, it is true, has reached the point where only occasional revisions are necessary, but this is not the only topic in which an association of accountants should be interested. The accountant should no longer be interested solely in the mechanism of his work. He should be today the first assistant of the executive, capable of properly compiling, analyzing and comparing financial and statistical reports of the business. He should not simply furnish figures; he should use his mind to ascertain what the figures mean, not merely to help discover what might have been remedied but also to cause actual prevention if this is possible.

In short, one of the greatest values of accounting lies in the application of compiled data to future operation. Hence the accountant must acquaint himself with the general problems of the executive and then evolve the best methods of general accounting, fare accounting, cost accounting, statistics and the like to help the executive. For these reasons, the work of accountants' associations is not done.

It all depends on the point of view. If the accountant starts from his accounts and figures, his work may look complete. If he starts from the problems of the executive, however, he will undoubtedly find spots where more can be gotten from the accounts to help the executive. If the second course is followed, there will be no dearth of topics or work for any accountants' association.

Is There an Opportunity for Long-Haul Passenger Traffic by Auto Buses?

IN SOUTHERN CALIFORNIA auto buses still compete with the electric railways to a formidable extent on long hauls of both freight and passengers. Local regulations are imposed on the buses by the municipalities which are traversed, so that the problem of regulation is one in which state-wide action is required. Out of the legislation now under consideration it is hoped that relief to the electric railways will come, but as yet no plan has been proposed upon which the several interests involved can agree.

It has been suggested that the first step in the analysis of this problem is to answer the question as to whether the electric railway is essential to the progress and development of the communities involved. If this question is answered affirmatively, then the electric railway has the right to at least the same encouragement and protection as is accorded any other carrier. This means that the auto buses must be put upon a parity with the electric railways as to rates and dependability of service. For example, assurance of continuity of service should be required, responsibility for accident liability should be imposed, and the automobiles should be required to pay a fair rate for the use of the State highways. Moreover, and most important of all, a principle should be applied here that has long been established with respect to the paralleling of satisfactory service furnished by steam railroads. This is that permission to install competing service in such a case cannot properly be granted, and there is no reason for other than the same conclusion when one of the carriers uses the public highway and the other uses a private way.

With the excellent highway system and favorable weather conditions that exist in California it is natural that the problem should have become a serious one in that State. Weather conditions permitting, auto buses run between San Francisco and Los Angeles, a distance of about 500 miles, throughout the entire year. In the southern part of the State both freight and passenger buses directly parallel the electric railway for runs up to 60 miles in length. Under these conditions legislative action in California on the subject of regulation of auto bus transportation will be followed with interest the country over.

Proposed Power Plant Inter-connection in the East

SECRETARY FRANKLIN K. LANE of the Department of the Interior is proposing to spend $200,000 in an investigation of the possibilities of making savings by means of an inter-connection of electric power plants on the Atlantic seaboard. If this investigation is made it will yield data of great value as to the supply of electric power for the railroads and undoubtedly will show the advisability of extending electric operation which is effective now only in spots. It is proposed that trunk-line connections be made throughout what is called the North Atlantic industrial district, comprising the territory surrounding the industrial centers between Boston and Washington inclusive and extending inland to include Albany and Harrisburg. The proposal has an important bearing upon the electrification of steam railroads in this territory, as nearly all of the electrifications in the East are comprised within the district, and these all need to be extended to enable them to yield the full benefits for which they were installed. Of course such extension was impossible during the war period. The territory also includes a number of interurban roads which are of steam railroad construction and a very great mileage of urban and other interurban lines. There is a great reason, therefore, why the electric railway field should be interested in Secretary Lane's proposition.

What Secretary Lane hopes to accomplish by the proposed study was outlined in the news columns of this paper last week. As far as the economics of this matter of inter-connection of power systems is concerned, there is much to be said in favor of such inter-connection. Under such a plan power could be produced where water power or fuel abounds and it could be cheaply transported by electrical means. By connecting the many existing plants to a trunk line such as that suggested they could insure a more continuous output and they could draw upon the trunk line to supplement their own capacity at times of peak load or power shortage. There would, of course, be many administrative difficulties in connection with such a plan, which can be visualized as one tries to picture the actual procedure of furnishing power to the trunk line and drawing power from it. Moreover the operators of power plants are likely to feel that an expensive investigation cannot disclose much that is not known now. The theory of the situation is well understood, but how to apply i in a practical manner is another question.

What May Be Learned from Glasgow?

WE BELIEVE that American electric railway managers will find a great deal to interest and help them in the articles which we expect to publish during the next few months on British tramway practice. These articles are the result of a special study which is being made by Walter Jackson of our editorial staff who is now in Europe to investigate the question of the collection of zone fares and other features of British tramway practice. The article in this issue is the first of three which are to appear on the Glasgow system.

It is interesting, in comparing British and American tramway practice, to remember that many of the earliest British tramways were built by an American, George Francis Train, and that when the lines began to be electrically equipped, much of the apparatus came from America. In consequence, the development of the tramways in the two countries to a considerable extent has been alike along engineering lines, but the same cannot be said in regard to transportation methods. From the beginning the British companies have used the zone system, the controlling reason undoubtedly being the necessity of a fare based on the penny as a unit.

At the present time our American electric railway properties are facing a situation very similar to that confronting the British tramways when they began operations. Owing to changed financial conditions the nickel has become inadequate as a uniform fare in our city transportation while our next coin, the dime, seems too large. American railways must therefore decide whether it would be better to collect two coins for a uniform fare or adopt the zone system.

The difference in transportation conditions between British and American tramways has already been mentioned. Some of the points besides the method of charging for transportation are: The general use in Great Britain of double-deck cars, the absence of the prepayment system, the comparatively small extent of the railways compared with the population served, the lower wages paid and the density of tramway traffic. The extent of the latter difference is shown by the fact that the Glasgow Tramways for the year ended May 31, 1918, showed 16.7 revenue passengers per car mile and its average for the last twenty-four years has been 12.6 revenue passengers per car-mile. These figures compare, for various years ending between December, 1915, and December, 1917, with American roads as follows: Brooklyn surface lines, 5.5 passengers; Manhattan surface lines, 8 passengers; New York City surface lines as a whole, 5.7 passengers; Baltimore, 6 revenue passengers and 8 total passengers per car-mile; St. Louis, 5.8 revenue and 9 total passengers per car-mile.

These figures show that in Glasgow at least either fewer cars are run in proportion to the passenger-miles or that the tramway companies there have discovered the method of inducing riders to use cars for short distances. As the Glasgow articles will develop later, the latter explanation accounts at least in part for the denser traffic, and in these days of existing or potential jitney competition, this is a matter which can well engage the attention of the railway managers in this country.

The War Labor Board Activities and the Electric Railways

IN TWO cases recently a question has been raised as to the power of the War Labor Board. We refer to the late finding of the board in the Kansas City case and the recent hearing in the San Diego case—both reported in the ELECTRIC RAILWAY JOURNAL. In the former case the federal board apparently reversed its original position by ordering the company to pay a scale of wages which had previously been held beyond its financial ability to meet, the employees having agreed to wait for more prosperous days which an increased fare would have brought about. When the company's revenues showed no signs of improvement the men went on strike and later appealed again to the board for help. Being directed to carry out the original wage award the company management refused because its financial condition would not permit of making the extra payments.

In the San Diego case the circumstances are different. The company has not acknowledged the jurisdiction of the board or agreed to accept its decision, since the generally unjustified complaint of some of the men was filed after Dec. 5, when the board declared that joint submission would be necessary for it to take action in the case.

We are of the opinion that the Kansas City and the San Diego companies were entirely within their rights in taking this firm stand, and we also believe the time has come to question whether this federal agency—created for a war emergency—has ever been in a position to decide electric railway questions with entire justice to both sides. The conditions under which it carried on its work were such that it was in a position to act fairly with one of the parties before it, the men, but unfortunately it did not have the power to obtain justice for the other party in the case, the company. This was a fatal omission in the legislation under which the board was established. It could and did strongly urge upon the local authorities in many if not all cases where an increase in wages was ordered that a corresponding increase in rates be allowed, but these words too often fell on deaf ears. A series of receiverships and financial troubles was the inevitable consequence of so inequitable an arrangement.

We do not pass judgment on the fairness of the higher wage standards set up by the board. It is probably true that as a whole they were not more than were warranted by the increased cost of living. However, we fail to see the fairness of a situation where a corporation is asked to carry out an award which, without definite revenues, can mean only disaster. There should have been some way by which the board could have put these decrees into effect without crippling the employing company, as was done with the steam railroads where the rates were increased when higher wages were ordered. The lack of equity in the electric railway arrangement is so evident that we are sure the members of the board themselves must have felt its incongruity.

At present the War Labor Board is hearing no cases except such as are submitted by both parties to a dispute, so that its functions now are practically only those of a board of arbitration. Perhaps this is the best possible arrangement under the circumstances because neither side will feel compelled to join in a proceeding and will only submit to jurisdiction as a last resort and with the hope of getting a decision with which compliance is possible. Meanwhile it is to be hoped that the financial situation will improve for the utilities and they will not then hold back on meeting such wage standards as may develop in a competitive labor market. It is very likely that the labor situation will take care of itself after the War Labor Board goes out of existence.

Good Welders Are Needed to Produce Good Welding

THE idea of increased economy which may result from a broader use of welding in car construction has been emphasized greatly by war conditions. The costs of steel cars must be reduced, and a fruitful field for producing economy appears to be in decreasing the amount of riveting necessary. Welding has already been used to a limited extent in this work and has been found successful. The best method for increasing its usefulness appears to be in extending the process to more important members of the car body. Railway officials should not expect to obtain a rivetless car immediately, since it is necessary to proceed continuously and to gain experience by adapting welding to minor parts first.

Manufacturers have found that considerable skill is necessary to obtain satisfactory results in welding, and there is much to be learned in the handling of the apparatus and the welding materials. Experience indicates that in general the defects encountered are mechanical and are not inherent in the process. Skilled men working under competent foremen will do much to establish confidence in the reliability of welds. Such men will know that clean surfaces are necessary for good work and will be quick to recognize the parts that can be welded rapidly and cheaply. Men who know the underlying principles of welding and possess a knowledge of the materials to be worked will get the quickest results, effect the greatest saving and produce the best work.

Several very interesting papers dealing with welding problems and results were presented at a joint meeting of the American Institute of Electrical Engineers and American Institute of Mining Engineers in New York this week. While most of the information furnished was the result of investigations made with a view to applying electric welding to ship construction, still all branches of industry will be benefited by the advances made toward a better and more intimate understanding of some of the principles involved. Much study has been made of the structure found in electric welds and to devising non-destructive methods for testing them when completed. Such studies and testing methods are very valuable but, as was pointed out by one of the speakers, when welders of proved skill only are employed, under experienced supervision, then such tests will no more be necessary than are shear tests on every rivet that is driven. So long as such welders are not available, car builders will look askance at a process that may be good generally but may leave weak spots in the work, which spots may be very difficult or quite impossible to detect by inspection.

Mr. Dalrymple on the Value of the Zone Fare

WE HAVE never questioned the fact that the universal 5-cent fare has many advantages from the operating point of view. It is very simple in collection and easier for the conductor. But we have always contended that the universal fare is against the interests of the passenger.

In Glasgow we have never had single fare operation. From the inauguration of the tramways in 1870, we have always charged according to the distance traveled. The statutory rate is still a penny a mile. This was the rate when we started as a municipal system in 1894. Gradually we not only increased the distance given for a penny, but also inaugurated the ½d. for ½-mile fare. In 1911 we extended the ½d. distance to a mile or more, giving more for ½d. than the law demands for 1d.

JAMES DALRYMPLE

Every change that we have made in reducing fares has meant to Glasgow both an increase in passengers and an increase in revenue. When we doubled the ½d. stage, our passengers per car-mile were already so high that we could not see how we were going to carry any more. The unexpected effect of the reduced rate was the filling up of the cars during the slack hours of the day. The amount of peak riding showed little change, as most of the peakload passengers rode in any case. Thus the traffic increased during the hours when the conductor had most time to handle it. With twenty passengers per car-mile, the cars are not crowded any more than when we were carrying fifteen passengers or less per car-mile.

In our older cities we were far more congested prior to the coming of tramways than we are to-day, so that the question of fares could have had nothing to do with the matter. When our tramways (in Glasgow) were organized in 1870, the penny fare carried the passenger out into the open. Even in the greater Glasgow of to-day, a 1½d. fare will take the passenger to green fields; and only 6.6 per cent of our passengers during the last year had to pay this fare. Of the remaining passengers, 1 per cent paid a 2½d. fare, 25.6 per cent a 1d. fare while 63.3 per cent paid only the ½d. minimum.

We do not believe that the graded fare as applied in Glasgow is more complicated than the American system of cash fares and transfers and surely not as complicated as 6-cent or 7-cent fares and 1-cent or 2-cent transfers. Fare collection with us is a simple cash transaction. The passenger pays his fare, secures his receipt and we have done with him. We no longer sell tickets on the car at a discount, as we found that this resulted in abuses. The only tokens we have are fiber disks sold from the main office at full value. In general, our base fare is so low that we can dispense with the complexities of workmen's tickets, free transfers and the like. Even the minimum fare for children is ½d., and most of these sales are for the minimum ride granted to adults at the same rate.

Everybody in Glasgow knows the Tramways and takes an interest in them. There is no mystery about operation, fares or other features that interest the public; and when the masses do understand and appreciate the local street railway, it makes an enormous difference in results.

The Zone Fare in Practice—Glasgow

BY WALTER JACKSON

A BUSY EVENING ON THE JAMAICA STREET BRIDGE, GLASGOW

PART ONE

Congestion Not Due to Graded Fares

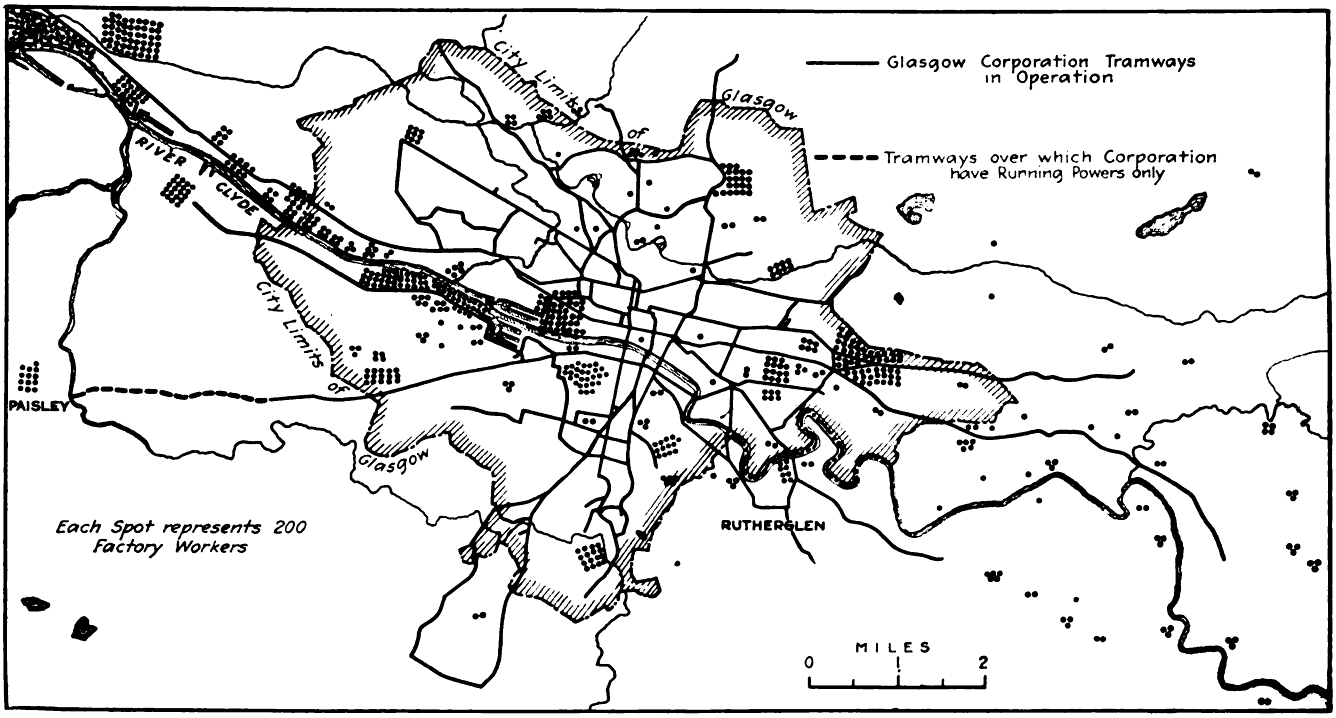
OF ALL the arguments raised against the principle of charging for street railway rides by distance, that of "congestion" holds first place. Parallels are drawn between American and European cities as to relative areas for like populations, and the draftsman invariably concludes that the congestion of the Old World city—which is taken for granted—and the diffusion of the New World city—which is also taken for granted—are due almost entirely to the differential fares of the one and the universal fare of the other. The most casual investigation *on the ground* will show that the connection between the distribution of population and the system of fare charging is a minor rather than a major factor in municipal development. It is not in Great Britain but in the United States that we find skyscrapers in the business district and elevator flats in the residential sections! Congestion there frequently is, of course, in both countries yet it would be erroneous to ascribe it to any one cause. However, so long as American electric railway operators will have to face the argument of congestion, which is bound to be raised by every land and house owner who fears the effect of a zone fare differential on his property, it is deemed well to set forth as many data as necessary to show whether or not such fears are justified. To this end, the following facts on housing have been gathered from direct observation, from official documents and from interviews with local municipal authorities.

NOTE:—*In view of the change from the convenient 5-cent fare to the inconvenient 6, 7 and 8-cent unit fares in the United States within the past year, and the indecisive results therefrom, the* ELECTRIC RAILWAY JOURNAL *decided that the time was opportune for a first-hand study of the zone or graded fare system used most commonly abroad. Mr. Jackson was therefore delegated to visit as many cities of the United Kingdom as appeared necessary to bring out the good and bad points of methods of fare charging and collection practices that are already being considered for the United States. This, the first article in the series, deals with Glasgow and its tramways, each of which is recognized as representative of the best British practice in municipal and tramway management respectively.*—EDITORS.

OBSTRUCTIONS IN AN OLD CITY ARE HARD TO REMOVE

In American cities the work of one generation is largely effaced by the next. In European cities, old structures with or without historical associations are clung to with far greater tenacity. This is one of the prime reasons why the older, central portions of many foreign cities are so congested. Glasgow, whose roots go deep into Caledonian history, still shows many traces of the past although few British communities have been so enterprising. More than once, the official who dared to suggest the straightening of an old lane or the removal of a crumbling tower has been denounced as a desecrator! Naturally, the street railway service cannot be any better than the standard set by the principal downtown thoroughfares, and it is really a marvel that the tracks of Glasgow carry the enormous traffic that they do.

In the official history of "Municipal Glasgow—Its Evolution and Enterprises," the interesting fact is recorded that the discovery of America gave Glasgow its first impetus on a successful career. First it became a great port of embarkation and then an important center for sugar and tobacco. When trade relations were resumed in 1782, following the War of Independence, cotton was added to the important imports. From that period it may be said that the growth of Glasgow was no less phenomenal than that of American cities.


Glasgow Corporation Tramways in Operation
Tramways over which Corporation have Running Powers only
City Limits of Glasgow
City Limits of Glasgow
River Clyde
PAISLEY
RUTHERGLEN
Each Spot represents 200 Factory Workers
MILES
0
1
2

MAP OF GLASGOW, SHOWING RELATION OF TRAMWAY LINES AND CITY GROWTH TO PLACES OF EMPLOYMENT

The change from a cathedral and university town to a commercial center is indicated by these statistics of population:

1740	17,000	1901	761,709
1780	43,000	1911	784,496
1801	83,769	1912 (extended city)	1,008,487
1861	395,503	1917 (estimated)	1,104,240
1881	511,415		

Modern Glasgow, of course, is much more than a port. The River Clyde is the home of the greatest shipyards in the Old World, while the vast locomotive shops, general engineering plants and chemical works are responsible for the smoke-laden atmosphere which has led to the expression: "The engineering skies of Glasgow." Add to this industrial activity a climate with more than a fair share of rain, fog and cold, and we have the "makings" of a heavy riding town. Later figures will prove that the riding is there!

In order to show the relation between the industries and the housing facilities of Glasgow, the accompanying map is presented. On this map have been noted the location of every place of employment, except the smallest, together with the number of people at each place. It is evident from this that the great mass of workers will be found in the engineering plants on or near the Clyde. At the same time, it is observable that the city tends to grow radially, so that not all of the workers feel that it is necessary to live in the immediate vicinity of their place of employment.

Although the area of the enlarged city is but 19,183 acres, it must not be supposed that it is a city of rookeries. On the contrary, a business structure more than six stories high is a rarity, while the prevailing type of flathouse does not exceed four stories in all. The accompanying engravings give a good idea of the prevailing types of buildings. The density of population is due more to the absence of large vacant spaces and of small houses in the older sections than to the presence of such tall structures as are found in many an American city of smaller population. Some of the larger manufacturers have also encouraged the construction of cottage towns near their plants, but this type of housing has not yet been developed to the same extent as in English cities.

CONGESTION PRECEDED STREET RAILWAY DAYS—MUNICIPAL HOUSING

As early as 1866, long before tramway transportation, the department known as the "City Improvement Trust" was constituted under the Glasgow improvements act. The preamble of this act stated:

> Whereas various portions of the City of Glasgow are so built, and the buildings thereon are so densely inhabited as to be highly injurious to the moral and physical welfare of the inhabitants, and many of the thoroughfares are narrow, circuitous and inconvenient, and it would be of public and local advantage if various houses and buildings were taken down and those portions of the said city reconstituted, and new streets were constructed in and through various parts of said city, and several of the existing streets altered, widened and diverted, and that, in connection with the reconstitution of those portions of the city, provision were made for dwellings for the laboring classes who may be displaced in consequence thereof.

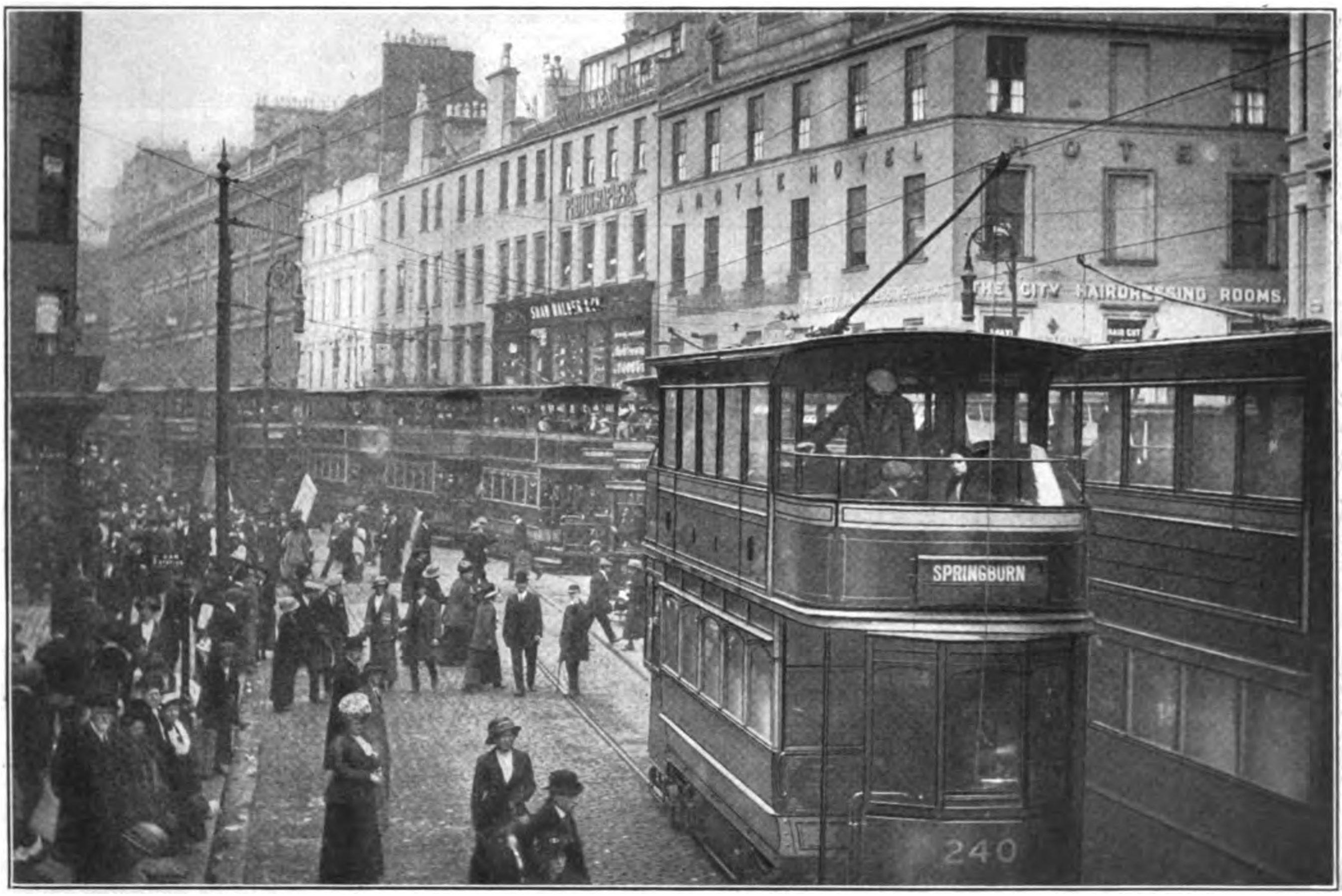
The municipality began to acquire 90 acres of land in the congested areas, by compulsion or agreement, shortly after the passage of the act, but it was not until 1889 that it exercised the power of erecting new buildings upon the land thus acquired. However, between 1871 and 1884, the municipality had erected

TYPICAL GLASGOW BACKGROUND, IN A RESIDENTIAL SECTION, SHOWING THREE-STORY HOUSES WITH STORES AT THE STREET LEVEL

seven model boarding houses, six for males and one for females, with a total capacity of 2235 beds. In 1896, the municipality opened a different kind of boarding house, called a Family Home, for widowers who could not afford individual caretakers for their children. This institution has 160 bedrooms aside from the community rooms. The erection of model houses in place of those demolished was inaugurated during 1889 with two blocks of houses which consisted of stores on the ground floor and three stories for residential purposes. The stores, of course, permitted a greater total rental than would otherwise have been the case. In localities not so close to the business centers the entire structure is used for dwelling purposes.

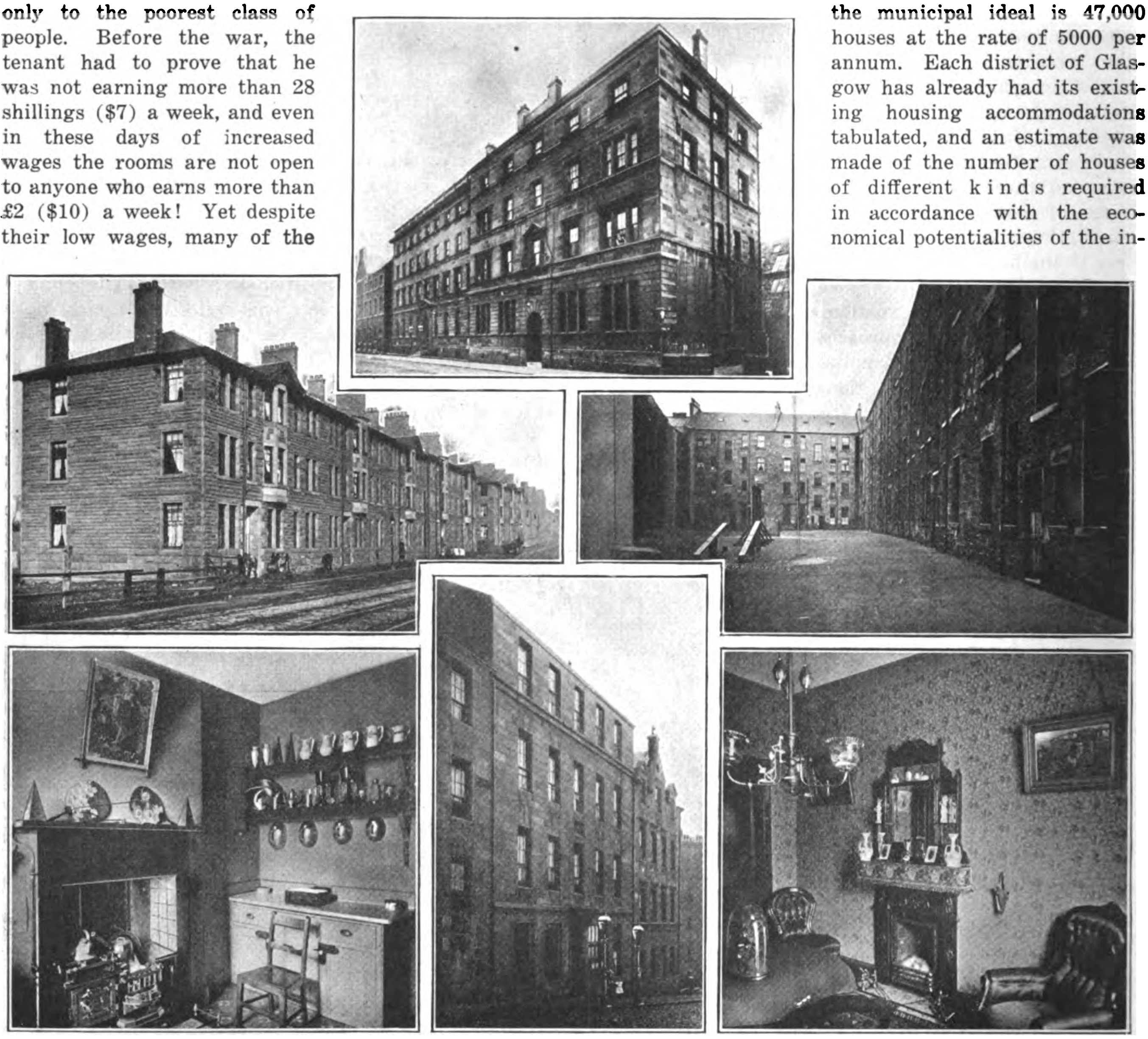
By 1896, the reconstruction of all the vacant land or cleared areas was approaching completion. Thereupon new powers were applied for to deal similarly with slum conditions on the fringe of the original scheduled areas and elsewhere. This application resulted in the Glasgow Corporation act of 1897, by section 12 of which the municipality was authorized to purchase, by agreement, any lands not exceeding *in cumulo* 25 acres, either within the city or within one-half mile from the city boundary, for the purpose of erecting thereon dwellings for the poorest classes. The new buildings were up by the summer of 1906. At the time of the opening of the war in 1914, the municipality had erected 2199 houses comprising 592 one-apartment houses, 1834 two-apartment houses, 257 three-apartment houses and sixteen larger houses. All of these structures are still owned and administered by the city. For the American reader, it should be explained that the word "apartment" is used in the following sense: An apartment may be simply a single room much larger than the largest room of an American flat and capable of use as a kitchen, living room and bedroom; or it may consist of a room with a separate kitchen, two rooms and kitchen, three rooms and kitchen, etc. Bathroom accommodation may be found from the two-room apartments onward. The washrooms or laundries are usually in the courtyard and are used in common by a specified number of tenants.

In an interview given to the writer on Dec. 17, 1918, William C. Menzies, manager City Improvement Department, said that the war had temporarily halted the construction of more buildings by the city except



STREET TRAFFIC, UNION AND ARGYLE STREETS, GLASGOW. NOTE THE PREVAILING LOW BUILDINGS IN THE BUSINESS DISTRICT for some small tenements and forty-eight single-room apartments. These apartments are rented furnished at 7 shillings ($1.75) a week to people who have lost their furnishings through fire or other causes. The city entered this field of housing to correct the abuses to which these unfortunates were subjected by rapacious landlords.

Asked as to the willingness of the workers to live in suburban territory, Mr. Menzies pointed out that the city's houses at Cumbernauld Road, Kennyhill, were 3 miles from the center of Glasgow. These were let only to the poorest class of people. Before the war, the tenant had to prove that he was not earning more than 28 shillings ($7) a week, and even in these days of increased wages the rooms are not open to anyone who earns more than £2 ($10) a week! Yet despite their low wages, many of the tenants worked on the other side of Glasgow 8 to 10 miles distant. To use the expression of a Kennyhill lodger who was interviewed later, they don't mind spending extra "cuppers" for the privilege of living in a section which is still in the open country. A visit to Kennyhill disclosed neat stone houses with tiled halls, toilets on each floor for every three tenants and wash houses in the yards. The rooms were fewer in number but larger in size than would be found in a poorer-type American flat, and the structures as a whole were more substantial than frame houses common in America. The views on this page give a good idea of the types of buildings erected.



APARTMENT HOUSES AND TENEMENTS WITH MODERATE RENT ERECTED BY THE CORPORATION OF GLASGOW

The Glasgow municipality now has in prospect a housing scheme which involves the provision of 7000 dwellings at Govan, Bellahouston, Mosspark near Corkerhill, Gilsochill, Coplawhill, Cathcart Road, Maryhill, Kennyhill and other suburbs. It is intended to erect cottages and tenements of three to six apartments, each house with baths and sculleries, and attached to cottage garden plots. Nor is this all, for the municipal ideal is 47,000 houses at the rate of 5000 per annum. Each district of Glasgow has already had its existing housing accommodations tabulated, and an estimate was made of the number of houses of different kinds required in accordance with the economical potentialities of the inhabitants. Glasgow knows it has slums and is anxious to get rid of them. In fact, to judge from the December election posters, the main differences between the candidates was as to how far they were willing to go in voting for housing measures and low rents, and the present tendency is toward renting future buildings at pre-war figures with the deficit to be divided between the state and the municipality. The objection raised to the latter scheme is that it will be exploited by employers to pay lower wages.

It may be noted that in the newer plans provision is made for garden plots wherever possible. This tendency has been encouraged by the city's experience in renting plots for "war gardens" to working people. These were rented at the rate of 4 shillings 3 pence ($1.06) per annum for allotments of 200 sq.yd. According to A. R. Crawford, of the City Assessor's department, in an interview granted on Dec. 18, 1918, the way the workers took to these allotments indicated that they would be glad to live in localities where house and garden would adjoin. An extra penny for fare, he said, did not and would not deter the worker from moving to more modern houses in better surroundings.

BUILDING RULES HAVE MADE TALL HOUSES IMPOSSIBLE SINCE 1900

Hitherto, reference has been made only to the municipality's direct purchase of property for rebuilding. However, since the Glasgow buildings regulations act of 1900 and its amendments of 1908, private owners are subject to far more restrictions than is common in American cities. According to paragraph 60, Part VI, no building except a church shall, exclusive of turrets or other ornaments, may exceed in height one and one-half times the distance between the building lines of the street on which it is located; and in no case may the height exceed 100 ft. without the consent of the municipality. If used as a dwelling the restriction on height is still greater, according to paragraph 61, which reads:

> No tenement and no building to be used as a dwelling house shall hereafter be erected the front walls of which measured from the level of the ground at the center of the face of any such wall shall exceed in height the distance between the building lines of the street. . . .

The height of a tenement is measured as from the level of the street to the ridge of the roof. It may be of interest to point out here that the roofs are usually sloped, but that in a local pamphlet by Margaret H. Irwin, entitled "Industrial Housing from the Housewife's Point of View," the suggestion is made that Glasgow dwellings be provided with fenced flat roofs in order to secure ample and safe playing ground for children.

New streets in Glasgow must be at least 50 ft. wide.

The foregoing restrictions as to height of buildings are typical of the regulations that are contributing to the wellbeing of Glasgow's citizens of all classes. The housing abuses of the past are still numerous, but the point to be emphasized here is that the modernization and expansion of Glasgow is in nowise hindered by the condition that transportation in that city is paid for by the mile.

The second article will discuss the origin and growth of the Glasgow tramways, their standards of speed and service, their rates of fare and their extraordinary development of traffic.

The third and concluding article of the series will consider the standard double-deck car used on the Glasgow system, the make-up of schedules, the hours and rates of pay of transportation employees and the checking and auditing of the graded fares collected. A special effort will be made to point out the points in which the practice differs from that on an electric railway in the United States.

Co-operation Makes Safety Work Successful

The "North Shore" High-Speed Interurban Line Reduces Accidents Forty Per Cent Through Co-operation of Employees

BY CHARLES B. SCOTT

Safety Engineer Chicago, North Shore & Milwaukee Railroad

THE operation of such a system as the Chicago, North Shore & Milwaukee Railroad involves serious safety problems, which can be met only by a thoroughly organized effort in the line of accident prevention. Some of these problems become apparent when it is stated that this road furnishes high-speed interurban service between Chicago, Ill., and Milwaukee, Wis., a distance of 73 miles, 3 miles of which is through the very congested district of Milwaukee. The intervening territory is thickly populated and includes the towns of Evanston, Wilmette, Winnetka, Lake Forrest, Glencoe, Highland Park, Highwood, Fort Sheridan, Great Lakes Naval Training Station, North Chicago, Waukegan and Zion City, in Illinois, and Kenosha and Racine in Wisconsin. This company also operates the city lines in Waukegan and one of the city lines in Milwaukee. In addition to the cars required for the local lines the equipment consists of seventy interurban cars, ten express cars, four large electric locomotives, one hundred and fifty freight cars, and the appropriate number of line and work cars, steam shovels, plows, sweepers, etc. Practically all highway crossings are at grade, many of which are protected by gates, flagmen or wigwag signals, as described in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 17, 1917, page 303. There are 625 employees, not including the office force.

The present management fully appreciated the necessity for organized safety work, and established a safety department in August, 1916. This is conducted along the same business lines as are employed in the company's operating department.

The plan of safety organization employed by the company comprises the following: (1) A central safety committee, composed of heads of departments, with the superintendent of transportation as chairman. This committee has full charge of all matters pertaining to accident prevention and holds its stated meetings bi-monthly. (2) Eleven employees' safety leagues so distributed with respect to departments and hours of service that they include in their membership all employees and thus definitely identify each with the safety organization and its work. Each league has its own set of officers including chairman, vice-chairman and secretary, and such committees as may be necessary. The officers are elected by ballot and hold office for one year. Meetings are held bi-monthly.

From the beginning of the movement the employees have been urged to submit safety recommendations, and since its organization the central committee has received and acted upon 935 such suggestions, most of which originated at employees' safety meetings. Fully 85 per cent of these have been approved and most of them were followed, while others are being taken care of as rapidly as possible. The fact that so many of the recommendations of the employees were approved speaks well for the intelligence of those who made them, and the further fact that the company carried out the recommendations, in many instances at heavy expense, accounts in a large measure for the continued and helpful co-operation of the employees in the safety work.

One of the unusual and important factors in the effective plans adopted has been the effort of the company to enlist the interest and help of the school children in the territory served. Mrs. Elizabeth Tobey and Mrs. Minnie Riddle, representing the company, have delivered safety lectures in all of the grades and to all of the school children in the territory served by the company. In every instance the courteous and earnest co-operation of the school authorities and teachers has been received, and the interest of the children has been created and maintained. To aid the teachers in continuing the work, a booklet, "methods for Instruction in Accident Prevention for use in Schools," was furnished to each, and in many cases, school safety bulletins were supplied for posting in school rooms. This school work has been reflected not only in a clear record of safety to school children but has also been of value in creating a better feeling toward the company.

There has been a steady reduction in the number and seriousness of accidents from the beginning of the safety work, but the best results were obtained in the year 1918. The records show the following reductions for that year as compared with 1917 in spite of an increase of about 60 per cent in gross earnings, with the resultant increase in the number of passengers carried and increase in car miles operated:

Items	Per cent Reduction 1918 Over 1917
Employee accidents	17.4
Employees disability accidents	38.3
Lost time on account of employee accidents	34.3
Public accidents	45.4
Property damage (public)	44.8
Total damage all kinds	34.1

In the beginning of the movement the recommendations of the employees concerned largely the physical conditions of the equipment, but during the last year more attention has been paid to careless operation, failure to observe certain safety rules and orders, etc.

The central committee has always considered the safety department as important as the mechanical, operating or any of the other departments, and has given whatever time was necessary thoroughly to investigate every suggestion which came to it from any source. It was thus able to act intelligently upon each, realizing that it was only by intelligent and persistent work that satisfactory results can be obtained. The employees also have shown commendable willingness to co-operate with the central committee and are justly entitled to a large share of the credit for the result.

In addressing the members of the Windsor (Conn.) Business Men's Association recently on the state of the electric railway industry in general and of the Connecticut Company in particular, J. K. Punderford, general manager of the company, made the following significane statement: "To my mind the great danger at present is the fact that the public does not seem to believe that some solution of the electric railway's problem must be immediately arrived at or the discontinuance of street railway operation threatens."

Women Replace Motormen Successfully at Vancouver, Wash.

When the difficulty of getting platform men merged into impossibility, R. M. Boykin, manager of the traction system in Vancouver, Wash., notified the Public Service Commission that he was going to put women operators on the cars. Ways and means of finding the right kind of women and properly training them were found and the plan has the unqualified endorsement of the management.

Mr. Boykin recently said to a representative of this journal: "Perhaps the plan would not have been so easy to work out under conditions before the war but we have been able to employ women who are able to operate cars on our system just as well as the men and they are, as a rule, more careful. The matter of suiting the training to women is comparatively simple, the biggest problem is in the selection of the right women from among those who apply."

Newspaper advertisements were used to secure applicants. After the first few trials the ads. were worded to explain clearly just what the work was and the replies then came along about as fast as they could be handled with the regular organization. Of those who successfully pass the first interview, only about one in six eventually qualify as motormen. The Vancouver system includes only about 20 miles of track, and because of the comparatively light traffic single operators only are put on the cars on some of the runs. Thus all carmen, women included, have to be trained as both motormen and conductors and at times serve in both capacities. The women are receiving 25 cents per hour during the instruction period. Thereafter they get the same wages as the men, ranging from 40 to 45 cents per hour. Thus far the women's hours have not been extended beyond 8.30 p.m.

The only serious accident thus far involving a car with woman operator, was a head-on collision on a curve, caused by a freight crew cutting into the passenger car's time. The woman operating the passenger car, as later examination showed, had turned the controller to off position and applied all the brakes before stepping back into the car just before the crash.

Glasgow Inaugurates Parcel Carriage

On Jan. 6, 1919, the Glasgow Corporation Tramways began the carriage of parcels between Glasgow and the suburb of Uddingston, distant about 8 miles. For about one month in advance announcement of the proposed service was made by car posters. The plan to give this service grew out of the work of the Road Transport (Board of Trade) Committee which was appointed some time ago to seek means of saving gasoline and horse provender. For this service, which does not include wagon or door delivery, these charges apply:

For Each Separate Parcel or Thing	
Not exceeding 7 lb. weight	3 d. or 6 cents
Between 7 lb. and 14 lb.	5 d. or 10 cents
Between 14 lb. and 28 lb.	7 d. or 14 cents
Over 28 lb. and less than 56 lb.	9 d. or 18 cents

The parcels car is a former passenger car from which the seats have been removed and the original sliding doors in the bulkheads replaced by two-leaf swing doors which can be locked.

What Is Wrong with the Railways?

A Canvass by This Journal Among Public Service Commissioners, Mayors, Chambers of Commerce and Civicists Brings Out Striking Reasons for Difficulty Experienced by Electric Lines in Increasing Fares

WHAT is wrong with the present electric railway situation, and how can it be improved? With the desire to secure answers that would aid electric railways in the study of reconstruction problems, the ELECTRIC RAILWAY JOURNAL recently sent out a questionnaire to more than 400 public service commissioners, mayors, representatives of chambers of commerce and other leaders interested in civic affairs.

The replies have not been so numerous as to indicate that representative public men in general are willing to commit themselves in regard to their beliefs concerning the relations which now exist and those which should be brought into existence between electric railways and the communities served. Nevertheless, about 15 per cent of the total mailing list responded, the percentage of replies ranging from 16 per cent for chambers of commerce to 11 per cent for civicists. From these it has been possible to prepare a fragmentary but interesting analysis of public thought.

The questionnaire began with the following valid and generally accepted premise:

> All statistics tend to prove that commodity prices have now reached a much higher level than during pre-war days. The operating expenses of electric railways have necessarily increased on account of the rise in the cost of all materials and labor that enter into the production of service.

The questions thereafter dealt with three main points —the reasons why electric railways have experienced difficulty in securing fare increases, the course which they should follow in seeking fare adjustments, and the policies which should govern in regard to guarantee of return, municipal ownership and other fundamental matters. Only the replies on the first point will be covered in the present article.

Why has it been difficult for electric railways to procure increases in fares to cover increases in expenses?

The above-stated leading question brought a somewhat varied lot of replies. The greatest variety of assigned reasons was in the case of the public service commissioners. The replies from this class represented sixteen states, divided roughly along geographical lines as follows: New England and Middle States, three; Central States, six; Southern States, three, and Western States, four. Of the total sixteen, seven are states in which the amount of electric railway mileage is relatively small and the companies few in number. The commission group included one chief engineer and one accounting supervisor.

To take the replies received, however, solely upon the basis of the ideas presented, the following points may well be noted. Probably the most striking opinions by commissioners were one to the effect that the regulatory system itself lacks sufficient power over rates and two to the effect that some rate-making bodies have shown a lack of courage in their work. Three commissioners mentioned overcapitalization as one of the causes of public antagonism, while four felt that the public had not been convinced of the insufficiency of the existing rates, and three declared that the public believes the companies to have made more than a reasonable return in the past.

In addition, individual commissioners mentioned the bad effect of the established custom of charging 5 cents for any ride, the imperfect methods of making change for higher fares, mutual misunderstandings on the part of the railways and the public, and a lack of appreciation by the public of the common interests of transportation agencies and the communities served. One commissioner also pointed out that electric railways have sometimes suffered undeservingly from being made a football in local politics. On the other hand, another regulator thought the railways had aroused antagonism by repudiating fare contracts which they had claimed to be inviolable when the cities had desired lower fares.

The civicists—among whom were four bureaus of municipal research—likewise attributed the fare-raising difficulties of electric railways to several causes. Besides mentioning two or three noted above, they directed attention to the points of opposition on the part of electric lines to the idea of closer public control, the subconscious feeling of the commissions that they are protectors of the public rather than judicial bodies, past sins of the railways and poor service.

The most emphatic insistence upon poor service and improper past actions as controlling factors in the present situation, however, was made by the mayors and the representatives of the chambers of commerce. These two classes seemed largely of the opinion that the public now distrusts electric railway officials because of past performances. Five out of the thirty replies for these two groups mentioned overcapitalization. Two of the business men stated that the reversal of the companies in regard to the sanctity of franchises had aroused public opposition, and two others thought that the need for higher fares had not been proved.

Below are reproduced in detail some of the most striking replies by the various classes:

COMMISSIONERS

To speak generally, the difficulties encountered by electric railways in increasing fares have been due to the timidity and in some cases the cowardice of rate regulatory bodies in combination with other causes.

No other industry seems to have the same amount of difficulty in raising the price of its commodity or service in keeping with the general advance in prices as the electric railway. This, in my opinion, is partially if not principally due to the long-established custom of using the single 5-cent coin as the unit of fare, which unit of fare carries the passengers varying distances.

In many instances, traction companies have been made the footballs of politics and public prejudice has been worked up against them. Then again, in some instances, there is watered stock and overcapitalization, requiring dividends on more than the actual investment. Moreover, in some instances, public service commissioners, although knowing the facts, have lacked the courage of their convictions and have failed to deal justly as between man and man, without fear or favor.

The railways have been injured by the making of contracts on the basis of 5-cent fares and their hard insistence through years that such contracts were sacred. Now these upholders of the sacredness and inviolability of contracts repudiate their previous stand. The public believes that it has had to stand and deliver in days of prosperity and that the companies should stand to their contracts now—at least to the 5-cent limitation.

In the opinion of the general public and municipal authorities, existing rates were compensatory.

Almost the whole reason is that over-capitalization and manipulation have led the public to lose confidence in these corporations.

Securities have been watered, and surpluses above a reasonable return have been accumulated in the past.

There is a long-established principle that rates should be averaged over a period of years.

The public has a fixed idea that electric railways have earned large amounts of money to which they were not entitled.

Mutual misunderstandings have arisen.

The chief reason is that the laws and their interpretation, as well as the entire machinery of regulation, do not square with the facts of the situation. The commissions should have full power to deal with rates, and they s have facilities by which they can keep constant track of the needs of the companies, so as to increase or decrease as conditions justify.

The railways could not convince the people of their exact condition. They did not attempt to create public sentiment in their favor and educate the people to it.

The public has been educated to low fares and, having no accurate knowledge of the subject, assumes that increases are not necessary.

Inconvenience in making change for higher fares has been the cause.

Partly if not largely the reason is that the public feels it has not had all the facts presented. The better informed ones know that the big item of investment has not been materially altered by war conditions, while the uninformed think that the usual margin between operating revenues and operating expenses is so great as to stand a considerable increase.

There is a lack of appreciation of municipal necessity and mutual interests which must exist between railways and the public.

MAYORS

Wretched service and inconsiderate treatment of the public have been the chief obstacle in this city.

Poor service and the "public be hanged" attitude in previous years when the railways were making money have aroused opposition.

The public has no confidence in traction officials. The belief is general that enormous profits have been made in the past and concealed in some "mysterious" way.

Existing franchises are not being lived up to in any respect, and the railways are overcapitalized.

The reason is that the standardized fare of 5 cents has been maintained in the past, regardless of length of ride or quality of service rendered.

There is an instinctive feeling on the part of the public that the remedy will not cure the disease—bring sufficient revenue. It is like increasing tolls on a toll road—the policy tends to bring disuse.

The reason is largely that the railways do not fairly show the necessity for higher fares.

Poorer service is given and a higher fare asked.

Antagonism has largely been aroused in the past by the disregard of popular appeals.

The public believes that the old rate is sufficient to give a fair return upon the actual investment.

In the past utilities have capitalized on their earning capacity, and now when the high price of both labor and material reduces this earning capacity, their bonds and their stocks do not represent tangible value.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

The public believes that utilities, because usually monopolies, are always evil monopolies, and that a large part of securities represents only wind and water.

Railway service is very close to the citizen, and it is subject to many interruptions and in our city to severe snow storms. The average passenger cares only for good service, and when it fails he complains but forgets to give credit for good service. Therefore almost all customers are enemies.

The electric railway manager of the next few years will need to know more about public psychology than he does about rails and fittings. Most managers in the past have not concerned themselves with public opinion except at those rare times when some concession was wanted. As a result, the managers of today have inherited from their predecessors no easy task.

Electric railways have encouraged the "big ride for a nickel" idea to help get themselves established. Now, when 5 cents is not a sufficient price, the roads have not carefully explained why it is not.

There is antagonism between railways and public. Some of the old sentiment implied in the famous phrase "the public be damned" still remains.

A prejudice in the public mind has been caused by the early extravagance of the railroads.

Public ill-will has been created in congested centers by years of continual refusal of electric railway officials to co-operate with the public.

Our local company is under a 5-cent contract until 1923. It refused a few years ago to obey a city ordinance requiring six tickets to be sold for a quarter, although it was generally conceded at the time that the company could well have afforded to do so. The people feel that the company should now live up to this contract. The situation is also complicated by the fact that a neighboring company has a 5-cent contract until about 1933, and the people there decline to stand for any increase in fare.

There is general public distrust and ill-feeling toward the management.

In keeping with its distrust of all corporations and "big business," the public is not convinced that the condition of the electric railways is as serious as it has been represented by them.

The public could not or would not see that the integrity of its service depended on compensating rates.

The reasons for public antagonism to higher fares are past sins in inflation of stock, bad management, and the too prominent "the public be damned" policy.

Franchise conditions are the cause.

There is a widespread public belief that electric railways are necessarily wealthy and could easily reduce dividends without looking to the public.

There is a vague idea on the part of the public that utility companies are badly overcapitalized and have been "gold mines."

CIVICISTS

The reasons for opposition to higher fares are the general objection of the public to any increase, coupled with a lack of understanding of the situation, and in some cases the sub-conscious feeling of commissions that they are the protectors of the general public rather than judicial bodies.

Past sins of omission and commission are largely the cause.

The local public is not very keen on increasing the rates when it believes that it is not getting adequate service under the present system and did not even under pre-war conditions.

The public does not accept as true the statements of the railways, for past performances have destroyed confidence. When the public wanted lower rates in the past, the companies often pleaded that the law protected them. Now they want justice.

The public feels no partnership in or responsibility for the operation of electric railways. Such control as the public has acquired has been over the protest of the companies, leading to added hostility. The companies have failed to catch the spirit of the times by neglecting to invite into their management representatives of their employees and disinterested public citizens who could help to overcome the unfavorable reputation of the early practices of these companies.

The cause is the imperfect understanding (a) of electric railway economies (b) of the business, social and æsthetic value to the community of electric railway service and (c) of the future capital requirements of the industry to enable it to satisfy the rapidly increasing transportation needs of the public.

Has the difficulty of procuring increased fares been due to a fixed idea on the part of the public that electric railways have in the recent past profiteered, that is, earned large amounts of money to which they were not entitled?

Besides asking the general question of why electric railways encountered obstacles in obtaining higher

fares, the questionnaire in this connection directed attention to certain subsidiary questions, in order to secure specific answers on points which it was desired none should overlook. The first of these questions, relative to profiteering in the past, is stated above.

That the public fixedly believes electric railways to have earned large amounts of money to which they were not entitled was the opinion of forty in the various classes. Several thought that the opposition of the public to higher fares was only partly caused by such a belief, but only four deemed the opposition not to arise from this cause. The leading detailed replies follow:

Commissioners

The idea has prevailed that electric railways have unduly profited in the past, an inheritance from the era of liberal and possible overconstruction.

The public has been led to believe that electric railways have earned money to which they were not entitled. This idea has been "pounded into the public" by designing politicians who knew no more about the actual facts than the public but capitalized this idea for the purpose of securing votes.

In our city this is true largely because it is believed that the electric railway system is overcapitalized.

Very largely this is the case. There has been a great deal of so-called "high-financing" in the promotion of electric railways, a fact the public has not forgotten.

In many cases this is true. The companies themselves have promoted the idea in their desire for additional franchises.

I should not consider this a fundamental reason. But there undoubtedly is some resentment of regulatory bodies over past obstructionary methods by the companies when the issues involved a reduction in rates.

A great many people assume this to be true, having no definite information to the contrary.

The public believes electric railways have been run for the benefit of promoters and speculators, whose prospectuses and security selling advertisements claimed big profits. Now the speculators can suffer. There is a great deal of sentiment that public utilities could afford to live on "accumulated fat" of previous years.

Mayors

Undoubtedly the public feels that the companies have been making large profits. When the 5-cent fare produced a large margin, the electric railway operators educated the public that this was a standard amount they should pay for a ride. As a consequence, they are now reaping the whirlwind.

At first this was the case; it is only partly so now.

Undoubtedly such a sentiment has prevailed to a considerable degree.

Representatives of Chambers of Commerce

I do not think the average rider knows much about the profits of electric roads.

It has been shown that the common stock of the consolidated company in this city was largely issued as bonus and promoter stock. Knowledge of this fact and that 6 per cent dividends has been paid on this stock for a number of years past undoubtedly has influenced public opinion.

Public feels that the roads have overcapitalized in times of prosperity and are now asking the public to pay the bill.

In part, yes; and in part because of the belief that the electric railways are selfishly trying to capitalize the present situation for the purpose of improving their financial condition.

Yes, owing to the consolidation of small companies with increase of capital stock.

There is a strong sentiment of this sort in the public mind which has found expression in newspaper columns and in the action of municipal authorities and legislators.

Civicists

The companies have not necessarily profiteered, but the public believes that poor service has been accorded it especially when a fair return was being earned.

In part only. It is more a lack of confidence and a feeling that the railways should bear losses as others must.

Yes, in part. The management of the electric railways has not generally been of a character to acquire public confidence. Franchises, capitalism, stock watering and high-finance mergers, as well as political corruption in the past, have not been sufficiently offset by a public-spirited policy in the present. What the public remembers regarding the companies is largely unfavorable to them.

Has the difficulty of procuring increased fares been due to a selfish interest on the part of the public evidenced by an unwillingness to pay more for service so long as they can procure this service without paying a higher price?

The general tenor of the replies to this question was negative. Five replies noted the inherent characteristic of the human race to want to procure a service or commodity for a price no higher than necessary, but only eight deemed this a controlling factor in the electric railway fare situation. Six of these were public service commissioners. Twenty-two answered "No," and most of the remainder of the fifty-eight replies were to the effect that only part of the public has been actuated by such a motive. Some of the replies follow:

Commissioners

This is not altogether the case, although if the question is changed to a statement it would express a fact inherent in the human race applicable to all services and commodities.

The great public always endeavors to secure the most service possible for the smallest amount of money.

This is so on the part of many people, although they would admit that the cost of production and operation in every other line of business has increased tremendously.

Yes. But the public does recognize the change in operating costs and is willing to waive franchise provisions of 4-cent ticket fares, special rates for school children, etc. Its resentment—and economies—are not registered until there is proposed a raise higher than the 5-cent fare of the franchise.

Such a sentiment would be held by only a small minority.

This is not necessarily the case, although it is a factor. Our experience has been, however, that the public has been favorably disposed to increases during the war period.

I do not think so. My opinion is that the public is willing to pay properly for what it gets providing the facts are clear and the methods of dealing with the facts are just.

A large part of the public is influenced by this motive.

I doubt if this idea holds with the majority. Most people are apparently willing to pay a fair living price when the price is clearly shown to be fair.

People are willing to pay when they are convinced that it is necessary in order to maintain the physical and financial integrity of the service.

Mayors

No. The public is willing to pay what the service costs.

Although human nature is such that no one desires to pay an increased price for any service or commodities, I believe there is a greater reluctance on the part of the public to pay the increase for the service of the public utilities than for other things.

Undoubtedly this is true, but the selfish attitude is generally created and fostered by the newspapers.

The public appears to believe that the service is not worth more than 5 cents. This is evidenced by the fact that a large part refuses to ride at a higher rate.

This is only human, and, of course, has to be reasoned with.

Representatives of Chambers of Commerce

The public is as willing to pay for electric railway service as for any other. When the jitney gives better service, there is no sentiment for the franchise holder.

No. There is rather a feeling that increased fares would mean increased extravagance.

The public is naturally disposed to be fair to electric railways and is willing to concede much so long as it is fairly treated; but it resents any attempt to enforce economies of operation like the skip-stop, pay-enter system, elimination of jitneys, crowded cars, etc., when at the same time car riders are asked to pay higher fares. Naturally the people do not wish to pay more for anything than they have agreed or are compelled to pay.

There is no doubt but that a part of the public would hold the railways to the old rates, regardless of whether these were fair or unfair, but this is not true of the rank and file or of the majority. The majority of the people of every community are willing to pay for the cost of the service when once convinced as to the actual cost.

In part this is true, but the feeling is due more to a lack of understanding than to selfishness on the part of the public.

CIVICISTS

In part, yes. Owing to the hostile attitude of the public and its belief that the companies were not genuinely concerned for public service, and owing to the lack of direct voice in the management of properties, the public has felt no responsibilities for the present financial embarrassment. There has been too much banker control of the companies as opposed to stockholder control, and stockholders have been too limited to provide an adequate popular basis for good will.

This is not an actuating motive with any considerable portion of the public. People desire to be shown, and rightly, the justification for higher fares, but once convinced they are glad to pay their just dues.

Has the difficulty of procuring increased fares been due to a belief on the part of the public that electric railways have accorded the public unfair treatment in the past through overcrowding of cars, poor service, etc.?

Eleven commissioners, ten mayors, twelve business men and three civicists all expressed the view that the opposition to higher fares arises from a public belief in the past existence of inadequate service in some form. Twelve more in the various classes judged that part of the opposition comes from this cause, one voting "Very slightly." Only four out of the total of fifty-eight answered with an outright "No," three of these being commissioners. The more important answers are as follows:

COMMISSIONERS

Inadequate and unsatisfactory service constantly imposed is the big factor. The "public-be-damned" attitude on the part of officers and employees is a big contributing factor.

Yes, decidedly yes. In the cities where the companies have had a social side and have tried to meet the demands of the public for service, our commission has not found opposition of a strenuous character to proposals to relieve the companies of their franchise obligations as to fares. But where the policy has been "the public be damned," the public now reciprocates with that spirit most enthusiastically.

That depends on local conditions. While such arguments are invariably used by those opposing rate increases, I believe they are frequently employed because of the lack of something better.

This is certainly a strong idea. It is often expressed to me: "Let the utilities give us good service, and we will be willing to pay more if necessary to give a living profit." But people fear additional fares will go into the company's pocket with no improvement in service.

MAYORS

This is the chief but not the only factor.

Yes. The past policy of "the straphanger pays the dividends" and of giving improved service only when absolutely compelled to do so has lost to this utility the good will which should exist among customers of any enterprise.

The "public-be-damned" spirit of the railways in the past is now bearing fruit, in spite of the efforts of the railway companies in the past ten years to change public opinion by a "public-be-pleased" attitude.

This may be true to some extent, but it is not the principal reason.

This has prevailed in some cities and is often believed when it is not true.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

Yes—but it is nearly all due to "belief."

It is not only a belief but also a constant fact, and it is the extra crowd that makes the money.

This is the main reason, not only "in the past" but also in the present. Under a 60 per cent increase in fare we are getting crowded cars and poor service.

Yes. An early recognition of the rights of the public would have averted much of the ill feeling and prejudice which now exists against electric railways.

Undoubtedly this has much to do with the situation, as the public has come in close contact with employees of the road who are oftentimes discourteous and assume an attitude of ownership rather than of public service.

In some communities this belief is quite general, due mostly to the attitude of the management in years gone by. Furthermore, there is no doubt that every community has some people who feel that they have been unfairly treated.

Yes. Because the public does not understand the difficulties in the practical operation of electric railways, it is using the present opportunity to vent long-standing "complaints."

CIVICISTS

To some extent this is true, but more opposition is due to dissatisfaction with present rush-hour service, for the public has no conception of the difficulties connected with the rush-hour operation.

In large cities the public has generally experienced inconvenience from reliance upon electric railways as the sole means of transportation. The monopolistic character of these services has created an actual sense of resentment because of the public's dependence upon them exclusively. This attitude could be overcome, I believe, through the public having a greater voice in the management.

Very largely this is so. The economics of electric railway operation are not understood. Physical limitations of track capacity and the burden of extreme loads need to be impressed on the public at large.

Has the difficulty of procuring increased fares been due to a desire on the part of the public or their official representatives to secure a readjustment of the franchise or contract relations between the communities and the electric railways?

The answers to this query were not so one-sided, although the negative ones predominated. The commissioners who expressed a positive opinion on this point voted "Yes" in five instances, "No" in five instances and "Partly" in six instances. Most of the thirteen mayors and seventeen business men answered "No," but four in each group expressed the interest of public officials or reform organizations in franchise reconstruction at a time deemed more or less propitious. Three civicists answered "No" and one "Yes." Some of the replies are given below:

COMMISSIONERS

I do not believe that the public greatly concerns itself in this respect. Newspapers and public officials often tie into such matters for reasons obvious to the better informed public.

No, except that there may be the desire for readjustments in policy which would result in the companies living up to their franchise and contract obligations.

This depends on local conditions, although I think there may be a more or less general sentiment for franchise readjustments.

I have no doubt that in certain communities nothing substantial will be done in the raising of rates until a comprehensive franchise settlement is made with the city. I do not see how it can be otherwise.

Unquestionably, franchise problems have complicated the situation, and blame lies on both sides in recent as well as past history. As long as electric railway service is subject to "bargaining trades," this impediment to flexible and fair adjustments will remain.

MAYORS

Public officials would like to secure a readjustment of the franchise relations, but that is a matter in which the public would take little interest if the service were good and the public satisfied that the fare covered only a reasonable return on the real value of the traction properties.

In some cases the public has sought to take advantage of the emergency of the utilities in order to be relieved of the antiquated or unfair franchise provisions adopted many years ago.

No. These readjustments of franchise obligations are inevitable, however. Unfair or incomplete franchises must be remodelled.

Yes, on the part of a minority composed mostly of small business men and reform organizations studying the problems of transportation.

Public officials naturally desire to correct some of the mistakes made in franchise ordinances and believe that the company should make concessions when they are asking some from the city.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

It is generally felt that an unfair franchise could now be adjusted upon a basis of fairness to the public.

No, except in some few isolated cases where the issue of municipal ownership was active.

There is very little of this feeling in our community. Only a few of the more thoughtful men are looking toward modification of perpetual unlimited franchises.

CIVICISTS

In general, the existing franchise provisions are not consonant with present public conceptions of an equitable arrangement between the corporations and their communities. This is an incident—a reaction from the distrust that prevails. Seldom is there a fundamental difference of opinion on franchise which is dissociated from the adequate service—reasonable fare issue.

The second article will cover replies regarding what fundamental facts should be presented to convince the public that higher fares are necessary.

Portable Hydraulic Jack Made from Old Car Axle

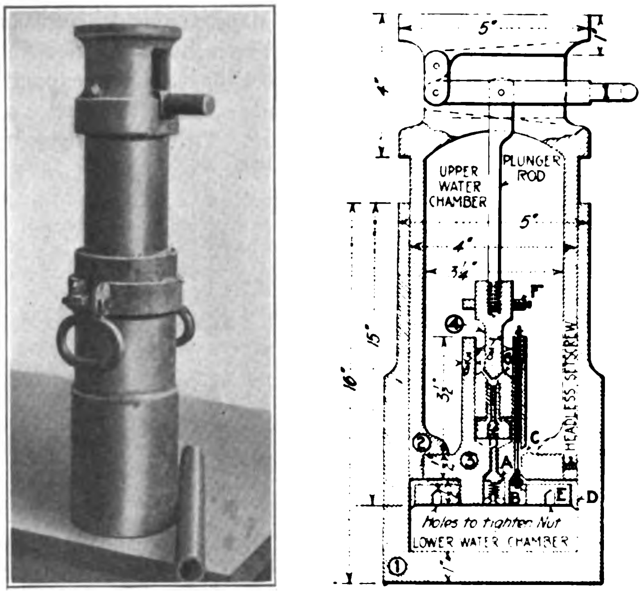
Chicago Elevated Railways Makes an Efficient 75-Ton Hydraulic Jack from Scrap Material for Shop Use

IN THE Wilson Avenue shops of the Northwestern Division of the Chicago Elevated Railways a portable hydraulic jack which is giving most satisfactory service was designed and built almost entirely from scrap materials, the greater part having been taken from an old car axle.

Some years ago a rather cumbersome hydraulic jack was in use around the shop and although there were several features about it which were not satisfactory, the principle was realized to be superior for many purposes to other types of jack. The machine shop foreman, therefore, during spare moments, set about making up a jack which would be capable of exerting the necessary force and would at the same time be easily moved about by one man and fulfill other requirements.

The completed jack and design of the various parts are shown in the accompanying illustration and assembly drawing. The lower water chamber (part 1 in the drawing) is turned down on a lathe, from a 16-in. length of axle to the exterior shape shown. This is then bored out 4 in. in diameter leaving a minimum wall thickness of ½ in. and a bottom thickness of 1 in.

The upper water chamber and its parts are considerably more complicated in design. This chamber also is made from a piece of car axle. The portion, which is 4 in. in external diameter (part 2) to fit into the bottom chamber, is 14½ in. long and is bored out, with the exception of a shoulder left ½ in. from the end, to an interior diameter of 3¼ in. leaving a wall thickness of ⅜ in. The ½-in. length from the end to the shoulder is threaded inside. The valve chamber (part 3) which screws into this is also made from a piece of axle 4½ in. long turned down in the initial stage to 3¼ in. in diameter. For ½ in. on one end this is turned down to 1⅝ in. in diameter and threaded. The next ½ in. remains at 3¼ in. in diameter and also is threaded. The remaining portion is formed into a cylinder 1⅝ in. in exterior diameter, ⅞ in. in interior diameter and 3½ in. deep. A valve, *A*, is placed in the end as indicated in the drawing. Vertically through the wall of this chamber a hole is bored the entire length and fitted with a valve rod, *B*, and spring as indicated, a port being made at *C*. This is the release valve. A leather cup gasket, *D*, is placed on the end of the valve chamber and held by the nut *E*. The plunger (part 4) fits the interior of the valve chamber and is formed and attached to the plunger rod as indicated. Two points in connection with this should be noted, first that the collar *F* is set to open the release valve; second, that there are four port holes, *G*, to admit water to the plunger valve *H*.



HYDRAULIC JACK MADE IN CHICAGO ELEVATED RAILWAYS SHOPS. ASSEMBLY DRAWING OF HYDRAULIC JACK

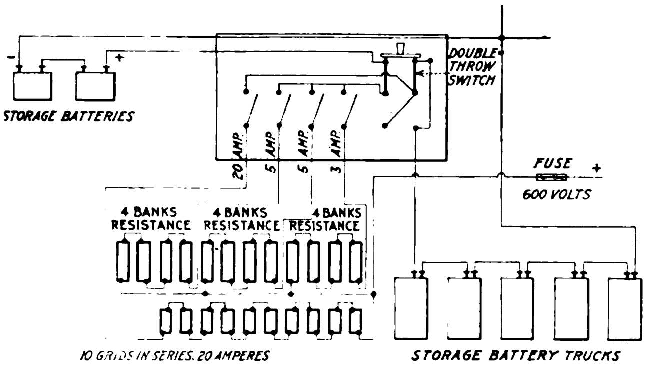
The working of the jack is simple. As the handle *I* is raised water is admitted to the valve chamber, and passes through the ports *G* and valve *H*. Lowering the handle forces the water through the valve *A* into the lower water chamber and raises the load. It will be noted that the handle which fits onto *I* has a lip which keeps the collar *F* on the plunger from coming in contact with the extension rod of the release valve *B*. To lower the jack the handle is removed and the plunger rod dropped. This opens the release valve and permits water to pass up through the valve *B*, out through the port *C* and back into the upper water chamber.

This jack has an effective lift of about 8 in. and weighs about 75 lb. which permits it to be easily lifted around by one man by means of the handle arrangement. The jack is used mainly in removing and putting on truck bolsters which requires a lift of from 60 to 75 tons. The jack was recently used in pressing a spider on an armature and it was estimated that a force of 165 tons was exerted.

Battery Charging at the Cleveland Railway Shops

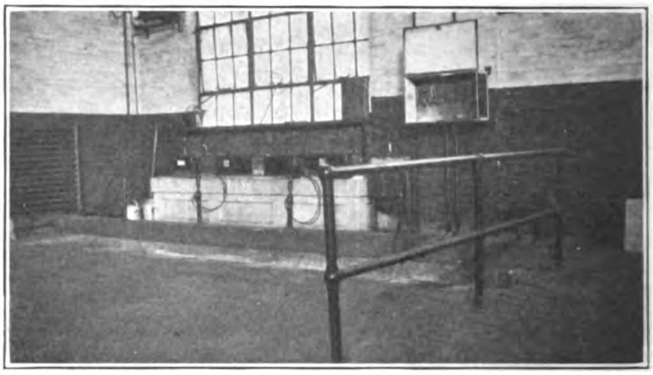
Trucks, Tractor and Portable Batteries Charged in Armature-Winding Room, Heat from Resistors Being Utilized in Baking Oven

IN ORDER to provide convenient facilities for charging portable storage batteries, storage-battery trucks and tractors, this company has recently set off part of the armature-winding room for the purpose and has installed there a concrete charging bench, switchboard, cable terminals, etc., as shown in the accompanying photographs. At present four Buda trucks are in use for transporting materials for the mechanical and building departments, distributing these to various sections of the shops. The tractor is used for moving trailers and dead motor cars from one department to another. Provision has been made for charging both portable batteries and trucks at the same time, and the capacity of the equipment is ample simultaneously to charge all that are likely to require charging. This charging work is done at night. The wiring diagram reproduced herewith shows the relation of the several pieces of apparatus.



WIRING DIAGRAM FOR BATTERY AND TRUCK-CHARGING EQUIPMENT

The concrete bench, which was constructed against the wall at a height convenient for manipulation, contains two charging stations in series for the portable batteries. The surfaces of the bench and of the floor of the charging station are sloped so as to drain into the sewer, providing a convenient means for flushing them. At the boundary of the floor is a curb against which the vehicles rest when charging, and from this curb the cable terminals project.



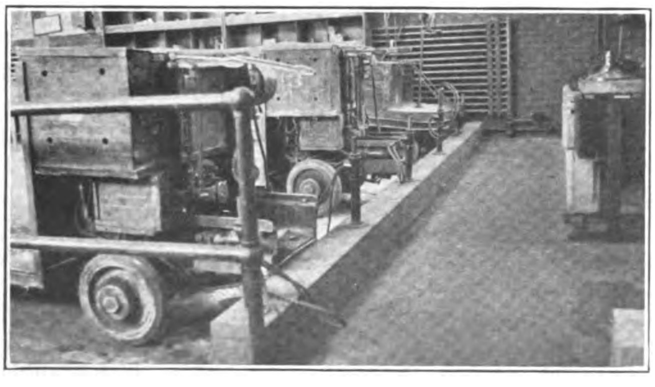
GENERAL VIEW OF BATTERY-CHARGING TABLE, SWITCHBOARD AND CABLE TERMINALS (PORTABLE BATTERIES IN PROCESS OF CHARGING)

A switch cabinet is mounted on the wall, and provides control of both truck and battery terminals. It contains switches for use in regulating the resistance in circuit and also a double-throw switch which when in the "up" position provides for charging both trucks and storage batteries and in the "down" position cuts out the battery circuit. The truck-charging rack contains five charging stations connected in series as indicated in the diagram.

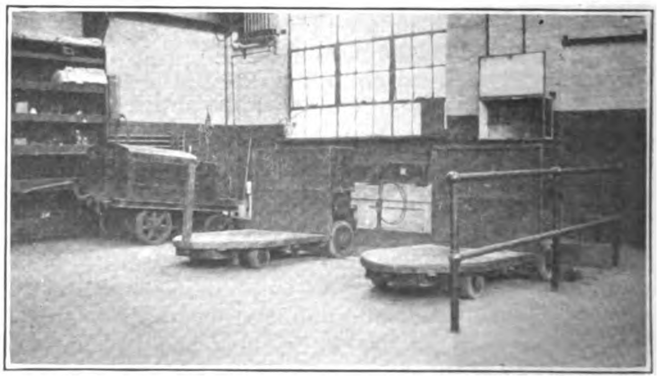
The charging is regulated by resistors composed of three sets having a capacity of 5 amp. each and one set of car grids with a capacity of 20 amp. The connections in the switch cabinet provide for from 5 to 15 amp. on the batteries and 5 to 35 amp. on the trucks.

The resistance units are fastened to the under side of the floor beneath the bake ovens, the charging equipment being, as stated above, in the winding room. The heat thus derived is used to assist in heating the ovens, the hot air flowing through a large duct in the floor. This prevents waste of energy and offsets any objection that might be made to the use of resistance control as compared with drawing the power supply from a motor-generator set. It only remains to state that the trucks and tractor are in the care of the mechanical and building departments although they may be used by other departments.

The Harvard Avenue shops of the Cleveland Railway, in which the above-mentioned equipment was installed, were fully described in the issues of this paper for Jan. 23, 1915, page 168, and Nov. 20, 1915, page 1022. Since those articles were published a number of short ones like this have appeared, giving details of special features.



TRUCKS AND TRACTOR IN CHARGING POSITION, CONCRETE CURB AND CABLE TERMINALS IN FOREGROUND



ANOTHER VIEW OF TRUCKS AND TRACTOR AT THE CHARGING STATION

Boston Trustees to Spend $21,500,000

Public Administrators Plan Capital Expenditures for Next Five Years—Cost of Service Increased $4,600,000 in First Six Months of Public Control—Trustees Believe Zone System Should Be Tried

HEAVY increases in the cost of service in the last half of 1918, ineffective efforts to secure adequate revenues through a 7-cent and later an 8-cent fare, improvements in service and equipment, and plans for the building up of the system—such constitute the main topics discussed in the report of the public trustees of the Boston (Mass.) Elevated Railway for their first six months of control. This report is abstracted in the following paragraphs.

What Boston Needs in the Next Five Years

To afford service reasonably free from interruptions caused by the breaking of cars, old or out of repair, and to effect economies which can be reflected in lower fares, the following capital expenditures for the years 1919-1923, inclusive, are proposed by the public trustees of the Boston Elevated Railway:

Cars	$10,500,000
Power	5,000,000
Track work	2,000,000
Shops	2,500,000
Miscellaneous	1,500,000
Total	$21,500,000

The two leading issues which confronted the trustees when they took possession of the property on July 1, 1918, was the existence of an operating deficit and the demand of employees for a wage increase totaling more than $5,000,000 a year. The latter was referred to the War Labor Board.

To increase the operating revenue a 7-cent fare was put in force on Aug. 1. In four months this fare resulted in an increase in revenue of only $1,005,918, or a little less than a 16 per cent gain over the same period in 1917 when a 5-cent fare was in force. On Dec. 1 an 8-cent fare was put in force with a resultant gain of $595,499 for the month or a 36 per cent increase over December, 1917. Owing to a decrease, however, in the revenue in July under a 5-cent fare, the total increase for the last six months of 1918 was about $1,500,000. During the same time the cost of service increased more than $4,600,000, so that the aggregate deficit for the last six months of 1918 was approximately $3,070,000, as shown in Table I.

COSTS INCREASED $4,600,000 IN SIX MONTHS

The distribution of the increased cost of $4,600,000 for the last half of 1918 can be seen from the following figures:

Increase in Operating Expenses:		
Maintaining track, line equipment and buildings	$485,000	
Maintaining cars, shop equipment, etc	359,000	
Power	603,000	
Wages of conductors and other transportation employees	1,223,000	
General expenses	127,000	
Depreciation	832,000	$3,629,000
Increase in Fixed Charges:		
Taxes	$12,000	
Rent of leased roads	27,000	
Rents for subways and tunnels	244,000	
Interest	63,000	
Rental in form of dividends on preferred and common stock under act of 1918	658,000	1,004,000
Total increase		$4,633,00

Of the $3,629,000 increase in operating expenses, more than one-half or $1,859,000 represents the increase in wages caused largely by the awards of the War Labor Board and the tendency of certain crafts to withdraw from the carmen's union and require that the company enter into separate agreements for the payment of craft wages. While this has meant an increased wage in every case, the trustees state that it has not been entirely without benefit, as the company has been permitted to get away from the seniority rule prevailing in the carmen's union and can hire men more skilled in the respective crafts.

The increased cost of material has had an important bearing in all departments of the company's work; while it has not been figured in dollars, it may be said that in many instances the cost of material has advanced 100 per cent. The increase in the cost of power resulted from the increase in wages and the increase in the consumption and the cost of coal. Owing to inferior grade of coal received, 9500 tons more coal, at an average cost of $7.47½ per ton, were used.

The increase in general expenses was caused by the increase in the cost of printing in connection with the introduction of 7 and 8-cent tickets and to the raise in wages of clerks under the War Labor Board award. Depreciation increased because a very inadequate amount had been charged to depreciation in the past. The trustees have determined upon $167,000 a month, or $2,000,000 a year, as the proper amount to be charged for depreciation.

The increase in rentals of subways and tunnels was largely owing to the opening of the Dorchester tunnel in the last six months of 1918. The increase under the head of dividends represents the rental paid by the State for the property owned by the company, being the amount required under the acts of 1918.

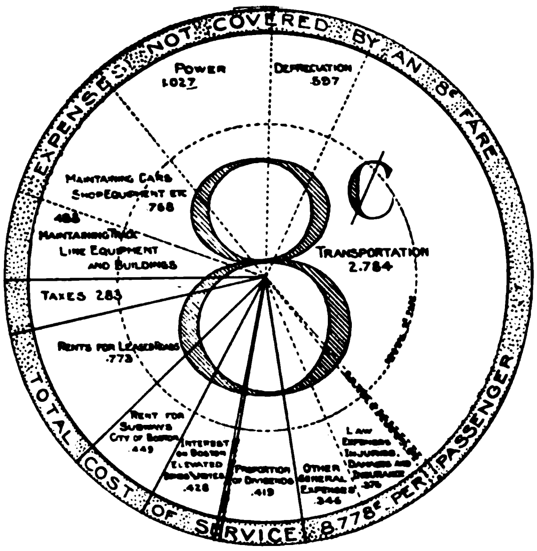
The cost of service as defined in the law for the six months of public operation amounted to 14,526,432. Based on the figures of the month of December now available, when the cost of service per passenger was 8.778 cents, the distribution of cost for each 8-cent fare collected is as shown in the diagram on the next page. The amounts making up the cost of service for this month are shown in Table II.

ZONE SYSTEM TO BE TRIED

The 8-cent fare, it is said, is to be continued in force long enough to provide an experience of at least four months. Paper tickets, however, have proved unsatisfactory, and metal tokens were ordered on Dec. 9, 1918. These tokens will be placed in use on Feb. 22.

1919. With their introduction all fares will be collected at prepayment areas and on prepayment cars through the deposit for each fare of a token in a self-registering fare box in the manner that nickels were formerly collected. In this way fraud in collection is reduced to a minimum.

In regard to a zone system the trustees say that such a system would seem to be more equitable than a flat fare as passengers pay according to the service rendered. The trustees are not convinced that the arguments against a zone system—to wit, that it tends to congestion in the inner zone, that people have settled in suburbs in reliance on a flat fare for the entire territory served by the Boston Elevated system, that a zone system costs more and that collection of fares under it may inconvenience passengers—outweigh the arguments in favor of introducing a zone system. They believe that at least there should be a trial of a zone system in Boston. Through such a trial the wisdom of those advocating it can be proved or disproved.



COST OF SERVICE PER PASSENGER FOR MONTH OF DECEMBER, 1918

Therefore, the trustees purpose some time in April to install a zone system, dividing the territory served into an inner and outer zone, in each of which the fare will be 5 cents. The zone boundaries will divide the population served about equally, so that it is reasonable to expect the result will be equivalent to that of a 7½-cent fare upon the basis of the number of passengers who ride to-day. The 8-cent fare is said to be causing many to walk who would ride at 5 cents, and it is therefore hoped that increased riding under two 5-cent zones will yield the company more revenue than the present 8-cent fare.

LABOR SUPPLY IS INCREASING

The labor situation has been much disturbed during most of the time since the trustees took office, and the shortage of men has prevented or delayed many contemplated improvements. The absence of men and a more than usual amount of sickness accounted for it. More than 1600 men left the company's employment to enter the army or navy.

A shortage of 353 blue uniform men on July 1 and of 569 such men on Nov. 1, however, has been entirely eliminated. The turn-over of platform men has been very rapid, as is shown by the fact that since the trustees took office 2295 blue uniform men have been employed and 1826 have left the company's service. The increase in payroll due to the award of the War Labor Board on Oct. 2, 1918, and to supplementary awards is estimated to cost the company more than $4,000,000 annually.

IMPROVING SERVICE AND EQUIPMENT

Although, the trustees state, the service cannot be made satisfactory until new equipment is secured, improvements have been made from time to time in large number. The operating department of the company has been subdivided into six departments, at the head of each of which is a superintendent directly responsible to the general manager. This reorganization has been already productive of good. Daily trips on surface lines have been increased by the number of 817. The car-miles run daily have been increased by 8300 miles. Four miles of track have been rebuilt and 18.64 miles repaired on the surface lines at a cost of $620,974.

The number of cars owned by the company at the time of its latest annual report was 3332, of which 1356 were open cars and 1140 were small box cars. Only a limited number of the box cars are in use, and it is said that all should be replaced as rapidly as capital becomes available. The trustees at their first meeting in July purchased 200 center-entrance-motor cars and fifty trail cars at a total cost of $3,028,550.

On Jan. 11, 1919, a one-man car was put into operation on the Grove Street line, West Roxbury, to try an experiment and to familiarize motormen with the car. The trustees believe in the policy of introducing cars of this type in considerable number on lines that seem suited for their use. Six new steel elevated cars, purchased before the trustees took possession, have been put in operation. Work has been resumed on the thirty-five Cambridge Subway cars, delivery of which ought to commence this coming spring. The trustees found completed vestibules for articulating the 25-ft. box cars and have ordered the articulating of forty-eight cars to tide over until more new cars can be purchased.

Eighty motors for No. 1 semi-convertible cars have been purchased at a cost of $89,000, and 264 motors have been purchased for No. 3 semi-convertible cars at a cost of $225,000. Seventy air-brake compressors for No. 4 semi-convertible cars were purchased at a cost of $31,000. Six double-truck Russell snowplows have been added to the equipment. One hundred and eighteen cars have gone through the shop for general repairs and painting; 527 cars have been put through the shop for light repairs, and forty-three snowplows and sweepers have gone through the shop for general repairs.

In the opinion of the trustees, however, the Boston Elevated Railway still needs cars, power, track renewals, car shops and carhouse alterations, irrespective of any remodeling or change of present subways to provide for rapid transit trains and irrespective of extensions of the system.

The trustees propose that in the five years beginning with 1919 they purchase 600 surface cars. These, with the cars already ordered, would permit the retirement in 1919 of 625 of the oldest box cars and in

1920 the retirement of the balance of cars of that type now in use, besides providing for the addition of 100 more cars than are now operating upon the system. These additional cars, it is believed, should take care of the natural growth in population for 1918 and 1919. In 1921, 1922 and 1923, 100 cars should be added each year to take care of this growth and to make necessary replacements. The cost of this program is estimated at $6,800,000, in addition to the $3,700,000 for equipment already ordered.

The growth of business based on experience requires provision to be made for an annual increase of power production equivalent to 5 per cent of the maximum capacity of the system. In 1919 the trustees purpose to install a new turbine (already ordered), a rotary and stokers at the Lincon Power Station; to complete the Somerville substation; to install two rotaries in the Charlestown station, and to provide necessary conduit and cable construction. The estimated cost is about $1,000,000. A similar expenditure is proposed for each year for five years, or a total of $5,000,000 in five years.

John A. Beeler suggested that 23 miles of track should be rebuilt each year in addition to ordinary repair and maintenance in order to keep the roadbed in satisfactory condition at all times. To the extent that track is renewed with heavier rails, the cost is a charge to capital. That item, it is said, will require in five years approximately $2,000,000. There is also a most urgent need of a modern car shop. The company has land conveniently situated to accommodate both surface and rapid transit cars, and the trustees propose the erection and equipment upon it of a modern shop. All old shops will be abandoned except necessary emergency repair shops at carhouses, and these must be improved. A total of $2,500,000 is needed for car shops.

Moreover, the trustees remark, incidental changes will be incurred in carrying out the foregoing program. Additions to the signal system will be required; bridges must be strengthened, and thirty snow sweepers of the modern type and a number of auto trucks are needed. The cost of all miscellaneous items is estimated to be slightly in excess of $1,500,000 in five years. The total estimated capital expenditures in the year 1919-1923, inclusive, are $21,500,000.

TABLE I—RECEIPTS AND COST OF SERVICE OF BOSTON ELEVATED RAILWAY FOR SIX MONTHS ENDED DEC. 31, 1918

Receipts		
From:		
5-cent fares—July, 2.89 per cent (decrease)	$1,525,538.09	
7-cent fares—August, 24.01 per cent (increase)	1,915,260.97	
7-cent fares—September, 12.33 per cent (increase)	1,722,738.34	
7-cent fares—October, 3.00 per cent (increase)	1,688,494.52	
7-cent fares—November, 21.03 per cent (increase)	1,919,914.47	
December adjustment of 7-cent fares	62,896.03	
8-cent fares—December, 36.33 per cent (increase)	2,234,532.17	
		$11,069,374.59
From operation of special cars, mail pouch service, express and service cars		64,918.36
From advertising in cars, on transfers, privileges at stations, etc.		146,465.86
From other railway companies for their use of tracks and facilities		25,163.53
From rent of buildings and other property		33,490.90
From sale of power and other revenue		65,615.91
Total receipts from operation		$11,405,029.15
Interest on deposits, income from securities, etc		48,738.87
Total receipts		$11,453,768.02
Cost of Service		
Operating expenses:		
Maintaining track, line equipment and buildings		$1,577,591.13
Maintaining cars, shop equipment, etc		1,162,415.01
Power (including 131,157 tons of coal at $7,475 or $980,454.83)		1,431,494.19
Transportation expenses (including wages of car employees, car-house expenses, etc.)		4,475,085.78
Salaries of administrative officers		50,456.72
Law expenses, injuries and damages, and insurance		554,334.11
Other general expenses		458,372.18
Depreciation		1,002,000.00
Total operating expenses*		$10,711,749.12
Taxes, proportion for six months		447,610.39
Rent for leased roads (exclusive of subways)		1,291,691.40
Proportion for six months of rent of subways and tunnels to be paid to the City of Boston, which does not include Cambridge Subway owned by the Boston Elevated Railway		738,918.16
Interest on Boston Elevated Railway bonds and notes		664,512.16
Miscellaneous items		13,716.55
Dividends paid under acts of 1918		658,235.00
Three and one-half months on preferred at 7 per cent		
Six months on common at 5 per cent		
Total cost of service		†$14,526,432.78
Net loss for six months		†$3,072,664.76
Revenue passengers carried		162,964,817
Total receipts per revenue passenger (cents)		7.028
Cost of service per revenue passenger (cents)		8.914

* Of this total $6,379,986.77 represents wages.

† Does not include $117,402.98 back pay covering period June 15 to 30, but paid during the months of November and December, 1918.

TABLE II—COST OF SERVICE OF BOSTON ELEVATED RAILWAY FOR DECEMBER, 1918

		Cost per Passenger, Cents
Operating Expenses:		
Maintaining track, line equipment and buildings	$135,085	0.483
Maintaining cars, shop equipment, etc	214,889	.768
Power (including 28,480 tons of coal at $6.757, or $192,455)	287,011	1.027
Depreciation	167,000	.597
Transportation expenses (including wages of car employees, carhouse expenses, etc.)	778,294	2.784
Salaries of administrative officers	9,132	0.033
Law expenses, injuries and damages, and insurance	105,143	0.376
Other general expenses	96,635	0.346
Total operating expenses*	$1,793,189	6.414
Fixed Charges:		
Taxes, proportion for month	79,256	0.283
Rent for leased roads (exclusive of subways)	216,098	0.773
Proportion for month of rent of subways and tunnels to be paid to the City of Boston, which does not include Cambridge Subway owned by the Boston Elevated Railway	125,664	0.449
Interest on bonds and notes of Boston Elevated Railway	119,562	0.428
Miscellaneous items	3,249	0.012
Proportion of dividends under acts of 1918	116,997	0.419
Total cost of service	$2,454,015	8.778

* Of this total $1,095,251 represents wages, the total wage cost per passenger being 3.918 cents.

MORE LEGISLATION IS NEEDED

One of the features of the electric railway situation in Boston is the extraordinary burden of subway rentals to be met from operating receipts. The trustees believe that to prevent deficits and eventually to secure a lower fare it is essential that at least while the public is operating its own railway this charge to operating expense should be removed. One of the bills now pending in the Legislature asks for relief from this burden.

The great need of additional capital has led the trustees also to recommend the sale of the Cambridge Subway. Such a sale would place the ownership of that subway in the hands of the public, where it should be and where the title to other subways has been kept. A bill has been presented in the Legislature to permit the sale and the transfer of the proceeds to capital uses for the benefit of the service.

It is reported that the Ministry of Reconstruction of Great Britain favors the development of an extensive system of light railways, largely for the purpose of transporting agricultural products. Track of 2-ft. gage, semi-portable in character and laid on the roadway, or on waste land alongside the roadway, has been proposed. The traction would be mainly by steam or electricity which would be supplemented by gasoline tractors or horses. Possibly by the use of "containers" it would be feasible to run loads from the "agrails" on the ordinary railways.

Electrical and Mining Engineers Get Together on Welding

A Joint Session of the A. I. E. E. and the A. I. M. E. Was Held in New York This Week in Connection with National Conventions of These Societies

THE American Institute of Electrical Engineers and the American Institute of Mining Engineers took advantage of the fact that the midwinter meeting of the former and the annual convention of the latter were scheduled to be held simultaneously in New York this month, to arrange a joint session on the subject of welding. The A. I. E. E. furnished two papers and the A. I. M. E. three, the principal points of which having relation to electric railway work being abstracted in the following paragraphs.

A paper dealing with the investigations undertaken by the welding committee of the Emergency Fleet Corporation was read by H. M. Hobart of the General Electric Company. In speaking of the various kinds of welding wire used Mr. Hobart said that these range all the way from the cheapest fence wire, costing but a few cents per pound, up to carefully treated and covered electrodes, which cost several times as much. As to bare electrodes, it is generally considered that uniformity is very essential, and it has been thought necessary to reject wire which has bad spots. It is now claimed that such material may be salvaged by dipping in milk of lime (whitewash) before welding. This dipping may be done in quantity and the coating allowed to dry, or the welder may keep a pot of the solution on hand into which the electrodes may be dipped immediately before welding.

ALTERNATING-CURRENT WELDING IS INCREASING IN FAVOR

In comparing direct current equipment with alternating current for arc welding, Mr. Hobart said that up to recently it had been contended that arc welding required a direct current supply, but now there are many advocates of alternating current. It is generally considered that it is a little more difficult to hold the arc where alternating current is used, but this simply resolves itself into a matter of practice. In regard to the frequency for alternating current arc welding, it is generally maintained that such welding is only thoroughly practicable with as high values as 50 or 60 cycles per second. There are, however, some who hold the opinion that the use of 25 cycles or less is equally satisfactory. With reference to the use of bare versus covered electrodes for alternating current arc welding, some maintain that flux-covered electrodes are best. A novice can learn to weld more quickly by employing flux-covered electrodes, but can ultimately learn to weld just as rapidly and successfully with bare electrodes. The difficulties lie in the initial stages of his education. As to the relative speeds of welding by the two processes, Mr. Hobart stated that the average speeds are about the same.

With reference to the comparative fields of gas and electric arc welding, it is generally considered that gas welding is more satisfactory for thin material, say ⅛ in. thick and under, and for general repair work, particularly where various kinds of steel and cast iron are involved. When it comes to depositing a large amount of metal and welding up structural steel or plates of ¼-in. thickness and upward, the results obtained by the ordinary direct current arc with the metal electrode are at least equal in quality to the gas welding work and they are certainly obtained more cheaply. The quality of the welds cannot be compared until certain elaborate tests of gas welds have been completed. The results will permit comparison with the considerable research data already obtained with regard to electric arc welds.

Mr. Hobart said that within reasonable limits the speed of welding increases considerably when larger currents are employed. It appears reasonable to estimate that this increase will probably be about 25 per cent to 35 per cent for large currents. This increase is not directly proportionate to the current employed, because with large current a greater amount of time is taken to insert new electrodes than with small current, and the operater is working under a more strenuous condition. Incidentally, the operator who employs the larger current will not only weld more quickly, but the weld will also have greater strength. In regard to the effect on arc welding of the voltage employed, tests demonstrate that it makes no material difference in the tensile strength, bending qualities, or appearance of the welded material.

With the advent of metal-arc welding there has been a tendency to neglect the carbon-arc method. It now appears that there is a definite field for the carbon-arc method. In general, this is not applicable to vertical and overhead welding. The majority opinion of competent observers indicates that carbon-arc welding is not as reliable as metal-arc welding because: (1) carbon is carried into the deposited material, thus reducing its ductility; (2) it is more difficult to obtain good fusion on account of overlapping of deposited metal on the original metal; (3) it is more difficult to manipulate and this requires greater skill; (4) the arc is much hotter, which means greater discomfort to the operator and, therefore, lower efficiency; (5) greater cooling spaces are developed because larger areas of adjacent metal are heated.

On the other hand, it is contended by some that carbon-arc welding can be developed to the point where these objections no longer exist, and the advantages of this method are assured, namely: (1) no preparation of the abutting edges is necessary; (2) greater rate of deposition of metal and, therefore, greater speed of welding is obtained, particularly in heavy work; (3) it has greater adaptability to automatic welding.

Much progress has been made in America in the use of spot-welding for the joining of plates. In making a fusion-weld, the cleaner the surface the better the weld. In spot-welding it is desirable to have clean surfaces under the electrodes, but scale between the two plates is a positive advantage. The extent of the field of the application for fusion and spot-welding is but little appreciated by engineers other than those who have been directly connected with welding development. It is evident that the field is an enormous one, as it includes all structures and apparatus where steel is employed.

SOME POINTS FROM THE OTHER PAPERS

In a paper dealing with welding as a process in ship construction, S. V. Goodall said that during the war welding had been resorted to in order to save time and economize in labor, but that cost was relatively unimportant. Now that hostilities have ceased, economy in first cost and maintenance becomes again of primary importance, economy of time and labor being of value only in so far as they result in cheaper production.

S. W. Miller, proprietor Rochester Welding Works, read a paper on "The Path of Rupture in Steel Fusion Welds." He said that the first evidence of strain in any weld is at the point where visible defects exist such as films of oxide around the grains or around small particles of metal. It appears that welding materials which are low in carbon give a much less columnar structure in gas welds than others, also in electric welds the structure is usually more columnar than in gas welds, although variations can be noted here also. It would appear that the rapid cooling of the electric welds is responsible for this, and that the slower cooling of gas welds probably makes the grain more nearly equiaxed. The quenching of electric welds appears to produce an entirely different structure. Here the grains loose their columnar nature and the lines entirely disappear. It seems quite clear that the only way to account for the brittleness in welds is to assume that it is caused by films of material at the grain boundaries. George F. Comstock, metallographist for the Titanium Alloy Manufacturing Company, discussed the points brought out in Mr. Miller's paper and added some further information regarding the identity of the needless or small crystals which are present in welds.

In a paper dealing with fusion in arc welding, O. H. Eshholz, of the Westinghouse Electric & Manufacturing Company, took up the effects of penetration, overlap and arc length on the quality of welds produced. He also gave some information regarding electrode material and diameters necessary for use with different values of current. In conclusion Mr. Eshholz said the fusion obtained in arc-welded joints between the plates and deposited metal is determined by the penetration of this metal into the plate metal and the overlap of the edge of the deposit layer on the plate. The penetration is comparable to the depth of arc crater as observed by the welder when moving the arc terminal over the plate with uniform velocity, and the overlap is indicated by the contour of the surface of the congealed deposit in the region adjacent to the material welded. He illustrated the relation between the depth of arc crater and the depth of the resulting penetration with several lantern slides. These showed sections through the crater obtained by breaking an arc during the process of depositing a layer of metal on a steel plate. The depth penetration was almost exactly the same as the depth of the crater and this followed a line of the same general form as the crater depression. For most welds, a depression of $\frac{1}{16}$ in. will give the desired penetration, while a contour which does not show a re-entrant angle between plates and deposit indicates an overlap per layer of approximately $\frac{1}{32}$ in. or less.

Thus by examining the surface and edges of the deposited metal a simple visual indication is given for gaging the penetration. The best welds show an intimate contact at the edges of the deposited metal and an entire absence of even the smallest re-entrant angle.

WHAT THE DISCUSSION BROUGHT OUT

In introducing the subject of welding President C. A. Adams, of the A. I. E. E., gave a brief summary of the work done by the welding committee of the Emergency Fleet Corporation of which he is chairman. He said that the advance made in electric welding during the past year had been as great as that of the preceding ten years. He also announced that a new welding organization is being started to continue the work begun by the welding committee and to carry on investigations necessary for the advancement of all classes of welding.

In the discussion of the various papers presented H. A. Hornor, consulting engineer, Philadelphia, Pa., spoke of the necessity of having skilled welders and told how those of the Emergency Fleet Corporation were instructed. He said that the various shipbuilders had selected the men whom they wished to have trained in welding and as a result all sorts and conditions presented themselves. Under the stress of war conditions the training, of necessity, had to be intensive, and very few exceptionally skilled welders were produced. From his experience Mr. Hornor said that the best arc welders are those with a very sensitive nature. To produce a satisfactory weld the welder must concentrate his whole attention on the work in hand and satisfactory work cannot be expected from men who have to dodge hot rivets and work in the constant din of a boiler factory.

A. M. Candy, Westinghouse Electric & Manufacturing Company, spoke briefly of the relative speeds of alternating and direct-current welding, and said that one of the greatest problems for practical welders is the selection of the most suitable arc current to be used. He referred to the depth of crater and the re-entrant angle discussed by Mr. Escholz as forming a basis for determining by visual means when a weld is good or bad. He said that this affords a means for the welder to determine for himself when he is doing good work.

C. J. Holslag, chief engineer Electric Arc Cutting & Welding Company, spoke of the relative speeds of alternating and direct-current welding. He said that in a melting test which he had conducted, with no attempt at welding, four units of metal had been melted by alternating current to three by direct current. He said that oxidization causes the weak points in most welds, and that the shorter the arc the less the chance for air to enter and produce oxidization, and the shorter the time that the molten metal is in contact with the air.

C. E. R. A. Accountants Reconvene

Delegates at Fort Wayne Meeting Lay Basis For Energetic Work After Suspension Caused by War

THE thirty-third meeting of the Central Electric Railway Accountants' Association was held at the Hotel Anthony in Fort Wayne, Ind., on Feb. 15, with sixteen members present. Most of the time was taken up with the presentation of addresses and lively planning for the future work of the association.

In his presidential address A. C. Van Driesen, secretary Toledo Railways & Light Company, Toledo, Ohio, directed attention to the fact that the last real meeting of this association was held in Cincinnati in December, 1916. Since that time there have been many changes in the personnel of the association, many members resigning to accept positions with industrial concerns. On account of no conventions having been held, it appears that a state of "dormancy" has enveloped the association, to the extent that in some quarters the members have expressed the sentiment that the object for which the association was organized has been accomplished and it should be disbanded. Others are luke-warm and do not seem to care one way or the other.

In regard to this point Mr. Van Driesen said in part:

> Do we really think that the entire object for which this association was formed has been accomplished? If so, then by all means disband. It seems to me, however, that with the multitudinous problems which are now confronting every industry in this country, the electric railway is at last about to come into its own. If this conclusion is correct, the Accountants' Association should be ready at all times to step into the breach and assist to the fullest extent of its powers the operators and managers of the various properties. Moreover, as we are enabled to acquire knowledge from our personal relationship with other men in the same line, the association should continue for the interchange of ideas and for more intimate personal relations.
>
> While the association has done good work in the past, the opportune time to show its mettle is now; it should get into this reconstruction period with a vim and do all in its power to solve the various problems as they appear. There will be plenty for us to do, and closer personal relation will be one of the ways in which we will be enabled to solve some of our problems.
>
> Although the constitution provides for only two meetings each year, it might be amended to provide for four meetings, February, May, August and November—the August meeting to be held at Detroit, Cleveland or Toledo or some other lake point and the remainder of the meetings to be held at the most central point to be decided upon at the previous meeting.
>
> It seems to me that now is the time to make up for lost motion during the last two years by holding more meetings, putting more "pep" into them and having an association that is alive and up to the minute, rather than one that is dying of dry rot.

The address at the morning session, on the subject of "Where the Money Comes From," was made by C. B. Kleinhans, auditor Toledo & Indiana Railroad, Toledo, Ohio. Mr. Kleinhans explained that the form of borrowing which an electric railway puts into effect may be through short-term notes issued by local banks or through bonds.

The local banks, he said, will often loan reasonable sums of money based upon the company's credit, but these loans are usually made for short terms of from thirty to ninety days. As such a note falls due banking laws very generally require that the note shall be reduced by a substantial payment before renewal. In many cases if money is scarce and the interest rates high, the bank prefers to conserve its resources by keeping its outstanding loans at a low point. Therefore, the most advantageous form of loan is to issue bonds, which are long-term certificates.

It can be conservatively stated, according to Mr. Kleinhans, that 50 per cent of all financing is in the form of bonds. Continuing he said:

> In order to float a security issue of any kind at the present time, it is first necessary to secure the consent of the Public Utilities Commission. But another difficulty exists, for in order to float a bond issue it is necessary to establish a credit rating with the banking industry and to demonstrate that the company has the ability to earn not only the interest on the securities about to be issued but also an additional amount over and above the interest which will permit the utility to retire a substantial amount of the bonds each year and also to pay the principal of the outstanding balance at maturity.
>
> If the utility can demonstrate that it has the earning capacity to warrant the issuance of a block of bonds sufficient to provide funds for the construction work in question and the restrictions of the bankers for the protection of the security holders can be complied with, the utility may procede with its additions and extensions, provided it can raise first the money to finance the work until bonds can be issued to reimburse the treasury for the money so expended. For it must be borne in mind that construction work must be paid for before it can be mortgaged, and the only means the utility has of paying is from the limited surplus earnings and through short-term loans from local banks.
>
> Here are some of the "restrictions" that may be imposed upon the utility in borrowing money. It may be required that:
>
> The net earnings be from one and one-half to two times the interest charged.
>
> The utility contract that it will not borrow from any source unless the securities outstanding are amply protected.
>
> Bonds may be issued to an amount not to exceed 75 per cent of the original cost of construction, and as such bonds are usually sold below par, the balance must be put back out of "surplus earnings."
>
> The sinking fund, to be paid out of "surplus earnings," must redeem a specified block of bonds each year.
>
> These are but a few of the many things the utility may be required to do before it can pay dividends to the stockholders. It is entirely possible that some of the passenger cars may be crowded and available freight equipment worked to full capacity, but the cost of operation be so high as to make the net return almost a minus quantity. If the net return is small, it will be hard to borrow money, and consequently extensions and improvements must be curtailed if not stopped altogether.
>
> It is a very erroneous impression that the securities of large corporations are owned by multi-millionaires. A man with a great deal of money can engage in business that will bring him in larger returns than he can get by purchasing bonds. While we do not wish to give the impression that men of large means do not purchase bonds, yet the greater part of the bond issues of the large companies, we believe, are held by the public at large or for their benefit, in the case of savings banks, insurance companies, trust funds, etc.
>
> It is considered quite the thing at the present day to attack the railways through Councils and newspapers when other subjects grow tame. The very men who are loudest in their denunciation of "those who fail to do their duty for the uplift of the public at large" are the ones who attack the public utilities upon the slightest provocation. Hundreds of these men are savings bank depositors, and the safety of the money they have so deposited may be guaranteed by the securities of the corporation which they are endeavoring to put out of business. It does not seem reasonable that men would seek to jeopardize their own interests and it is very unlikely that they would do so if they understood the facts.

The following officers were elected, and the following committees then appointed for the new year:

Officers: President, A. C. VanDriesen, secretary Toledo Railways & Light Company; first vice-president, C. B.

Kleinhans, auditor Toledo & Indiana Railroad; second vice-president, J. B. Hooper, Detroit United Railway, and secretary-treasurer, A. L. Neereamer, Central Electric Railway Association.

Executive Committee: Officers and H. F. McColgin, Indianapolis & Louisville Traction Railway; L. W. VanBibber, Ohio Electric Railway; E. O. Reed, Western Ohio Railway, and Walter Shroyer, Union Traction Company of Indiana.

Compiling Committee: L. T. Hixson, chairman, Terre Haute, Indianapolis & Eastern Traction Company; I. E. Guthrie, Interstate Public Service Company; H. F. McColgin, Indianapolis & Louisville Traction Railway; A. R. Baxter, Indianapolis & Cincinnati Traction Company, and A. L. Neereamer, Central Electric Railway Association.

Constitution and By-Laws: A. R. Baxter, chairman, Indianapolis & Cincinnati Traction Company; O. A. Small, Chicago, South Bend & Northern Indiana Railway, and J. P. Longon, Cincinnati & Dayton Traction Company.

Freight and Express Accounts: Walter Shroyer, chairman, Union Traction Company of Indiana; L. W. VanBibber, Ohio Electric Railway, and G. B. Dobbin, Michigan Railway.

Light and Power: H. T. Ledbetter, chairman, Toledo Railways & Light Company; James Sweeney, Northern Ohio Traction & Light Company; Karl A. George, Indiana Railways & Light Company; H. E. Vordermark, Fort Wayne & Northern Indiana Traction Company, and J. S. Minary, Benton Harbor-St. Joe Railway & Light Company.

Membership: O. A. Small, chairman, Chicago, South Bend & Northern Indiana Railway; C. B. Baker, Toledo, Bowling Green & Southern Traction Company, and J. F. Stratton, Louisville & Northern Railway & Lighting Company.

Program and Arrangement: E. O. Reed, chairman, Western Ohio Railway; J. B. Hooper, Detroit United Railway, and G. H. Wilson, Evansville Railways.

Readjustment: W. H. Forse, Jr., chairman, Union Traction Company of Indiana; James Sweeney, Northern Ohio Traction & Light Company, and Irwin Fullerton, Detroit United Railway.

It was decided that the association would hold the next meeting at Springfield, Ohio, on May 24; and a meeting in Toledo, Ohio, on Aug. 22 and 23. It was also decided that the majority of the time at the next meeting would be devoted to the question box. Questions are to be submitted to the secretary, and these are to be printed on the program without the name of the company being mentioned and are to be answered in open meeting.

Progress in Solving Traction Problems

In commenting on the electric railway situation for the coming year, M. R. Bump, chief engineer of the Doherty organization, recently made a statement in part as follows:

"The great traction problem remains unsolved, but material progress, we believe, is being made toward its solution. Recent court decisions seem to point to relief in many localities, but we believe the ultimate solution of this problem lies in a more equitable system of charging for street car service. The straight fare as at present almost universally in use has many objectionable features; the zone systems adopted in many localities have been only a slight improvement on the former system.

"We believe that the ultimate solution of this problem lies in a method of charging in proportion to the length of haul, thereby not discriminating against the short-haul rider, permitting costs to be equitably distributed, and collecting from each customer a proper fare in proportion to the amount of cost that is occasioned by him."

AMERICAN ASSOCIATION NEWS

N. W. Bolen Elected President at Newark

AT THE ANNUAL meeting of the Public Service Railway company section held on Feb. 14 at Newark, N. J., N. W. Bolen, general superintendent, was elected president of the section. Other elections were as follows: Vice-president, H. M. Ehlers (formerly secretary), clerk in the general superintendent's office; secretary, A. H. Nelson, engineering department; directors, Charles F. Bachman, division master mechanic Essex division, and J. E. Rutledge, engineer distribution department. In his annual report Retiring Secretary Ehlers said that the present membership is 362, made up as follows: Transportation, 182; mechanical, 37; distribution, 21; engineering and maintenance of way, 28; claims, 20; auditing, 23, and general, 51. The attendance at meetings during the year has averaged 218 although this average must be considered in the light of the fact that one very large general meeting was held. In taking the chair at the close of the meeting Mr. Bolen expressed himself as confident that the section will resume its pre-war vigor, that the programs for 1919 will be attractive enough to bring in the men from the outlying divisions, that the talks will contain solid information as well as entertainment and that the social features of the meetings will be very attractive. He used the expression "fill the house" as one suggestive of a successful coming year's work.

Research Bureau Established at Milwaukee

A NEW department known as the Operating Research Bureau has been established by the Milwaukee Electric Railway & Light Company for the purpose of carrying on certain of the functions of the management dealing with the research work required by the company and its subsidiaries. The work of the bureau will be confined largely to investigating and standardizing existing profit-sharing plans with a view of profiting by past experience.

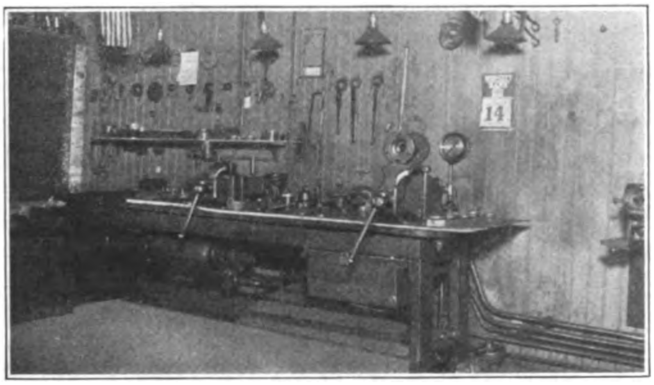
Extensive and comprehensive study will be required to place all plans on a basis which will, in so far as possible, recognize individual effort to a greater extent. The bureau will co-operate with the various departments in devising, where practicable, new plans for profit sharing in divisions not now participating. It will prepare monthly the summary of the results achieved under the profit-sharing plans in each department and comment thereon in a monthly report, the data for which will be obtained from the representatives appointed in each department to co-operate with the bureau in its activities. The bureau will also assume charge of all valuation work, in connection with which unit costs will be developed. Such cost information is to be checked in a manner suited to the use of the various departments for estimating purposes. Time studies will also be made and the facilities therefor developed.

The Operating Research Bureau is under the direction of William Baum, research engineer, and Ralph Moody, assistant research engineer.

Convenient Testing Room for Air-Brake Valves

The Necessary Equipment for Testing Different Types of Brake, Triple and Feed Valves Is Arranged as On a Car

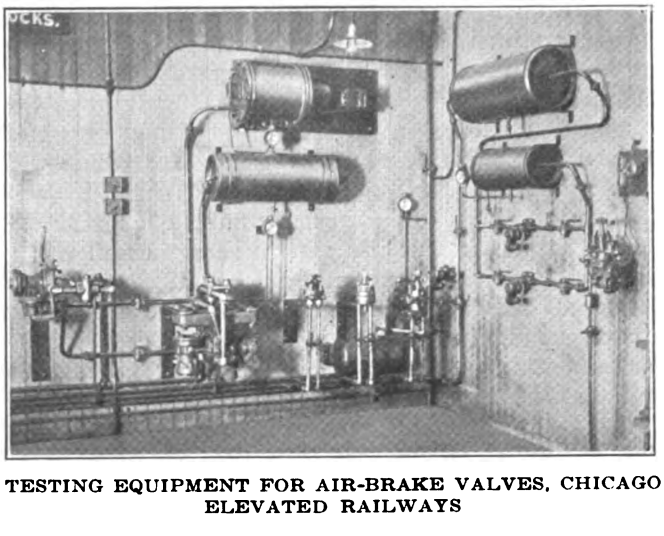
THE air brake testing equipment used by any railway depends to a large extent upon the size of the property or upon the number of cars equipped with automatic valves but it also depends somewhat upon the man in charge of this particular department. A very efficient and complete layout is in service at the shops of the Northwestern division of the Chicago Elevated Railways. There are 613 cars equipped with automatic air brakes which come under the supervision of this shop.



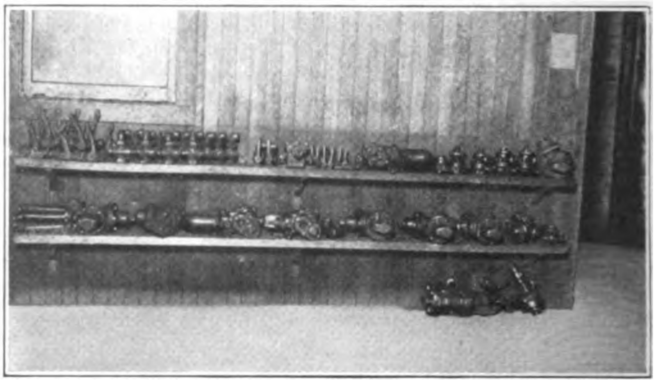
REPAIR SHOP END OF THE CHICAGO RAILWAYS' TESTING ROOM

The layout shown in an accompanying illustration is arranged just as on an electric car and is for the testing of brake valves, triple valves, feed valves and type J governors. It will be noted that there is provision for three types of brake valves. Those shown are, reading from left to right in the illustration, the M-1, the M-15-C and the M-23, all of which are in service on this property. At the left of the brake valve testing stands is the U-4 Universal valve testing equipment and at the left of this the equipment for testing the R-1 triple valves. The arrangement of the quick-action closing and opening gage on the U-4 triple valve, the air-brake cylinder and the auxiliary reservoir with gage needs no explanation.

On the right wall is the equipment for testing the feed valves and at the extreme right is a type J governor being tested. This is left on test for a day or two. It will be noted that two feed valves can be tested at once if desired. A feed valve is put on and the cut-out cock at the left is opened. The pet cock at the right is then opened and the feed valve is vibrated for ten minutes to loosen it up. The cut-out cock at the right of the pet cock is then opened and the feed valve adjusted to show 70 lb. on the gage at the left of the reservoir. The pet cock from the reservoir is then opened and if the feed valve responds at a 2-lb. reduction it is "O. K. for service." If the piston is loose the feed valve will not respond at a 2-lb. reduction and needs further attention. The compressors for all this equipment are located on the floor below.



TESTING EQUIPMENT FOR AIR-BRAKE VALVES, CHICAGO ELEVATED RAILWAYS



VARIOUS TYPES OF VALVES, TESTED, REPAIRED AND READY FOR SERVICE

The work bench, where all the valves are repaired and put in order, is located just at the left and is shown in another illustration. Everything is orderly and neat and was not arranged for the picture. When the various kinds of valves are repaired and ready to go back into service they are placed on racks just at the right of the testing equipment.

This testing and repair room measures about 28 ft. x 34 ft. and one corner is partitioned off as a private office about 12 ft. x 15 ft. The shop force includes one foreman and two men. Pumps and pump armatures are also handled in this department and this requires the services of two pipe fitters additional.

Bonus Reward for Careful Firing

In the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 8 the practice of the Denver Tramway in rewarding men in the power plant for careful operation was described. The principle of the bonus for this purpose in one form or another is coming into considerable use. For example, in a large chemical works in Brooklyn, N. Y., watch engineers are paid a bonus of 10 per cent of their pay if they maintain an average evaporation rate of 8.4 lb. of water from and at 212 deg. Fahr., per pound of coal. The fireman's bonus in turn depends on the maintaining of an average CO_2 percentage of 11.6 as shown by analysis of gas drawn continuously during each watch. Coal passers receive a bonus if they keep the firing floor in good order and lose no time. This boiler plant consists of two 380-hp. boilers with Westinghouse underfeed stokers and forced-draft blower, and eight 150-hp. hand-fired boilers which serve largely as a standby. Bituminous run-of-mine coal is burned.

Preventing Theft of Rail Bonds

The Losses from Theft and Loosening of Bonds Are Greater with the Exposed Type, But Track Construction and Maintenance Difficulties Cause This Type to Be Favored

BY G. H. MCKELWAY
Engineer of Distribution, Brooklyn Rapid Transit System

TO THE average man, not connected with an electric railway, there is practically nothing so unfamiliar as a rail bond. And even to many track men, especially the old-timers of the "practical" sort, the value of bonds is but little clearer. To their minds the bonds are only of theoretical value and from the practical standpoint they are a nuisance. All can remember occasions when the cars operated over unbonded track and everything worked smoothly, so why go to the trouble and expense of installing bonds when they are only in the way when the joints have to be repaired? That is, if they have not been stolen before the time comes when the joints need attention.

Even those who appreciate the value of good bonding are apt not to think enough of the bonds to impel them to keep the bonds in good condition, as this requires continued watchfulness, testing and repairing or renewing. On many roads no attention is paid to the bonds once they are put on, and the result is too often found in electrolysis trouble or the complaints of "weak power," which latter condition is often improved by the running of additional and unnecessary copper on the positive side of the system instead of making repairs to the negative returns.

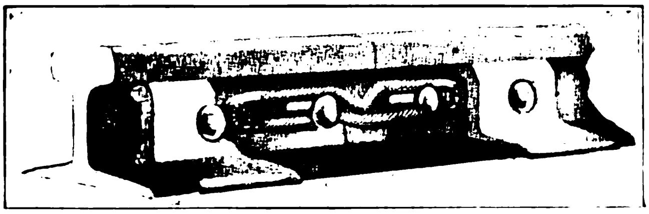
There have been so many different types of rail bonds tried out that it is difficult to divide them into sharply defined classes, as one bond may have one or more characteristics of several of the classes. As a beginning, however, we may divide them into those which are installed under the plates and those which are installed outside of the joints.

The primary reason for placing the bonds under the plates is to protect them against theft or accident, generally the former. In addition the protected bond is generally shorter than the other type and is therefore cheaper and of lower resistance than the long bond. This is always true if the bonds are attached to the web of the rail but is not necessarily the case if the bonds outside make contact with either the head or the base of the rail.

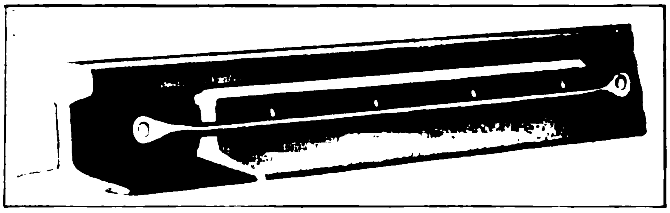
To be absolutely protected against theft not only the bond itself but also its terminals should be placed under the plate, as otherwise the thief will cut off the terminals and pull the bond out from under the plate. Sometimes this procedure is varied by cutting the conductor in only one place and then punching out the terminals, in which case the thief adds the weight of the terminals to that of the other stolen copper. This is an unusual refinement, however, as he seldom wishes to be burdened with both a chisel and a punch. When they are used there is generally proof of an "inside job," that is, that the bond has been stolen by an employee of the road who has access to the tools.

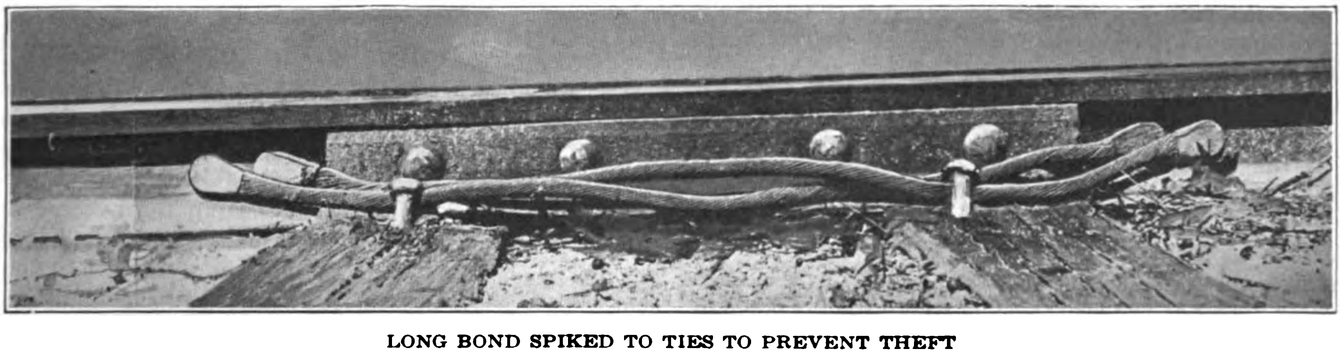
While attempts have been made to protect bonds installed outside of the plates by bolting covers over them and by stapling long bonds down to the ties, such attempts have been only partly successful, although of some value. Most of the covers do not extend over the terminals, so are open to the same objection as plates which do not protect the terminals. Again, the covers are generally fastened on by means of the track bolts and therefore interfere with the tightening of the lat-

A RAIL BOND OF THE PROTECTED TYPE



THE EXPOSED-TYPE RAIL BOND





LONG BOND SPIKED TO TIES TO PREVENT THEFT ter, or they add a part which must be removed and reinstalled when the splice bars are taken off. There is the further objection that either the bond must be installed at the same time as the plates, or the latter must be loosened up by the removal of the nuts to permit of the covers being put on.

So far as the use of nails or staples is concerned, it is seldom that the former are of any value as they are too easily bent out of the way, often merely by pulling on the ends of the bond after the terminals have been cut off or punched out of the rail. Staples are much to be preferred to nails, but unless long and strongly made they can be pulled out of the tie, and unless driven tightly against the bond the latter can be pulled out from under them after the terminals have been cut off. If the staples are driven in firmly there is danger of their cutting or breaking some of the strands of the bond. Even if that is not done the bond is tightly fastened to the tie so that only short free ends remain, and so far as withstanding vibration and creepage is concerned, the long bond is no better than a short one and its life is much less. If the long bond is stapled to the tie at only one place, the bond, of course, has much greater freedom of movement than is the case when more staples are used, but it is much less safe against theft, as it is only necessary to cut it close to the staple as well as at the rail and then secure two fairly long lengths of bond. It is also much easier to pull up a single staple than two or more. At times spikes are used for fastening down the bonds, instead of nails or staples, and, while there is no danger of their being bent or pulled up they are more expensive and have the same faults as the staples.

From the foregoing arguments it might be thought that the protected type of bond is to be preferred to the exposed type. So far as protection from theft is concerned that is the case and probably, if the bond could be considered only in its relation to the return circuit, the protected type would be used almost exclusively. But the bond is so intimately connected with the remainder of the track that thought must be given to its influence on the construction and maintenance of that too. In the track department opinion will be found to favor the bond which is placed outside the plates. The long bonds can be put on at any time after the rails are in place and do not require that the bonders work with the trackmen and install the bonds after the rails are spiked to the ties and before the joint plates are bolted up. When the work of two different gangs of men depend on each other there is sure to be delay from one of them waiting until the other does its part. If the bonds are long enough the plates can be taken off without disturbing them and can be replaced without any care in placing the strands safely around the bolts so that the bonds will not be "pinched."

If the terminals are attached to the rails by means of holes drilled in the webs, protected bonds require the drilling of these holes close to the bolt holes and so further weaken the rail under the joint, just where it receives the severest pounding from the car wheels. The writer knows of one large system where the breakage of rails at their ends was traced, in many cases, to the use of short bonds and the consequent weakening of the web by the holes for their terminals. As a result, such bonds are no longer permitted in the rails and all bonds must be installed outside the plates.

Sand Car Requiring Little New Material

AT THE Wolf Street shops in Syracuse the mechanical department has just rigged up two very effective sand cars out of two antiquated single-truck cars.

In each body two sand boxes of the form shown in Fig. 1 were placed in such a way as to permit ingress and egress through a left-hand door at each end. Each box was made of 1⅜-in. hard pine, 15 ft. 3 in. long, 2 ft. 3 in. wide and 3 ft. 6 in. high, outside dimensions. Inside it was provided with sloping sides and bottom converging toward a perforated sheet-iron cylinder in the center. A ½-in. staybolt, about midway on each end of the box, reinforces it against bulging.

The 6-in. sheet-iron cylinder, perforated with ½-in. holes on about 2-in. centers, reaches from the bottom to the top of the box. Its purpose is to limit the rate of flow of sand to the valve and prevent packing. The valve is simply a conical plug, with a suitable guide, fitting into the flared upper end of a 1½-in. pipe which leads to the rail almost directly below. This pipe is braced to the truck frame.

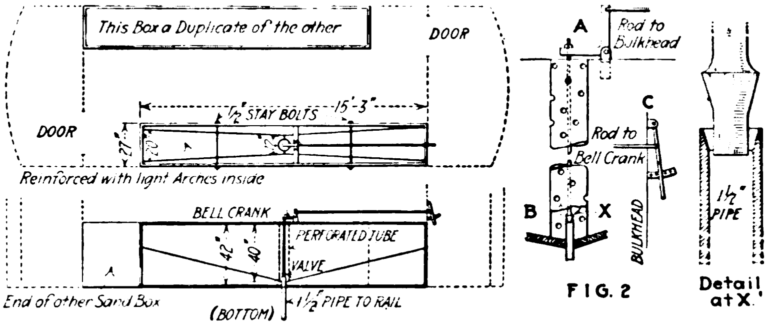


FIG. 1—DIAGRAMMATIC SKETCH, ROUGHLY TO SCALE, OF SAND BOXES INSTALLED IN SINGLE-TRUCK CARS AT SYRACUSE, N. Y. FIG. 2—DETAILS OF THE VALVE AND AUXILIARY MECHANISM

The valve is operated through a vertical rod attached to one limb of a bell crank, to the other limb of which is attached a second rod leading to an adjusting lever on the outside of the bulkhead. This lever swings over a sector provided with plug holes by means of which the valve can be set and held at any desired position.

Besides the addition of the sand boxes the windows of the cars were boarded up and the bodies and trucks were freshly painted.

New Type Malleable Pin for Crossarms

A specially constructed malleable pin for use on angle crossarms has been placed on the market by the Drew Electric & Manufacturing Company of Indianapolis, Ind. This pin is designed to permit locking over the angle by a flange which holds the pin firmly against strain in any direction. The insulator is cemented to the pin which can be quickly and rigidly bolted to the arm. Two sizes are offered—1-in. and 1⅜-in. diameter head.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

San Diego Wages Not Low

Company at Hearings Before the War Labor Board Shows that the Employees Are Generally Satisfied

At hearings before an examiner of the National War Labor Board during the last week in January officials of the San Diego (Cal.) Electric Railway refuted serious charges made by the employees. This was done without the company acknowledging the jurisdiction of the board, in any way, the submission of the men's complaint on Dec. 24 not having been joined in by the company.

COLLECTIVE BARGAINING DEMANDED

The demands of the members of the union were for collective bargaining; an increase of wages to 40 cents an hour for extra men and 50 cents an hour for regular platform men; an eight-hour day with thirty minutes leeway; the reinstatement of six men who are alleged to have been discharged for affiliating with the union, and improved working conditions.

The company said that it had refused to receive a committee elected or selected by Division No. 826 of the Amalgamated Association of Street & Electric Railway Employees of America. On the other hand it had never refused to receive a committee of employees up to the time of this complaint.

William Clayton, vice-president of the company, denied that wages were inadequate to maintain the standard of living in San Diego. The wage scale of 40 cents for the first year and 45 cents thereafter, with 3 cents additional for motor-conductors, is higher than the 38 cents to 42 cents granted by the board in the New Orleans case and many other cities, where climatic conditions alone are not nearly so favorable to street car operation as in San Diego. Moreover, it was averred, the majority of the platform men in San Diego are fully satisfied with the wage scale now in effect. The company has been refusing for some time past to receive any more applications for employment on the cars. The company showed that the present railway wages are on a scale above the average for seventeen other lines of work in the community.

MEN DISCHARGED FOR CAUSE

M. J. Perrin, superintendent, showed that the six men had been discharged for actual and long-continued violations of the rules, and that no intimidation had ever been employed. That letters upon dismissal had been refused because the applicants were union men was asserted to be absolutely unfounded.

To show the financial condition of the company, it was explained that the loss for the year ended Dec. 31, 1918, exclusive of dividends to the stockholders, amounted to $243,000. The estimated deficit for 1919 is $394,000. If the same number of cash fare passengers as estimated on the present 5-cent fare would travel in 1919, a 50 per cent increase in the cash fare would be sufficient. The experience of other properties however, was said to indicate that instead of a theoretical increase of 50 per cent there will be a much smaller percentage on account of a decrease in the number of passengers traveling. Consequently, it will require an increase of 90 per cent to 100 per cent in the cash fare in order to pay operating expenses, replacement reserve, taxes and interest on bonds.

Says Industry Is Decaying

Spokane Commissioner of Public Utilities Raises Question About Autos Supplanting Electric Cars

In a report made on Feb. 6 to the City Commissioners of Spokane, Wash., C. M. Fassett, commissioner of public utilities, stated that in his opinion public purchase of the electric railway lines in that city would not now be a good business proposition. Mr. Fassett said in part:

> It seems certain from what I can learn that the street railway business is a decaying business, and that this condition is fast getting to be recognized by the students of municipal life and also by the owners of the car lines everywhere. It is very doubtful if capital invested in this business should be salvaged either by a guarantee by the public of the investment, or by public purchase.
>
> Some students of urban transportation believe that in the near future it will be carried on rubber-tired vehicles, not on rails. If this be true, any municipality which buys a street car line at anywhere near its cost, or which guarantees its earnings, is getting the proverbial gold brick.

Mr. Fassett stated that the studies now being made in the department of public utilities point to the probability that the transportation problem in Spokane can be handled by 150 auto buses on routes totalling about 100 miles, as against the existing 129 miles of electric railway lines. The department believes that these buses can be bought for $6,000 each, and that the complete outfit, including shop and storage facilities, can be covered by an investment of $1,500,000, as against the investment of $6,750,000 for the electric lines. This special aspect of the problem, it was said, will be the subject of a further report to the City Council when the investigation is completed.

Taxation to Aid Rider

Massachusetts Commission Reports to Legislature on General Situation and Case of Bay State System

At the request of the Massachusetts Legislature, expressed in a resolution adopted on Jan. 24, the Massachusetts Public Service Commission has surveyed the condition of the Bay State Street Railway and of other electric lines in the State, and now recommends the use of taxation to reduce the burden of the car riders.

AMEND PUBLIC CONTROL ACT

In regard to the Bay State system, the commission recommends that the public control act for this company be amended to provide that the first 5 cents of the cost of service per passenger be paid by the car rider and that any additional cost be paid 50 per cent by the car rider and 50 per cent by general taxation. The commission believes that this will prevent the fares from going above the present level and both fares and taxes will be gradually reduced as the trustees who are responsible for operating the railway system are able to decrease operating costs.

In regard to the general situation, the commission says that the first necessary step is the removal of the burden of special taxes and public charges upon the railways, and a draft of a bill to this end is submitted. But relief of this character, it is believed, will go only a short way toward meeting the absolutely essential revenue requirements. The commission is therefore convinced that direct community contributions through the tax levy is the only practicable way out of the present difficulty.

FARE SHOULD MEET COST OF SERVICE

It is said that fares should be fixed so as to meet the cost of service in so far as this may be done without unduly hampering or discouraging the free movement of traffic and the economic development of the communities served and otherwise injuriously affecting the general public interest. If the fares thus established do not yield sufficient revenue, the balance should be met by an addition to the tax levy up to a reasonable maximum, which is suggested as $2 for each $1,000 of assessed valuation. Any such appropriation should be coupled with public control.

A draft of a bill embodying this general plan and effective until December, 1922, was submitted by the Public Service Commission.

Buffalo Stage All Set

International Railway and City Prepared to Act Toward Ending Differences

Peter Witt, Cleveland, Ohio, has been selected by the City Council of Buffalo, N. Y., to represent the city on the board of arbitration which will formulate a plan whereby the International Railway, Buffalo, will be placed under municipal control. James E. Allison, Jr., St. Louis, will represent the railway. These two arbiters will select a third member of the board. If no agreement can be reached, some Supreme Court justice will designate the umpire. Mr. Witt will be paid by the city at the rate of $150 a day.

WILL SELECT THIRD ARBITRATOR

The selection of the third member of the board of arbitration will mark the completion of the first advance step taken to solve Buffalo's traction problems. Under the provisions of the agreement between the municipal authorities and the International Railway, neither side is bound by the decision of the board, but it is generally accepted that the findings of the board will be used as the basis for a permanent agreement between the city and the company whereby the service-at-cost plan will be adopted in Buffalo and the railway operated under the control of the city.

The first task for the board of arbitration is to fix the valuation of the company's property within the city of Buffalo. Figures have been presented by the city and company and have been practically agreed upon, except for certain intangible items, contractors' profits, depreciation and a few minor points. The sum thus suggested is $22,624,873. This figure is being used in the preliminary negotiations.

The company has secured a loan of $425,000 with which it has paid the interest due on Nov. 1, 1918, on its issue of $16,735,000 of 5 per cent refunding and improvement bonds. It is believed that a permanent agreement will be reached before interest due on May 1, 1919, becomes payable.

LEGISLATIVE ACTION NECESSARY

Some legislative action is necessary to stop the special referendum election which is scheduled to be held on March 25 on the question of whether or not the voters shall repeal the action of the City Council in granting a 6-cent fare to the railway with a 1-cent rebate slip pending the determination of a just and reasonable fare within the city by the Public Service Commission of the Second District. Referendum petitions were circulated soon after this action was taken by the Council and the fact that more than a sufficient number of signatures were secured forestalled the putting of this resolution into effect. The time limit has passed within which the Council can rescind its action so that legislative action is necessary in order to stop the referendum. The referendum would cost about $50,000. The action of the Council would be repealed by an overwhelming vote, probably larger than it was at the first referendum, and it is because of this fact that the city would seek legislative action to stop the referendum. That would automatically rescind the Council's action.

The International Railway has scored in its effort to have the Public Service Commission investigate the rates charged by the company in Buffalo with a view of securing a higher fare. The proceeding was started several years ago by the city to force the company to give service for a 3 or 4-cent fare. The company at that time secured an injunction restraining the commission from hearing the city's complaint because the company had a franchise with the city allowing it to charge a 5-cent fare. When conditions became such that the city saw that it would fail in the investigation and that probably a 6-cent or 7-cent fare would result the proceedings were dropped.

COMPANY WILL APPEAL CASE

Application was made three weeks ago before Justice William P. Rudd in the Supreme Court at Albany by Henry W. Killeen, of counsel for the International, seeking a writ of mandamus directing the commission to receive the company's answer. To this application the city entered a vigorous protest. Justice Rudd has held that the commission must receive the company's answer. This places the case squarely before the Public Service Commission for investigation. The city announces it will appeal to the Appellate Division of the Supreme Court. On behalf of the railway, Mr. Killeen, of counsel, says that the company will make no determined effort to bring the rate case before the commission until after the determination of the arbitration proceedings instituted by the city and the company to bring about a permanent agreement based upon the service-at-cost plan.

A Plea for a Square Deal

A. W. Harris, president of the Harris Trust & Savings Bank, Chicago, Ill., charges business men of that city with failing to back the efforts of public utilities to secure living rates. He says business men of Chicago and the country generally are woefully neglecting to support some lines of business and in a way "knocking" others. He is quoted in part as follows:

> It strikes me as peculiar that business men generally don't see the equity of supporting the so-called public utility companies in the efforts to secure more revenue. All other lines of business, it is granted, must raise prices if they are to live nowadays, yet gas, street railways, steam railroads and all similar forms of semi-public utilities are denied the right of living. These public utilities companies, electric railways in partcular, are like a dying man. If they cannot get relief they must expire, yet the business interests are willing to allow this death simply because there was a contract that prevented the dying man being given more than a certain amount of food a day. Our business associations can easily get at the facts of the income and outgo of the public utilities, and once convinced of the justice of their contentions they should stand behind them. I think such a move by the Chicago Association of Commerce would have a tremendous effect in enlightening the public and enable it to see the justice of the contention of public utilities for higher rates.

Detroit Offers to Buy

City Suggests $29,653,936 as Price for Railway Property It Desires to Acquire

The first meeting of the new city officials of Detroit, Mich., the street railway commission of that city and the representatives of the Detroit United Raliway took place on Feb. 11. Present at the conference were Mayor Couzens, the entire membership of the street railway commission, M. M. O'Shaughnessy and H. M. Brinckerhoff, appraisal experts for the city, Frank W. Brooks, president of the Detroit United Railway, A. F. Edwards, vice-president and treasurer of the company, and Elliott G. Stevenson, attorney for the company.

The conference had to do with the announced determination of the city through its new city administration to arrange, if possible, for the purchase of the lines of the company within the present 5-cent limits. The representatives of the city stated that the purchase would be considered only upon the basis of the physical valuation and not upon any basis of reproduction as a going concern. Mr. Brooks replied to the effect that the railway and its directors would do all in their power to come to an amicable and just agreement.

Actual figures of valuation and the purchase price were not discussed at this meeting. Later, however, an offer of $29,653,936 was made on behalf of the city for the property of the railway within the 5-cent zone.

Mr. Brooks made it plain that the company's representatives would not recommend acceptance of the city's offer and that they would present to the directors and shareholders all the facts which the street railway commission had laid before them.

Mayor Couzens said that the appraisals by the city showed the value of the system which the city desired to acquire to be about $27,500,000. This figure was based on average prices over low periods of cost of materials and labor. To this sum the city later decided to add $2,000,000, on account of new conditions that had arisen since the appraisals were made.

On Feb. 18 Mr. Brooks wrote the city that it was the opinion of the stockholders and the directors that the value fixed by the city was inadequate. The company suggested as an alternative a price of $33,500,000 or a lease to the city for a period of fifty years on a rental tentatively fixed at $2,010,000 per annum—6 per cent on a valuation of $33,500,000.

All Seattle Rides Again

Electric railway service in Seattle, Wash., has been restored to normal on the lines of the Puget Sound Traction, Light & Power Company, Seattle & Rainier Valley, and municipal system, following the cessation of the general strike called on Feb. 6. The return to work on Feb. 9 of the trainmen of the Puget Sound Traction Company was the beginning of the end of the general strike. Other unions rapidly fell in line and their members returned to their respective employments. In a statement to the general strike committee the members of the trainmen's union said that they had done what they set out to do, namely, assisted in showing the solidarity of labor. During the strike period, the only attempt at vandalism was made on the municipal railway. Some one familiar with the mechanism of the municipal cars tampered with the electrical machinery on the eight cars of the Lake Burien line, with the result that service was crippled for one day.

News Notes

Another Service-at-Cost Suggestion.—A committee of the Board of Trade of Louisville, Ky., is inquiring into service-at-cost operation with a view to the possible application of this plan to the Louisville Railway.

M. O. Bills Appear in New Jersey.—In brief sessions of the House and Senate of New Jersey on Feb. 17, nearly 100 measures were introduced. Among those offered were two by Assemblyman Gill authorizing public ownership of electric railways and also enabling cities to operate jitney lines.

Company Will Pave Streets.—The policy of the old management of the Columbus Railway, Power & Light Company, Columbus, Ohio, has been reversed by the new officers and it will pay its part of the street paving expense, according to plans submitted recently by C. C. Slater, general manager.

Business Papers Urge Labor Conference.—At a meeting of the New York Business Publishers' Association, held on Feb. 17, a resolution was adopted urging President Wilson to call "a national conference of representatives of labor, capital and government, to the end that industrial peace, so vital to our national welfare, may be speedily restored."

Fire Detroys Interurban Carhouse.—Fire destroyed the main carhouse of the Chicago, South Bend & Northern Indiana Traction Company, South Bend, Ind., recently. Nine city cars were burned at a loss estimated at $50,000. A car stalled on the track and prevented the employees from running the others to safety. Local service in South Bend was temporarily crippled by the fire, but there was no interruption of the interurban schedule.

St. Louis Sets a Good Example.—The United Railways, St. Louis, Mo., has already reinstated about 130 men returned from service and is giving them seniority pay just as if they had not been away. The company carries a cardboard placard in the front of every car urging that jobs be found for soldiers and telling of the action it is taking. It is believed that this will result beneficially with the general public for men returning from service.

Would Negative Power of Commission.—A bill has been introduced into the Legislature of Illinois by Representative Lyon, to prohibit the Public Utilities Commission from revising or altering in any manner a contract between a municipality and a public utility corporation. The measure has been referred to the committee on public utilities. The effect of the bill, if passed, would be to restore home rule to Illinois cities in connection with the regulation of their utilities.

Mayor Favors City Bus Lines.—In a report recently filed by Mayor Fassett of Spokane, Wash., touching on the railway problem in Spokane, the Mayor suggests that the city enter the transportation business by buying 150 motor buses at a cost of $900,000. Other necessary equipment would bring the total investment to $1,500,000. This action is along lines indicated in the report of the commissioner of public utilities referred to on page 377 of this issue.

Wage Arbitration in Des Moines.—Employees of the Des Moines (Ia.) City Railway, who are asking the company for a material wage increase, have announced that after referring the question to the international organization they will seek arbitration. At a conference with the men Emil G. Schmidt, president of the company, advised representatives of the union that any further increase at this time was out of the question. The present agreement between the company and the men expires in March.

Jury Assails Public Service Law.—A declaration that the public service commission law of New York is inadequate was made by the November Grand Jury of Kings County. The declaration was made in a presentment handed up to County Judge Dike in Brooklyn a few days ago after an investigation of the railway situation in Brooklyn, undertaken as a result of the Malbone Street tunnel wreck last fall. The Grand Jury says a law is needed at once in order to obtain a public body which can, when it desires, compel service by public service corporations summarily and expeditiously, and enforce prompt compliance with its orders.

Seattle M. O. Contracts Signed.—Further steps toward the completion of the city of Seattle's purchase of the Puget Sound Traction, Light & Power Company's railway system for $15,000,000, were taken recently when the contract of delivery was signed by Mayor Ole Hanson and A. W. Leonard, president of the Traction Company. As soon as the State Supreme Court hands down a favorable decision on the legality of the purchase of utility bonds, the company is prepared to deliver to the city all properties and equipment designated in the purchase ordinance. The case has recently been argued.

Objections to Refunding Commission Expense.—The Citizens' Union of New York has started a taxpayers' suit in Brooklyn to enjoin the Board of Estimate from issuing long-term securities for $4,500,000, to cover current expenses of the Public Service Commission. The charge is made that the issuance of the securities, as proposed, would be illegal and a waste of the city's property. Justice Lazansky granted a temporary stay. The suit is based on the recent action of the Board of Estimate in authorizing the issue of corporate stock. The proceeds are to be used to "refund" the expenses of the Public Service Commission, over several years, for supervising the building of new subways. These expenses have actually been met out of tax levies. It has been freely charged that the sole purpose of the proposed "refunding" is to keep the tax rate lower than it rightfully should be.

Putting on the Finishing Touches.—New and probably final schedules showing when practically the entire dual system of rapid transit in New York City will be completed and in operation, have just been prepared by the Public Service Commission for the First District. The setting of approximately precise dates for the completion of the work was impossible until after the Board of Estimate had made the necessary appropriations. The commission believes that in the future no further attempt will be made to hold back money urgently needed for getting the other lines and branches in running condition. On the whole the returns indicate a very early date for the completion of most of the lines. Separately the dates mean little except to the New Yorker called upon to use the transportation facilities. The information about the dates is of general interest, however, as indicating the early completion of a $300,000,000 undertaking.

Program of Meeting

National Lumber Convention

The National Lumber Manufacturers' Association headquarters officials are drawing up plans for the annual lumber congress to be held in Chicago, Ill., on April 14, 15 and 16. An elaborate program of speakers covering all angles of the industry has been announced. W. S. Culbertson of the tariff commission, a recognized authority on foreign tariffs, is expected to bring out facts highly interesting to those in attendance at the convention.

Financial and Corporate

Winnipeg Net Drops

Costs High in 1918 — Non-Resident Directors Retire from Management of the Company

The gross income of the Winnipeg (Man.) Electric Railway for the calendar year 1918 showed an increase of $249,713 over that of the previous year, but increased wages and operating expenses swelled the operating charges so that the net income decreased $63,845. The income statement for 1918, as presented at the recent annual meeting on Feb. 12, is shown herewith.

INCOME STATEMENT OF WINNIPEG ELECTRIC RAILWAY FOR CALENDAR YEAR 1918

Gross earnings from operations		$3,588,723
Operating expenses — before charging depreciation		2,412,226
Net operating revenue		$1,176,497
Miscellaneous income		44,931
Income available for fixed charges		$1,221,428
Deductions:		
Interest	$668,342	
Debt discount	16,255	
City percentage and car license	114,509	
Taxes	114,928	
Miscellaneous expenses	2,191	
Other deductions..	15,419	931,644
Net income, excluding depreciation		$269,784

Sir William Mackenzie, who had been president of the company since its inception, announced at the annual meeting that he intended to retire from the board, and that the other non-resident directors, Sir Donald Mann, D. B Hanna and R. J. Mackenzie, were also retiring. The following directors were elected: Sir Augustus Nanton, A. W. McLimont, F. Morton Morse, George V. Hastings, J. D. McArthur, Hugh Sutherland, George W. Allan, W. R. Bawlf and W. J. Bulman. This places the direction of the company entirely in the hands of local men. At a subsequent meeting of the new board of directors Sir Augustus Nanton was elected president and A. W. McLimont, vice-president.

During 1918 the Winnipeg Electric Railway encountered great difficulties. The prevalence of the influenza epidemic was responsible for a large loss in revenue, and in May the company's motormen and conductors went out on a sympathetic strike with the city fire brigade, tying the service up for several days. Increased wages later awarded and increased cost of materials made a large addition to operating costs.

On the other hand, the jitney competition has been eliminated. Moreover, the Public Utilities Commission upon the application of the company made an order providing for a temporary increase of fares effective on Nov. 1, 1918. Application for a permanent increase of fares is now before the commission.

Unless further unforeseen adverse conditions have to be contended with, the outlook for 1919 is said to be much brighter and more hopeful than for a number of years past. With the return of peace business is gradually resuming its normal activity, and provision is being made by the management to take advantage of the increased business which is looked forward to.

Jersey Net Still Going Down

There was a reduction of 3,091,349, or an average of 99,721 a day, in the first-fare passengers (those paying 7 cents) carried on the Public Service Railway, Newark, N. J., last December as compared with December, 1917. A report filed with the State Board of Public Utility Commissioners also shows that the company's loss for the month was $106,911, as compared with a loss of $16,939 in a like period in the year 1917.

The reduction in first-fare passengers was less in December, 1918, than in either of the two preceding months of increased fare operation. In October, 1918, compared with the same month in 1917, the falling off totaled 5,173,902, or a daily average of 166,900. In November, 1918, compared with November, 1917, there was a total decrease of 4,563,796, making a daily average of 152,126. At 5 cents in December, 1917, the company carried 29,918,220 passengers, while last December, under the raised fare, the initial, or 7-cent, riders totaled 26,826,871.

CARRIED 33,121,601 IN DECEMBER

The company carried 33,121,601 passengers in December, 1918. Of this number, 26,953,375 are designated in the report as revenue passengers and 6,168,226 as transfer passengers. The total passenger revenue of $1,937,920 was made up of $1,877,881 from 7-cent fares and $60,039 from revenue transfers.

The gross income for last December was $333,122, while for December, 1917, it was $395,258. The total revenue from transportation for December, 1918, was $1,942,622, while for the preceding December it was $1,500,407. The total operating income for December, 1918, was $265,869, against a total operating income in the month of December, 1917, of $355,381.

The cost of operation of cars for December, 1918, was $724,615, while in December, 1917, it was $580,715, the difference being mainly due to wages of trainmen, which increased from $311,700 to $446,690. The total operating expenses increased from $945,322 in December, 1917, to $1,606,148 in December, 1918. Total operating revenue deductions increased from $1,192,276 to $1,735,885.

Drastic Reorganization

Preferred and Common Stocks of Interurban Line Wiped Out—Old Bondholders Called Upon for Cash

A plan of reorganization has been announced for the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., which defaulted in the payment of interest on its first mortgage bonds on Aug. 1, 1916. Reviewing earnings for six years, the committee which represents the bondholders says that, in view of needed improvements and difficulty of floating securities at present, the new company would not be justified in issuing any bonds. Both preferred and common stocks of the old company are excluded from participation in the plan. The securities to be provided for are: $2,799,000 of first mortgage 5 per cent bonds; $200,000 of second mortgage 6 per cent bonds, floated to pay interest for a period on the first mortgage bonds.

The new company will have the following capital liabilities:

	Authorized	To be Issued
Six per cent cumulative preferred stock.	$1,500,000	$1,499,500
Common stock......	2,200,000	2,199,250

The preferred stock will be distributed in the ratio of 50 per cent of holdings of either first or second mortgage bonds. Holders of first mortgage bonds will receive 75 per cent of common, and holders of second mortgage bonds 50 per cent of common. The right of second mortgage bondholders to participate in the plan is made contingent on execution of an agreement whereby they individually undertake, in ratio to their holdings, to provide any cash needed to pay dissenting holders of first mortgage bonds whatever pro rata sums would be payable under the foreclosure sale.

It is provided that the committee may take any sum of cash in the company's treasury to meet its expenses and compensation.

Depositing bondholders under a formal deposit agreement had until Feb. 10 to withdraw their securities. Non-depositing bondholders who wished to participate in the plan had until Feb. 20 to deposit.

The Buffalo, Lockport & Rochester Railway was incorporated under New York laws in June, 1905. It is a consolidation of the Albion Electric Railway, the Albion & Lockport Railway and the Albion & Rochester Railway. The road from Rochester to Lockport, 54 miles, was completed in 1908. Entrance into Buffalo is secured over the lines of the International Railway. There were outstanding $2,790,000 of first mortgage 5 per cent bonds and $200,000 of second mortgage 6 per cent bonds. In addition there were outstanding $1,500,000 of 6 per cent noncumulative preferred stock and $2,500,000 of common stock. Neither of these issues of stocks appears ever to have paid a dividend. The total of stocks and bonds outstanding per mile of line averaged $120,520.

Dallas Falls Short

Fails by $234,480 to Secure 7 Per Cent Return Allowed by New Franchise—Actual Return Only 3.97 Per Cent

The Dallas (Tex.) Railway, the consolidated street car lines under the Strickland-Hobson service-at-cost franchise, fell $234,480 short of its permissible earnings during the first twelve months of operation. The loss can be attributed altogether to the operation of the jitneys in Dallas in competition with the street cars, as the months during which the jitneys were not in operation showed an average gain for the traction company, but when the jitneys were operating in full a heavy loss was suffered.

The net earnings for the first twelve months, which ended Sept. 30, 1918, amounted to $307,637, a decrease of $7,485 as compared with the earnings of the previous year. The 1918 result made a net return of 3.97 per cent on the agreed valuation of the property, although the company, under its franchise, was to be permitted to earn 7 per cent. The difference between the allowable earnings under the franchise and the actual earnings amounted to $234,480.

The comparative income statement of the lines for the years ended Sept. 30, 1917 and 1918, is shown herewith.

COMPARATIVE INCOME STATEMENT OF DALLAS RAILWAY FOR YEARS ENDED SEPT. 30, 1917 AND 1918

	1918	1917	Change
Railway gross earnings	$1,627,419	$1,334,828	+ $292,591
Operating expenses, plus appropriations to repair, maintenance and depreciation, reserve and accident reserve	1,367,568	1,072,319	+ 295,249
Railway net earnings	$259,851	$262,509	— $2,658
Interurban terminal net earnings	46,147	42,727	+ 3,419
Non-operating income	1,639	9,886	— 8,247
Net earnings	$307,637	$315,122	— $7,485

The appropriations to the repair, maintenance and depreciation reserve totaled $176,840 or 10.86 per cent of the railway gross earnings. The franchise contemplates that the earnings should be sufficient to permit the transfer of 18 per cent of the railway gross earnings to the reserve account. The actual maintenance expenditures were $186,269, or $9,428 in excess of the amount accrued in the repair, maintenance and depreciation reserve, and it was necessary to provide for this excess through the operating expense account.

As one of the conditions precedent to the lowering of fares, the franchise provides that the balance accumulated in the repair, maintenance and depreciation reserve shall equal 6 per cent of the contemporaneous property value (which on the property value at present would amount to approximately $480,000). Under present conditions, however, no balance is accumulated in this reserve account, as the accruals are not sufficient to meet the ordinary maintenance charges.

The appropriations to the accident reserve for the year (6 per cent of the railway gross earnings, as provided in the franchise) amounted to $97,645, and the expenditures therefrom were $67,360, leaving a balance in this reserve of $30,284 as to Sept. 30, 1918.

For the twelve months ended Sept. 30, 1918, railway gross earnings showed an increase of $292,591 or 21.92 per cent over the preceding twelve months. Against this increase in gross earnings, there was an increase of 10.78 per cent in car mileage, so that the increase in earnings per car-mile was only 10.07 per cent, from 21.86 cents to 24.06 cents per car-mile. Operating expenses, plus appropriations to repair, maintenance and depreciation reserve and accident reserve increased $295,249 or 27.53 per cent. This increase was due in part to the increase of approximately 11 per cent in car mileage, but more largely to several increases in wages granted to conductors, motormen and other employees during the year as well as the increased cost of power.

The net earnings from railway operations proper decreased $2,658 (less than 1 per cent); interurban terminal net earnings increased $3,419 (8.01 per cent), and non-operating income decreased $8,247 (83.42 per cent). The total net earnings decreased $7,485 (2.37 per cent).

The net earnings of $307,637 for the last twelve months were insufficient by $21,544 to meet the amount required for the payment of the fixed charges of the company (interest on notes and bonds and rental paid Northern Texas Traction Company for the use of the Oak Cliff leased lines).

The following statement shows the earnings and expenses by quarters. The competition from jitneys was eliminated on July 1, 1918, and the figures for the last quarter show the results for a period practically free from such competition.

EARNINGS OF DALLAS RAILWAY BY QUARTERS

Quarter Ended—	Railway Gross Earnings	Operating Expenses and Appropriations	Railway Net Earnings
Dec. 31, 1917	$375,956	$303,493	$72,462
Mar. 31, 1918	370,718	325,579	45,138
June 30, 1918	389,399	338,404	50,995
Sept. 30, 1918	491,545	400,090	91,254

For the first three months following the elimination of the jitneys, the total net earnings available for the payment of the authorized return were at the rate of 5.22 per cent per annum on the property value, being still somewhat short of the 7 per cent allowable return.

Turn Thrift to Account

Plans Advocated for Wide Distribution of Public Utility and Other Investment Securities

Those in control of the management and operation of public utility companies will be interested in an article which appears in *The Annalist*, New York, for Jan. 20, entitled "Public Utility Control Through Thrift Dollars." The writer points out some new field that might be open to investment savers when Liberty Loan issues shall have ceased through the offering of stocks and bonds in denominations to meet the purse of the small buyer. He reviews the theory and practice of corporation stock and bond issues, tells how the Harris Trust & Savings Bank, Chicago, established a savings system which, for want of a better name, is called the "pass-book system," whereby a bond could be paid for in installments, and refers to some of the successful flotations of public utility issues by such companies direct to their patrons.

O. B. Willcox, of Bonbright & Company, New York, who has given a great deal of study to public utility securities, is quoted as strongly advocating the production of fractional units in corporation securities both to supply the demand created by war loans and to aid utility companies in obtaining a just measure of political recognition through the wide dissemination of the companies' capital. While admitting the mechanical difficulties of distribution and the relatively small profit existing on the individual transaction and the impossibility of using high-priced salesmen in connection with this type of business, Mr. Willcox is of the opinion that a continued campaign of education will bring these buyers voluntarily to the doors of the dealer.

Discussing means for enlarging the field of investment opportunity, in order to encourage the growth of the spirit of saving born of the exigencies of the war, Travis H. Whitney, chairman of the Public Service Commission for the First District of New York, and Commissioner F. J. H. Kracke, in *The Annalist* of Jan. 27, considered with favor the suggestion that municipal and public utilities securities be issued in such denominations, or in such manner, as to suit the purses of the army of small investors that is learning the new lesson of thrift.

In the issue of the same paper for Feb. 3, Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, entered the discussion. He is fully in accord with the views of Messrs. Whitney and Kracke as to the importance of a channel for thrift investment. He declares, however, that the most important channel in New York—public utilities—is practically closed by the attitude of the local authorities, and until, as he contends, the safety of the investment is assured, no lesser problem is of importance.

Philadelphia Rapid Transit Must Pay

The Philadelphia (Pa.) Rapid Transit Company must pay the income and excess war-profit taxes levied by the government on ten of its underlying companies. A decision to this effect was rendered on Feb. 17 by Chief Justice Brown in the State Supreme Court. The ruling affirms the decision of the Common Pleas Court. The amount involved is upward of $360,000.

When the controversy arose thirteen suits were started against the Philadelphia Rapid Transit Company by the subsidiary companies to recover the tax. The legal fight centered around the clauses in the leases under which the transit company took over the roads. It was contended these covenants expressly stated the transit company must pay all taxes being levied, or hereafter to be levied.

Ellis Ames Ballard, chief counsel for the transit company, and ex-Judge Beitler, argued that when the leases were made it was never contemplated extraordinary obligations, as war taxes, would crop up. The court, however, construed leases in ten cases as binding upon the transit company to pay the taxes. In three other companies the leases were different and the court found in favor of the transit company. About $11,000 was involved in these cases. Justice Brown in his opinion says in part:

> In the case at bar, the income tax is laid upon net income and the so-called war excess-profit tax is laid upon income received during the calendar year, preceding the time when the tax is assessed. So far as the covenant under consideration is concerned, we think it amply sufficient to cover both the income tax and the excess-profit tax in view of the fact that any taxes assessed upon the earnings or profits of the plaintiff were to be paid by the defendant. The plaintiffs having turned over all of their property to the defendant, the only earnings or profit they can receive are from the lessee, and whether the tax be imposed upon income, net or gross, it is in fact imposed upon the rental. Earnings and profits under the circumstances must be regarded as was the yearly rent in the North Penn case.

Receiver Reports on Montgomery Property

Ray Rushton, as receiver for the Montgomery Light & Traction Company, Montgomery, Ala., has filed in the United States District Court in Montgomery a statement of the indebtedness of the company showing obligations amounting to $1,794,158. Of this amount $1,430,000 is represented by bonds and $171,000 by notes secured by mortgages, and $193,158 is owed on open accounts.

In his report Mr. Rushton states that the property of the company, particularly the railway, is in need of repairs and betterments, which are absolutely necessary to enable the property to be operated with anything like reasonable efficiency, and that a supply of materials necessary to put the cars in operating condition will be needed, costing altogether approximately $10,000.

In addition to these items money is needed to pay licenses and taxes so as to protect the property. In order to meet these demands he petitions the court for authority to borrow money from time to time as it may be needed, issuing notes or certificates as a lien on the net income of the properties of the company and upon the properties themselves.

Unsecured accounts owed by the company are given as follows: State and county taxes $12,584; taxes and license for 1916, 1917 and 1918 paid by the Commercial Trust & Savings Bank, New Orleans, $44,800; Montgomery city taxes and license for 1918 $6,000; unsecured notes $83,000; open accounts $32,300; personal injury and property damage suit judgments, $14,474.

A Plea for One Committee

A committee of which Thomas E. Gates is chairman and J. C. Wallace secretary, has addressed all holders of bonds issued by corporations included in the Pittburgh (Pa.) Railways System, urging that the holders of all bonds in the system have a common interest to protect and stating that this can be most effectively done by one protective committee representing all bondholders. The committee says in part:

> The undersigned committee was formed in January, 1918, for the protection of holders of bonds of the various corporations included in the Pittsburgh Railways System, almost immediately after defaults had been permitted to occur in the payment of interest due on Jan. 1, 1918, on fifteen of these issues.
>
> At that time deposits were invited only of bonds of such issues as had been defaulted on Jan. 1, 1918, and several million dollars of these bonds were deposited with the committee.
>
> On Feb. 14, 1918, a test suit in equity was instituted by one of the committee's depositing United Traction Company bondholders, to compel the Philadelphia Company to recognize liability for the principal and interest of all bonds issued by subsidiaries in the street railways system.
>
> After the filing of this suit, the interest on practically all bonds which had been defaulted on Jan. 1, 1918, was paid, but on April 23, 1918, receivers were appointed for the Pittsburgh Railways and thereafter additional defaults were permitted to occur, until at the present time approximately twenty-nine bond issues are in default as respects one or more interest payments.
>
> Under these circumstances, the undersigned believe that the holders of all bonds in the system have common interests to protect, and that this can be most effectively done by one protective committee representing all bondholders.
>
> They believe that if the Pittsburgh Railways System is permitted to be reorganized without proper consideration being given to the liability of the Philadelphia Company for the payment of its debts, or if divergent action by the owners of the underlying securities should result in a disintegration of the system, there is grave danger that the holders of bonds on the underlying systems will not only be kept out of their interest from time to time, for shorter or longer periods, but that a large portion of the volume of their principal invested in these bonds may be jeopardized.
>
> They accordingly call on all bondholders, whether defaults in their bonds have actually occurred or not, to deposit all bonds with one or the other of their depositories.
>
> An amendment of the deposit agreement has been drawn providing that deposited bonds upon which interest shall have been paid when due may be withdrawn prior to the occurrence of default without expense to the depositor.
>
> The deposit agreement already contains provision for protecting the interests of any class of bondholders whose interest may at any time become adverse to the interest of any other class.

Financial News Notes

Note Issue Authorized.—The Chicago (Ill.) City Railway has been authorized by the Illinois Public Utility Commission to issue $1,700,000 of promissory notes.

Stock Issue Authorized.—The Jacksonville Railway & Light Company, Jacksonville, Ill., has been authorized to issue $123,000 of additional preferred capital stock.

Small Block of Bonds to Be Sold.—The Ohio Public Utilities Commission has authorized the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, to sell an issue of $32,000 of bonds at 85 per cent of par or to pledge them for a loan at 65 per cent. The proceeds are to be used in making improvements.

St. Louis Directors Re-elected.—At the annual meeting of the stockholders of the United Railways, St. Louis, Mo., on Feb. 11 the former directors were re-elected. The directors later organized by re-electing all the former officers and creating a new office, that of second vice-president, to which post Murray Carleton, formerly vice-president, was elected.

Want Service Restored.—Citizens of Conway and Ashfield were heard recently by the Massachusetts Public Service Commission on their petition for restoration of service on the Conway Electric Street Railway, controlled by the Boston & Maine Railroad. The commission reserved decision. The company has offered to sell the property to the towns concerned for its value as junk.

Receiver Wants to Discontinue Lines.—James H. Hustis, who is receiver of the Boston & Maine Railroad, has filed with the Public Service Commission a petition for authority to discontinue permanently the so-called North Hampton branch and to discontinue temporarily the so-called North Beach branch of the Portsmouth Electric Railway. The commission set Feb. 17 as the date for a hearing.

Yonkers Abandonment Hearings Continue.—Chairman Hill and Commissioner Fennell of the Public Service Commission for the Second District, at Yonkers on Feb. 14 gave hearings upon the proceedings to abandon part of the line of the Yonkers Railroad, the New York, Westchester & Connecticut Traction Company, and the Westchester Electric Railroad, and upon the complaint over service by the railroad between Tuckahoe and New Rochelle. The case has not yet been closed.

Successor to St. Joseph Valley Organizing.—The Indiana Public Service Commission has authorized the La

Grange, Toledo & Eastern Railway to issue $55,000 of common stock at par and $35,000 of bonds at par to finance the rehabilitation of that part of the defunct St. Joseph Valley Railway between La Grange and Mongo. This part of the old road connects at La Grange with a division of the Pennsylvania lines and will afford an outlet to the business which otherwise would have been shut off from railroad communication if the old St. Joseph Valley Railway had been junked.

Offer Montreal Tramway Bonds.—The Montreal Tramways & Power Company, Ltd., Montreal, Que., has sold an issue of $7,300,000 five-year 6½ per cent gold bonds, due 1924, which are being offered by the Crédit Canadien in Montreal at par and interest. Subscriptions to the issue are being asked in New York by A. Hicks Lawrence, at the same price, and the firm is inviting a limited exchange of the Montreal Tramways & Power Company 6 per cent notes, due April 1, to net holders a premium of approximately 1¾ per cent.

$1,428,062 Award to B. R. T.—Judge Mayer has made an order authorizing Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, to accept the award of the board of appraisers of the War Department, on Jan. 20 last, of $1,428,062, for certain dock property in the vicinity of Sixty-third, Sixty-fourth and Sixty-fifth Streets, South Brooklyn, owned by the New York Consolidated Railroad. Out of this money, $659,000 is to be applied to the payment of principal and interest of bonds of the Sea Beach Railway, dated Sept. 1, 1896, all of which are owned by the Brooklyn Rapid Transit Company.

Receiver Dispelling the Gloom.—The Chicago, Aurora & DeKalb Railroad, Aurora, Ill., reports an exceptionally satisfactory business for the month of January. Out of one station, Kaneville, the company transported 100 cars of livestock and grain. The net earnings of the road during the year 1918 under the management of Receiver Gunsul showed a net increase of 38 per cent. Passenger traffic has also been increasing. The company is hauling daily each way carload and less than carload freight, and during the month of January two express cars were operated. Special passenger cars are also operated occasionally.

Protest Against Abandonment.—About fifty residents of Melville, Long Island, have filed with the Public Service Commission for the Second District, a protest against threatened discontinuance of electric railway service by the Huntington Railroad. The trolley lines make connection with the main lines of the Long Island Railroad, and the complainants protest against the proposed discontinuance on the ground that it would entail direct and substantial loss to property and compel residents to move elsewhere and would make it impossible for them to travel to their places of business.

Refuses Transfer of Receivership Case.—In the receivership case brought against the Columbus Railway, Power & Light Company, Columbus, Ohio, Attorney F. S. Monnett has filed with the Franklin County Clerk of Courts depositions tending to show that the Tennessee Power Company, controlled by the E. W. Clark interests, which also formerly operated the Columbus property, made a large profit on the transfer of a turbo-generator to the Columbus company. An attempt was made to have the receivership case transferred from the Common Pleas Court to the United States District Court, but Judge Kinkead instructed the Clerk of Courts to refuse to deliver the records to any one, no matter what the pretext.

Receiver Asks Directions.—The petition of Receiver Frank H. Swan of the Rhode Island Company, Providence, R. I., for authority to pay back-wages amounting to $72,000 to the employees of the company, has not yet been heard by the Superior Court, but it is probable that it will come up within a few days. After the court passes on the petition Mr. Swan will probably find it necessary to petition the court again shortly, as a payment of $180,000, representing rental of leased lines due the United Traction & Electric Company, becomes due on Feb. 24. At present there is a balance of $47,500 due the latter company on account of rentals due on Dec. 24, last, a compromise having been effected whereby the Rhode Island Company made its payments in installments.

Cities Must Buy or Road Will Suspend.—That the towns through which the Norton & Taunton Street Railway, Norton, Mass., operating 21 miles of line between Norton, Attleboro, Mansfield and Taunton, passes must purchase the road or it will be junked, was the statement made recently in Attleboro. The fare was increased to 6 cents in 1917 and to 7 cents in 1918, but the revenue does not show the gain needed to make a return on the investment. Attleboro, which already owns and operates a 3-mile railway to Briggs' Corner, will be asked to buy the Norton, Taunton and Attleboro line to Chartley. Norton has a line from Chartley to the Taunton line and from Norton Center to Mansfield, which it will be asked to buy. Five miles of the railway are within the limits of Taunton and the rest is in Mansfield territory.

Spokane Merger Again Considered.—According to D. L. Huntington, president of the Washington Water Power Company, Spokane, Wash., there is a distinct probability of an early combination of the systems of the Washington Water Power Company and the Spokane Traction Company. The plan which has received most favorable consideration, according to Mr. Huntington, is for both companies to deed their property to a third company, taking in exchange stock in the new corporation. F. S. Conners, receiver of the Spokane & Inland Empire System, which includes the traction company, says the plan of consolidation will likely go through if the Legislature, now in session, passes a law allowing electric railways to charge more than 5 cents for fare. The merger has been under consideration for three years. Last May it was reported to be nearer a successful conclusion than at any previous time.

Indianapolis & Cincinnati Adversely Affected.—The financial statement of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., for the year ended Dec. 31, 1918, shows a gross income of $532,143, operating expenses of $389,517, net operating earnings of $142,625 and net income of $136,673. Interest of $60,000 on outstanding bonds due Jan. 1, 1919, was not paid, certificates of indebtedness due two years thereafter and bearing 6 per cent interest being issued in lieu of same. Dividends of $15,000 due Oct. 1, 1918, were not paid, certificates of indebtedness due two years after the close of the war being issued. Claude Cambern, secretary, says that the company was adversely affected by war conditions and that the expected decrease in costs of labor and materials since the signing of the armistice has not materialized. The prospect for the extension to Cincinnati, upon which the final success of the property depends, is said to be uncertain and indefinite until the cost of construction reaches a more nearly normal level.

Abandonment Authorized.—The Los Angeles & San Diego Beach Railway has been authorized by the California Railroad Commission to discontinue its railway service, public hearings held in the matter having shown that for more than five years past the receipts from operation have been insufficient to pay operating expenses or interest. The hearings developed that the smallest deficit sustained in any of the five years covered by the hearings was $9,605, and that an approximate deficit for the entire five-year period was $69,112. Abandonment of the service was opposed by the Chamber of Commerce of La Jolla, the Chamber of Commerce of San Diego, the city of San Diego, the Citizens' Club of Pacific Beach and the San Diego Beach Company, none of which, however, was able to advance an alternative proposition. In rendering its decision, the commission held that that part of the petition referring to dismantling the road and the restoration of streets upon which the company's rails have been laid, is not within the jurisdiction of the commission. Of the 20,000 shares of stock, the company was authorized to issue 5460 at $100 a share, which have been fully paid up, and 10 per cent has been paid on 1650 shares of common stock, there being no preferred stock issued. There is outstanding a bond issue of $375,000, maturing on Jan. 2, 1950. The company owes E. S. Babcock $109,209 and has outstanding notes totaling $83,261.

Traffic and Transportation

Voluntary Tax Succeeding

Convinced of Justice of Fare Appeal 1500 Patrons Agree to Pay Seven Cents

The movement for the payment of a 7-cent fare by the patrons of the New York & North Shore Traction Company, Roslyn, Long Island, is progressing satisfactorily. According to estimates made a few days ago more than 1500 persons have voluntarily agreed to pay the extra 2 cents.

MOVEMENT A VOLUNTARY ONE

The League of Voluntary Seven-Cent Fare Payers, which is behind the movement, is continuing its campaign actively in behalf of the company through posters in the cars, direct personal appeals and through public meetings. That the residents of the district through which the company operates are whole heartedly behind the movement is shown by the diversity of the interests included among the officers and directors of the league. The chairman, Elmer G. Story, is president of the Bay Side National Bank; the vice-chairman, Mrs. J. K. Robinson, is head of the Women's Welfare League of the L. W. F. aeroplane factory in College Point; the secretary, Mrs. Elizabeth Gross, is society editor of the Flushing *Journal*. Among the other directors are the assistant district attorney of Queens County, a prominent real estate man, the chairman of the transit committee of the United Flushing Association, a retired bank president, a New York attorney who is attorney for the Douglaston Civic Association, and a Flushing business man who represents the Flushing Business Men's Association.

Since the active campaign was started in its behalf the railway has submitted to the Board of Estimate & Apportionment of New York another petition in which it suggests a new fare plan to the city.

CASE ESTABLISHED BEFORE COMMISSION

The first appeal by the railway to the city was dated June 22, 1918. Its request then was for a 7-cent fare on its lines within the limits of New York City. The proposition now made is for the sale of the lines to the city or for their lease to the city under an agreement which in short would guarantee a return of 6 per cent on the fair value of the investment. The Board of Estimate has referred this petition to its franchise committee.

In presenting this offer the company points out that the facts justifying the charge of a 7-cent fare have been fully established before the Public Service Commission after a critical and exhaustive examination.

So far so good. At this point enters discord. He makes his appearance in the shape of Corporation Counsel William P. Burr. Mr. Burr is not satisfied that everything is as it should be. At least the papers make him appear in this light. "After a cursory investigation," Mr. Burr is "firmly convinced the company is illegally collecting 2 cents from those who pay 7 cents." He evidently intends to protect the people against themselves, for, says he, "if I find that the company has used coercion I shall take the necessary steps to meet the situation."

Hearing on Overcrowding Shows Need for More Equipment

The purchase of a large amount of new equipment for the Boston Elevated Railway was forecasted by Samuel L. Powers, one of the five trustees, at a hearing before the electric railway committee of the Legislature on Jan. 30. The discussion centered in a bill which aims to prevent overcrowding of cars by limiting straphangers to "five passengers above the actual seating capacity of each car."

Advocates of the increase contended that overcrowded cars were responsible for the spread of contagious diseases, and that such congestion could be obviated by running more cars.

Dr. W. C. Woodward, head of the Boston Department of Health, stated that the 300 employees of the department have been reporting to the office on the sanitary condition of cars, numbers of passengers standing and numbers of vacant seats. Reports of several months ago showed unsatisfactory conditions, but current reports indicate marked improvement.

H. W. Barnum, general counsel for the trustees, said the net result of the bill would be to penalize the corporation. If the public requires improved facilities, such as new cars, the State must authorize the expenditure of more capital.

Mr. Powers stated that the road expected to receive, early in April, the first installment of 250 new cars ordered last July, and all by midsummer. He hoped for the assumption by the State of the burden of carrying the cost of the Cambridge Subway, by which about $9,000,000 would be released for use in rehabilitating equipment. In referring to the subject of care of cars and ventilation, Mr. Powers said that while cars are washed thoroughly every two weeks, it is proposed to make a daily cleansing as soon as possible, and that it is likely that all cars will eventually be equipped with blowers of the type installed on the Chicago traction system.

A Helpful Suggestion

Illinois Commission Points Out Wherein the Utilities Can Work to Better Their Public Relations

As a result of the experience of the Public Service Commission of Illinois extending over a period of five years in meeting various problems involving the relations of public utilities with the public, the commission has become very strongly impressed with the large influence which the quality of service rendered and the methods of handling complaints exert upon the character of this relationship with the public. In consequence the commission wrote a letter on Feb. 1 to all the utilities of the State except the steam railroads which reads in part as follows:

> During the recent times of stress, with the attendant scarcity of labor, there has been a tendency on the part of utilities to decrease the standard of service rendered, possibly with a view to more economical operation and possibly because of inability adequately to supervise the work of strange employees necessarily employed. In so far as such a policy may have been intended, we believe that it is most unwise and that instead of operating to relieve the utility of its burdens, it will greatly increase them. We have seen this proved repeatedly during the past year.

A POINT OF CONTACT OFTEN NEGLECTED

> Through the handling of complaints most utilities find their only opportunity of meeting their consumers. This is unfortunate, because the utility gains its impression of its consumers through these complaints, which are often presented at times when the consumer is aggravated, and, on the other hand, the consumer gains his impression of the utility through the methods by which the complaint is handled.
>
> With the utility, the handling of complaints is a routine transaction which occurs with regularity, and the employees engaged upon this phase of the work come to regard the complaints merely as a part of the company's routine which is capable of being handled by routine methods, in much the same manner that material is passed through the stock room. With the consumer, however, a complaint is not a routine matter, but represents to him a real grievance. In other words, utilities are apt to regard a complaint as lacking individuality, while from the consumer's standpoint, each complaint has a very distinct individuality and stands out in his mind as a particular situation which merits individual attention.
>
> We have been frequently impressed with the fact that if a utility is willing to accord to each complaint an individuality and give it a just investigation, both from the consumer's and the utility's viewpoint, the complaint is well satisfied and, as a result of his contact with the company, has an appreciation of its human characteristics and a regard for its sincerity of purpose. A routine reply to some classes of complaints may be suitable, but its routine nature will usually impress the complainant unfavorably.

A BROADMINDED POLICY ESSENTIAL

> The problem as to the future of public utilities is one which occupies considerable attention in the public mind to-day and is one which is of vital importance to the utility and to the public. We believe that much of the criticism directed against utilities and which, in a certain measure, reacts against the regulatory bodies charged with their supervision, might be relieved by a broadminded policy of handling complaints in which each case is treated as an opportunity for acquaintanceship with the consumer and each complaint is impartially investigated.
>
> I hope that you, as the responsible executive of a utility, will give the subject matter of this letter careful consideration. It is presented as a helpful suggestion regarding a vital matter and with the further idea that in many cases the operating heads of utilities inadvertently allow themselves to get out of touch with working details, some of which have a very important bearing upon the development of this complicated situation.

Rehearing Denied

Commission Will Not Reopen Case Which Resulted in Increased Fares in Indianapolis

The Public Service Commission of Indiana, on Feb. 12 issued an order denying a petition filed by Woodburn Masson for the West Side Improvement Organization and for Edward P. Barry, in which the petitioners asked that the commission grant them a rehearing in the case of the Indianapolis Traction & Terminal Company which resulted in higher fares in Indianapolis.

With the denial of the petition appeared the possibility that a complaint may be filed in one of the local county courts, which will ask that the original order of the commission be set aside, and that the railway be enjoined from collecting any other than the franchise fares.

Mr. Masson said that it "might be some time yet" before the suit is filed. He said, however, that the petition for rehearing was filed as a formality to get the case into the courts and to test the authority of the commission to change the terms of a contract entered into between the city and the railway when the city had a specific grant of power from the Legislature to make the contract according to fixed specifications.

It was explained also that the case will be carried to the Supreme Court of the United States in an effort to knock out the 5-cent fare. The petitioners assert that the 5-cent fare is unreasonable under the circumstances and is charged because of alleged mismanagement of both capital and operating affairs of the railway. The attorneys for the railway state that there could be no possibility of taking the matter into the federal courts as the situation is purely a local one, and there is no federal question involved.

Bridgeport Acts While Hartford Thinks

Bridgeport, Conn., is a buzz-saw city. Its peripheral speed is tremendous. It cuts clean and true. It is an old city with new ideas, new hopes and new aspirations. That it is in a large measuse a war-boom city is nothing against it. In fact, the influx to it has taught it how to absorb, digest and get the most out of the new elements that have been injected into its life. If Bridgeport had been afraid of an idea it never could have scored the industrial triumph which has made it a source of wonder to those who are given to dealing with figures that spell finished product. That Bridgeport does not shy at a new idea is illustrated by its quick and hearty reception of the one-man car and by its bid for more of these vehicles. Thus the Bridgeport *Standard-Telegram* of Feb. 15 said:

> Hartford is grousing a bit at the prospect of getting some "Toonerville trolleys"—as they call the Birney safety car—and is wondering whether they really ought to be permitted.
>
> Bridgeport should put in a quick bid to the Connecticut Company. All the Birney cars that Hartford does not want, Bridgeport will take.
>
> These trolleys are the logical development of the traction business. They represent a sane and sensible departure from the conventional and cumbersome "jumbos."
>
> They take about one-third the power of the big car, get under way faster, are easier of control, safer of operation, cover their runs in quicker time and furnish better accommodation to the public. What more is wanted of a trolley car?
>
> The Birney cars in operation in Bridgeport are giving every satisfaction. They furnish seats for all and travel fast enough to maintain a five-minute headway, doing away with the necessity of long waits on street corners.
>
> If they can help the Connecticut Company out of its financial difficulties and afford the happy means of giving good service while affording a sufficient revenue for operation at a fair profit, the public will rise up and call them blessed.
>
> Mr. Fox's cartoons are not far out of the way. A return to the Toonerville trolley with its lone "skipper" is apparently the solution of our traction troubles.

Dallas Jitneys Ruled Out

The anti-jitney ordinance enacted by the city of Dallas, Tex., designed to stop jitney operation, has been upheld by the Court of Civil Appeals for the Fifth Supreme Judicial District of Texas, sitting at Dallas. The decision came in the refusal of the court to grant an injunction on petition of the Dallas Jitney Drivers' Association to restrain the city of Dallas from taking action to enforce the city ordinance on the ground that the ordinance was violative of the State Constitution.

The ordinance in question sought to eliminate the jitney from the business district of Dallas by prohibiting jitneys from operating within a prescribed zone. Since the passengers were gathered and discharged mainly in the business district, the measure effectively put them out of business.

In denying the injunction the court held that under its police power the city has authority to enact any ordinance designed to protect the lives of its citizens, or their property or rights, and that the ordinance prohibiting the operation of jitneys on the business streets of the city was a measure designed to protect the city by eliminating congestion.

As to the claim of the jitneys that the ordinance was discriminatory in that it favored the railway, the court denied such discrimination. It held that the railway was compelled to take measures to insure the safety of passengers and pedestrians; that the railway could be held liable for any damage done, but that jitneys could not be so held.

In Woman's Interest

A bill to protect women conductors in New York is now before the Legislature at Albany. It is backed by the Women's Joint Legislative Conference. The bill limits the hours of women workers to nine consecutive hours a day, and thus eliminates the "swing" between runs; provides that they be paid from the time they report for duty; for one day's rest in seven; eliminates work after 10 o'clock p.m.; makes suitable toilet facilities compulsory, and prohibits the employment of either male or female minors.

Battling for Its Life

Trolley and Auto Stage a Fight to a Finish in Small Connecticut Community

The Danbury & Bethel Street Railway, Danbury, Conn., now in the hands of J. Moss Ives as receiver, is battling for its life. Its antagonist is the automobile. There is no effort on the part of the railway to hide its fears. In fact, through public notices and by appeal direct to such patrons as still remain to it the company says frankly that the community will have to choose between the two forms of transportation. Already the company has been compelled to abandon the Bridgeport to Long Hill line on account of unfair jitney competition. Other branches will have to go if conditions do not improve. The appeals which are posted in the cars call attention to the fact that the company pays taxes, keeps up part of the pavements, keeps the track clear of snow and ice in the winter, runs cars on schedule time whether or not they have passengers, and pays the seventy odd employees more than $1,300 a week in wages. Each of the three appeals which have been posted asks the public to choose between the jitney and the trolley, and reminds the reader that the public cannot have both.

The same hostility to the electric railway that has manifested itself in so many other instances seems to be present here in exaggerated form. A combination of conditions that lead up to a receivership do not make for amiable public relations, and in this case the tendency persists to carry over and inflict punishment on the receiver for sins fancied and real of the managements of the past. In other quarters there is an air of total indifference. As the matter now stands things seem to be half jitney, half trolley. If the jitneys are forced to go there appears to be doubt about the trolley, despite its appeal for confidence. On the other hand if the trolley is forced to go there appears to be hope that a permanent, reliable motor bus system will then result.

B. R. T. Looking Up

Improvement in the service on the Brooklyn (N. Y.) Rapid Transit Company lines, also in the number and character of employees, is indicated in a statement issued by Lindley M. Garrison, receiver for the company. The statement is based on a comparison of reports of the various departments from November, 1918, to the end of January, 1919. The report says:

> The number of employees on rapid transit lines has increased from 3550 in November to 3859 at the end of last month. In the same time cars available for service on these lines have increased from 1221 to 1318. In January there were 474,410 trips made on subway and elevated lines, an increase of 48,769 trips over the November showing. The mileage record for January was 4,165,216, an increase of 395,255 miles over the record for November. On the surface lines the number of round trips increased by 50,000 last month over those operated in November.

Women shop employees are being replaced by men, discharged soldiers being given the preference. Thirty of the 157 women in the shops in November have resigned. The report states that the additions to the different operating forces have improved greatly the morale of all the workers. In spite of the fact that 825 men left the service of the surface transportation department either by resignation or discharge there has been a net gain of 457 employees. In the elevated and subway transportation departments there was a net gain of 114 men, although 425 men left the service.

Transportation News Notes

Six Cents for Valdosta.—The Valdosta (Ga.) Street Railway was recently authorized by the Railroad Commission of Georgia to increase fares from 5 cents to 6 cents, effective immediately.

Skip Stop Abolished.—The skip-stop system of operation on the lines of the Indianapolis Traction & Terminal Company in the city of Indianapolis was abolished on Feb. 9, following an order of the Board of Public Works.

One-Man Cars for Greenville.—E. F. Taylor, vice-president of the Southern Public Utilities Company, Charlotte, N. C., has announced that two one-man cars will be placed in operation on the lines of the company in Greenville, S. C., as an experiment.

Zone Fares Made Seven Cents.—The Public Service Commission of New Hampshire recently ordered public notice of an increase in fares from 6 cents to 7 cents per fare zone, with no changes in the fare limits filed by the Portsmouth Electric Railway, to become effective on Feb. 23.

Six-Cent Fare at Lima.—The City Council of Lima, Ohio, recently voted to grant the Ohio Electric Railway a 6-cent fare for its local service in that city, effective from Feb. 10. The city agreed several months ago to make the increase on the condition that the company would increase the wages of the men. Nine tickets will be sold for 50 cents.

Six-Cent Fare Bill in New York.—Assemblyman Louis M. Martin, chairman of the Assembly judiciary committee, has introduced a bill which makes possible a 6-cent fare on the surface, elevated and subway lines in the city of New York. The bill empowers the Public Service Commission to authorize fare increases regardless of franchise rate limitations.

New Worcester Tariff Suspended.—The Public Service Commission of Massachusetts has ordered the Worcester Consolidated Street Railway to suspend until March 9 at least, the putting into operation of the 7-cent fare in Worcester and county towns served by the company. Hearings are now in progress in regard to the need for the company to charge 7 cents.

A Six-Mile Road Wants More.—The Albany (Ga.) Transit Company, which operates 6 miles of line, has asked the Railroad Commission of Georgia for permission to increase its fares from 5 cents to 10 cents. The deficit of the company last year was $4,000. The president and the secretary of the company draw $25 each per month and the total office expense is only $137 a month. The road is owned locally.

Would Speed Up Dayton Cars.—An ordinance is before the City Commission of Dayton, Ohio, which provides for increasing the speed of electric railway cars in the business district from 10 m.p.h. to 20 m.p.h. and in the outskirts to 25 m.p.h. It also enumerates the stops to be made on the routes. Instead of a straight skip-stop plan, the ordinance seeks to stagger the stops by placing them where they will be needed most.

One-Man Cars for Brooklyn.—The Brooklyn (N. Y.) Rapid Transit Company has four one-man cars at its shops at Fifty-second Street which it is planning to put into operation as an experiment on the Nassau Avenue line in the Greenpoint section of the city. This is a short feeder line, which extends from Manhattan Avenue to Newton Creek. These four cars are the first of a shipment of twelve one-man cars which the company expects to try out on its lines.

New Mail Service for I. T. S.—Negotiations are said to be under way between the officials of the Illinois Traction System, Peoria, Ill., and the United States postal authorities with a view of making mail trains out of the two night runs between Peoria and St. Louis through Springfield. If the agreement is reached it means that the Illinois Traction System will have three-car trains, consisting of mail car, coach and sleeper, running in each direction between Peoria and St. Louis.

Reduced Fare Denied to School Children.—A petition for a fare of 2½ cents for school children in the city of Boston has been refused by the trustees of the Boston (Mass.) Elevated Railway. The trustees state the action was taken because the cost of transporting the school children of Boston would not alone be assessed upon the taxpayers of that city, but also upon the taxpayers of other cities and towns served by the elevated system, which is now operated under guarantees from the State.

Fares Increased in Temple.—The Temple (Tex.) Traction Company, the Temple - Belton Interurban Company and the Belton (Tex.) Traction Company, all owned jointly, increased fares on Feb. 1. The local fares in Belton and Temple were increased from 5 cents to 7 cents with four rides for a quarter, and the interurban fare between Temple and Belton was increased from 25 cents to 35 cents. So far there has been no complaint and no effort on the part of patrons to enjoin such increases.

Question of Fare at Massillon.—Members of the Council at Massillon, Ohio, are not all agreed as to what should be done with the request of the Northern Ohio Traction & Light Company for 7-cent fare on the city lines. Some of them are inclined to agree with the company, if it will make certain improvements suggested, while others contend that 6 cents will be sufficient to cover the increased expense of operation.

Old Fares Restored for Columbus Suburbs.—It has been announced by President Charles L. Kurtz that the 5 cents added to the fares of passengers for Linden, Camp Chase and Beckley by the old management of the Columbus Railway, Power & Light Company, Columbus, Ohio, have been eliminated, after a careful investigation of passengers from those points, made by C. C. Slater, general manager. These points will be effected by any general legislation in regard to increased rates of fare that may be enacted.

Would Compel Company to Re-establish Tickets.—Samuel L. Seeman, an insurance man of Des Moines, Ia., has applied to the Federal Court there for permission to continue his suit in the District Court to compel the Des Moines City Railway to re-establish the sale of tickets at six for a quarter. He further asks that Emil G. Schmidt and Homar A. Miller, receivers of the railway, be made parties to the suit. Mr. Seeman's attorney announces that his client will soon request as "a friend of the court" to have the receivership dissolved.

Would Discontinue Tickets.—The Black River Traction Company, Watertown, N. Y., has filed with the Public Service Commission for the Second District, a new tariff schedule proposed as effective on March 7 and affecting local passenger traffic on its lines. The proposed change is that the sale of books containing twenty-five tickets for $1, each ticket good for one local 5-cent fare, is to be discontinued. The company will redeem pro rata all outstanding tickets when presented at the company's general office in Watertown.

Survey Before Service Is Cut.—The Des Moines (Ia.) City Railway will make a survey of at least a week's duration before announcing the service cut which it will make as a result of the decision of Federal Judge Martin J. Wade denying the company's request for an increased fare. Emil G. Schmidt, president of the company, has announced that a cut of 20 per cent in service would mean a saving for the company of $175,000 a year. Attorneys for the city have announced that they will fight any attempt on the part of the city to reduce service.

Reduction in Its Commutation Fares.—Under a supplemental tariff, filed with the Public Service Commission for the Second District, the Auburn & Syracuse Electric Railroad, Auburn, N. Y., effective on March 9, will sell fifty-trip commutation ticket fares for distances, 19 to 22 miles inclusive, for $13.75. The tariff cancels higher commutation rates, $14.25 for 19 miles, $15 for 20 miles, $15.75 for 21 miles and $16.50 for 22 miles. Patrons who buy commutation fares for distances 19 miles and over, will secure reductions over existing commutation fares.

Wants Seven Cents in Port Jervis.—The Port Jervis (N. Y.) Traction Company, operating in Port Jervis and the town of Deer Park, Orange County, has filed with the Public Service Commission for the Second District, a petition asking permission to increase its rate of fare from 5 to 7 cents. The commission will conduct a public hearing. The petition shows that the Port Jervis Common Council on Dec. 19 passed a resolution permitting the company to increase its rate of fare to 7 cents until Dec. 31, 1919. Like action was taken by the Deer Park Town Board on Dec. 28.

Protest Fare Increase.—Eight city officials and residents of Maywood, Ill., protested to Federal Judge K. M. Landis against increased fares on the Aurora, Elgin & Chicago Railroad under the decision of Judge Landis himself. The railroad was ordered to restore the 5-cent fare within the limits of Maywood. The rates had been raised to 10 cents. The residents also protested against the new 10-cent rate from Maywood to Forest Park and against increases in the price of fifty-four-ride tickets from Chicago from $5.60 to $6.40 and the sixty-ride tickets from $5.95 to $6.70.

New Boston & Worcester Fares Approved.—The Public Service Commission of Massachusetts has approved a new fare schedule for the Boston & Worcester Street Railway, which will become operative on March 9. The fare rate is increased from 2½ cents to 3 cents a mile, and the minimum fare is increased from 6 cents to 7 cents. At the request of the commission, however, the reduced rate ticket privilege now given to residents of Overbrook will be extended by the company to residents of Sunnyside riding through the Overbrook territory, thus giving them a lower fare on through trips to and from Boston.

Another Company Wants Seven Cents.—The Freeport Railway & Light Company, Freeport, Ill., a subsidiary of the Illinois Northern Utilities Company, has applied to the Public Utilities Commission of Illinois for an increase of fares in Freeport from 5 cents to 7 cents, for trips within the city limits or 600 ft. beyond, with eight tickets to be sold for 50 cents. Rates would increase, under the petition, from 5 cents to 10 cents for trips to or from any point more than 600 ft. from the city limits to a point on the city lines, with a round-trip for 15 cents. School children are to have forty rides for $1.40, according to the petition.

Direct Appeal by Dallas Company.—The service department of the Dallas (Tex.) Railway, under direction of Homer Fisher, is publishing a weekly magazine, which is intended to be a medium through which railway problems can be discussed freely. No name has been chosen for the new publication, but a contest has been held in which a first prize of $15, and other prizes of $5, $3 and $1 were offered for the best suggestions for a name for this publication. The new publication will be issued weekly. The establishment of the service department at Dallas was reviewed in the ELECTRIC RAILWAY JOURNAL for Feb. 8, page 296.

Increases Its Own Rate of Fare.—The Portsmouth (Ohio) Street Railway is at odds with two villages over the rate of fare for the section between them. The company has a franchise for carrying passengers between New Boston and Sciotoville at the rate of seven tickets for a quarter. Recently it was refused an increase in New Boston. Following this the company announced that passengers would be carried from New Boston to the corporation line of Sciotoville at the old rate, with an additional straight fare of 5 cents for those who rode into the village proper, several squares distant. The commission will send a representative to look into the matter.

Regards Appeal as Futile.—Former City Counsel Spaulding Frazer, has written to Mayor Calkins of Plainfield, president of the League of New Jersey Municipalities, to the effect that contracts between the Public Service Railway and municipalities in which the railway operates, are matters of "purely internal policy" and subject to legislative action. It is the opinion of Mr. Spaulding that appeal of the fare cases to the Supreme Court would be futile. The letter was turned over to the legal committee, which has recommended to the league that no move toward an appeal to the Federal Court be made until the Court of Errors shall have decided the Public Service Railway case.

Joint Fares Increased.—The New York State Railways, Utica Lines, proposes under a supplemental tariff filed with the Public Service Commission for the Second District, to put into effect on March 9, new joint one-way and round-trip fares from Utica to various points on the lines of the Southern New York Power & Railway Company. All joint one-way fares in both directions between Utica and the Southern New York Power & Railway Company's stations will be increased, the minimum 3 cents between Utica and McCreedys, near Mohawk, and the maximum increase, 53 cents, between Utica and Oneonta. The new round-trip rate increases vary from 22 cents to as much as $1.06.

Skip Stops Will Continue.—The St. Paul Association, which concerns itself with public and business affairs in St. Paul, Minn., published in its bulletin dated Feb. 14 an interpretative analysis made by the association of the audit of the St. Paul Street Railway. This audit was made for the purpose of ascertaining whether the company actually needed the relief which it would receive by the continuance of the skip-stop system now in operation. The City Council had before it an ordinance abolishing the skip-stop system, but as a result of this audit and the attitude of the people of St. Paul as expressed through the association of 4000 business and professional men, the skip-stop system in St. Paul will be continued at least until peace is definitely concluded.

Special Cars Suggested for Workers.—"Workers' specials," operated by railways in cities to enable workmen to reach their places of employment on time, are suggested by the information and education service of the Department of Labor, as a means of reducing tardiness and absences in industrial plants. It is pointed out that in many instances workmen who realize that they will be late for work decide to remain away for the entire day. Placing a certain number of cars on a definite schedule and operating them as special cars for workmen only, with stops every six blocks or so, would do much to improve the condition in certain cities, it is suggested. Government committees in certain factories are interested in a revision of city railway schedules along this line.

One-Man Car Rights Established.—City Counsel Charles E. Bird, Trenton, N. J., has filed an opinion in which he says that the Trenton & Mercer County Traction Corporation has a legal right to operate one-man safety cars over its lines in Trenton and vicinity. The opinion was given at the request of George B. La Barre, director of public safety of Trenton, in view of the fact that the city had passed an ordinance in 1889, whereby it was made unlawful to run a car having a driver and no other agent for the control and care of passengers. Counselor Bird is of the opinion that this ordinance does not prohibit the present one-man cars, which are electrically operated. He says that the 1889 ordinance became inoperative when the Trenton Street Railway changed its motive power in 1894.

One-Man Cars to Stay.—The Mayor of Waco, Tex., has vetoed the ordinance to which reference was made recently in the ELECTRIC RAILWAY JOURNAL, requiring the Texas Electric Railway to discontinue the operation of the safety, or one-man, cars. The Commissioners of Waco finally passed the ordinance on Feb. 6, only two members of the commission voting. The fourth man, Mr. Fitzhugh, had resigned several days before on account of ill health. Had he been present Mr. Fitzhugh and the other commissioner, together with the Mayor, would undoubtedly have prevented the final passage of the measure. On the next day the Mayor disapproved the ordinance. The safety cars are popular in Waco, and the patrons living along the line on which they are operated were active in having the Mayor veto the measure. It is understood that the company plans to equip two more lines with safety cars this year.

Personal Mention

Winthrop Coffin, Brookline, Mass., has accepted the nomination to a trusteeship on the Boston (Mass.) Elevated Railway.

Woodward Hudson has been elected president of the Conway (Mass.) Electric Street Railway to succeed James H. Hustis.

Frank R. Bissell has been appointed second vice-president of the Dallas (Tex.) Railway to succeed H. M. Hughes, deceased.

Charles De Sombers has been appointed master mechanic of the Lincoln (Neb.) Traction Company to succeed John B. Blaiklock.

Norman James has been elected president of the Charlottesville & Albemarle Railway, Charlottesville, Va., to succeed F. C. Todd.

E. J. Shaylor has been appointed auditor of the Ironwood & Bessemer Railway & Light Company, Ashland, Wis., to succeed L. C. Clark.

F. J. Fish has been appointed auditor of the Rockland, Thomaston & Camden Street Railway, Rockland, Me., to succeed E. J. Thompson.

Edward J. Ives has been appointed assistant general superintendent of the Detroit (Mich.) United Railway, to succeed Paul W. Dohrman.

William Elliott has been elected vice-president of the Columbia Railway, Gas & Electric Company, Columbia, S. C., to succeed Henry Parsons.

A. J. Harter has been appointed purchasing agent of the Bamberger Electric Railroad, Salt Lake City, Utah, to succeed H. F. Barraclough.

Chapin M. Seley, Waco, Tex., son of the late W. W. Seley, has been elected an assistant treasurer of the Texas Electric Railway, Dallas, Tex.

E. M. Pottorff has been appointed chief clerk of the freight department of the Illinois Traction System, with headquarters at Springfield, Ill.

C. M. Lake has been appointed claim agent of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., to succeed William L. Schulz.

William J. Poling has been appointed superintendent of transportation of the Jersey Central Traction Company, Keyport, N. J., to succeed W. A. Haley.

W. C. Edmiston has been appointed general superintendent of the Omaha & Lincoln Railway & Light Company, Ralston, Neb., to succeed E. A. Roehry.

I. W. Morris has been appointed treasurer of the Charleston Consolidated Railway & Lighting Company, Charleston, S. C., to succeed James Ball.

W. E. Campbell has been appointed chief engineer of power station of the Nashville Railway & Light Company, Nashville, Tenn., to succeed H. S. Badger.

J. E. Harvell has been appointed general superintendent of light and power of the Virginia Railway & Power Company, Norfolk, Va., to succeed H. Root Palmer.

Gerry Cathcart has been appointed claim agent of the Columbus Railway, Power & Light Company, Columbus, Ohio, to succeed E. K. Stewart, who resigned recently.

J. P. Moran has been appointed chief engineer of power station of the South Carolina Light, Power & Railways Company, Spartanburg, S. C., to succeed H. A. Parshall.

H. G. Boyter has been appointed engineer of maintenance of way of the South Carolina Light, Power & Railways Company, Spartanburg, S. C., to succeed J. P. Sellers.

L. LeMay has been appointed secretary and treasurer of the Memphis & Lake View Railway and the Memphis (Tenn.) Street Railway, to succeed W. H. Burroughs, deceased.

John Sparrow, a well-known advertising man of Birmingham, Ala., has been appointed publicity agent of the Birmingham Railway, Light & Power Company by Lee Bradley, the receiver of the company.

Albert H. Bruner, formerly with the Tri-City Railway, Davenport, Ia., and later with Stone & Webster on the arsenal at Rock Island, Ill., has accepted a position with the city of Chicago as a civil engineer engaged in the Chicago Plan Commission.

Murray Carleton has been elected second vice-president of the United Railways, St. Louis, Mo., a newly-created office. Mr. Carleton was formerly vice-president of the company. He retired from that post in October, 1918, upon the election of R. L. Warner to the company.

Sir Augustus Nanton has been elected president of the Winnipeg (Man.) Electric Railway, to succeed Sir William Mackenzie, who has been president of the company since its inception. Sir William has also retired as a director of the company. Sir Augustus was formerly vice-president of the Winnipeg Electric Railway.

C. Wright has been appointed assistant secretary and assistant treasurer of the Chattanooga Railway & Light Company, the Lookout Incline Railway of the Lookout Mountain Railway, Chattanooga, Tenn., to succeed George W. Buchanan, who resigned some time ago to accept a position with the Wright-Martin Air Craft Corporation at New Brunswick, N. J.

M. E. Graston, who has been general agent of the Union Traction Company of Indiana at Indianapolis, has been appointed freight claim agent, succeeding W. V. Morris. Mr. Graston will handle all matters pertaining to freight claims, reporting to C. S. Keever, superintendent of transportation, instead of to the auditor, to whom the freight claim agent has formerly reported. Mr. Graston will remain in Indianapolis.

C. R. Collins, assistant engineer of the Puget Sound Traction, Light & Power Company, Seattle, Wash., who left the company in 1917 to become general superintendent of the Grays Harbor Railway & Light Company, Aberdeen, Wash., has resigned his position with that company and is now in the East. Mr. Collins has announced that he expects to return to the Puget Sound Traction, Light & Power Company again, as soon as his business in the East is finished.

W. H. Sawyer, vice-president of the E. W. Clark & Company Management Corporation, has been elected president of the East St. Louis & Suburban Railway, East St. Louis Light & Power Company, East St. Louis Railway, Alton Granite & St. Louis Traction Company, and vice-president of St. Louis & Belleville Electric Railway, Alton Gas & Electric Company and the St. Louis & East St. Louis Electric Railway. H. W. Clapp as vice-president of the East St. Louis & Suburban Railway is associated with Mr. Sawyer in connection with operating matters.

C. C. Slater has been appointed general manager and general superintendent of the Columbus Railway, Power & Light Company, Columbus, Ohio, as the successor of Harold W. Clapp, general manager, and W. C. Campbell, general superintendent, whose connection with the road ceased through the establishment of reorganization plans by the new regime. Mr. Slater has been a resident of Columbus for thirty years. He was in charge of the construction work of the old Public Service Company and acted as its general superintendent for eight years. In recent years he has been interested in the coal business.

Charles B. Cooke, Jr., has been appointed assistant manager of the passenger transportation and housing division, United States Shipping Board Emergency Fleet Corporation, in charge of the passenger transportation department. Mr. Cooke is a member of the firm of Kelly, Cooke & Company, Philadelphia, well-known consulting engineers. He succeeds Garrett T. Seely, who resigned recently in order to resume his duties as assistant general manager of the Chicago Elevated Railroads. Mr. Cooke entered the government service with the Emergency Fleet Corporation on April 3, 1918, when he undertook the solution of the complex passenger transportation problems in the Delaware River District which involved the construction of additional electric railway facilities costing $2,600,000. The construction of these facilities has been completed under his direct supervision.

Mr. Gadsden Goes with U. G. I.

President of Charleston Consolidated Will Take Charge of National Public Relations as Vice-President of the United Gas Improvement Company

Philip H. Gadsden of Charleston, S. C., who was chairman of the American Electric Railway War Board and is now chairman of its successor, the committee on national relations of the association and also chairman of its committee on readjustment, has been elected vice-president of the United Gas Improvement Company of Philadelphia, and will take charge of a new department of national public relations of that organization.

For some time Mr. Gadsden has been president of the Charleston Consolidated Railway & Lighting Company, which is controlled by the U. G. I., but in which he is personally a heavy owner. During the war, however, he has made his headquarters at Washington, where he has attained national prominence in connection with his work in behalf of public utilities.

The new activities which Mr. Gadsden is about to undertake are not expected to interfere with his continued interest in the association work. In fact, the establishment by such an important company as the U. G. I., of a public relations organization under a vice-president, and his appointment to that office, should be of great assistance to Mr. Gadsden in the work to which he has put his hand in helping improve the status of the utilities. The example of this important company may encourage others to pay greater attention to the subject of public relations.

The United Gas Improvement Company is owner and operator of public utilities all over the country, including railway, gas and power companies. It is one of the strongest of all of the holding companies, and it operates thirty-five or forty plants, among them the Philadelphia Gas Works, which belong to the city of Philadelphia and are leased to the U. G. I. It is also the largest individual stockholder in the Public Service Corporation of New Jersey.

GETTING CO-OPERATION WITH THE DIFFERENT BRANCHES

In a way, Mr. Gadsden is expected in his new work to carry out many of the policies which have made him a national figure in the public utility field during the war. Speaking broadly, Mr. Gadsden has been occupied with "putting the public utilities of the country on the national map." Their true condition has been presented clearly and convincingly to congressional committees and government officers, and the sentiment in Washington is now much more favorable to these properties than before. In this work Mr. Gadsden has been equally successful in bringing about a co-operation on the part of the three branches of the public utilities industry, and leading them to think in terms of the industry rather than in terms of their own special interests. He has assisted in arousing a consciousness among public utility men that they are part of a great national industry instead of being merely officials of local plants and local industries.

HIS ATTITUDE TOWARD THE NEWSPAPERS AND CIVIC SERVICE

Those who know Mr. Gadsden well describe him as a man of charm and winning personality. In this connection a story is told: When he first came to Washington and it seemed desirable for him to become acquainted with important newspaper correspondents on duty at the national capital who might assist in telling the true story of the difficulties of the public utilities to the people of the country through the newspapers, it was suggested by a friend that one important correspondent could be brought to call on Mr. Gadsden.

P. H. GADSDEN

"Not at all," Mr. Gadsden said; "if this gentleman is to do me a favor, it is I who will call on him."

By doing so he made a friendship, which will in all probability be a lasting one, with a newspaper correspondent who during the Peace Conference in Paris, has been representing a great group of American readers at the elbow of President Wilson in Europe. Other instances of formation of similar friendships with those who address the public constantly through the newspapers are available although perhaps unnecessary.

Another story of Mr. Gadsden's public relations ideas is told: When and after the U. G. I. leased the Charleston property in 1910, and Mr. Gadsden discussed public relations with his associates at Charleston, he impressed the necessity of taking part in all local movements upon the Charleston staff with the result that upon one occasion so many officials and employees of the Charleston company were taking part in civic movements and local affairs that the company began to feel the loss of their time from its own affairs. Mr. Gadsden tells this story to illustrate the point that community leaders welcome the assistance of public utility men in home affairs.

This knowledge of human relations, of courtesy and of etiquette is expected to stand Mr. Gadsden in good stead in his new work, and he has other special qualifications for a position which will require a closer contact between the public and the public utilities with which he is identified.

SOME BIOGRAPHICAL FACTS

A man of broad reading and experience, Mr. Gadsden was born in Charleston fifty-one years ago. He was educated in the schools of that city, and afterward in the South Carolina University, at Columbia. The same university has conferred upon him the degree of LL.D. He is a lawyer, and has practiced at the bar for fifteen years. He was a member of the South Carolina Legislature for six years, elected by the people for three successive terms, and one of the most interesting sidelights upon his character is the fact that he is the man who was largely responsible for putting the word "Enforce" in the League to Enforce Peace, without which, it was noted in the public prints at the time, the league would have had merely the name of a pacifist organization. The incident is related by his friends to show the virility of his mind. He is one of the charter members of the League to Enforce Peace.

As a consequence of his work for the public utilities during the war, Mr. Gadsden is being constantly sought to make speeches, and because of the national prominence he has assisted in giving to the difficulties of the public utilities he is now being urged to write articles from time to time concerning these difficulties for such popular magazines as *Everybody's* and others.

Appointments Made to New Jersey Commission

Governor Edge of New Jersey, has appointed Harry L. Knight, Burlington County, and Andrew Gaul, Jr., Bergen County, members of the Board of Public Utility Commissioners of that State. Each term runs for six years at an annual salary of $7,500. Mr. Knight succeeds Ralph W. E. Donges, Camden, who resigned to enter the military service. Mr. Gaul was appointed under the act of 1918 increasing the number of commissioners from three to five. A bill is now before the Legislature to make the commissioners of the future elective.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Fare Register Production Goes Ahead

The Demand Is Greater Than Ever Before with Bright Outlook for the Future

The change from a peace to a war basis caused many manufacturing companies to curtail the output of their regular products in order to take up new lines of work to satisfy government contracts. One company manufacturing fare-recording instruments used largely by interurban railways where the zoning system is employed has reported that "even with our new buildings and all additional equipment, we had to encroach upon the register production to a certain extent, but the 1918 volume of register business, as compared with 1917, shows an increase, both as compared to the registers in use and the number shipped."

"The war," it was stated, "brought many problems to the electric railway people. Quick changes in fare rates had to be made and the advantages of flexibility and adaptability became at once apparent. Changes were made in register mountings, or the particular type of register in use was often replaced by another type with the proper capacity to meet the new conditions.

"Now that the war is over, even though we are still working pretty strenuously on our Navy contracts, yet we are preparing for bigger things than ever before in the manufacture of our regular products. Our reserve stock must not only be brought up, but the companies, which have been delayed for a time in receiving their new registers must not be kept waiting. The demand for registers is now greater than it has ever been, and the situation assures us as to the future success of the register business.

"We shall no doubt see many improvements perfected. During the coming year we anticipate a big increase in the number of machines for city use which will have to be built, especially for use in connection with our pay-as-you-enter operating equipments."

Inquiries for Rail Welders

Much Activity Anticipated by April—Giving of Guarantees Against Defective Joints Being Considered

The mild and open winter has brought to notice rather earlier this year than ordinarily the maintenance of track equipment. Although few orders have actually been placed much information has been required from manufacturers of rail welding equipment for welders, grinders and supplies. The manufacturers are looking for real activity in the market in April.

Rails of rather low carbon content have presented no difficulties for electric welding, and at the present time high carbon rails are being welded very successfully. One manufacturer is considering the advisability of placing a guarantee of a certain number of years against defective rail joints electrically welded under the supervision of one of their foremen.

Cord Prices Appear Stabilized

Cost of Cotton Not Sufficiently Low to Warrant Reduction on Bell, Register and Trolley Rope

Reduction in the price of spot cotton at New York cannot, according to manufacturing opinion, be taken as the measure of trolley rope, bell and register cord selling price changes at this time. It is pointed out that the price of raw material at the factory does not closely follow the speculative movements in the cotton market and that there is a substantial difference between exchange prices and delivery costs at the factory door. The changes in the latter have not yet been sufficient to warrant any decided price reductions, especially as the manufacturers of such material are doing their best to maintain liberal wages. Little sign of early wage reductions can be seen and the future labor cost in production is complicated by the unsettled conditions, especially in the New England textile field. In some cases labor costs have been increased in the past half-year. A drop of 5 or 6 cents per pound in the cost of cotton would probably be shared with the consumer.

Some street railways within a few weeks have paid as high as 75 cents per pound for trolley rope, and if cotton prices continue to reflect downward tendencies, it is fair to assume that prices will be shaded somewhat. The manufacturers are generally in shape to make good deliveries. All manufacturing costs are still high, and while manufacturers are unwilling to make public their data or pass upon the accuracy of estimates of the ratio of labor to material costs, it is certain that both classes of costs are so important that there will have to be very substantial reductions in either or both together before prices can really approach pre-war levels. The demand is rather moderate for these materials and it can be increased a great deal before an adverse effect would be noted on deliveries.

Cancellation Privilege Abused

Suggestion Is Made That Manufacturers Require Payment of a Charge for Cancellation

Immediately upon the signing of the armistice in November last manufacturers began to receive cancellation orders not only from the government, but also from other customers. Even where orders were supposed to be firm, cancellations came in.

Electrical manufacturers, of course, were hard hit by this situation because long deliveries had occasioned the placing of orders far in advance. On some of the large equipment, for instance, it was impossible in November to get promises of deliveries for any period prior to 1920.

MANUFACTURERS RESPONSIBLE FOR PRESENT CONDITION

Of course, the manufacturers are really to blame for allowing the practice of cancellation to go as far as it has. To be sure, the manufacturer in the past has felt that if the customers could be accommodated without too much trouble or expense it was the proper thing to do. As a result the cancellation privilege has been abused and the manufacturers in order to protect themselves and their employees are rapidly being forced to take some vigorous action.

It has been suggested by a prominent electrical manufacturer that the remedy for this abuse is a cancellation charge. The manufacturer has been put to a certain expense in taking and holding the order. With an accumulation of orders he may have gone ahead and made arrangements for raw materials, new machinery, additional labor, additional factory space, etc. Besides, it costs a certain amount of money just to book an order and the same work to take that order off the books.

Some one has to pay these charges. If the one cancelling the order doesn't, the charges go against general expense and must therefore be absorbed by the customer who sticks by his contract.

The manufacturers have to pay such a charge to get out of their raw-material contracts. Only a couple of weeks ago an instance came up where a cable manufacturer paid $45,000 to be released from his cotton-yarn contract. If such is the condition, it does not seem unreasonable to require a cancellation charge of the manufacturer's customer where cancellation is allowed.

Brill Sales Doubled

Without Aeroplane Sales the Combined Output During the Year 1918 Totaled $16,761,000

The sales value of the combined output of the three plants wholly operated by the J. G. Brill Company, Philadelphia, Pa., showed an enormous increase to $16,761,145 for the calendar year 1918 as compared to $7,706,099 in 1917 and $6,180,895 in 1916. This 1918 figure does not include the $2,280,000 sales value of aeroplanes from the Springfield Aircraft Corporation, in which the company has an interest. The sales record of the other plants since 1907 follows:

1907......	$9,211,825	1913......	$9,154,433
1908......	3,845,173	1914......	4,903,510
1909......	4,261,204	1915......	4,403,116
1910......	5,960,778	1916......	6,180,895
1911......	5,870,907	1917......	7,706,099
1912......	7,842,090	1918......	16,761,154

The combined result of operation was a profit of $1,341,509, after deducting all amounts expended for maintenance and repair during the year and after making allowances for depreciation and for amortization of equipment obtained for special government production. From this profit must be paid federal income and war profits taxes, estimated at $425,000. Upon this basis the net profit for the year would be $916,509.

CANCELLATIONS OF CONTRACT FOLLOWS ARMISTICE DECLARATION

During practically the entire year the company, especially at its Philadelphia plant, was engaged almost exclusively in the execution of orders for cars, trucks and field equipment received from the war departments of the government. After the signing of the armistice, the company, like most others manufacturing material for the government, was asked gradually to decrease its production and to accept cancellations on some of the orders which had been placed with it.

The orders that the company had from the government were all in proper contract form and contained the proper clauses for cancellation and for adjustment, if cancelled. Final adjustments are now in process of being made. Notwithstanding the cancellations of contracts for government work, the company had on hand, as of Feb. 1, 1919, work amounting to $8,204,448, including the government work which will no be cancelled. The Wason Company is now making preparation to operate its plant in the production of cars instead of aeroplanes.

NEED FOR WORKING CAPITAL MAKES DIVIDEND INADVISABLE

Notwithstanding the profit earned during 1918 and the previous year, the great demand for working capital, owing to the largely increased business, made it inadvisable, in the opinion of the board of directors, to declare dividends on the preferred stock in excess of the yearly rate of 4 per cent which has been maintained for the last few years, and dividends of 4 per cent for the year paid in reduction of the accumulated preferred stock dividends. A quarterly dividend of 1 per cent and a dividend of 3 per cent in reduction of the accumulated unpaid dividends on the preferred stock were declared and paid on Feb. 1, 1919. The remaining accumulated dividends on the preferred stock now amount to 6½ per cent.

Rolling Stock

Levis County Railway, Levis, Que., is building one single-truck steel one-man car.

Salina (Kan.) Street Railway reports that it may purchase two second-hand one-man cars or bodies.

Austin (Tex.) Street Railway, expects to purchase four safety cars employing features of their own design.

Washington & Old Dominion Railway, Washington, D. C., expects to build one 50-ton locomotive this year.

Tiffin, Fostoria & Eastern Electric Railway, Tiffin, Ohio, may possibly purchase a few freight trail cars this year.

Springfield (Mo.) Traction Company has received eight of the thirty-two cars which are being remodeled into pay-as-you-enter type.

Columbus, Delaware & Marion Electric Company, Columbus, Ohio, may possibly build several additional freight cars in its own shops.

Pennsylvania & Ohio Railway, Ashtabula, Ohio, expects some time this year to purchase one quadruple equipment for one interurban car.

Chicago, South Bend & Northern Indiana Traction Company, South Bend, Ind., lost its main carhouse in a fire recently. Nine city cars were burned at a loss estimated at $50,000. A car stalled on the track and prevented the employees from saving the others.

Washington Railway & Electric Company, Washington, D. C., and **Capital Traction Company**, it is reported, are to be ordered by the Public Utilities Commission to equip all their hand-brake passenger cars with air brakes. The same report states that there are more than 125 cars of the former company and but few of the latter company which will come under this ruling, all told at an estimated cost of $75,000.

Brooklyn (N. Y.) Rapid Transit Company, through its receiver Lindley M. Garrison, has been authorized by Judge Mayer in the Federal Court to cancel the contract of May 11, 1918, with the Jewett Car Company of Newark, Ohio, for construction and delivery of fifty car bodies for use on the surface lines at a cost of $266,000. The order recites that the contractor has gone into the hands of a receiver without completing the order, and authorizes the receiver to take steps to obtain needed equipment elsewhere. The order for 100 cars mentioned last week as being let to the Brill Company did not include these fifty cars.

Trade Notes

Delos F. Wilcox is engaged in practice as a consulting franchise and public utility expert with offices at 73 Gleane Street, Elmhurst, N. Y.

Edward H. Mays, president of E. G. Long Company, New York, will leave on March 1 for the Far East to give personal attention to his company's interests in Japan and China.

Epping-Carpenter Pump Company, Pittsburgh, Pa., announces that Theodore R. Hermanson, formerly of the Harrison Works of the Worthington Machinery Corporation, has become its works manager.

Western Electric Company has announced that D. J. Butts, manager of the Los Angeles branch since March, 1917, has been appointed sales manager at San Francisco. H. L. Harper has been transferred from Kansas City to take charge of the Los Angeles house.

Valentine J. Burger, D. S. C., first lieutenant, aviator observer with the French and American air forces, has recently returned to the Standard Underground Cable Company, where he resumes charge as the New York manager of exports. He was the guest of honor at a presentation luncheon tendered by the New York officers of the company on Feb. 13 at the Railway Club. C. J. Marsh, vice-president of the Standard Underground, acted as chairman, and with him were T. L. Wiley, Eastern manager, R. S. Hopkins, assistant Eastern manager, and other members of the New York construction, sales and office force. Lieut. Burger received the distinguished service cross, the French croix de guerre with palm and star, and is cited for oak leaf to the D. S. C., another palm to the French cross and for the Congressional medal of honor. He rendered repeatedly distinguished service under great personal danger and has been officially credited with three Boche planes.

New Advertising Literature

Wayne Oil Tank & Pump Company, Fort Wayne, Ind.: Booklet dealing with storage and distribution systems for oils, varnishes, gasoline, etc.

Wilson Welder & Metals Company, Inc., New York City: Bulletin on the "Repair of the German Ships," showing the use of plastic arc welding in placing these ships back in service.

Wilson Welder & Metals Company, Inc., New York City: Bulletin on the "Repair of the German Ships," showing the use of plastic-arc welding in placing these ships back in service.

Crescent Belt Fastener Company, New York City: Bulletin covering "The Crescent Principle of Belt Joining" containing a ready reference service chart for determining the correct type of belt fastener to use for any condition of work.

Track and Roadway

Calgary (Alta.) Municipal Railway.—The Calgary Municipal Railway is considering the construction of a single-track extension of the Center Street line to Sixteenth Street.

San Francisco-Oakland Terminal Railways, San Francisco, Cal.—The installation of loop service on all connecting lines, the replacement of light rails with heavy ones on all paved streets and the construction of new cars and reconstruction of old rolling stock are among the proposed improvements now being inaugurated by the San Francisco-Oakland Terminal Railways.

Peninsular Railway, San Jose, Cal.—About $100,000 is being spent by the Peninsular Railway on improvements to its line.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—Work will soon be begun by the Honolulu Rapid Transit & Land Company on the double-tracking of King Street from Alapai to Punahou Street. The construction of several extensions is under consideration by the company.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa.—The Waterloo, Cedar Falls & Northern Railway will install safety devices at its crossings.

New Orleans Railway & Light Company, New Orleans, La.—Efforts to establish an extension of the line of the New Orleans Railway & Light Company to the shipbuilding plant of the Foundation Company on the industrial canal were furthered at a recent conference held at the Mayor's office. It was practically decided to bring the matter before Judge Foster in the United States Court. Part of the extension has already been constructed, but work has been halted on account of the appointment of a receiver for the company. The extension would cost about $50,000.

Kansas City, Mo.—The Board of Public Works of Kansas City, F. E. McCabe, secretary, will receive bids until March 11 for the construction of the Twenty-third Street viaduct. The main viaduct will be approximately 1726 ft. long with sidewalk, roadway and separate space for car tracks; the Wyoming Street approach approximately 940 ft. long with sidewalk, roadway and car tracks in the center and the Frisco yard approach, roadway only.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—It is reported that the Kansas City, Clay County & St. Joseph Railway will construct an extension from St. Joseph to Omaha and from Excelsior Springs eastward, with Richmond as its first objective.

La Grange, Toledo & Eastern Railway, La Grange, Mo.—The Indiana Public Service Commission has authorized the La Grange, Toledo & Eastern Railway to issue $55,000 of common stock at par and $35,000 of bonds at par to finance the rehabilitation of that part of the defunct St. Joseph Valley Railway between La Grange and Mongo. This part of the old road connects at La Grange with a division of the Pennsylvania lines.

Toronto (Ont.) Railway.—It is reported that efforts will be made to complete the Pape Avenue line of the Toronto Railway this year.

Philadelphia, Pa.—At a conference held on Feb. 17 by Mayor Smith and William S. Twining, director of the Department of City Transit, it was decided that work on the Frankford elevated line will be resumed at once and will be pushed to completion as rapidly as possible. Permission has been granted by the Public Service Commission of Pennsylvania to complete that portion of the line on Front Street between Callowhill and Arch Streets where connection is to be made with the Market Street subway. Plans for this extension are well advanced and advertising for proposals for a portion of the work will be begun within a few weeks.

Prince Edward Island Railway, Charlottetown, P. E. I.—Third-rails are being installed on 60 miles of this company's line from Borden north to Emerald, thence east and west to Charlottetown and Summerside. Since the spring of 1918 progress has been steadily made in widening roadbeds, reinforcing or rebuilding bridges and culverts and laying the third-rail. The work at the beginning of December was 75 per cent finished and suspended for the winter. It is intended to resume work in the spring.

Saskatoon (Sask.) Municipal Railway.—The City Council of Saskatoon has under consideration the construction of an extension of the Saskatoon Municipal Railway at an estimated cost of $46,000.

Knoxville Railway & Light Company, Knoxville, Tenn.—Plans have been prepared and work will be begun early in April on the construction of a new reinforced concrete viaduct on Gay Street, crossing the Southern Railway tracks. It is estimated that the cost of the viaduct will be about $500,000. It is expected that the Knoxville Railway & Light Company and the Southern Railway will share their proportionate cost of the project.

Texas Electric Railway, Dallas, Tex.—It is reported that the Texas Electric Railway will take steps soon to carry out its deferred project of extending its line from Waco south to San Antonio, via Austin, a distance of about 185 miles. The plans involve the construction of power station in the city of Austin.

Mineral Wells, Tex.—W. J. Walder of Mineral Wells and associates are promoting the construction of an interurban electric railway between Fort Worth and Mineral Wells, about 65 miles. It is possible that the proposed line may be extended as far west as Cisco.

Power Houses, Shops and Buildings

Pacific Electric Railway, Los Angeles, Cal.—Plans have been approved by the Board of Harbor Commissioners for the new passenger and freight station to be erected at San Pedro by the Pacific Electric Railway. The new structure is expected to be completed within seven months and is estimated to cost about $50,000.

Cairo Railway & Light System, Cairo, Ill.—A new 2000-kw. turbine generator has been ordered by the Cairo Railway & Light System from the General Electric Company, Schenectady, N. Y.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—Fire recently destroyed the main carhouse of the Chicago, South Bend & Northern Indiana Railway. Nine city cars were burned at a loss which is estimated at $50,000.

Boston, Mass.—Sealed bids will be received by the Transit Department of the City of Boston until Feb. 25 for furnishing and installing roof lights in the Massachusetts Avenue surface station of the Boylston Street subway. Specifications and forms of contract can be obtained at 15 Beacon Street.

London & Port Stanley Railway, London, Ont.—A new station will be built by the London Railway Commission at St. Thomas. The commission will also alter the present station of the London & Port Stanley Railway at Port Stanley and build a new freight house.

London, (Ont.) Street Railway.—The London Street Railway contemplates making some alterations and slight extensions to its shops.

Philadelphia & Western Railway, Upper Darby, Pa.—Work has recently been begun by the Philadelphia & Western Railway on the construction of two new electric substations at Villa Nova and Beechwood, Pa. The structures are estimated to cost approximately $20,000 each. H. P. Friend, Norristown, has the contract for the erection of the buildings.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—The Charleston Consolidated Railway & Lighting Company is considering the increase of its common stock by $1,500,000 to pay for extensive improvements recently made and now being installed. The company is enlarging its power house and completing a duplicate high tension line from the power house to the Port Terminal at North Charleston at an estimated cost of about $700,000. It has just completed the installation of a third generating set at its gas plant, increasing its capacity about 50 per cent.

Virginia Railway & Power Company, Norfolk, Va.—A new generator is being installed at the Reeves Avenue power plant of the Virginia Railway & Power Company.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 53 New York, Saturday, March 1, 1919 *Number 9*

The Program of the Mid-Year Meeting Will Be Found on Page 412 of This Issue

Standardizing the Various Committees on Standards

THE standardization work of the American Electric Railway Association should be benefited by the organization of the American Engineering Standards Committee (which will probably become known as the A. E. S. Committee), to which Comfort A. Adams gave considerable space in his A. I. E. E. presidential address last week. The scope and plan of this committee are covered in an article elsewhere in this issue. The formation of this committee is in line with what is being done in other countries, and the work of the committee will be a success from the start if the co-operation of all interested societies is enlisted at once. An enormous amount of time and energy has been put into the department of specifications of one sort and another in the hope that these would prove useful in reducing costs, and undoubtedly the total results secured have been very great. That they have not been as great as hoped or expected is illustrated by the experience of the American Electric Railway Engineering Association, which is typical.

One trouble in all of this work, as pointed out by Professor Adams, is "that in many cases the committees are made up of men who do not realize that a standard must not only be rational and technically correct but it must also be acceptable to all those interested in its manufacture and use." In the case of the railway association it has not been so much a matter of the personnel of the committees as a failure on the part of the industry to realize in a practical way what can be accomplished from reasonable uniformity in design. There has not, of course, been the urgent necessity for standardization in electric railway work as in some other lines. For example, the steam roads simply had to get together on couplers and other car details on account of the interchange of freight cars. The automobile manufacturers had to do something of the same kind to enable repairmen to maintain cars of all makes with a reasonable stock of supplies. In the electric railway field the benefits seem more remote and therefor less tangible.

To return to the quotation given above, let us consider further the expresion, "a standard . . . must also be acceptable to all those interested." Now the proof of acceptability is use, not mental assent to theoretical value. A "standard" is a standard only when things are made to standard specification. It would be as idle to expect a musical or literary composition to be a "classic" by so labeling it as to expect a specification to become standard by the same process. A standard must be a crystallization of existing tendencies in practice if it is to live and serve its purpose. To paraphrase an old conundrum: "When is a standard not a standard?"—Answer: When nobody uses it.

Painting Economies Are Increasing

THERE are very few railways that have been able to increase the number of their cars in proportion to the increase in passenger traffic that has occurred during the past two years. This has caused an increased demand by the transportation department that all cars possible be made available for rush-hour service. The mechanical department has thus been placed at a decided disadvantage in carrying out its car-painting schedule, as it is difficult to get the equipment into the shops and when once started all work must be hurried so as to get the cars back into service again at the earliest possible moment. Proper protection of all cars, and especially of steel cars by painting, is very important. Several roads have simplified their painting considerably by eliminating striping and lettering; simple monograms have been substituted for the long names of railways, and numbers have been omitted from the body of the car in many instances. The use of house paint of a uniform color which does not show dirt readily is being adopted at least to some extent. Several roads have adopted battleship gray for their cars and effected considerable savings. Oil enamel has come into general use instead of the older methods of applying a primer with several coats of lead to be followed by rubbing coats and finishing varnish.

The spraying system of painting has also been adopted by several roads. This permits of the work being done in a much shorter time, and many places inaccessible to a brush are thus reached. The amount of paint used with the spraying system is undoubtedly greater than if cars are painted by hand, but this slightly increased cost will be more than paid by the revenue resulting from the earlier return to service.

The removal of paint from cars is another item on which time can be saved by careful selection of equipment and the use of approved methods. In Omaha by using a type of torch for burning off paint with a single hose line instead of with hand torches previously used, the time taken for this part of the work was reduced 40 per cent. Old methods of painting cars are being rapidly superseded by more rapid and simpler practices. The long standing tradition that electric railway cars must be painted and varnished much like a piano is not in harmony with the present times of efficiency and economy.

Safety Cars Making Good in Connecticut

EVIDENCE continues to accumulate that the safety cars put in operation in Bridgeport on Feb. 2 are most popular with the public, the men and the company. As described in our issue of Feb. 15, the line on which they run is not in the outskirts but extends through the center of the city where the streets, as in many other cities in New England, are quite narrow. Nevertheless the cars maintain their schedule and make such good time that they are winning traffic from those who formerly walked or rode in private automobiles. The Hartford press is already calling for their installation, at least experimentally, in that city, to which one of the Bridgeport papers replies: "All the Birney cars that Hartford does not want, Bridgeport will take." The success of the light car was presaged by experience in the Southwest, but satisfaction over the first extended trial in New England is none the less welcome.

Of course the demonstrated value of the safety car for certain routes should not tempt managers to apply it to conditions to which it is not adapted. On heavy traffic lines in large cities two men per car are still recognized as necessary by the advocates of the safety car. Nor should the car be considered as in any way removing the necessity for a higher fare than that which was adequate before the war conditions raised the prices of material and labor. The car helps a railway to give improved passenger service on a route for which it is adapted, but it should not be expected to effect miracles in the financial condition of the operating company. In this connection it might be said that the Connecticut experiment has demonstrated that the motorman on a safety car has no difficulty in collecting a 6-cent fare. The fact that it consists of two coins has not materially affected the speed of the safety cars.

Complaint Handling Makes Friends or Enemies—Which Do You Want?

THE Illinois Public Service Commission, as a result of its five years' experience, has been much impressed with the influence of complaint handling upon public relations. As we noted in a recent issue, the commission has directed the attention of the State utilities to this point. Its action in so doing is to be commended, not because utilities in Illinois need the reminder any more than those in other states, but because the commissions should be encouraged to make use of their function of double representation to bring the public and the railways into a better understanding.

The specific suggestion of the Illinois commission cannot be urged too strongly. Complaints in most cases are the beginning of an intercourse which will result in the making of friends or enemies. The choice in the main lies with the company. A prompt, sympathetic acknowledgment, followed by a just investigation and a prompt, frank explanation, will probably satisfy the complainant and convince him of the company's sincerity and honest efforts to serve. But what does the other course do?

Three years ago a friend of ours sent in a legitimate complaint regarding poor service and discourteous treatment by employees on an Eastern railway. Two weeks later he received a stereotyped reply to the effect that the complaint had been referred to the official who had "special charge" of such relations with the public. Since then—silence, in spite of a repetition of the complaint. Perhaps the case has not yet been reached on the company's complaint docket; be that as it may, an enemy has been made. Need we add that this company to-day is in general public disfavor? Need we say that a large part of this ill-will is undoubtedly due to such examples of complaint-handling stupidity?

But it may be argued that the company is not at fault for what this "public relations" official failed to do. It is true that an executive and a board of directors cannot keep in touch with the details of such work, but the vital character of all relationships with the public permits no excuse for a lack of general supervision by those in authority. Certainly when public hostility is growing yearly and no effort is made to lessen it, the blame lies at the door of the highest.

Public Misconceptions Cannot Simply Be Wished Away

ELECTRIC railways are widely distrusted by the public. This may be stating conditions with excessive harshness, but not to any great extent. Observant operators have during the last two years noticed on the part of the public an attitude of decided hostility which has hindered if not prevented the procuring of many higher fares. About 348 fare increases have indeed been granted, but many petitions have been refused and many others have been allowed only after much delay and strife. Why is this?

This question permits of various answers, according to the class and the experience of each respondent. Some striking answers are given in the address made by R. T. Sullivan before the Central Electric Railway Association, abstracted this week, and more are contained in the replies, published this week and last, to the questionnaire which this journal recently sent out to public service commissioners, mayors, representatives of chambers of commerce and other men interested in civic affairs. The answers are not sufficiently numerous to warrant the drafting of very definite conclusions, but on the whole they seem to be centered around a few general ideas worthy of mention.

To take Mr. Sullivan's remarks first, he frankly says that electric railways have shown the lack of a definite and a continuous policy in the past; that their publicity has too often consisted of cries for succor in emergencies rather than of a constant telling of all the facts in times of calm as well as storm, and that some deeds of the past are not to be commended. He avers, however, that frequently railway men are too ready to take the blame for sins of bygone days; that political attacks and yellow journalism have created and fostered public ill-will against the railways, and that the car rider's interest in service is purely selfish while the railway desires the good of the largest number.

While admitting that the electric railway industry has internal faults, therefore, Mr. Sullivan points out emphatically some external causes of public distrust. He undoubtedly speaks the truth, but—here's the vital point—the public is less interested in its own faults than in the believed faults of the railways. The thinking part of the public will confess the injustice and the impropriety of certain methods of handling utilities, but the public as a whole lays the greatest blame for present conditions upon internal defects of the electric railway industry.

Do you think that this is exaggeration? Read the replies to our questionnaire. The points which public representatives believe the public has in the front of its mind are these—that many railways are overcapitalized; that they held on to the 5-cent fare to make excessive profits in the past and can well stand temporary losses now, and that they have in the past rendered some form of inadequate and inefficient service. Therefore the public's idea of correction is more of a punitive character than that of assisting the railways to get on their feet again. In most concrete cases the charges are based only upon erroneous ideas and deep-seated prejudice, as many public leaders admit behind the scenes. But the public believes the charges to be true, and it requires more than a mere denial of them on the part of the railways to convince the public that retributory treatment is not justified.

The public has a certain fundamental antipathy against doing any more than it must to aid any monopoly, but its hostility to electric railways goes beyond this. If we had to sum up in two words the reasons for this general hostility, as portrayed by the replies to our questionnaire, we would unhesitatingly choose "ignorance" and "distrust." And what do the public representatives suggest as the proper means for overcoming these states of the public mind? Facts, and a conduct that creates and maintains confidence. Note carefully this double answer, for it is characteristic of the public point of view. Publicity is deemed to be fully effective only when it is backed up by the rendition of adequate service and the maintenance of a genuine policy of public co-operation.

The public must be educated, to be sure, but it has its own ideas about the process. It wants to be able to find out the facts instead of being deluged with mere argument. It wants its education to be through a consistent 365-day policy of facts supported by performance and not through a sudden splurge of publicity only when the company is in difficulty. It wants to know what the service costs and where the money goes. It wants to know the reasons, if adequate service cannot be given. It wants a surfeit of information and evidences of a desire to serve and to please. That is the price of public good will.

One word more. As Mr. Sullivan says, unfortunate is the company which cannot see its way clear to a consistent policy of publicity until it finds itself in a tight place. The last two years has produced many such unfortunates. Have they fully learned their lesson? We hope so, for doubly unfortunate would be such a company if it should now give up its work for better public relations. There is only one thing worse than a public neglected, and that is a public used and abandoned.

A Decision in Which Both Sides Lose

THE people of Des Moines appear to have won a hollow victory in the decision of Federal Judge Wade denying an increased rate of fare and holding that service must be adjusted to the income of the electric railway property. The decision was referred to in our issue of Feb. 15, and while it is a complete indorsement of the sanctity of a franchise agreement it also makes clear that a contract works both ways.

The court's ruling interprets two sections of the ordinance of 1915 under which the receivers for the company hoped to be released from the established fare of 5 cents or six tickets for a quarter. The receivers claimed that the service demanded by the city could not be rendered under present conditions from the present income. The federal judge held that while this claim if true is most unfortunate, he had no authority to modify the provisions of the contract. This meant, he explained, that the people are bound by the agreement as well as the company, "and when they get that service which can be paid for under the provisions of the contract, they must be content." Announcement of the court's views was followed by a statement of the company officials that a general curtailment of service would go into effect in the near future.

A regrettable feature of the Des Moines situation is that this modern type of ordinance, containing many excellent features, the result of a long period of negotiations, should so soon fall short of the purpose contemplated by its framers. Its weakness, of course, was the establishment of a flat rate of fare, and now that the court has emphasized the folly of such an arrangement we believe the car riders will be convinced that they have won no real victory in having the contract declared sacred. This view is already taken by the Des Moines *Capital* which says: "The real loser will be the patron, and when the patron loses the merchant naturally suffers his proportion of the loss, which will be exceedingly great. It is a most unfortunate result, after all of the years of effort Des Moines has made to get a real solution of its street railway problem."

Adequate transportation is the life-blood of a community. Excess service is a waste and insufficient service is a detriment. It is the part of good operating policy to eliminate non-productive lines, but when the curtailment of service is necessary on other routes because the patrons are unwilling to pay for what they are getting, the result must be unfortunate for all concerned.

The people who must put up with inferior service will, of course, be subjected to inconvenience, and business interests are bound to suffer in every district where trade is driven away because the facilities for transportation are allowed to deteriorate. We hope the people of Des Moines will not be too long in finding this to be true. Their better judgment must prevail after an experience with inadequate facilities, and if a new and more equitable deal between the company and the city is the outcome the decision of Judge Wade will have proved beneficial to all parties in this unfortunate dispute. We look for a speedy readjustment of the fare controversy.

Handling Electric Railway Freight by Train Loads

(In order of appearance)

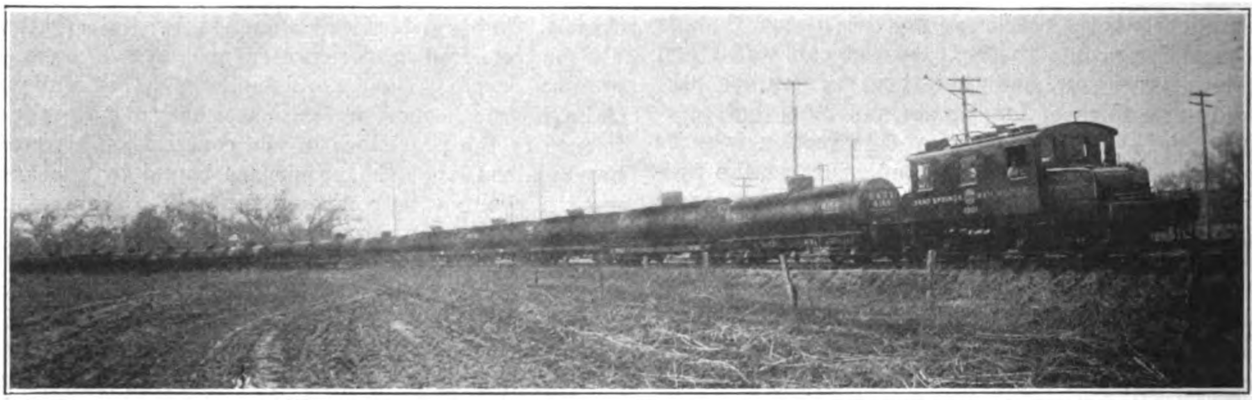
Waterloo, Cedar Falls & Northern Railway.

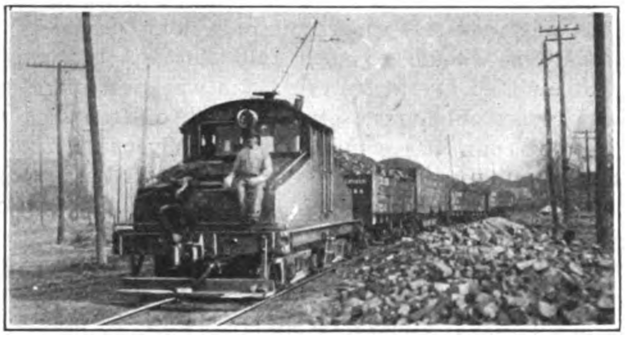
Sand Springs Railway.

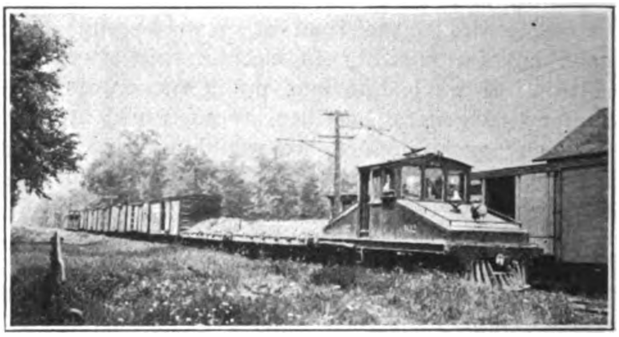
East St. Louis & Belleville Electric Railway.

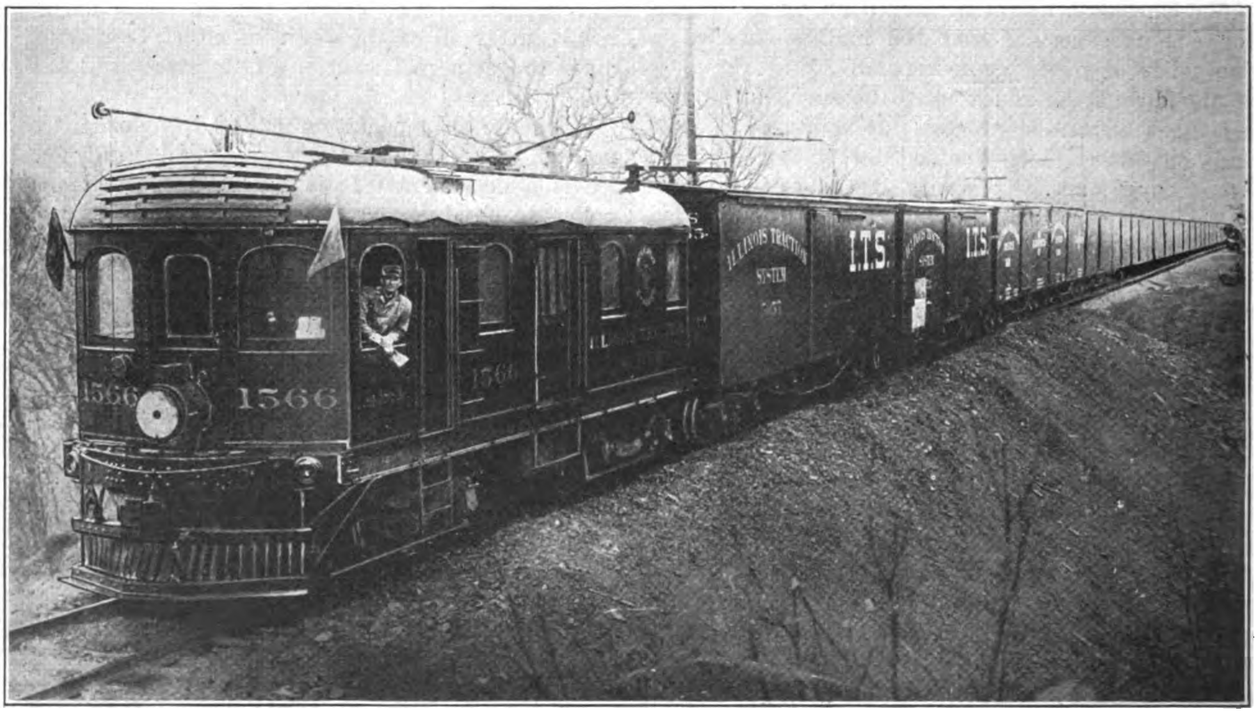
Toledo & Western Railway

Illinois Traction System.





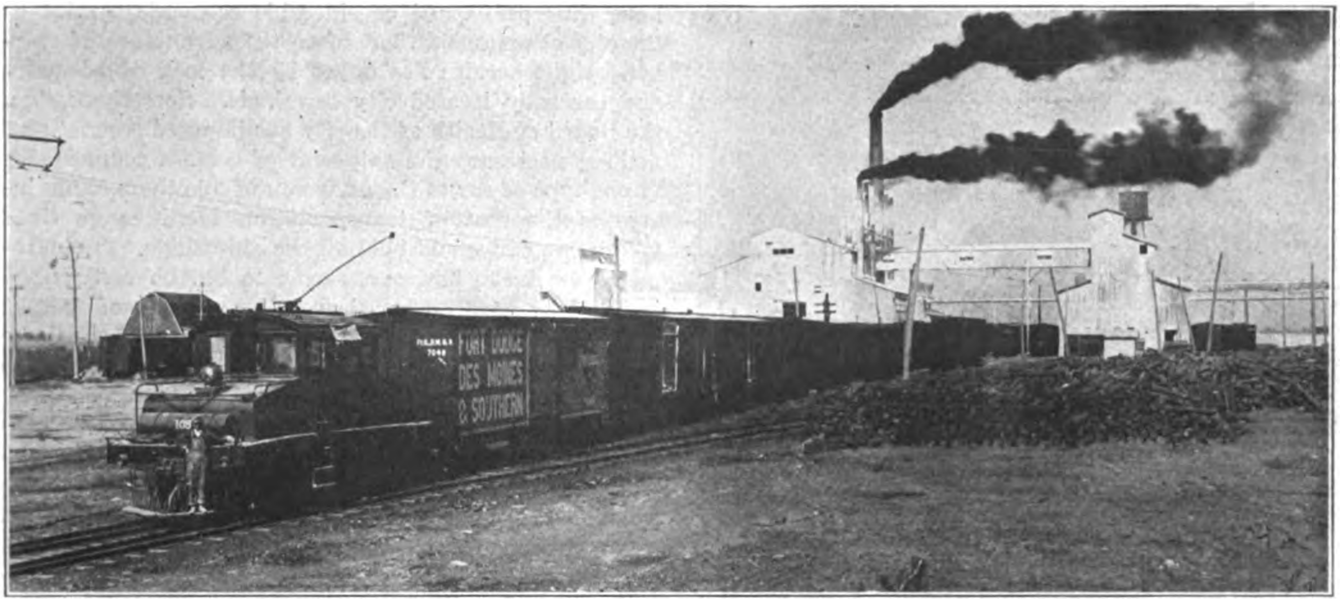




1566
ILLINOIS TRACTION SYSTEM
I.T.S.

Hints for the Freight Operator*

BY A. B. COLE
Westinghouse Electric & Manufacturing Company



HAULING FREIGHT ON THE FORT DODGE, DES MOINES & SOUTHERN RAILROAD

Market Train Service Offers Lucrative Field for Electric Railways—How Interchanged Equipment Should Be Cared For—When Motor Cars, Trailers and Electric Locomotives Should Be Used—Proper Signaling Is Necessary for Safe Freight Operation

MILK HANDLING is undoubtedly one of the oldest forms of freight service on electric lines, and milk is generally one of the first commodities to be handled by any line taking up freight operation. Almost all electric railways have milk service, and this service is so valuable to the communities served that its loss would be of considerable monetary value. Consider, for example, the milk traffic into Indianapolis. The interurban lines entering this large center transport about two and one-half times as much milk and cream from the surrounding territory as do the steam railroads. During one year an interurban line carried 191,000 cans of milk and cream into the city, while all the steam lines together brought only 186,000 cans. This tremendous traffic is probably due to the frequent movement of electric as compared to steam trains, and also to the accessibility of the electric lines to the farms. The electric lines not only give frequent and fast service but also load milk at cross roads.

One way for an interurban railway to increase its freight revenue, without materially affecting the quantity of freight handled, is to see that all milk rates over the various divisions are consistent. On many lines inconsistencies often exist which involve discrimination and cause the companies to lose considerable money.

To supplement a milk and dairy service, one of the most natural services is that given by market trains. This applies, of course, to interurban lines that operate in territory having a number of truck and fruit farms. Market-train service has proved lucrative wherever tried on steam railroads, and undoubtedly interurbans, on account of their accessibility to the farms at one end and the city public at the other, could in many instances do a similarly profitable business. In general, however, this market-train service would not interest growers whose production was sufficiently large to enable them to ship in carload lots. Nor would it be of any advantage to those communities where farmers were co-operatively united to ship in carload shipments the output of many farms devoted to the products of the same commodity.

The service is designed primarily for small producers. Fruits and vegetables on many farms are maturing at intervals throughout the summer. The dairy products (eggs and poultry) and such commodities as apples and potatoes usually can be shipped throughout the year when ready for shipment or as the market demands. In all cases the producers would naturally combine their shipments into carload lots whenever possible.

The market nearest to the small farmer is generally the best for him, especially if he produces a great variety of commodities and does not specialize on one or two. As nearness to the market enables him to keep in close touch with its demands, he can quickly adjust his supply to the demand. The electric railway plays a most important part in making the market accessible to the farmer irrespective of the location of his farm, provided it is within a distance of 100 miles.

In other words, the small farmer is really doing a re-

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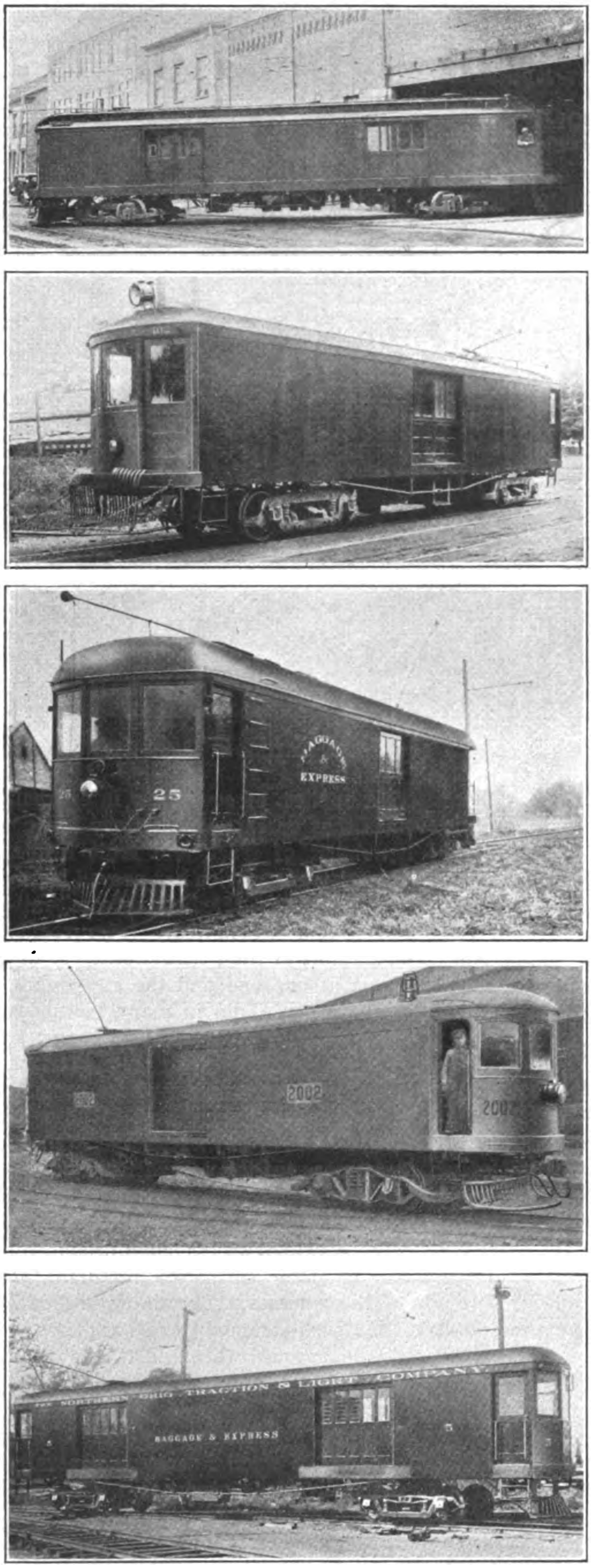
*Other articles by Mr. Cole in regard to freight hauling by electric lines were published in the ELECTRIC RAILWAY JOURNAL of May 11, 1918; Jan. 4, 1919, and Feb. 1, 1919.



TYPICAL FREIGHT MOTOR CARS IN ELECTRIC RAILWAY SERVICE

New York State Railways.
Interurban Railway & Terminal Company.
Waterloo, Cedar Falls & Northern Railway.
Detroit United Railway.
Northern Ohio Traction & Light Company.

tail business when compared with the large producer. Since the retail market is adjacent to or near the city terminal of the electric railway, the small producer by using the interurban can do a retail business in every sense of the word and sell direct to the consumer in spite of the distance of his farm from the city.

In some sections of the country electric interurbans have thus performed considerable economic service to the city communities, but often the advantages of market-freight service are offset by the lack of adequate and centrally located city terminals. Sometimes, too, the Board of Health of the city has imposed restrictions, making necessary the shipment of certain commodities in one type of car to the exclusion of all others. This increases the cost of transportation facilities on lines where one car would hold all the shipments. The paramount obstacle, however, seems to be the restrictions imposed by local authorities on the running of freight cars through city streets, but even this can be overcome by proper salesmanship on the part of the traffic manager.

These are merely a few of the objections that are found to exist in connection with instituting a market-train service. Without electric service, however, the small farmer is dependent either upon the local freight train service of the steam railroad, which is too slow, or upon express service, which is relatively too expensive. Therefore there seems to be a possibility for considerable development along the line of electric railway market service.

HOW LOCAL SERVICE SHOULD BE HANDLED

The handling of local freight train service is a most important transportation problem. As conditions exist throughout the country, it is the immediate problem that electric railways must solve if they expect ever to meet the freight situation successfully. The steam railroads are passing up the local or short-haul freight and in many instances turning this over to the motor truck.

Adequate passenger service generally supplied by electric railways enables traveling salesmen to make several towns in one day. This always increases the merchandise sales of the jobbing houses and thus in many cases assists in building up carload shipments for points along the line.

In giving local freight service, an electric railway must remember that its patrons from the millionaire wholesaler down to the cross-roads storekeeper watch and comment upon such service. The storekeeper is anxious about his small shipment, just as the carload dealer looks after his in seeing that it is not delayed in transit. The delivery of merchandise or l.c.l. shipments promptly and in good condition assists unquestionably in keeping down criticism and, above all things, in cutting down claims.

The freight loaders should understand the handling and the storing of commodities so that the train crew can unload the freight promptly without searching the cars over and possibly carrying the shipment by. A record should be made of all cases where the packages show signs of rough handling. Any packages bearing evidence of pillage should have their contents carefully collected, and a proper record should be made for future reference when claims are presented.

Each freight house along the line should be provided with a door of the correct height according to the cars. It should also have a gang plank long enough to reach from the car door to the freight-house door so that freight for inland towns and freight which cannot be delivered on the day of arrival can be safely and easily placed in the house; likewise in order that freight from the house may be so placed in the car. Usually the station agent will have some arrangement with the town draymen to be on hand if the arrival time of local trains can be depended upon, and these men will handle a lot of freight direct from the cars to the consignees. Of course, where night operation prevails (which must be resorted to by electric railways), it is necessary for the freight in many cases to be placed in the freight-house by the crew.

The crews for local freight should be among the best in the service as far as the employees' schedule will permit. By a little diplomacy the employing officer can secure good experienced men on these trains. They should be able-bodied men weighing at least 150 to 160 lb. The conductor should be a man more than fairly educated, not easily excited, polite, able to render his reports accurately, and immune from the charge of laziness. He should also have some executive ability in order to secure the full support of his motorman and other members of his crew if any.

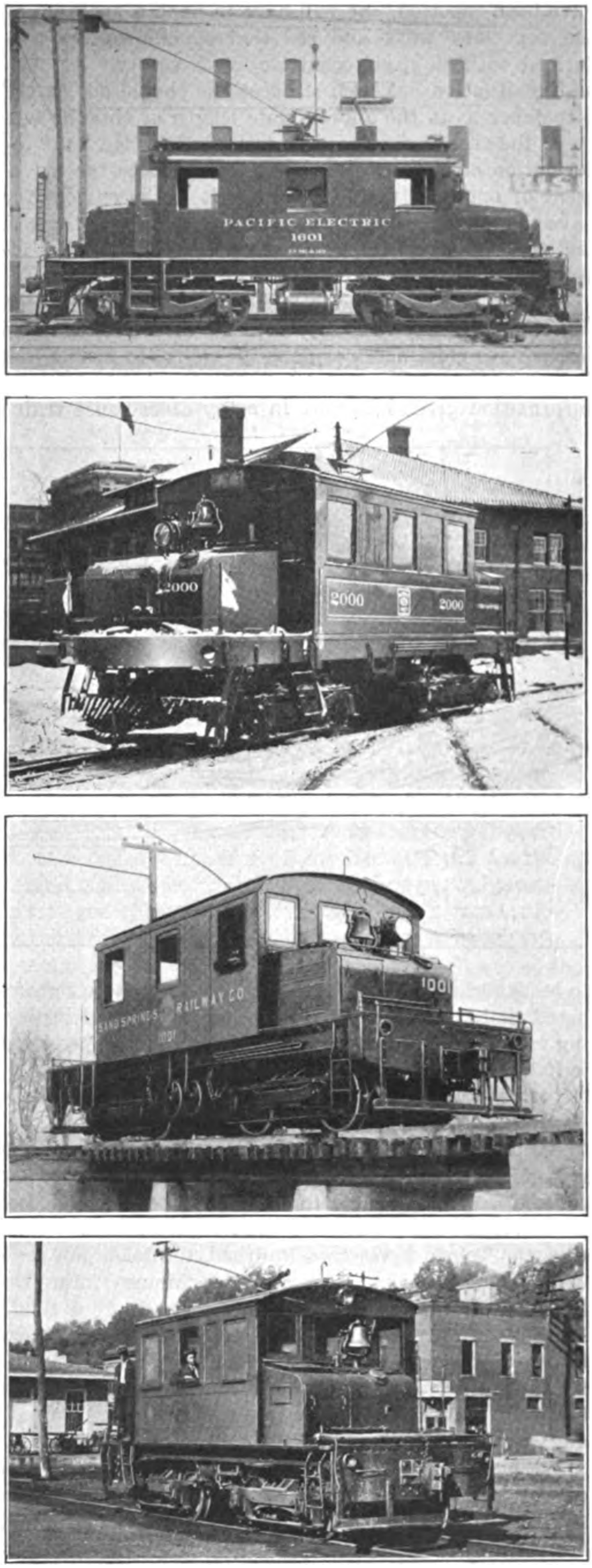
Accidents should be kept down to a minimum. This especially refers to switching at stations to avoid collisions with vehicles on crossings, laborers loading and unloading cars on industry tracks, children playing around the station grounds, and passengers in general.

On a railroad where sufficient traffic prevails and where the "local" is in the form of a long train operated during the day, the yard master should see that the cars are properly placed in the train and in good condition. This is necessary so that when the conductor checks the train, he will not have to go to the office and advise that there is a wrong car in the train or one that must be "set out" on account of some defect. Either of these conditions might result in considerable terminal delay and overtime.

Usually the local crew does all the station switching up to where it meets the train running on the opposite local run. It moves all intermediate loads and as far as possible bunches through loads originating at way-stations for through freight or "drags" to pick up without switching at designated points.

When the local trains are of any length, the agents can be of great assistance in expediting movement by telephoning to the conductor in advance the amount of switching in order that the crew may be informed as to the character and the volume of work and can arrange that work may be saved farther down the road in making "setouts" and "pickups." The agent's helpers and operators should be lined up at the station upon the arrival of the local train and help as much as possible in handling the freight.

The conductor should be on the locomotive or front motor car when approaching stations where switching is to be done, and by the time the merchandise cars



TYPICAL INTERURBAN FREIGHT LOCOMOTIVES ON ELECTRIC LINES

Pacific Electric Railway—60 tons.
Detroit United Railway—50 tons.
Sand Springs Railway—50 tons.
Lewisburg & Ronceverte Electric Railway—30 tons

have been "spotted," he will have in hand a program of the necessary work and see that it is properly performed with all speed consistent with safety. As soon as the situation has been sized up, he should advise the dispatcher as to the approximate length of time he will be at the station, in order that the latter may have information on which to base his figures as to the movement of opposing trains. Usually it is the custom for a local crew to take dinner at some convenient place, and the conductor should make this arrangement in advance and notify the dispatcher.

In all cases the dispatcher should receive notification of all movements and any advance information as to prospective movements or delay to traffic, to enable him to fortify himself against delays of many kinds. Wrong information given him may in many cases cause trains to be "knocked down." In every case it must be remembered that the dispatcher is as much interested in having trains move promptly over any division as any other individual connected with the road.

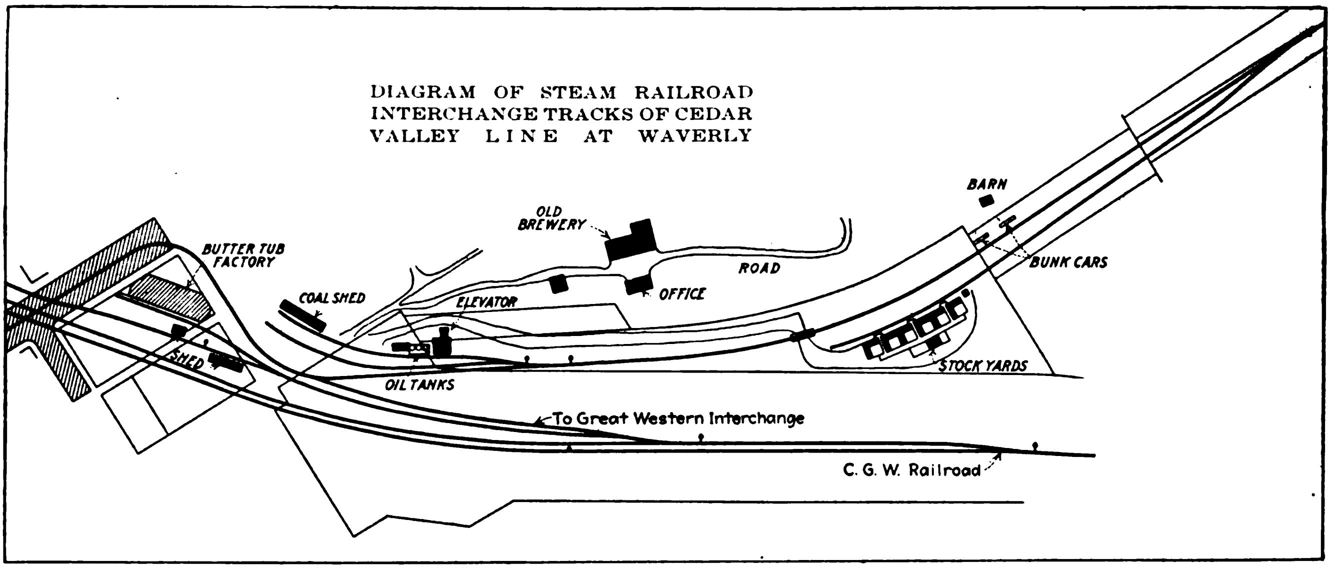


DIAGRAM OF STEAM RAILROAD INTERCHANGE TRACKS OF CEDAR VALLEY LINE AT WAVERLY

INTERCHANGING WITH STEAM RAILROADS

A number of electric railways throughout the country enjoy full interchange privileges with the steam railroads. Among these lines are the Fort Dodge, Des Moines & Southern Railroad, the Niagara Junction Railway, the Toledo & Western Railroad, the Michigan Railway, the Interurban Railway (Des Moines), the Detroit United Railway, the Chicago, Lake Shore & South Bend Railway, the Waterloo, Cedar Falls & Northern Railway and a number of others. This service is highly desirable. In many cases interchange business has been found to be very profitable, and it is worth due consideration by all electric lines.

To handle steam railroad interchange, proper facilities must be laid out at important checking points on the electric lines. Usually these interchanges take the form of a steam road delivery track and an electric railway delivery track, having leads running from both the steam and the electric lines at each end of the interchange. The length of interchange depends entirely upon the car capacity demanded by the volume of business.

Another type of interchange is that which is merely either a side track, or part of a wye between steam and electric lines, of one or two cars capacity. A typical example of steam railroad interchange, shown in the accompanying diagram, is that of the Waterloo, Cedar Falls & Northern Railway, which was one of the pioneer electric lines to compel steam railroads to interchange freight with electric lines. More than 70 per cent of the switching from steam roads entering Waterloo is performed by this line.

Many of the 155 factories of Waterloo are located on the electric belt line belonging to the Cedar Valley road. Moreover, a 60-mile branch of the electric line from Waterloo to Cedar Rapids forms a feeder for the steam lines entering Cedar Rapids. There the Cedar Rapids Terminal & Transfer Company receives traffic from the electric and steam lines, distributes the shipments and handles local switching. Thus by this transfer line the several steam roads entering Cedar Rapids are able to enjoy from the northern territory business which they were unable to receive prior to the construction of the Cedar Valley road.

At Waterloo interchange connections are made with the Illinois Central, the Chicago, Rock Island & Pacific and the Chicago Great Western Railroads. At Waverly such connections are made with the Omaha Division of the Chicago Great Western; at Cedar Falls, with the Chicago Great Western Railroad, and at Cedar Rapids, with the Chicago, Milwaukee & St. Paul Railway, which handles all the cars to and from the Chicago & Northwestern, the Chicago, Rock Island & Pacific and the Illinois Central Railroads, for points served from Cedar Rapids as well as for industries in Cedar Rapids.

Roads doing the standard steam-road business understand, of course, that all interchange of equipment comes under the M. C. B. rules. In operating interchange service, therefore, it is very important that the electric railway also obey these rules.

Proper account must be made of all car repairs, as the rules hold the car owners responsible for repairs made necessary by ordinary wear and tear in service. The company handling the cars is responsible for damage done by unfair usage, derailment, etc., and must

TABLE I—FREIGHT MOTIVE POWER AND CAR EQUIPMENT DOING A MAN'S SIZE FREIGHT BUSINESS ON A 100-MILE ELECTRIC RAILWAY

Freight Motive Power Equipment			Motors			Service		Body			Trucks	Freight Car Equipment					
Number of Units	Type	Total Weight in Pounds	Gear Ratio	Hp.	Volt	Capacity in Tons	Class	Width	Length	Wheelbase	Wheel Diameter	Number of Cars	Type	Capacity in Pounds	Service	Body Length	Truck Wheels
1	Double-truck locomotive	120,000	16:57	250	650 1300	†800	Fast freight....	9' 1"	35' 0"	7' 6"	36"	20	Stock........	60,000	General interchange freight	36' 8"	33"
1	Double-truck locomotive	120,000	16:57	250	650 1300	†800	Fast freight....	9' 1"	35' 0"	7' 6"	36"	40	Gondolas....	100,000	General interchange freight............	40' 0"	33"
1	Double-truck locomotive	120,000	16:57	250	650 1300	†800	Fast freight....	9' 1"	35' 0"	7' 6"	36"	50	Automobile box	80,000	General interchange freight	40' 8"	33"
1	Double-truck locomotive	120,000	16:57	250	650 1300	†800	Fast freight....	9' 1"	35' 0"	7' 6"	36"	6	Refrigerator..	40,000	L.C.L. merchandise	35' 0"	33"
1	Double-truck locomotive	120,000	16:57	250	650 1300	†800	Fast freight....	9' 1"	35' 0"	7' 6"	36"	35	Flat.........	60,000	Interchange freight, stone, gravel, etc.	36' 0"	33"
1	Double-truck locomotive	95,000	17:73	100	650	*500	Switching......	9' 8"	33' 4"	6' 6"	33"	2	Four-wheel cabin car	....	Main line..........	......	33"
1	Double-truck locomotive	83,400	16:82	75	650	*500	Switching......	9' 0"	30' 0"	6' 0"	33"	1	Four-wheel cabin car	....	Main line..........	......	33"
1	Double-truck package car	80,000	16:73	90	650 1300	*500	‡Freight—all lines	9' 2"	53' 2"	6' 11"	33"	1	Eight-wheel caboose	....	Main line..........	42' 0"	33"
1	Double-truck package car	80,000	17:58	100	650	*500	‡Freight—650-volt only	9' 2"	53' 2"	6' 6"	33"	6	Box.........	40,000	On company lines only	34'	33"
1	Double-truck package car	56,000	17:69	40	650	....	Freight—650-volt only	9' 0"	52' 2"	6' 3"	33"	13	Box.........	40,000	Bunk cars.........	34'	33"
1	Double-truck trap car	32,200	17:69	40	650	§60,000	L.C.L. freight..	9' 8"	41' 0"	5' 6"	33"	..	....	....	....	......	....
1	Double-truck trap car	32,200	15:71	40	650	§60,000	L.C.L. freight..	9' 8"	41' 0"	5' 6"	33"	..	....	....	....	......	....

† Continuous rating on 1 per cent grade; full speed, 1300-volts; half-speed, 650-volts.
* One-hour rating.
‡ Also used for special train movements requiring baggage space with coach.
§ Pounds.

provide the proper loading and handling for cars interchanged.

On the Cedar Valley road two inspectors are located at Waterloo and one at Cedar Rapids to facilitate interchange inspection. They look over all cars passing their respective interchanges and make out daily interchange reports to the master mechanic. If a car needs repairs, the inspector notes the trouble in the repair book, a record from which is sent to the master mechanic each month. Cars that cannot be repaired at the interchange, or those requiring heavy repairs, are "carded" according to M. C. B. rules and disposed of either by turning them over to the receiving road or by sending them to the Cedar Valley shops.

On the "rip" track in the shop yards all defective cars of the electric line are placed in first-class condition. Repairs are made according to the "defect" cards on the rolling stock. "Bad order" cards are placed on cars that should not be reloaded but sent home, if possible.

At interchange points trainmen inspect the cars. Their daily interchange report is sent to the master mechanic. If the train crew makes repairs (such as installing new air hose, knuckles, etc.), a trainmen's repair card is made out. This card for the master mechanic describes the repairs made.

In general, repairs are made by inspectors and trainmen as far as possible. If they cannot be so made but can be handled by one or two car repairers with tools, such employees are sent out and the car is not brought onto the "rip" track. Thus unnecessary movements are avoided.

Once every month there is a settlement due to interchange repairs and also a settlement on the per diem basis in accordance with the standard practice of steam railroads. (This has been abandoned during the government control.)

3000 FREIGHT TRAILERS NEEDED

One of the most important needs of electric railways is sufficient freight rolling stock. This does not necessarily apply to the motive-power rolling stock, but to trailer cars. If from 2000 to 3000 electric freight trailer cars could be distributed over the electric lines, the electric railway freight situation would be considerably improved.

Many lines say that they have all the freight that can possibly be handled, and the overflow goes to the

TABLE II—GENERAL DIMENSIONS OF STANDARD FREIGHT CARS OF UNITED STATES RAILROAD ADMINISTRATION

	40-Ton Double Sheathed Box	40 and 50-Ton Steel Frame Single Sheathed Box	50-Ton Steel Gondola	50-Ton Composite Gondola	70-Ton Steel Gondola	55-Ton Hopper	70 Ton Hopper
Length, inside..........	40 ft. 6 in.	40 ft. 6 in.	41 ft. 6 in.	41 ft. 6 in.	46 ft. 6 in.	30 ft. 6 in.	39 ft. 6 in.
Width, inside..........	8 ft. 6 in.	8 ft. 6 in.	9 ft. 4½ in.	9 ft. 1½ in.	9 ft. 6 in.	9 ft. 5½ in.	9 ft. 5½ in.
Height, inside....	9 ft. 0 in.	9 ft. 0 in.	4 ft. 8 in.	4 ft. 8 in.	3 ft. 0 in.	....	....
Length over striking plates..........	42 ft. 1½ in.	42 ft. 1½ in.	42 ft. 10½ in.	42 ft. 10½ in.	48 ft. 7 in.	31 ft. 11 in.	40 ft. 5 in.
Width over eaves..........	9 ft. 4 in.	9 ft. 4½ in.	....	....	....	....	....
Width over all..........	10 ft. 2½ in.	10 ft. 2½ in.	10 ft. 2½ in.	10 ft. 2½ in.	10 ft. 3½ in.	10 ft. 2½ in.	10 ft. 2½ in.
Height from rail to top of car at eaves..........	12 ft. 10½ in.	12 ft. 10½ in.	....	....	....	....	....
Height from rail to top of car body..........	....	....	8 ft. ¾ in.	8 ft. 3½ in.	6 ft. 4¾ in.	10 ft. 8 in.	10 ft. 8 in.
Height from rail to top of brake mast..........	14 ft. 1¾ in.	14 ft. 1¾ in.	8 ft. 7¾ in.	8 ft. 10½ in.	7 ft. 1½ in.	11 ft. 2½ in.	11 ft. 2½ in.
Height from rail to top of running board..........	13 ft. 6¾ in.	13 ft. 6¾ in.	....	....	....	....	....
Distance center to center of trucks..........	31 ft. 1½ in.	31 ft. 1½ in.	31 ft. 10½ in.	31 ft. 10½ in.	37 ft. 7 in.	21 ft. 11 in.	30 ft. 5 in.
Height from rail to center of coupler..........	2 ft. 10½ in.	2 ft. 10½ in.	2 ft. 10½ in.	2 ft. 10½ in.	2 ft. 10½ in.	2 ft. 10½ in.	2 ft. 10½ in.
Height from rail to bottom of center sill..........	2 ft. 4½ in.	2 ft. 4½ in.	2 ft. 4½ in.	2 ft. 4½ in.	2 ft. 4½ in.	2 ft. 4½ in.	2 ft. 4½ in.
Cubic capacity—level full..........	....	....	1,820 cu.ft.	1,770 cu.ft.	....	1,880 cu.ft.	2,508 cu.ft.
Cubic capacity—with 30 deg. heap..........	....	....	2,310 cu.ft.	2,230 cu.ft.	....	2,235 cu.ft.	2,978 cu.ft.
Estimated weight..........	44,000 lb.	44,000 lb.	42,000 lb.	40,000 lb.	49,500 lb.	40,000 lb.	49,500 lb.

steam or motor truck lines. In many cases this is business gone forever. The loss could have been prevented if the electric lines had possessed adequate equipment. For example, Table I shows the freight motive power and car equipment used in handling a "man's size" freight business on a 100-mile electric line.

The pooling of freight trailer equipment would considerably assist in the extension of electric railway freight haulage throughout the country. Moreover, it would aid in standardizing electric railway rolling stock. One of the drastic needs of such carriers is standardization of rolling stock, if they ever expect to do a universal freight business. This is true more particularly of freight than of passenger cars, as the latter are not used so much in inter-line service.

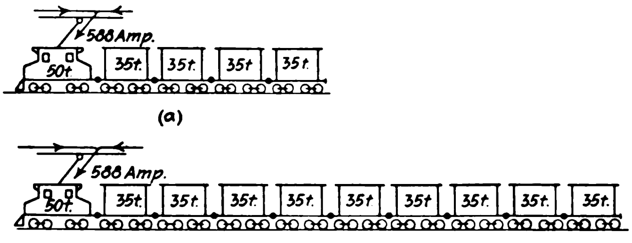


FIG. 1—SLOW-SPEED LOCOMOTIVE EQUIPMENT (b) OUTHAULS CAR-TYPE MOTORS WITH MAXIMUM GEAR REDUCTION (a)

With an electric railway freight interchange pool in operation, the disease of localism in the case of many properties would be stamped out. This particularly refers to the deliberate refusal to apply couplers and other mechanical parts so that cars can be used in freight interchange over the various electric lines.

Table II gives the general dimensions of the United States Railroad Administration standard freight cars.

LAYING THE MOTIVE POWER GHOST

One of the ghosts to the average operating man contemplating freight haulage is that the power house and substation equipment will not permit it. This one bugaboo has in too many cases stood in the way of the development of a freight service that would be a great economic aid to the community served and a revenue builder to the company. Hence it would be well for all railway men to analyze their power conditions before permitting themselves to be frightened away from lucrative revenue and the possibility of rendering invaluable service.

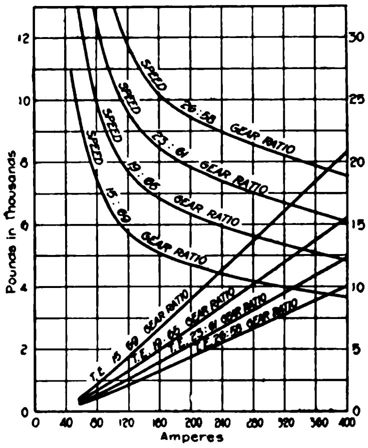


FIG. 2—CHARACTERISTIC CURVES FOR CHANGING GEAR RATIOS

Analysis will show that for freight service, whether the motive-power equipment is placed under a flat car or a regular electric locomotive, there must be some differentiation in the design from that for passenger propulsion. The use of passenger motive power equipment should be eliminated entirely in considering freight service. Speed is obtained at the expense of power, and the fact that many roads operate motor-car freight service on practically passenger time has led operating officials to believe that all freight service exacts a large amount of power. But freight trains need not move at passenger speeds.

This being the case, there are two ways for existing systems to develop freight service:

1. Equip freight motor cars with slow-speed locomotive motors capable of propelling the motor car and hauling from two to five trailers. This type of operation could in many cases be handled during the day, between passenger trains, through the provision of long sidings.

2. Carry on heavy drag freight operation with slow-speed motor equipped electric locomotives hauling standard steam railroad and interurban freight cars during the early hours of the morning.

During the off-peak hours on many systems there is practically no operation, and hence no earning on the idle investment. Therefore, freight service in such cases when properly developed can increase the revenue and materially help the load factor. The use of slow-speed locomotive motors with their low power demand for relatively high tractive efforts has made freight haulage possible on many roads of limited substation and feeder capacity.

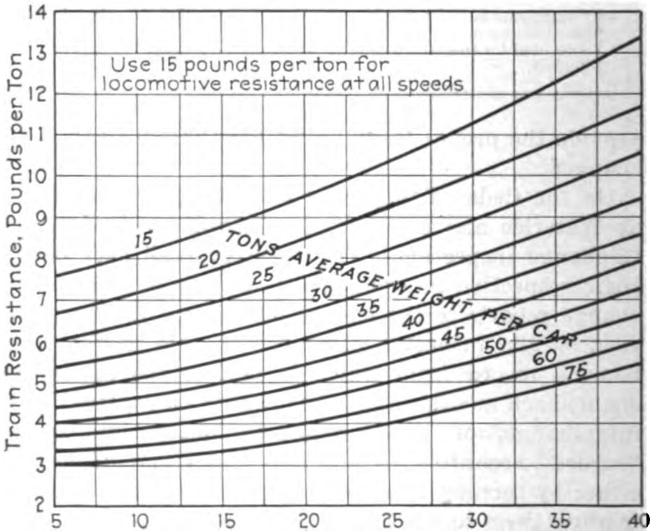
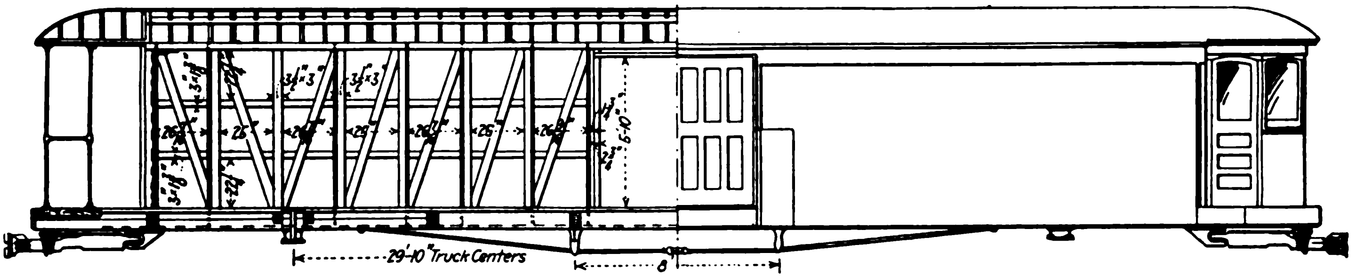


FIG. 3—FREIGHT TRAIN RESISTANCE CURVES

Fig. 1 indicates the superiority of the regular slow-speed locomotive motor equipment over car-type motors with maximum gear reduction. In *A* the 50-ton locomotive with four 100-hp. car type motors with maximum gear reduction can haul only 140 tons at 16.75 m.p.h., whereas the same locomotive (*B*) equipped with four 100-hp. regular slow-speed locomotive motors can haul 315 tons under the same conditions and power demand.

Many railways have equipment that could be pressed into freight service with little more than a change in gear ratio. This also applies to freight motor cars which now approximate passenger speeds but really are more desirable for hauling three or more trailers during off-peak hours at lower speeds.

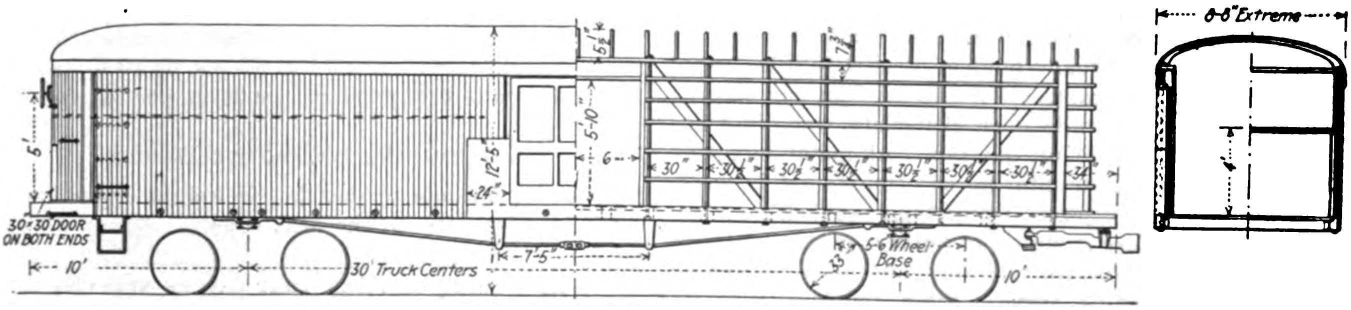
In effecting this change, the characteristics of the motor must be considered. For slow-speed freight service generally, the maximum reduction gearing is most satisfactory. It must be remembred that with high-speed gearing the power demands are increased while the rating remains the same. With high-speed motors, however, the power demands increase with the revolutions per minute, and the motor heating, while higher, equalizes for the higher power requirements of this type of motor.



ELEVATION OF MOTOR FREIGHT CAR USED BY DETROIT UNITED RAILWAY

From the characteristic curves shown in Fig. 2 it will be noted that the speed varies inversely as the ratio of gear teeth to pinion teeth, and that the tractive effort varies directly as the ratio. With an increase in speed at any given current, the tractive effort proportionally decreases. The high currents required by high-speed gearing can be readily seen from these curves. In spite of this, many roads are operating freight equipment with motors geared for the same speed as that of their high-speed passenger cars. This is dearly paid for by excessive motor maintenance, by high energy consumption at the car, by high line losses, by overloaded substations in some instances, and last, but not least, by restricted freight hauling capacity. There are many cases of single freight car operation where several trailers could be handled by slow-speed motor equipment.

A freight motor car adapted for single-car operation or able to haul from three to five trailers is one of the most valuable types of motive power an electric railway can use. This provides single car rolling stock where the service is of the dispatch nature, and where the service demands the handling of carload freight, the freight motor car type permits flexible operation. When operating a train the freight motor car can act as a peddler or merchandise car while the other cars, which are ordinary trailers of either interurban or steam railroad type, may be "set out" at any station.



ELEVATION OF FREIGHT TRAILER USED BY DETROIT UNITED RAILWAY

The equipment of these freight motor cars usually includes four motors, preferably of the slow-speed locomotive type, and drum or multiple-unit control. All freight motive power equipment must do some switching, and this often demands that circuits carrying heavy currents be broken, which is particularly damaging to control equipment. It is highly important that the motors be properly applied to meet the service requirements, and that a control be used which can stand the heavy duty imposed on any control equipment used in freight service.

Often where single motor-freight car operation has been going for some time, and the freight business has been growing so that it becomes necessary to handle trains, a convenient method of expediting the movement of freight is to equip the motor cars with multiple-unit apparatus so that two motor cars coupled together and operated by one motorman can handle several trailers.

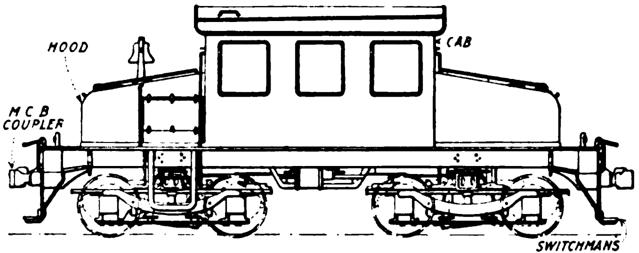
The Empire United Railways of Rochester handles such service, as it has in operation five multiple-unit freight cars equipped with modern railway motor unit switch control arranged to operate in trains. The plan of operation provides for two and three-car trains, thus approaching more nearly steam traffic conditions. The service rendered by this line is superior to that afforded by steam roads, and the cost of operation is such as to allow a profit at the steam road rates. The Northern Ohio Traction & Light Company is another electric line which uses multiple-unit equipped freight cars.

After the business of a road has become great enough through the building up of traffic by the use of motor car trains of one motor car and several trailers, or two motor cars operating in multiple-unit with trailers, locomotive operation becomes practicable. This is particularly true where a steam railroad interchange service has been developed, as it is very important that, irrespective of the length of the "cut" of cars left by the steam railroad on an interchange, the electric line have motive power to handle this expeditiously. If it does not, the electric interchange service receives a "black eye."

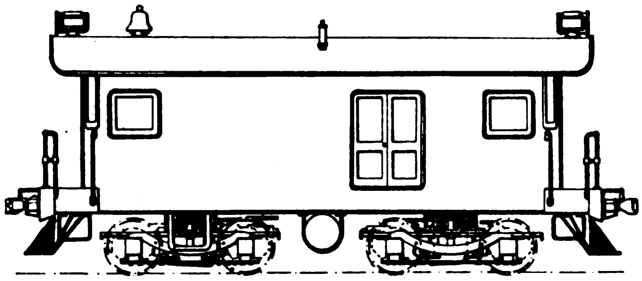
G. M. Woods in the ELECTRIC RAILWAY JOURNAL of June 1, 1918, in an article on "Freight Motive Power Equipment" goes into detail as to how many existing interurbans, with their present electrical equipment, can successfully handle freight by means of both freight motor cars and electric locomotives. He also explains how the present substation capacity of many of these lines can handle such service.

USING ELECTRIC LOCOMOTIVES

Two of the most important factors to be considered in handling freight by electric locomotive are the reliability of equipment and continuity of service. The first is of prime importance in that on many roads there are but one or two electric locomotives, and these must be in condition for service at all times regardless of the fact that they must be kept in operation as much as possible.



Steeple-Type Cab



Box-Type Cab

DIAGRAMS OF STEEPLE AND BOX-TYPE CABS OF ELECTRIC LOCOMOTIVES

In designing locomotive equipment, five points must be kept in mind:

1. The weight, type, capacity and mechanical design must be suitable for the service requirements.
2. Motive-power apparatus must be selected that will meet the service conditions.
3. The apparatus on the locomotive should be mounted in such a way that each part will be permitted to operate to the best advantage, with the least danger of trouble.
4. All apparatus should be accessible for inspection, maintenance and overhauling.
5. There should be no danger of the operator being thrown into contact with the live parts.

Standard interurban freight locomotives are usually of the "steeple" type, which is often preferable to the "box" in appearance and eliminates compressor noise. The cab proper is usually built of steel with rolled steel channels for underframe. A hardwood floor can be provided in the cab, while a checker-plate walking platform is used outside of the cab. All-metal bumpers should be used, the splintering so often found in wood bumpers with steel plates being thus avoided.

M. C. B. couplers mounted in bumper pocket castings are standard, but where trailing loads must be hauled around short radius curves, these couplers may be mounted on radial drawbars. Friction draft gear or spring draft gear can be supplied to meet severe conditions. When the weight of a given type of locomotive of a sufficient electrical capacity is less than the weight required from the standpoint of adhesion, additional weight can be added, principally by strengthening the various members instead of adding ballast.

The electric freight locomotive trucks are usually of the rigid-bolster equalized-pedestal type, possessing the advantages of a minimum number of wearing parts, no projecting springs and the provision of substantial means for transmitting the high tractive efforts required in freight service. The various members of the trucks are held together by tapered bolts in reamed holes. Swivel trucks with brakes actuated through a radius bar are standard, owing to the ease with which they negotiate short radius curves.

The preliminary determination of the minimum weight of locomotive for any given service may be made from the weight of the trailing load, average car weight, speed, grade and service—together with the probable train resistance values and a reasonable assumption of acceleration and adhesion factors. It is also necessary to know what the drawbar pull would be under the worst running and starting conditions of resistance.

Table III shows the weight of train that can be started on a given grade. "Train resistance" applies to the friction and windage of a train in motion; it is a variable rather than a constant quantity. The values that may be used for freight trains are shown in Fig. 3. Curve resistance is also a variable, but an average may be taken at 0.8 lb. per ton per degree of curvature.

Grade resistance requires 20 lb. per ton (2000 lb. for each percentage of grade against the load). In starting, the drawbar pull must exceed that in running by an amount sufficient to accelerate the train at the desired rate. If there are no rotating parts, a force of 91.3 lb. per ton is sufficient for acceleration at the rate of 1 m.p.h.p.s., but to allow for the effect of rotating parts it is customary to consider 100 lb. per ton as necessary for acceleration at the rate of 1 m.p.h.p.s. For other rates, the force required is in direct proportion to the rate of acceleration. Reasonable and common rates of acceleration for heavy freight service are 0.1 m.p.h.p.s. or 10 lb. per ton for pick-up and 0.25 m.p.h.p.s. or 25 lb. per ton for way freight.

DETERMINING LOCOMOTIVE WEIGHT

A simple formula for locomotive weight under known conditions is given on the next page.

TABLE III—WEIGHT OF TRAIN THAT CAN BE STARTED ON A GIVEN GRADE

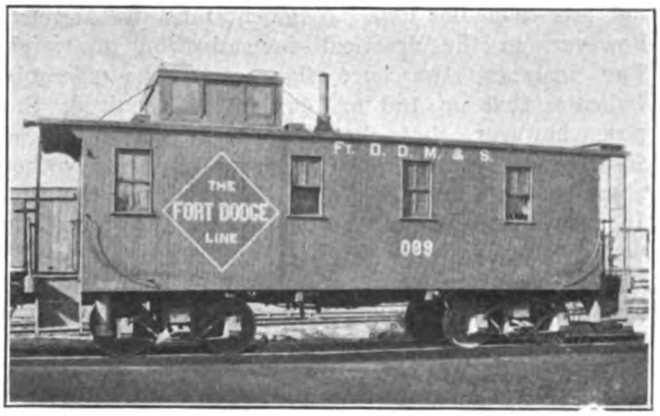
Assumed data:

Train friction	10 lb. per ton
Acceleration	20 lb. per ton
Coefficient of adhesion	25 per cent

TONS WEIGHT OF TRAILING TRAIN

Weight of Locomotive Tons	Grade 1%	2%	3%	4%	5%
25	225	155	115	90	70
30	270	185	135	105	85
40	360	245	180	140	115
50	450	310	230	180	140
60	540	370	270	210	170
70	630	430	320	250	200
80	720	490	365	280	230
90	810	550	410	320	255
100	900	615	455	355	285

INTERURBAN FREIGHT TRAILER USED IN DETROIT UNITED INTERLINE SERVICE



STANDARD TYPE OF CABOOSE USED ON THE FORT DODGE LINE

W = Locomotive weight (tons) on drivers.
L = All resistance acting on locomotive, in pounds per ton.
T = Weight of trailing load (tons).
R = All resistance acting on trailing load, in pounds, per ton.
P = Assumed percentage of adhesion.

(a) $$P(2000)W - LW = TR$$

(b) $$W = \frac{TR}{(2000\,P - L)}$$

The adhesion of the driving wheels is variable, depending upon the weight of the rail, weather conditions, air surface of rail, etc. Adhesion frequently is 25 per cent of the weight of the locomotive when running and about 33 per cent of the weight of the locomotive when starting. On long grades, these figures may be reduced to 22 per cent for running and 27 per cent for starting. In the use of these percentages for adhesion, the total tractive effort for train and locomotive is employed and not the ratio of drawbar pull to locomotive weight on drivers, the latter practice being commonly followed in rating locomotives.

As an example: What is the minimum weight of electric locomotive, all on drivers, to handle a trailing load of 1000 tons gross in twenty-five cars on a road having a maximum compensated grade of 2 per cent for 2000 ft., and 1.5 per cent for 10 miles, a speed of approximately 15 m.p.h. being desired on the long grade?

Consider the starting conditions first. From Fig. 3 the train resistance is 5 lb. per ton, and the locomotive resistance is 15 lb. per ton. The resistance of the 2 per cent grade is 40 lb. per ton. Allow 10 lb. per ton for acceleration. Then the starting drawbar pull is: $(5 + 40 + 10)\ 1000 = 55{,}000$ lb. Let the locomotive weight in tons be W and assume 33 per cent adhesion. Then

$$\frac{25}{100}\ (2000)\ \mathrm{W} - 55\ \mathrm{W} = 45{,}000$$

or $$445\ \mathrm{W} = 45{,}000 \text{ and } \mathrm{W} = 101 \text{ tons.}$$

When starting on the long 1.5 per cent grade at 27 per cent adhesion, the drawbar pull is 45,000 lb.

$$\frac{27}{100}\ (2000)\ \mathrm{W} - 55\ \mathrm{W} = 45{,}000$$

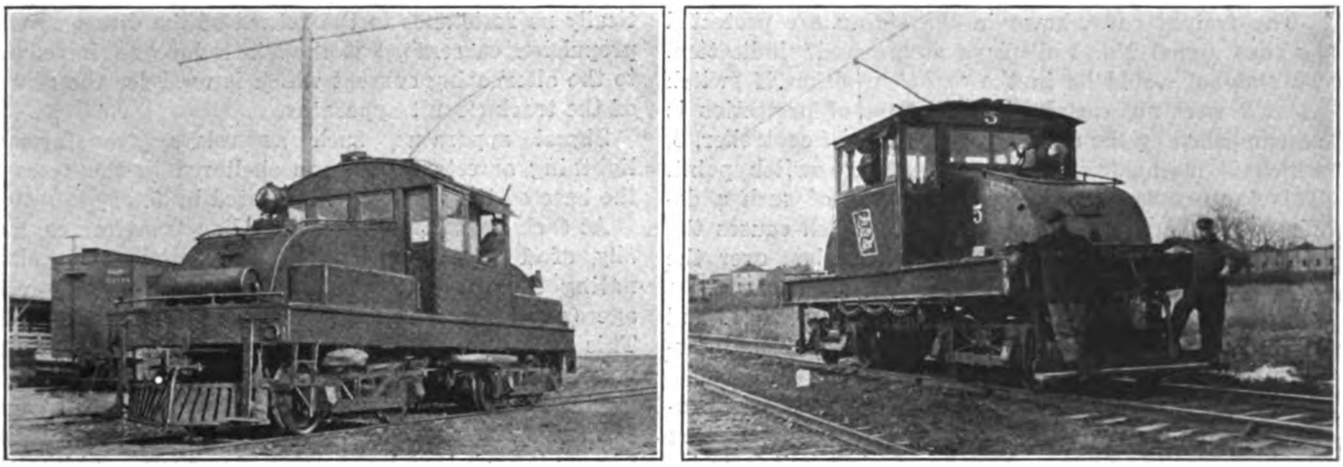
or $$485\ \mathrm{W} = 45{,}000 \text{ and } \mathrm{W} = 92.9 \text{ tons.}$$

When running at 22 per cent adhesion, the draw-bar pull is 35,000 lb., and

$$\frac{22}{100}\ (2000)\ \mathrm{W} - 45\ \mathrm{W} = 35{,}000$$

or $$395\ \mathrm{W} = 35{,}000 \text{ and } \mathrm{W} = 88.6 \text{ tons.}$$

Hence, for this set of conditions, the running adhesion on the short 2 per cent maximum grade is the determining feature, and the locomotive should weigh



60-Ton Road Locomotive

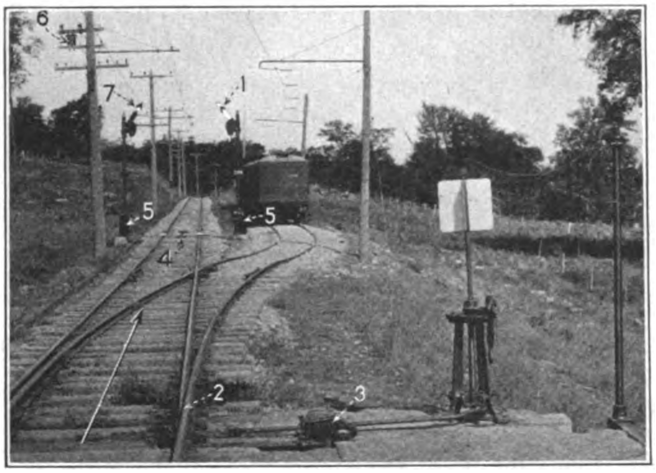
40-Ton Belt-Line Switching Locomotive

WATERLOO, CEDAR FALLS & NORTHERN RAILWAY not less than 100 tons. Judgment must be exercised, however, in the practical determination of weight. For instance, the bare figures in the foregoing indicate that a 100-ton engine is required. Suppose, however, that the 2000-ft. 2 per cent grade is preceded by a long-level or down-grade run without stops so that it could always be taken "on the run." In such a case, the figures show that a 93-ton engine would be of ample weight.

The economical speed of a freight train depends a great deal upon the electrical equipment. "Drag" or "tonnage" freights may well be operated at 15 m.p.h., while despatch freight service can easily be handled by trains at 30 m.p.h. Speeds above this become not only uneconomical but dangerous, being conducive to increasing claims and damage to equipment. In switching service a maximum speed of 8 m.p.h. for yard work is economical and safe.

SIGNALING MUST BE PROVIDED

In order to operate freight service safely, a company must provide for proper signaling. The illustration below shows block-signal protection for freight operation. Signal No. 1 governs trains moving in the direction of the arrow, while signal No. 7 governs trains moving in the opposite direction.



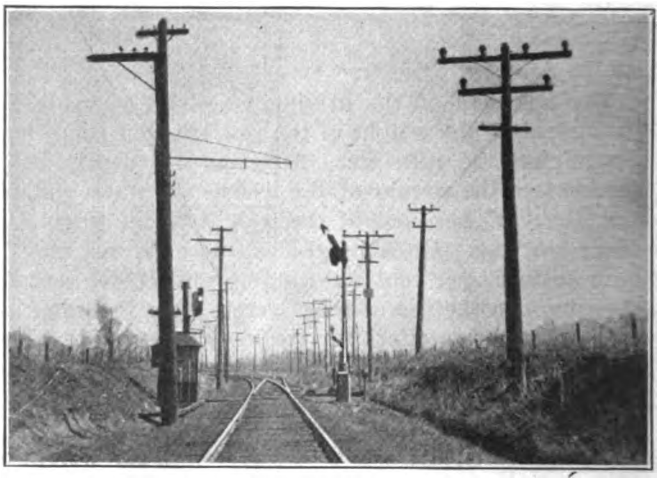
BLOCK SIGNAL PROTECTION FOR FREIGHT OPERATION ON ELECTRIC RAILWAY LINES

The freight cars shown in the siding are protected because signal No. 1 displays a "proceed" indication. This signal would be in the "stop" position if switch point 2 were not closed. This feature of protection is accomplished by the use of a switch circuit controller, 3, which is mechanically connected to the switch point. This in turn is equipped with contacts of such a design as to permit a fine adjustment, which causes the circuit controlling signal No. 1 to be taken over the contacts in switch circuit controller 3. Whenever the switch point 2 is not closed to within ⅛ in. of its full stroke, the control circuit for signal No. 1 is interrupted.

This control of signal No. 1 not only guarantees protection to the cars in the siding but also protects cars on the main line (approaching the facing switch as indicated by the arrow) from unexpectedly running into switch 2 when the points are open. Signal No. 1 in the 60-deg. position as shown in the illustration indicates to the approaching car that the switch is closed. This shows the motorman that he may pass this point at full speed, having assurance that the switch is properly set and that the next block is clear.

Another important feature of protection is that which permits a train to approach the siding at high speed in either direction on the main line. The automatic signals are controlled by track circuits, which extend from signal to signal. By this means a clear signal guarantees that the main-line track is free from obstruction. Wherever there are sidings leading into the main line track, the track circuit is carried back into the siding to a "fouling" point. This guarantees that cars must be pulled into the siding so as not to "foul" a train on the main line before the signals on the main line will "clear." This is a strong point in favor of the use of automatic block signals where freight operation is contemplated. There is a tendency, especially where sidings are crowded, to allow cars to "foul" the main line.

The illustration also shows the location of the insulated rail joints which determine the limits of the track circuit as it extends into the siding. At the point opposite the two signals is located an impedance bond layout between the rails (at 4). The bonds offer practically no resistance to the return of the direct current propulsion currents, but they introduce an impedance to the alternating current which is used for the control of the track circuit apparatus.



SIGNAL PROTECTION FOR A BELT-LINE FREIGHT CUT-OFF ON THE I. T. S.

Signal apparatus, such as relays, transformers, lightning arresters, etc., are sheltered in the cases at the base of the signals, as indicated by 5.

At each signal location a main-line transformer, usually of 1 kva. capacity, is installed to step alternating current energy down from transmission voltage (anything from 2200 to 6600 volts) to 110 volts. This main-line transformer is indicated as 6. The 110-volt energy is used for the operation of the signal motors and also for the primary circuit of the track transformer. The secondary voltage of the track transformer is such that by the use of various combinations of taps, a variation in voltage can be realized anywhere from 4 to 15 volts.

Such is a brief description of some of the facilities that are needed for developing a real freight business.

Unfortunately, electric railway managements have been in the habit of providing facilities sufficient to meet demands six months or a year hence, while steam road practice anticipates from five to ten years and often more. This condition may be due to the more or less restricted finances of the electric railway industry, but it should be overcome in developing freight business.

It is commercially possible to obtain freight motive-power equipment to handle successfully any weight of train that freight conditions may demand.

Therefore, electric railway freight haulage is not only practicable but profitable, and it can be developed by the proper co-ordination of existing facilities, equipment, and executive and engineering talent.

Organization and Procedure of A. E. S. Committee Explained

In His Address Before A. I. E. E. Last Week C. A. Adams Explained Plans of New American Engineering Standards Committee

AT THE midwinter convention of the American Institute of Electrical Engineers, held in New York City last week, President Comfort A. Adams devoted his entire address to the subject of standards and standardization. After showing how chaotic is the condition of standardization practice he outlined the plan and scope of the work of the newly-formed American Engineering Standards Committee, substantially as follows:

This committee was formed by joint action of five national engineering societies (A. S. C. E., A. I. M. E., A. S. M. E., A. I. E. E. and A. S. T. M.), called the "founder societies," to provide machinery for the development of engineering and industrial standards, by the operation of which duplication would be avoided and co-operation between all interested organizations and government departments secured.

The A. E. S. committee machinery now proposed for the development of standards comprises these elements:

1. The committee proper, or "main committee," with three representatives from each of the five founder societies and three government departments, whose functions are chiefly those of organizing, co-ordinating and "steering."

2. Sectional committees, one for each group of standards with representatives from all organizations and government departments vitally interested in particular groups of standards. Their function is to prepare standards under the direction of the most vitally interested organization, known as the "sponsor body."

3. The "sponsor body" or "body" may be one of the founder societies, a government department, or one of the co-operating societies or organizations.

4. "Co-operating societies," intended to include all organizations interested in the production of standards and willing to co-operate.

When the development of a particular group of standards is proposed, the main committee assigns the work to the appropriate organization as "sponsor," or, if the situation seems to indicate that more than one organization is equally interested, to these organizations as "joint sponsor."

The sponsor then appoints the sectional committee subject to the approval of the main committee, this approval being merely to assure a comprehensive representation of all interests involved. Complete records of all interested organizations and of their standardization work will be kept on file and properly classified in the office of the main committee. This committee, or its secretary, will thus be able either promptly to suggest the proper representation to a sponsor on request or to approve or amplify the representation as provisionally proposed by the sponsor.

After a group of standards has been prepared and accepted by a sectional committee, it is submitted to the sponsor body for its approval and then to the main committee with a full report of its history. When approved by both the sponsor body and the main committee, the standards in question become "American Standards."

When the report of any sectional committee is being considered by the main committee, three members of that sectional committee are invited to sit with the main committee to report, discuss and vote on the standards in question as if they were regular members of the committee. Thus each sectional committee, and therefore usually each sponsor body, will be represented on the main committee when standards in which they are interested are being discussed.

The scrutiny of a standard by the main committee is to make sure that the proper procedure has been followed, that the vote of acceptance was nearly enough unanimous, and that the standard is consistent with other related standards. Consideration is also given to international relations, but the main committee is not expected to pass upon details.

After approval by the main committee the standard is published by the sponsor body, with the statement that it has been approved by the A. E. S. committee, and labeled "American Standard" with the appropriate descriptive title.

THE WHOLE PLAN IN A NUTSHELL

Briefly summarized this procedure is as follows:

1. Standard assigned by main committee to sponsor body.

2. Sponsor body appoints a thoroughly representative sectional committee, subject to approval of main committee.

3. Sectional committee prepares standard and submits to sponsor body, which then submits standard with its approval to the main committee.

4. The standard is then published by the sponsor body and labelled "American Standard."

The machinery thus provides for comprehensive co-operation and eliminates duplication of effort, but does not undesirably restrict the initiative of the several co-operating societies. With proper support and co-operation it should contribute largely to the industrial development of the country and become a potent factor in promoting international standardization and foreign commerce.

How Can the Public Be Convinced?

Replies to Questionnaire Sent Out by This Journal to Public Men Express Conviction That the Public Will Respond to a Frank and Honest Presentation of Facts If Good Service Is Provided and the Companies Ask for a Return on Only a Fair Valuation

ELECTRIC railways have encountered obstacles in procuring increases in fares to cover increases in expenses. The reasons are many, according to the replies drawn out by the questionnaire which the ELECTRIC RAILWAY JOURNAL recently sent out to more than 400 public service commissioners, mayors, representatives of chambers of commerce and other leaders interested in municipal affairs.

The first article on the subject, published in the issue of Feb. 22, showed that although only about 15 per cent of the total mailing list responded, a fragmentary but striking analysis of public thought on the various questions raised was possible. As shown then in detail, the difficulties experienced by the electric lines were laid generally at the door of lack of public understanding, politics, defects in the regulatory system, and utility sins of omission and commission. The mayors and the representatives of the chambers of commerce urged most strongly the importance of poor service and improper past acts as the controlling factors in the opposition of the public to higher fares.

What, then, should the railways have done? What should they do now? These questions, where the various public representatives had constructive suggestions to make in regard to improving the situation as they saw it, are answered in this second article. So far as the replies can be summarized in a sentence, it seems to be believed that the railways can convince the public of their needs by frankly stating all the facts, subject perhaps to public verification, asking only for a fair return on a reasonable investment and winning the public confidence through efficient and adequate service and a manifest desire to please.

Would it have been easier for electric railways to procure an adjustment of fares if they had more extensively advertised their increases in expenses and other facts of their situation?

This leading question definitely raised the issue as to whether or not the publicity work of the electric railways had been carried on with sufficient thoroughness. The predominating opinion was to the contrary, for thirty-two out of the fifty-eight replies expressed the belief that higher fares could have been secured more easily if the publicity had been more extensive. The mayors, however, were evenly divided in their replies, and several others expressed doubt.

In more than a few cases the idea was expressed that the public distrusts the railways and that service needs to be improved. Actions, it was intimated, are more important than words. This tendency of mind was well expressed by the following comment of one civicist:

> Advertising would not have been sufficient. It was tried in many quarters and failed even when indorsed by authoritative approval of federal government officials. Public confidence can be gained only slowly and then by a genuine policy of public co-operation and public discussion and settlement of company affairs.

Other representative opinions by individuals in the various classes follow:

COMMISSIONERS

Undoubtedly, yes. The more public service companies take the public into their confidence the better for all concerned.

I am of the opinion that such a procedure would have a tendency to offset the effect of the efforts of the designing politician.

I am positive there should have been greater publicity.

Yes. Wherever the companies have taken the public into their confidence as to company affairs, the public attitude has been most notably affected.

Yes, if the advertising was properly conducted—through the medium of committees composed of private citizens. Public officials do not constitute a proper medium.

I do not believe so except in those cases where the company could show an unmistakable record for honest financing.

In some cases, yes—in others, no, because of excessive investment, obsolesence and poor service.

Somewhat perhaps, but not much. Publicity, however, may cause more injury than aid to the cause of proper settlement. Certain efforts have been a mistake. The difficulty is that in most instances the companies in the past have not been particularly careful in building up good-will, so that now there is suspicion of publicity.

Yes. The majority of the public is inclined to be fair if they have full knowledge of the facts and would be willing to grant such increases as were warranted.

If the policy of the railways had been as public in prosperous times as in hard times, there would be far less trouble. I believe the partial advertising during recent hard times has been an injury among some thinking people, as it is often manifestly only part of the truth and not all the truth.

An adjustment of fares would have been more easily obtained had the railways considered the interests of the community in the past and not simply operated in an arbitrary manner without regard to public opinion or necessity.

MAYORS

It would depend upon where they advertised. Advertising in the newspapers arouses resentment, because the public feels that the company's money should be put in better service and that advertising in the press is only a form of subsidy to secure newspaper support.

Publicity is what is needed and what these utilities have been so reluctant to give in the past. As a result there is a tendency on the part of the public to doubt their sincerity and accuracy.

No. The lack of confidence of the people must first be overcome. Even where all the figures were given, the people think they are "padded."

Yes, and the company should show more freely what part of the increase would go to pay wages, etc., if fares were increased.

Yes. The public must be advised. If not, their officials who allow increases will be discredited and defeated.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

The public generally discredits such figures.

Yes. They have always, with few exceptions, carried on their affairs in a "Public be damned" way, and the people rose up almost solidly when the opportunity offered and "smote the railways hard." None of them reasoned why but just got even.

That has helped some locally, but so long as the service is not improved the public will complain.

I am firmly convinced that the public of any American city will pay the railway any fare which may be necessary for the maintenance of good service, as soon as that public is convinced that it is not paying dividends on water, and more especially as soon as it is sure that real service is going to be provided. The thought that the American public is unwilling to pay any reasonable price for real goods and real service is bosh. On the other hand, the American public does not forget the place where it bought shoddy. Poor service will never be tolerated. In connection with the matter of service, I am still unconvinced of the impracticability of offering first and second-class service to take care of the varying wishes of the public. This has been a long established custom in foreign countries and might go a long way toward contenting the riding public. I realize that it would mean very considerable changes in the physical plant and equipment to bring this about. On the other hand, I am equally convinced that no intelligent and honest effort has been made to find out what the public wants, acquaint them with the cost of it and then furnish it to them. If there had been, the present deplorable condition could not have developed.

Yes. A comprehensive campaign of advertising should have been started years ago to take the public into the confidence of the carriers.

Yes, if the railways dealt fairly with the public and honestly gave information the public is entitled to receive. It appears like a case of camouflage of expenses.

The local company has done this extensively and the public is well aware of the company's claim, but I have heard no offer on the part of the company to submit to an examination of its books by an impartial expert accountant in behalf of the city, and consequently the public is somewhat skeptical as to whether the claims are justified.

If the roads could prove conclusively to the public that they are capitalized upon a fair basis, that the increased cost of operation was out of relation to the income and that in the future the cost of transportation would be reduced as expenses decreased, the general public would look more favorably upon the necessary increase at this time.

No. These facts were fairly well understood, but the public did not feel the problem to be vital. It felt that the question was one of how much profit went to the railways rather than—as it really was—one of life or death to them.

Civicists

Most unlikely. The public suspects the statements are at best half-truths.

Yes. But the need is deeper than indicated. The nature of the normal expenses must be understood before the significance of the increases become impressive.

What fundamental facts should be presented to the public in order to convince it that increases in fares are necessary?

In order to secure suggestions as to how the character of electric railway publicity work might be improved, the foregoing question was asked. The answers tended to show the importance of giving explicit data in regard to the investment, operating expenses, increases in cost and the rate of return. The need of frankness and complete truthfulness was emphasized.

One mayor doubted that any facts can be successfully presented to convince the public in its present state of distrust, but other public men suggested that electric railway publicity give information such as follows:

Commissioners

The assurance through adequate legislative measures in special settlements, that the rights of the public will be properly safeguarded while at the same time justice is done to the companies. The past ill-will, unfortunately, cannot be forgotten or entirely overlooked in the present emergency.

A simple statement showing the increased cost of every article entering into operation and maintenance.

That there has been economic and efficient management, and that, in spite of these, revenues have not been sufficient.

A plain statement of expenses and a comparison with the expenses of former years.

An honest and sufficiently subdivided investment account capable of some checking. An honest and sufficiently subdivided operating cost account for say five years. An honest and sufficiently subdivided revenue account for all railway sources for five years. An honest and sufficiently subdivided cost of obtaining money to finance dividends and interest paid, and the necessary margin between revenue and operating costs to recompense investors.

Money invested, cost of giving service, adequate funds for maintenance and depreciation, disposition to give the best service under the conditions, proper treatment of the public by agents of the company and reasonable return for money invested.

First, that service cannot be maintained unless a fare increase is granted; second, that a financially embarrassed transportation system is a serious handicap to any community; third, that the financial integrity of a company must be retained, or bankruptcy and arbitrary fares will be forced upon the public.

The cost of the properties; operating and fixed charges and the net, expressed in percentage on the cost with an invitation or suggestion that the operating company urges verification.

Actual capital invested and reasonable rate of return; depreciation, operating expenses, etc., and actual return—and the fact that the money would earn more if invested in other enterprises.

Frank statement of income and operating and other expenses. A statement showing that service will have to be suspended unless relief is obtained.

The actual items of cost and especially a showing that the capitalization is proper and that fixed charges are just.

An honest valuation of the properties and a frank statement in detail of costs and earnings.

That the increase is actually needed in the operation and maintenance of the property and is not to be used to pay increased dividends; that bond interest and dividends will be paid only on a reasonably fair value of the property. This last is the more important.

Amount of owners' capital invested from the beginning, and the return paid thereon. Annual surplus above a reasonable return. Cost of annual maintenance. Increases in current costs.

A manifest desire to make the public a partner in the enterprise. Something on the order of the Chicago plan by which excessive investment or obsolesence can be written off and state or municipalities encouraged to participate in the cost of additions and betterments.

Mayors

The real value of the property on which a fair return is to be earned; the amount that should be set aside for the proper upkeep of the property, operating expenses and taxes.

A frank statement of income, operating expenses, rate of return on investment and any other information to which the public is reasonably entitled.

A simple statement of receipts and expenditures.

First, comparison between the value of a 5-cent street car ride to the public and 5 cents worth of other commodities; second, increase in length of ride, speed of travel, and quality of service, with no change in rate of fare; third, increase in operating costs; fourth, increase in efficiency of operation with no prospect of further reduction in operating expenses.

The actual investment honestly and prudently made.

The decreased value of the nickel, and actual costs of operation.

The increases in labor and materials are a sound basis to prove that fixed charges represent a fair return on tangible equipment now in operation.

Representatives of Chambers of Commerce

An honest, concise, easily understood statement of earnings and costs by honest officials. Almost every statement issued appears cunning or the figures are so complicated that the crank in every community can pick them to pieces and make out a plausible case against the company.

I should emphasize the increase in wages as ordered by the government, and also the increase in cost of materials, taxes, etc. Wages in particular show that the money goes into local pockets.

Percentage of profit in past, increase of expenses at present, relation between expense and income, and salaries paid executives of companies.

Increased expenses, dwindling revenue and its causes. Any conditions operating to interfere with good service.

First, an honest valuation of the company's property; second, a full disclosure of the company's business operations, involving frequent complete examination and audit of its books by accountants employed by the city; third, an agreement by the company to submit to regulation and control by the city under a service-at-cost franchise.

The actual physical value of the property, the actual cost of operation and the rate of return, together with all other necessary facts.

First, the actual cost or investment in property regardless of securities outstanding; second, detailed operating expenses so as to show that no funds have been misappropriated, and that no abnormal salaries are being paid; third, the balance insufficient to pay the current rate of interest on the actual cost of the property and allow a reasonable sum for depreciation.

That service cannot be rendered at less than cost, and that cost includes a fair rate of return on the capital necessarily invested for the rendering of the service.

Increased wages necessary for employees; increased cost of rolling stock, supplies, general maintenance; taxes; need of increased facilities for improvements in service.

CIVICISTS

Costs of materials and labor; necessity of reserves for repairs and renewals; amortization of superseded property; provision against future obsolescence, and necessity of sufficient operating margins to maintain flow of new capital for betterments.

That all cards are placed upon the table. Whenever there is evidence of bad financing and a situation now existing has been brought about by bad financing, it is almost impossible to convince the public that fare increases are necessary.

That there is no watered stock.

Not facts so much as evidences to deal fairly with the public when the company has the upper hand.

(1) Willingness to readjust franchises so as to permit adequate public participation in benefits of monopoly and control over operating conditions. (2) Constructive and co-operative policy with employees. (3) Publicity of costs and expenses. (4) Limitation of profits. (5) Broadening of stock ownership. (6) Representation on boards of directors of disinterested citizens.

(1) Low rate of capital turn-over and normally small margin of profit. (2) Load factors. (3) Physical impediments to better service. (4) The efforts of the management from day to day to make adjustments for the betterment of the service should be advertised. (5) Traffic checks. (6) The service problem in general.

Distinction between revenues from transportation, electric light, power or other sources. Proof that higher fares increase net revenue adequately to justify their imposition on the community. The proposed increases are normally arbitrary, representing no more thought on the part of the company than is given by the public.

Do you believe that the resistance to higher fares comes from people who understand what is meant by fair value, fair return, operating expenses, maintenance and depreciation?

That the opposition to higher fares does not come from the so-called thinking part of the public was the general opinion of those replying to this query, only five answering "Yes." As one commissioner summed up the situation, however, the most determined and radically hostile resistance to higher fares is from the best informed when companies have not lived up to their contracts in the past and have given poor service. Moreover, as a business man pointed out, opposition often comes from men who understand railway economics but represent people who do not. Some replies follow:

COMMISSIONERS

Not in the main. I believe the average, thinking person is fair-minded and believes in the policy of live and let live.

Largely, yes. But of course the greater voting population would vote on the basis of their own convenience, comfort or profit.

No, not generally. In some cases opposition to higher fares may be justified.

Doubtless there is much ignorant opposition, but the regulatory bodies are helpless to deal adequately with the situation. The people who ought to have power and have not, understand the questions of fair value, etc., fairly well.

No, not where higher fare is justified.

Opposition comes from nearly all classes of people. If a man understands "fair return," "depreciation," etc., it only intensifies his opposition if he thinks the company has formerly earned more than a fair return, etc. To the ignorant the large sums involved seem to mean riches anyway. They do not understand the absolutely necessary large margin above operating expense necessary for return on investment.

No, usually from those who do not understand; also from a certain class who are always antagonistic to anything corporate.

MAYORS

No, I believe the public is willing to pay a fair return upon fair value, but the public must see that it is getting fair service to be satisfied.

Few electric railway patrons understand these terms, but there has been a great deal of public education along these lines within the last year.

Seventy-five per cent of the resistance is due to ignorance of basic principles of fair value, fair return, operating expenses, etc.

To a considerable extent, but most people do not understand and could not pass upon a financial statement in ordinary form.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

I think they all complain when they do not get service, even those who will admit that an increase is justified. I do myself.

Yes. The public has not been informed, so far as I have observed, as to the facts of fundamental costs and maintenance.

There is a well developed and intelligent public opinion in this city. A large number of people grasp the situation in general terms and ask for only a fair deal. They are willing to pay a higher fare if this is justified and shown to be necessary. On the other hand, there is a large group of socialists and their sympathizers, who are satisfied with nothing short of municipal ownership and operation, and want to force the company into bankruptcy so as to buy the property in for the city as cheaply as possible.

I think the public is better informed upon these subjects than is generally believed as the average intelligence is high. The public can be depended upon to act according to the known facts.

No; very few of the company's patrons know what these terms mean.

No. This class of people, however, does not know of the invested capital without an appraisal.

Yes, in part. But the great mass of the public opinion is "against" electric railways without analyzing anything.

CIVICISTS

Comparatively few of the general public understand these things. Those who do will probably not oppose the road that has been frank and has a good case.

I do not believe resistance is based upon analytical discrimination but upon a general attitude of hostility and lack of confidence in management.

No. But these are the people who understand the physical problems of furnishing electric railway service. They are sympathetic because they know from their own experience that the other fellow's business is likely to have complications as serious as those in their own.

Do you believe that it would be possible to overcome the resistance of the objectors by extensive information respecting fair value, fair return, operating expenses, maintenance and depreciation?

Only five out of the total fifty-eight answered this query negatively, the general reasons being the uncertainty of good results, the cost and public distrust. Thirty replies were affirmative, while several others answered "partly." Six additional affirmative answers had strings attached in that publicity alone was deemed to be ineffective if there was a lack of fairness and of good service. Eleven replies contained the caution that a part of the public would not be convinced by any means.

The leading answers were as follows:

COMMISSIONERS

Very largely — except from the class which does not care what happens to public utilities, if it only happens. Happily that class is restricted.

Such publicity might be in a measure effective, but there are always protestants who do not want to be shown or convinced.

Somewhat; but the company first has to show a willingness to participate in the readjustment instead of letting all concessions fall on the public; and, above all, it has to come in with clean hands as to capitalization and fixed charges.

Such information would overcome all unjust opposition except by the demogogue.

Not unless the public can first be satisfied as to the capitalization of the company. In my opinion, this is a vital step and a prerequisite to any campaign of education.

No, because this engenders contest and uncertainty in the public mind.

Of course, education is proper, but, in my opinion, publicity regarding general policy will serve much better than the discussion of the needs of a particular company.

If the public is fully informed, it will be inclined to do what is fair. There will always be some whose minds are closed against any presentation.

Yes, if completely presented—for several years back and with a demonstration that public utility investment and revenue are on a radically different basis from those of a grocery store, factory or department store, where the turnover is two, three or more times a year as compared with 20 to 40 per cent for utilities.

The more reliable and trustworthy the information, the less resistance will be made.

MAYORS

Where the company has given poor service for some years, the public will be satisfied only with a change in management, because the public will reason that more money paid to a management that has failed when the returns were ample will not assure any better success in the future.

Not all objectors can be convinced, of course, but in general the public has shown a disposition to be fair with the companies when the situation was fully explained.

No. The advertising cost would be prohibitive and the results problematical. The answer of the public now is: "Let the city take over the company."

All resistance can thus be overcome except such as is due to prejudice and bitterness from the past.

Yes, if the company could show upon a fair basis that it needed the increase.

Yes, to a large extent, if facts are made plain. Most people want to be fair.

Yes, if the utilities could show fair value.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

Maybe—and a new generation.

Yes, if the information is given in an understandable way. In other words, elementary education is needed.

Such information alone would not be sufficient so long as the service was inadequate. Under good conditions it would be of great value. Most of us are reasonable beings.

Yes, but it is hard to get a respectful hearing from the great mass of voters. They are unthinkingly opposed to privately-owned public utilities and do not want to be convinced.

Yes, largely, if the diffusing of this information was begun prior to the establishment of the deep-seated prejudices that now exist.

Yes, if the company makes an honest effort to practice sound economics.

Further information would be necessary along the lines of future intentions and requirements of the company toward the public.

No. The average statements are one sided and do not merit confidence as a rule.

It would thus be possible to rob professional agitators of much of their thunder.

CIVICISTS

Possibly, but such education is probably possible only with local leaders of thought indirectly affecting public sentiment.

Perhaps, but not if the financial history of the company is bad.

To some degree, but this is not the main point.

Positively, yes. Let the industry—nationally and locally—employ up-to-date merchandising methods and it will "sell" itself readily to the public, at the same time eliminating latent defects in its goods.

Yes, if accompanied by a proposal for a unification of transportation facilities, steam and electric, urban and interurban, trolley and jitney, and a strategic disposition of the services which would insure the upbuilding of the community and its increasing prosperity.

What selling points occur to you as making the strongest appeal to the public in an effort on the part of electric railways to increase fares?

In the opinion of one commissioner, the service of a public utility, which has a monopoly, does not "sell" in the sense that the product of a private commercial enterprise is sold, and "selling points," in the ordinary commercial sense, should not be emphasized. The other public representatives, however, in general recognized the usefulness of merchandising principles between the electric lines and the public, and they were frank to point out what sort of sales talk would be most effective in putting across the idea of a higher fare.

The general tenor of the replies was that nothing counts for more than do facts, presented with frankness and honesty, and an effort to give efficient and adequate service. Other detailed suggestions were made, as can best be seen from the following specimen replies:

COMMISSIONERS

"Can you, property owners and residents of Red Gap, dispense with your electric lines? Is it worth while to YOU to have them operated efficiently? Can their continuance be expected, can good service be rendered, unless their owners are fairly compensated? Think it over. Let's be fair with each other," etc. In brief, an appeal for a square deal supported by facts.

Increases in the wages of employees constitute the strongest selling point. The public is willing to pay a fair and just rate if it believes the wage earners are being treated fairly and the additional revenue is needed for this purpose and not for increased dividends.

The actual facts plus a showing of willingness on part of the company to share the burdens of readjustment plus a civic attitude plus an effort to give service.

Clean cars, prompt service, obliging and courteous employees.

The fair cost of rendering service and the increase of cost attending the furnishing of more service—the cost of more men, more cars and more power to provide adequate capacity to handle "peak loads" of traffic.

Complete accounting, proper service, essentiality to the community, frank and specific acknowledgment of obligations to the public, and recognition of right of employees to bargain collectively.

The adoption of an operating and financial policy in which the public is represented and has a voice.

The value of the service to the patrons: dispatch, commercial reliability and efficiency. A railway should seek no increases which are not justifiable, and it should make the service efficient.

Decrease in business, especially to pleasure resorts, by reason of the advent of the automobile.

The sum totals of wages, salaries, fuel and supplies, taxes and insurance, miscellaneous expenses (detailed somewhat) for several years, and maintenance; revenues, number of cars operated, number of paying passengers carried for some years; all expenditures for additions, etc., by years.

(1) Service; (2) extensions; (3) improvement in equipment, and (4) a promise that a return to the old schedule, or even a better rate, will be favored when conditions warrant.

MAYORS

The strongest selling point is that the increased fare is adequate to maintain adequate service. The excuse for the existence of electric railway lines is the furnishing of service rather than the earning of profits. When the company-created "fetich" of the nickel is eliminated from the public's mind, it will be willing to pay a reasonable price for good service, but it will still be very suspicious that the old adage will still prevail: "When the devil was sick, the devil a monk would be; when the devil got well, a devil a monk was he!"

There are two classes of citizens on this proposition—the ones who would respond to the "fair value, fair return" argument, and those who distrust the company and will listen to none. I can think of no "selling points" except perhaps a nation-wide movement to readjustment franchises so as to give more city control and profit sharing.

The wages formerly paid and those now paid under the recent order.

The actual necessities—upon the basis of fair value under competent management.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

Safety, speed, comfort and convenience.

Principally the truth, something most companies know nothing about. Most companies would gain half the battle if the management were changed. The people will not believe the men who have fooled them for years.

I should use a comparison of the increases in the cost or various foods, clothing and other everyday necessities as compared with the cost of riding on the electric lines. I would also compare present costs of operation with costs of five years ago.

If the railways can convince the riding public that they are trying to inject into the conduct of their business some of the same desire to please that Israel Braunstein manifests when he wants to sell a second-hand suit of clothes, the problem will be solved and their proposition will be sold. The trouble is that during the past indefinite number of years (when the electric railway sun was shining) the companies did not take the public into their confidence, and now that they are in distress, the dear public is not easy to woo.

Better equipment and reliable and more adequate service.

Laying all their cards on the table, and giving good service even at a temporary loss.

Absolutely honest statements backed up with facts that can be clearly proved, and the general necessity of the electric roads to the welfare of the community.

Frankness and fairness.

The most effective selling point is an understanding on the part of the public that low fares mean inferior service.

Better service in every phase; need of revenue to pay better wages and obtain higher types of employees; need of better rolling stock and general equipment; need of paying fair return on its investment.

Public necessity of good service, including convenience schedules, good cars, etc.

The fact that the welfare of the railways is closely linked with the business prosperity of the community.

CIVICISTS

The fact that prosperity of the road with reasonable margin of profit is essential to maintenance of service and future extensions thereof.

The need for good transportation as being the arterial system of a city and fundamental to its growth and progress.

The offering to cities a chance to run their own railways, which might convince them that it costs money to run a public utility.

The imagination of the public must be kindled. Here is a great money-making (for the public), pleasure-dispensing, health-giving, home-creating institution which with cooperation can be made to double and treble its dividends (to the public) of profits, pleasure, health, homes, etc. Tell the public that the company is an instrument to be used, and that it should be aided. If a friendly atmosphere is created, a fare increase will come whenever needed.

The best selling point is a guarantee of adequate maintenance and depreciation, with a provision for a fund to provide for municipal ownership without any joker such as was imposed in Chicago.

The third and last article dealing with the replies to the questionnaire sent out by this journal will cover questions concerning guarantee of return, public ownership and similar fundamental points. This will be published in a later issue.

Program for the Mid-Year Meeting on March 14

THE mid-year meeting and banquet of the American Electric Railway Association will be held in New York City on Friday, March 14. The technical sessions will be held in the Engineering Societies' Building, 29 West Thirty-ninth Street, beginning at 10 a.m. The program appears below.

[1]

Report of Committee on Readjustment

BY P. H. GADSDEN, Chairman.

Discussion of Report:

(a) Valuation

BY P. J. KEALY, President Kansas City Railways, and
H. H. CROWELL, Vice-President Michigan Railway.

(b) Rate of Return

BY EDWIN GRUHL,
Assistant to President,
North American Company.

(c) Maintenance and Renewal Reserves

BY A. L. DRUM,
A. L. Drum and Company, Chicago.

[2]

The State of the Industry

(a) Modern Regulatory Plans and Theories

BY A. MERRITT TAYLOR,
President,
Philadelphia & West Chester Traction Company.

(b) Capital and Electric Railways

BY FRANCIS H. SISSON,
Vice-President,
Guaranty Trust Company of New York.

(c) From the Regulatory Viewpoint

BY HON. WILLIAM D. B. AINEY,
Chairman Public Service Commission,
of the Commonwealth of Pennsylvania.
and HON. CHARLES E. ELMQUIST,
President National Association
of Railway & Utility Commissioners.

THE annual banquet will be held in the evening at the Waldorf-Astoria Hotel. The speakers will be President J. H. Pardee of the Association, Hon. Warren G. Harding, United States Senator from Ohio; Hon. Lindley M. Garrison, former Secretary of War and now receiver of the Brooklyn Rapid Transit System, and B. A. Hegeman, Jr., representing the manufacturer members of the Association.

A special invitation is extended to the ladies to listen to the speaking in the evening. Mrs. Pardee, assisted by a committee of ladies, will act as hostess. A dinner for the ladies will be served in a separate room, but when the speaking begins the ladies will occupy the boxes in the galleries of the main banquet room so that they may hear the addresses. After the conclusion of the addresses there will be dancing in the Astor Gallery. A committee, with N. M. Garland as chairman, has been appointed to look after the comfort and convenience of the lady guests.

Ethical Aspects of the Situation*

The Writer Analyzes the Causes of the Fare Trouble and Suggests Remedies—He Believes That the Fallacy of a Fixed Fare Has Won Widespread Recognition and Believes the Railways Are "At the Dawn of a Better Day"

By R. T. SULLIVAN
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WHY are electric railway companies so generally hated and distrusted?

That is a question that is constantly recurrent to the minds of all of us who are engaged in electric railway transportation. Furthermore, it must be admitted, the question fairly states the case, for the first impulse of the public, with few exceptions, is to oppose all things that the street railway company purposes doing, to look behind any given situation for an ulterior and sinister motive. Too often this first impulse becomes a lasting belief, and not only are the development and efficiency of the railway system seriously affected, but the very growth of the community concerned is retarded. Generally, the interurban systems find themselves in better case than do those of the cities. Nevertheless, the finger of suspicion is pointed at them in the same manner, though less frequently, perhaps, and, in principle, what may be said of the city transportation systems may be applied equally to the railways devoted to transporting the people from one community to another. This is not a new question. In fact, it is older than many of us are in the business to which it applies. But it comes to us with peculiar force and insistence at this time because of the griefs and worries—yes, even business tragedies—through which we have passed in the last year and because of the serious situation confronting us of the transportation industry now at the dawn of the world's reconstruction period.

> THE most important development in the street railway world in many years is the present widespread recognition of the fact that the nickel is not a potent talisman that will produce a street car ride for the possessor in any and all circumstances.

LESSONS TAUGHT BY THE WAR

The lessons of the war are for the electric railway industry as for all other enterprise, and several of them have a direct bearing upon the theme of our discussion to-day:

1. It has been more thoroughly demonstrated than ever before that the electric railways of the country are a vital industry—that any failure on their part to function properly is a serious retardation of the industrial and commercial life of the nation.
2. The crust has been cracked on the hoary illusion that a street car ride should be had for a fixed sum—for a nickel—despite the length of the ride, the conditions under which it is given, or the cost of giving it.
3. Public trust and community co-operation are essential to the proper and efficient development of local transportation systems.

The national government early in the war recognized the vital nature of our business, and the President and others stressed the fact that adequate development of the industrial resources of the country for the purposes of making war rested largely on our humble street cars. Whether the government should have gone farther and should have taken over the control of the electric lines as well as the steam roads it is futile to discuss now. Perhaps, since, as the English say, we have "muddled through" the war period somehow, and since we know not whither government control of the steam roads may be drifting, we should be content that things are as they are.

Our towns and cities also came to a somewhat tardy but general realization of the vital nature of the street railway industry, and many and insistent were the demands for service and more service to carry industrial workers to plants engaged in essential war work. Whether such service was possible or wholly impossible mattered little to those making the insistent demands.

Shall we let this popular recognition of our problems drop where it was when the armistice was signed? Electric railways are just as important to commercial development and community growth as they are to the mobilization of the nation's man-power for war-making output. Should we not then exert our very best efforts to solidify and increase this recognition of the railways' vital character to the end that it may bring to us constructive consideration as an offset to destructive criticism?

NECESSITY FOR FLEXIBLE FARE RECOGNIZED

As to the widespread recognition that has been won for the fact that the nickel is not some potent talisman that will produce a street car ride for the possessor in any and all circumstances, probably there has been no other such important development in the electric railway world in many years. A recent survey showed that in 348 cities increases in street car fares had been made. In this list all excepting six of the forty-eight states were represented. The urban population of the United States is estimated to be approximately 43,000,000, of which 23,000,000, or something more than half, are paying increased fares.

That is an imposing array. It justifies the assertion that the fallacy of a fixed and unaltered fare has won widespread recognition. But the points of particular interest to our discussion are that in many places it is recognition of a war emergency only and not an admission that the costs and prices of the electric railways vary and should vary in accordance with economic conditions; and further that it has required untold work and argument to bring the belated and grudging assent to increased fares.

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*Abstract of paper presented at annual meeting of Central Electric Railway Association, Cleveland, Feb. 27, 1919.

The fact remains that there are many thousands of persons to-day who concede that electric railways are affected by increased costs in the same manner as the merchant and the manufacturer and should be allowed to advance their prices for rides, but who, two years ago, would have smiled in derision at the mere thought of such a thing. That is a distinct gain. It is the application by outside observers in large numbers of ordinary business sense to an enterprise which was not before accorded that business logic. Is it not then an opening through which we can win further and more lasting application of ordinary business rules to our affairs? Is it not a companion piece to the recognition of the vital nature of our industry to be developed in like manner?

PUBLIC TRUST MUST BE WON

Then that third lesson of the strenuous times which have passed but from which we shall be a long time recovering—the need of public trust and community co-operation. Why are electric railway companies so generally hated and distrusted? What remedies can be applied to overcome or mitigate this feeling? Usually the first thing that pops into mind is that the electric railway is "a woman with a past." "The public be damned" policies of former years are sometimes referred to with a wave of the hand as if this somewhat nebulous statement was final and conclusive, or the "watered stock" bugaboo is trotted forth with a flourish.

I am not going to assert that these charges of past misdeeds are groundless, but I do believe that frequently they are too readily acceded to by electric railway men, whether the shoe fits or not. Certainly they are imbedded in the popular mind whether or not they have application to the property that may be under consideration. Roseate dreams of the pioneers in electric railway work which led them to assume that everything over and above operating expenses was profit without regard to the wearing out of the property and the tremendous rapidity with which the industry developed certainly have given color to popular ideas of huge profits and stock juggling, as have mergers and combinations, some malodorous and some purely on a business basis. But the fact remains that there are many properties in this country that have no actual taint of the past clinging to them, and it is a further fact that supervision of corporate activities by state regulatory bodies for some years has amply safeguarded the people against such abuses on the greater number of properties, if not on all.

Nevertheless these popular beliefs have come down to all of us, pretty much alike, and with them have come a variety of ills, such as extraordinary taxation, paving requirements, street cleaning and sprinkling obligations, bridge maintenance and the like, all manifesting the effort of the people through their local governing bodies to get back a part of the money paid for car rides, all based on the thought that the profits of the business of transporting the people through the streets were too great to be fair.

Public regulatory supervision over fares and service has not removed these burdens, nor have time and drastic legislation surrounding the issues of bonds and stocks done away with the suspicion and distrust.

Then what shall we do in this situation? For one thing I believe we should not be so ready to plead guilty for our predecessors to uncommitted sins of the past, and I believe that we should combat with the logic of graphic figures new and old impositions on the pockets of the street car riders. So many new cars balanced against a certain number of miles of street paving will have a strong appeal to most car riders. They use the cars, but the paving is for automobiles and other vehicles. Then, too, the steady presentation of the cost of the improvements and replacements to the public as opportunity offers, showing what becomes of the money the car rider pays and how new capital is used, certainly will help gradually to wear away some of the old mistrust and suspicion as to where the money goes.

You have done these things, you say. Well, the suggestion is not offered as a novelty. Keep on doing them and do them more consistently. This distrust of financial methods has been a long time growing, and it will require time to wear it away.

INHERENT HANDICAPS IN METHODS OF FINANCING

Then undoubtedly much of the antipathy of the ordinary individual to the electric railway company is due to the fact that every such corporation is the embodiment of capital—that capital which so seldom presents itself to the mind of the "man on the street" in its true aspect of the conglomerate of the savings of the multitude, but always as the ogre of untold wealth gathered into the hands of the few—that capital which he has been taught to despise by the office-seeker and the muckraker.

Unfortunately there are inherent in the public utility business several factors which encourage this attitude of mind and frequently lead to the allegations of "outside ownership" in a manner which, to say the least, is damning with faint praise. These factors include the means of financing to which a public utility usually is compelled. A mercantile establishment is ordinarily looked upon as a local enterprise, made so by the use of a local name regardless of where the stock is held, and an industry, if not largely owned where it is located, at least has its chief touch with the people of the community by affording employment to a large number of them, and it sells to them little or nothing directly. Thus both the manufacturer and the merchant have local favor while the street railway, or other utility, usually has its stock and bonds widely held while it is gaining its sustenance from the local field.

Again, the industrial and mercantile enterprises, with their turnover of capital at the rate of from two to six or more times a year, frequently can finance improvements or additions out of surplus, while the utility, with its turnover of capital only once in four, five or six years, and the heavy demands on it for extensions and new capital expenditures, must always and with great frequency raise the needed amounts by new issues of stocks or bonds. Both because of the volume and usually low dividend-paying qualities of these securities, the local money supply in most instances is not sufficient to absorb them and, like the municipal bonds, they have to seek the money where it is—New York or some other money center.

This gives rise to the condition of so-called "outside ownership" and the feeling on the part of the people as a whole that the only interest the utility has in the community is to get as much as possible out of it.

HOW TO CARE FOR THIS SITUATION

Two thoughts suggest themselves as means of meeting this situation, in part at least. One is care in making public full financial statements, and the other is consistent effort to secure the greatest possible number of local stockholders. To be sure, the freedom with which the financial statements of a company may be spread broadcast is a question to be answered in the light of each company's situation, but usually there is too great timidity in offering these salient facts concerning the corporation for the scrutiny of the public. Certainly, where the facts are open to all, the financial affairs of the company lose much of their mystery and less frequently are the basis for attack.

> IN the conduct of our business we are denied the usual methods of the merchant and the clerks who are his points of contact with his patrons in making the purchase of our commodity a pleasant incident. Yet ours is a selling business—the selling of rides—and the closer we can approximate mercantile methods the smoother will become our contact with the people whom we serve.

As to the sale of securities to the local investor, small or large, certainly this seems logical and correct in principle. How far this is possible for railway companies in the present condition of affairs is a problem, but combined properties and electric light and power companies have found that the results of the local sale of their preferred stocks have been excellent, not only as a logical method of financing, but as one of the best means of reaching a solid basis of understanding with the people they serve.

TWO CAUSES FOR DISTRUST OF UTILITIES

But the genuine cases of scandal involving street railways, of maladministration of the properties and of "stock manipulation" have not been so general or so frequent as to account entirely for the prevalence of the suspicion and distrust directed against the transportation utilities. Other elements are involved, one of which is the practice of candidates for political office to a greater degree than twenty-five years ago to talk directly to the public, and the extent to which demagogues in such talks denounce corporate wealth, often selecting the local railway as a butt for their denunciations, irrespective of the facts.

A companion to this political form of attack is "muckraking." The original muckraking, which was founded upon careful investigation and a conscientious effort to present the facts, has done its quota of good; but magazine muckraking begot that more modern form of scandal mongering which is termed "yellow journalism" and though, fortunately, the "yellow journal" is much in the minority among the newspapers of the land, its effect has been widespread. Together with the condemnation of business corporate so freely dispensed from the political rostrum, it has gradually brought into being what might be termed a distinct type of news writing, a type that gives precedence to the flashy, though unimportant detail, over the important, but solid, substance.

RELATIONS WITH NEWSPAPERS

I am firm in my belief that the newspapers as a whole do not get nearly so much credit as they deserve for the earnest efforts made to present facts correctly to their readers. Nevertheless there is hardly a newspaper, especially in the smaller cities and towns, no matter how carefully edited or conscientiously directed, which does not have to depend in the hurly-burly of getting to press on time not only upon the veracity but on the judgment of comparatively young, irresponsible and uninformed reporters. Thus many ill-considered items are printed and much unintentional misrepresentation results. Perhaps others might dispute the assertion, but I doubt whether any form of business suffers so frequently or so keenly from this type of news as the traction company. And not even the long-range "horror gun" of the Hun could hurl a denial or correction far enough to overtake the evil thus inflicted.

Then what are the street railways to do to offset or prevent this unfair criticism in politics and in the ordinary channels for public information? Certainly here is a field for thoughtful, well-considered and persistent publicity. All that is printed is not publicity, and the value of publicity is not to be measured solely by its volume. Self-congratulatory statements that smack loudly of the press agent simply clutter up the galleys of the newspaper composing room, or the waste basket. They do little good if they are printed. But honest-to-goodness facts about the local electric railway business will help materially to meet the situation.

In the first place, much of the criticism hurled at the railways by the small office seeker is not based upon any fundamental idea that he really knows whereof he speaks. It is usually a very general accusation, sometimes coupled with the statement that the facts are hidden and cannot bear the light of day. If the facts concerning the company, its service and its business are already in the possession of the people, much of the ground is swept from under the feet of such assailants, and even if they are not adduced till after the charge has been made they often will stop the repetition of the canard or offset some of the evil that it has done. Uninformed critics do not like to face facts.

As to the common troubles of incorrect statements in the newspapers, the situation is somewhat easier.

In the great majority of cases where a misstatement is printed the reason for it is that the writer of the item did not have the facts and did not have initiative enough to dig for them. If a consistent effort is made to supply the facts, the chances are strongly in favor of them being used by any reputable newspaper. If something happens or is impending, try to beat the misstatement into print with the facts—do the reporter's digging for him and usually he will appreciate it. Sometimes you will be too late, but try again and keep on trying, and after the reporters get to know that the facts are available for them they will come after them or wait for them before breaking into print. But beware of discolored facts, for as surely as a burned child avoids fire so will a reporter who has once been misled look askance at any information coming from the same source again.

As to whether your facts should be placed before the people in news items, in paid advertisements or in pamphlets in the cars depends upon circumstances. The one thing of which I feel confident is that if the public is not to be misled by false or incorrect statements they must be supplied with the truth and the facts. To wait till the storm breaks is a bit tardy to think of repairing the roof, and so it is unfortunate if you cannot see your way clear to a consistent policy of publicity till you find yourself in a tight place.

HOW TO MAKE THE PEOPLE BELIEVE

It is just as well, also, to endeavor to give a human, natural tone to the utterances that go to the people, whether they be advertisements or comments for the news columns. At an electric railway convention a commanding figure in the industry complained with regard to publicity that "the people will not believe us." Now stop a minute and analyze that.

People do not ordinarily accept anything as the embodiment of the whole truth. Assuredly they will accept as true something stated as a fact in which they may not be greatly interested and which is not of a controversial nature, but if we expect them to accept as the last word a statement issued in the somewhat stilted form that usually marks the official statement handed out at a time of difficulty, or when something is wanted, we are more credulous than we have any reasonable right to expect them to be. On the other hand, if they are accustomed, when things are going right and nothing is needed or wanted, to hear from that same source in a natural, human way, then we may expect a number of them to believe all that we have to say and a still larger number to believe the greater part of our statements.

This is all the truer if we endeavor to be persons rather than figureheads, if we are known to the people with whom we do business in some other capacity than that of president, manager, or superintendent of the electric railway company. A real, vivid interest and activity in community affairs wholly detached from the transportation of the people not only is wholesome for us as men but gives us a personality that does much toward offsetting the impersonal nature of our work, in so far as it affects the car rider.

Nor can this be made, so to speak, a "one-man job" for the organization. Rather every man who is capable of representing the company with the proper spirit should be encouraged to take a part in the various and varying interests exemplified in the social and business organizations of every town. It is quite probable that some might not enter with enthusiasm into a "hot dog" supper of the Twenty-ninth Ward Social Club, or the bowling tournament of an athletic club, or again be interested in the technical discussions of an engineering society. Yet there is someone in every organization of any size who does have a real interest in about every type of activity that a worth-while organization will promote, and if such interest is encouraged, then the company has a way opened for it, in time of need, to reach receptive and friendly minds in about every group in the community where public opinion is molded. Furthermore these employees will be efficient representatives of the company at all times in casually winning consideration for the railway's plans and motives if they are kept well informed through the medium of company clubs, periodical bulletins or the like.

Our actual business contacts with the people are almost exclusively through the medium of ticket sellers, ticket takers at prepaid areas and the motormen and conductors on the cars. With very few exceptions they are not under anything like constant supervision of those who have a broad conception of the service we are selling to the riders. Thus we are denied the usual methods of the merchant and the clerks who are his points of contact in making the purchase of our commodity a pleasant incident. Yet ours is a selling business—the selling of rides—and the closer we can approximate mercantile methods the smoother will become our contact with the people whom we serve. So-called "welfare" work among employees, the methods of conducting schools for motormen and conductors and the like would in themselves furnish the subject matter for prolonged discussion. Yet it is in activities like these that we may find the answer to the very knotty problem presented by our widely scattered points of contact.

TWO OTHER POINTS TO OVERCOME

Closely allied, in so far as it affects the public attitude, with the undesirable nature of our points of contact are two other factors in making the people so generally hate us and distrust us. One is, of course, that the economical transportation of the people in any given community is a natural monopoly, and the other is the diametrically opposite views that must be taken by the rider and the company of what constitutes good service. Our customer is buying an individual ride. The service is either good or it is "rotten," to his way of thinking, in accordance with whether he can board a car at the time he chooses to ride and be carried to his destination in a fair degree of comfort, with expedition and without delay. Though he is buying an individual ride, we are selling a general service. We cannot think of each individual as such. We must pay strict attention to the best possible service for the greatest number. Hence, perhaps, a transfer of passengers from one car to another short of their destination, or some other untoward happening that results in discommoding a few for the benefit of many. The many for whom we may take this step in operation don't know it and don't care, but you are mighty certain to hear from the few who were inconvenienced.

In this case of the individual ride against the general service, one of the most powerful things in swinging the jury of public opinion against the railway company is the "rush hour." Naturally there are thousands of persons in any fairly large community who do most of their street car riding in the morning and evening during the peak-load periods. Just as naturally their opinion of the quality of the service given throughout the twenty-four hours of the day is based upon these two short periods when they do most of their riding. Holiday crowds or pleasure seekers rarely "kick" about crowded cars, but men and women going to and from their work day after day in similar crowded cars are bound to become a bit nasty about it.

SOME THINGS THAT CAN BE DONE

But what are we to do about these matters? How can we ameliorate these conditions and how can we overcome the prejudices founded upon them?

Frank and well-considered publicity telling the facts about the service, newspaper advertising and advertising in the cars for the same purpose and occasional talks on railway problems before civic bodies will help. In some cities it has been possible to gain the co-operation of employers of large numbers of persons through the staggering of the hours of employment so that the peak loads may be flattened out. Where this has been done it has proved beneficial.

There also has come in for wide consideration and for adoption in a number of cities comparatively recently what is commonly known as the "service-at-cost" franchise. Under this plan the rider knows that the amount he must pay for his ride is dependent upon the cost of the service. He knows that the cost of the service is largely in proportion to the amount and quality of service. Whether there shall be more service at a higher rate or less service at a lower rate becomes virtually his own problem. Under a fixed fare the company may sweat blood to get by without it being in the least a matter of concern for the rider. He may growl about the service as much as he pleases, it costs him nothing. Under an automatically flexible fare he does have a direct interest—in a sense he is a partner—and his own interests curb his passion for unlimited service when he realizes that he will have to do his part toward footing the bill.

DON'T BOTHER THE PASSENGER TOO MUCH

In this same regard there is another matter which I am going to advance somewhat timorously for your consideration. It is almost axiomatic that the easier a person is parted from his money the less likely he is to object, and the more complicated the transaction of paying for what he gets the more certain is he to object to paying. If that means anything to us it is that the simpler and easier we make the matter of paying street car fares, the more convenient and comfortable we make the access to our cars and the passenger's progress to the point of parting with his money, the less likely are we to hear complaints both about the amount of the fare and the quality of the service.

Is it not true that sometimes when we seek to make sure that we are receiving all that is properly coming to us we make the process of paying fares too complicated to permit of the passenger parting pleasantly and easily with his money so that he will be pleased with the purchase of a ride? The passenger's part in the transaction should be fully developed and considered when a new method of collection or of checking loads is planned, and frequent changes in methods of fare collection and the like should be avoided. True, in time people become accustomed to almost anything, but the oftener the manner of paying is changed, the oftener the amount of the payment is brought actively to the mind of the car-rider and the oftener the question arises why anything at all should be paid.

There is still another form of clamor against the railway company with which we all are acquainted. This is the insistence upon extensions of the railways into sections of a city about to be plotted into building lots and placed on the market. There was a time, in the days of perpetual franchises, when the idea of building lines for the future possible profit might be viewed with a degree of equanimity, but that is not true in these days of short-time franchises and high costs of construction and operation. Yet the thought is deeply imbedded in the popular mind that there is bound to be a large profit in a street railway whether anybody rides or not, and there are always glowing estimates of the rapidity with which traffic will build up in this new section—estimates, it goes without saying, that are seldom borne out in the experience of traffic checkers.

Perhaps here, too, if it is fair and equitable otherwise, the service-at-cost plan may be helpful, for it will identify the people's own interests directly with those of the company in the economy and efficiency of electric railway operation. Another plan that sometimes is helpful is to take the matter up with the real estate developers upon a co-operative basis. In some instances where the enterprise has been sound and of sufficient magnitude the developers have consented to pay the construction cost upon the agreement of the company to operate the line, or have guaranteed the operating costs for a period of years sufficient to permit of the building up of a fair amount of traffic. Such co-operative effort is sound policy as it distributes the burden of cost and places a part of it where it belongs—upon those who will be immediately and directly benefited by the improvement.

One more suggestion in this effort to consider some of the aspects of our business for which we are seeking

> THERE is reason for optimism. We are at the dawn of a better day. True, the months that have passed have left some casualties along the way. That is the havoc of war, let us say, but we who have come through, somehow, must keep our faces to the front like good soldiers and win out for an industry that is just as vital to our country in peace as in war.

remedial measures. Is it not a fact that much of the difficulty of the electric railways in placing themselves upon a better basis of understanding with the communities they serve is due in large measure to the lack of a definite and continuous policy? Is this not equally true of the average individual company and of the industry as a whole?

Many of the problems with which we are wrestling exist because someone who has preceded us did not have the vision to see, or else he cared little, what would be the effect of his actions upon a situation that probably or certainly would arise in after years. Likewise the contracts and agreements and promises into which we enter to-day are going to have their future effect on the affairs of the properties we manage, and we should give careful thought to the years to come so that we may be doing as little as possible for some present benefit that will inflict future and perhaps permanent injury.

Now is a good time to consider this phase of our business. Never before has such a large part of the people we serve realized either the importance to them or the difficulty to the company of the carrying on of transportation. Never before have we had nearly so much of a hearing on the relation of our costs and the price of a ride. Many persons have been wrung from skepticism to a fair appreciation of some of the important troubles of the electric railway men, and more of them can be won to that viewpoint.

We must use this wider interest in our business and better view of our problems as the opening to a stronger accord between the public.

OUTLOOK IS FAVORABLE

We have passed through the most tremendous times the electric railway industry has ever known. We are just now beginning to turn our attention once more to matters of operation which two years ago were in our daily thoughts but which have been lost to view by the weightier matter of finding a way to continue operation at all. In common with every other body of patriotic men we have had only one thought—the winning of the war and how we, of a vital industry in the line behind the line, might do our utmost to that end.

One of the results of this war will be the springing up of a crop of experts and here again the industry may reap benefit from their activities. New ideas and new methods are bound to be developed and we must be prepared to take advantage of those which are good. One way in which we can do so is to develop our own experts on our own properties, for the best expert I know of is an enthusiastic and ambitious man in one's own organization who follows the lead of the best opinion and experience as set forth in the technical journals and has the initiative and "pep" to apply them constructively to our own local problems.

In these and in other ways the future holds something for us. There is reason for optimism. We are at the dawn of a better day. True, the months that have passed have left some casualties along the way. That is the havoc of war, let us say, but we who have come through, somehow, must keep our faces to the front like good soldiers and win out for an industry that is just as vital in peace as in war.

One-Man Car Service Started in Brooklyn

Trial Operation Was Begun with Three Safety Cars, and Others Will Be Added to Completely Equip Test Lines

THREE new one-man safety cars furnished by the American Car Company of St. Louis, Mo., were put in operation on one of the suburban lines of the Brooklyn Rapid Transit System last Sunday. Three more of this type, together with six to be furnished by George H. Tontrup of St. Louis, Mo., will be tested later. If the trial meets with the approval of the Public Service Commission and the service is acceptable to the public, it is planned to purchase a total of 150 one-man cars for use on lines in the outlying sections of Brooklyn.

The present trial is being conducted on a line running from the Sixty-fifth Street terminal of the Fifth Avenue Elevated Line to Fort Hamilton, a distance of 2 miles. Most of the passengers use this line as a means of connecting with the elevated road and the surface cars run into the elevated station up an incline so that no additional fare or transfers are required in making the transfer. The morning rush-hour service consists of picking up the load and taking it to the terminal, while during the evening rush hour the load received at the terminal is distributed. There is one transfer point to surface cars at the foot of the terminal incline. To provide for the present schedule on this line seven cars are used, three of which are one-man cars and the others are double-truck closed cars which is the type previously used in this service. The weight of the one-man cars is 14,500 lb. as against 31,000 lb. for the closed cars, and the one-man cars seat thirty-four passengers to thirty for the other type. The one-man cars thus have less than half the weight per seated passenger of the cars of the older type.

Previously the service was operated with a seven-and-one-half-minute interval during rush hours and a ten-minute interval during non-rush hours. With the introduction of one-man cars this has been reduced so now a three-and-one-half-minute interval is maintained during rush hours and a five-minute interval at other times. This increase in service should result in an additional increase in the number of passengers carried, as many who previously walked the short distance to and from the terminal rather than wait a few minutes for a car will now take to riding with the short headway. A complete trip in one direction requires twelve minutes and there is a three-minute layover at each end of the trip. This is sufficient for the operator to change ends, move the fare box, take register readings, and fill out his record cards for the trip. With the present service an average load during rush hours consists of from thirty-five to forty-five passengers, and during non-rush hours from eight to twelve is an average load. The wages for the operators of the one-man cars have been increased 5 cents per hour over the rate which they previously received as motormen. This increase in rates makes the work popular so that the most efficient motormen are anxious to operate these cars. The cars are equipped with the full complement of the now-familiar safety devices.

Fifty-Fifty for Car Rider and Taxpayer

Massachusetts Commission Recommends Such Plan to Meet Deficit of Bay State System from Five-Cent Fare—Also Asks Aid from Taxation for Other Lines

IN LAST WEEK'S issue the ELECTRIC RAILWAY JOURNAL referred briefly to the fact that the Massachusetts Public Service Commission on Feb. 15 recommended the use of taxation to reduce the burdens of car riders in the State. This recommendation was made after an investigation requested by the Legislature on Jan. 24. From the full report now available the following details can now be added:

The first part of the investigation covered the Bay State Street Railway and was made jointly with the public trustees of this system. The company, it is said, was operated during the calendar year 1918 at a total deficit of $2,918,500, the legislative act of that year being taken as a basis for comparative purposes. The total deficit for the year ended June 30, 1920, the first year of public-trustee operation, is estimated at $1,817,900. The situation will make necessary further increases in fares, but the commission and the trustees believe that higher fares will be likely to increase congestion in the city centers and otherwise seriously impair the company's usefulness. Furthermore, they believe that any wholesale abandonment of routes would be a public misfortune.

Under the Bay State public control act, the trustees have no option but to collect the entire cost of service from the car rider. Wage increases, however, have increased operating costs far beyond those prevailing when this legislation was enacted. Because of the changed conditions, the commission and the trustees "are forced" to these conclusions:

> It is no longer equitable to require the car rider to pay the very high fares which will be necessary and the car rider should be relieved, through taxation, of a moderate portion of the cost of service. In view of the unquestionable benefits which accrue to taxable property from adequate electric railway service at reasonable rates, we believe that such an arrangement will not impose undue burdens on the taxpayer.
>
> We therefore recommend for enactment an amendment to the Bay State public control act. This amendment provides that the first 5 cents of the cost of service per passenger shall be paid by the car rider and that any costs beyond 5 cents per passenger shall be paid 50 per cent by the car rider and 50 per cent by general taxation. A commission would apportion the tax among the communities served and the initial payment by the taxpayer would be made in the autumn of 1920. In our opinion, the enactment of this amendment will prevent Bay State fares from going above the present level, and both fares and taxes will be gradually reduced as the trustees are able to decrease operating costs. We believe also that it will enable the trustees to continue in operation most of the lines which the receiver has petitioned the court for authority to discontinue.

In regard to the general electric railway situation in Massachusetts, which the commission reports upon by itself, various financial statistics are shown, some of which are given in Table I. The commission finds depreciation allowances insufficient and suggests that the annual sum of 1.8 per cent of the cost of permanent investments in addition to the maintenance expenditures be taken as a minimum requirement. It also says that it is necessary to make provision at least for the payment of all dividends on preferred stock and a return upon the legitimate investment represented by common stock substantially equivalent to what the companies were able to pay under normal operating conditions up to a maximum of 5 per cent. With adjustments for these items and for certain tax eliminations, it is found that additional revenue of $2,195,950 is required for the lines (excluding the Boston Elevated Railway, the Bay State Street Railway and the Massachusetts Northwestern Street Railways). Details of this deficiency are given in Table II.

In discussing how this deficiency would best be met, the commission says in part:

> The present system, which throws the entire cost of service upon the car riders, apparently rests upon the assumption that the individual riders are the only persons who have any legitimate interest in the maintenance of good local transportation facilities. The fallacy in such an assumption is so obvious that it scarcely needs to be pointed out. In addition to the benefits received by individual electric railway patrons, there is a very large community benefit which can be measured by the losses in industry, trade, real estate values and other forms of community wealth which would result if all electric railway facilities were suddenly blotted out.
>
> For this benefit, up to the present time, the community has paid nothing and has succeeded not only in unloading its legitimate part of the transportation burden upon the shoulders of the car rider, but also in making him pay, in addition, a portion of the cost of general municipal improvements through the imposition of special taxes and public charges. The only justification for the existing system is the fact that the burden is so widely distributed that fares in the past have been relatively low and their payment has involved no special hardship.
>
> But when the car riders are compelled, as a large proportion of them now are through reductions in fare zones and increases in the unit of fare, to pay increases of fare varying from 100 per cent to 400 per cent, the inequality of the present system is thrown into strong relief. The burden is one that the car rider not only ought not to pay but, to speak broadly, cannot pay under present economic conditions.

TABLE I. STATISTICS OF MASSACHUSETTS ELECTRIC RAILWAYS FOR CALENDAR YEAR 1918*

	All Railways	All But Boston and Bay State Systems
Capital stock	$84,823,200	$33,412,300
Capital stock and premiums	89,266,374	34,789,565
Passenger revenue	42,817,200	12,905,847
Other operating revenue	2,546,849	1,010,473
Total operating revenue	45,364,050	13,916,320
Conducting transportation	16,292,878	4,525,011
Depreciation	2,538,031	249,361
Other operating expenses	21,994,833	7,267,018
Total operating expenses	40,825,743	12,041,391
Net railway revenue from operation	4,538,307	1,874,928
Taxes	2,007,182	691,292
Operating income	2,531,124	1,183,635
Non-operating income	221,560	73,567
Gross income	2,752,684	1,257,203
Deductions for gross income	8,229,833	1,646,227
Deficit	5,477,148	389,023
Estimated deficit for 1919	4,725,580	267,779

---

*In the case of certain individual companies the figures are based on actual returns for eleven months and estimated returns for one month.

The first step to be taken, the commission says, is to relieve the companies of the incubus of the special taxes and public charges, and it submits the draft of a bill intended to accomplish that result. In its opinion, however, relief of this character will go only a short way towards meeting absolutely essential revenue requirements. The commission is convinced that direct community contributions through the tax levy is the only practicable way out of the present transportation difficulties. The plan which the commission submitted jointly with the trustees for the Bay State system is said to be perhaps as fair a method as can be devised, but owing to the diversity in fare zones and methods of collection on the lines of the various companies, its general application to all the electric railways of the Commonwealth would be impracticable.

In evolving a suitable general plan, the commission says in part:

> We believe that the most urgent need of the present electric railway situation is to take measures that will not only save the public from the further increases of fare which are now imminent, but will permit the gradual reduction of present fares to a more moderate level. Instead of the present rigid system under which the entire cost of the service must be borne by the car rider, irrespective of where the application of that principle may lead, those charged with the responsibility of establishing or regulating fares should be allowed sufficient discretion to enable them to fix fares which are consistent with the general public interest.
>
> It is easier to understand the principle which should govern than to state it by any concise and specific formula. It may, however, be expressed by requiring fares to be fixed which will meet the cost of the service in so far as this may be done without unduly hampering or discouraging the free movement of traffic and the economic development of the communities served or otherwise injuriously affecting the general public interest.
>
> If fares established upon that basis do not yield sufficient revenue to meet the legitimate requirements of the company, the balance should be met by an addition to the tax levy up to a reasonable maximum, which we suggest should be $2 on each $1000 of assessed valuation. Any such appropriations should be coupled with public control.
>
> We submit the draft of a bill embodying this general plan. It was necessary, in making provision for the assessment of taxes, to meet the situation resulting from the fact that about seventy cities and towns are served by two or more electric railways. As one of such companies might accept the act and the others not, we have suggested that the tax in such cities and towns be apportioned upon the basis of track mileage. With this adjustment we believe that the tax should be apportioned to the various cities and towns served on the basis of valuation. This method is based upon the ability of the several communities to pay, which is the principle underlying all taxation. An apportionment on the basis of the number of car riders, which is the method adopted in the special Bay State and Boston Elevated acts, seems to us illogical and unsound, as it is not those who ride but those who fail to ride who are responsible for the present deficits

The practical effects of this general plan for all companies except the Boston Elevated, Bay State and Massachusetts Northeastern companies are shown in Table II. Provision for the assessment of the revenue deficiency is already made in the Boston Elevated act, and a separate plan for the assessment of such deficiency in the case of the Bay State system has been presented. The other exception is the Massachusetts Northeastern Street Railway, which is an interstate road incorporated in both Massachusetts and New Hampshire with its lines interlacing across the boundary between the two states. If it should be thought desirable, some feasible method might possibly be found for accomplishing the same general results in the case of that company, but this could probably be done only through a special act.

TABLE II. ESTIMATE OF CONTRIBUTION TO BE NEEDED FROM TAXES IN MASSACHUSETTS

1918 deficit for all lines except Boston, Bay State and Massachusetts Northeastern companies	$364,293
Additional allowance for depreciation	892,914
Return on stock	1,254,898
Total deficit	$2,512,105
Excise and franchise tax	316,154
Additional revenue required	$2,195,950
Assessed valuation of districts served by the twenty-one railways included	$1,317,855,145
Average additional tax per $1000	$1.24

HOW THE TAX RATE WOULD VARY

It is said that four companies (East Taunton, Linwood, Lowell & Fitchburg and Union) fully meet the revenue requirements defined in the act without any tax contribution. These companies would not be affected by the act, as they would have no inducement to accept it. In the case of all the other companies there would be a deficit to be met from the tax levy amounting in the average to $1.24 per $1,000 of valuation. Seven companies (Berkshire, Blue Hill, Boston & Worcester, Concord, Maynard & Hudson, Milford, Attleborough & Woonsocket, Nahant and Lynn) would require the maximum tax of $2, and even that amount would be insufficient to meet their estimated revenue requirements. In the case of three important roads (Springfield, Holyoke and Middlesex & Boston) the rate would be approximately $1. The rate for the Worcester Consolidated would be $1.78, and the rate for the other roads would vary from $1.96 for the Northern Massachusetts down to $0.17 for the Interstate Consolidated.

The plan suggested is intended to be merely a measure for tiding over the present emergency. The legislation suggested is therefore to be effective only until Dec. 31, 1922. In the commission's opinion, any temporary plan and, indeed, any permanent plan which falls short of public ownership will not fully restore electric railway credit. It is believed that the plan suggested, however, should at least improve credit and by making better provision for depreciation should assist in the rehabilitation of the properties and thus make possible better service as well as lower fares than would otherwise prevail.

Meeting of Oklahoma Association

THE Oklahoma Utilities Association held its annual convention at Oklahoma City, Okla., on Thursday, Friday and Saturday, Feb. 6 to 8. One of the papers presented at the meeting was on the present status of the electric railway industry. The author, J. W. Shartel, vice-president and general manager Oklahoma Railway, reviewed the prosperity which the interurban lines had brought to the communities in Oklahoma but said that the conditions surrounding electric railway construction now made further development impossible. The electric railways need greater revenue, but the public seems indifferent to their condition. Automobiles will not solve the question of city transportation, partly because they are inherently more expensive, partly because of the room which they occupy on the street and partly because they cause many accidents. The speaker recommended rigorous traffic regulations for automobiles, increased schedule speed for electric cars and higher fares.

C. E. R. A. Meets in Cleveland

President Coen Says Future Looks Brighter for Electric Railways Than a Year Ago—J. F. Collins, Michigan United Railways, Was Elected President for Ensuing Year—Association Decides to Resume Annual Boat Trip

THE annual meeting of the Central Electric Railway Association was held in the new Hotel Cleveland, Cleveland, Ohio, on Feb. 27 and 28. Papers were presented by J. T. Sullivan, general manager Mahoning & Shenango Railway & Light Company, on "Ethical Aspects of the Street Railway Situation," by G. H. Kelsay, electrical engineer Union Traction Company of Indiana, on "Power House Economies," and by A. B. Cole, publication department Westinghouse Companies, on "Freight Haulage." An abstract of Mr. Sullivan's paper is published elsewhere in this issue, and a report of the proceedings on Feb. 26 is given below. An account of the proceedings on Feb. 27 with abstracts of the papers by Messrs. Cole and Kelsay will be published next week.

There was a good attendance at the meeting, some 300 members being present. F. W. Coen, vice-president and general manager Lake Shore Electric Railway and president of the association, presided. At the opening of the morning session A. R. Corlett, representing Mayor Davis of Cleveland, presented the association with a large key, symbolizing the freedom of the city.

PRESIDENT COEN SAYS FUTURE LOOKS BRIGHTER

In his presidential address Mr. Coen reviewed the unusual conditions under which electric railways had operated during the past year. Increased income, he said, has been necessary, and those in authority have in general met the situation by granting additional rates where they had the ability. The utilities are not yet on the basis that they should be, but as a whole the future looks much brighter for them than it did a year ago. There are too many different political bodies telling the electric railways what to do. Some centralized authority would more likely be free from prejudices growing out of local conditions.

In each state, according to Mr. Coen, there should be one body with authority over railway properties on the one hand to determine construction, operation and service requirements and on the other to prescribe such rates as may be necessary to cover operating and maintenance costs and a return on the investment. The speaker had no quarrel with the jitney and auto-truck if they supply transportation needed by the public, but they should be compelled to fulfill the requirements of common carriers. The war has taught many lessons of co-operation which should be applied on electric railway properties. The public also should be told of the unjust burdens which are now being imposed on the railways.

In conclusion, Mr. Coen expressed a feeling of optimism—a belief that the cloud which has overhung the industry for many years shows a silver lining and that better things can be expected if the railway's case is presented fairly and continuously.

The annual report of A. L. Neereamer as secretary and treasurer of the Central Electric Railway Association for the year ended Dec. 31, 1918, was then presented. An abstract follows:

During the past year the association has held three meetings as follows: Dayton, Ohio, Feb. 28 and March 1; Cedar Point, Ohio, July 17 and 18; Indianapolis, Ind., Nov. 21 and 22. The interurban railway membership of this association as shown in the report for the year 1917 consisted of sixty-eight interurban lines, operating 4927 miles, and two city lines. During the year we have lost five interurban lines and 113 miles; the membership for the year ending Dec. 31, 1918, being sixty-three lines operating 4814 miles. This is the net result shown above for the reason that we secured one new line, and one of the larger lines separated into two companies which would make the total loss in interurban lines seven.

During the year 1917 we had 140 supply members and in the year just ended 126, a decrease of fourteen.

The receipts and disbursements for the year 1918 are as follows:

Receipts:		
Cash on hand	$1,608 95	
Receipts	7,219 24	
Disbursements		$7,866 97
Cash on hand		968 12
	$8,828 19	$8,828 19

You will note from this statement that while the cost of all material has greatly increased, the operating expenses have been kept down to the minimum.

During the first portion of the year there was considerable work done for the committee on military efficiency and defense, and the data sheets and records were completed so far as reports could be secured from the member companies. The work of this committee of course ceased with the signing of the armistice on Nov. 11, 1918.

Investments were made during the past year as follows:

Third Liberty Loan	$500 00
Fourth Liberty Loan	500 00
Paid on running stock of the Railroadmen's Building and Savings Association	75 00
Total	$1,075 00

For the information of the members I am submitting herewith a statement of the expenses of the Central Electric Railway Accountants' Association:

Total expenses for the year	$20 31	
Received from sale of pamphlets	00 00	
Balance	$20 31	
Dues at $5 per annum from two lines not members of the Central Electric Railway Association	10 00	$10 31

The secretary and treasurer also submits herewith a statement of current assets and liabilities of the association for the year just ended:

Current Assets:			
Cash on deposit		$962.12	
Investments—Liberty Bonds	$1,500 00		
Railroadmen's Building and Savings Association	3,031.56	4,531.56	
Due from members		266.68	
Liabilities			$0,000 00
Balance			5,760 36
		$5,760 36	$5,760 36

An explanation of the items covering stationery and printing and the miscellaneous charge against the Central Electric Traffic Association, a statement is submitted herewith of the expenses and receipts of that association for the year 1918:

Received from sale of tariffs	$865 54	
Traveling expenses		$158 06
Stationery and printing		746 30
Postage		40 00
Telegraph and telephone		16 89
Freight and express		9 90
Legal expense		35 00
Due from member companies	62 02	
Deficit	43.59	
	$1,006.15	$1,006.15

The financial affairs of the association are now in the best condition they have been since its organization and this situation is only achieved by careful watching of each and every expense, buying at the proper time on the market and only at such times as is absolutely necessary to have supplies in the office. We were very fortunate in the purchase of some of the stationery, of which we use a great deal, in a large quantity before a very marked advance in price.

In closing this report the secretary and treasurer desires to thank the officers, committees and members for the assistance given him in the discharge of his duties during the past year.

At the conclusion of the report an amendment to the by-laws raising the dues of the supply members of the association to $10 a year was adopted. Thirty-four applications from supply men were received and acted on, making membership largest in history. An amendment making past presidents ex-officio members of the executive committee was also approved. S. D. Hutchins then outlined proposed boat trip, on July 8 to 11, from Toledo to Benton Harbor, and Chicago was then approved by the meeting. A telegram was then read from J H. Pardee containing the greetings of the American Association and urging united action in the present railway crisis and attendance at mid-year meeting in New York on March 14.

Mr. Sullivan then read his paper on the "Ethics of the Street Railway Situation," which appears on page 413 of this issue. There was no discussion.

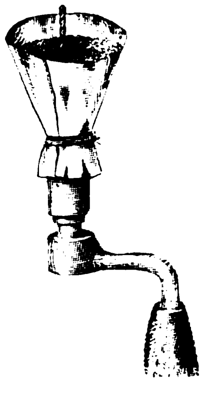
OFFICERS ELECTED

On Friday morning the following were elected officers for the ensuing year: President, J. F. Collins; vice-presidents: R. I. Todd, Indianapolis and A. C. Blinn, Akron.

Executive committee; F. D. Carpenter, Lima, H. A. Nicholl, Anderson; F. W. Coen, Sandusky; C. L. Henry, Indianapolis; F. R. Coates, Toledo; C. N. Wilcoxon, Michigan City; S. W. Greenland, Fort Wayne; W. S. Rodger, Detroit; F. J. Haas, Evansville: A. C. Van Driesen, Toledo; J. R. Farrell, of the General Electric Company, Indianapolis; L. G. Parker, of the Cleveland Frog & Crossing Company, Indianapolis.

A. L. Neereamer was later re-elected secretary and treasurer by the new executive committee.

Inexpensive Guard Prevents Dropping of Shavings and Drilling from Overhead Work

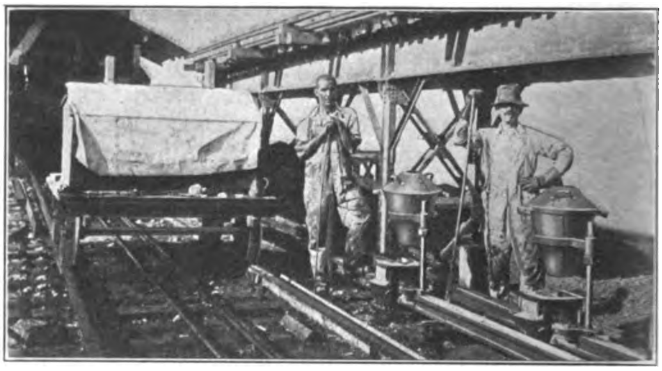


TO PREVENT drillings from dropping into the eyes of the workmen when drilling overhead and to keep the machinery below free from dirt and grit, the guard shown in the accompanying illustration has been found very effective. This guard can be constructed of cardboard or even newspaper. It is simple and inexpensive and its use may save a great amount of trouble.

A funnel of suitable size is placed over the drill and the bottom is wound with string to make a close fit around the bit-stock. The grit and chips from the work are collected in the funnel and after the work is done it can be easily removed and cleaned out.

Welding Third-Rail in Cuba

THE welding of third-rail has received very little attention in the United States except on recent rapid transit lines. The practice has been used quite extensively abroad, however, and an accompanying illustration shows such a weld being made in Cuba. This weld of the conductor rail was made by the Spanish-American Iron Company at Felton, Cuba, with thermit. Some of the welds were made under very difficult circumstances as the wind was blowing at a rate of about 20 m.p.h. and frequent showers occurred. In some cases it was almost impossible to keep the preheating torch in operation. In this case the entire rail section was welded.



WELDING THIRD-RAIL AT FELTON, CUBA

London Underground's Pictorial Souvenirs for Its War Workers

As a token of appreciation of those employees, new and old, who were "carrying on" while their predecessors were at the front, the Underground Railways and the associated London General Omnibus Company have issued a series of lithographs entitled "Playing the Game." Each lithograph is of an employee sketched from life in the performance of his or her duties with an auxiliary photo-derived drawing below where appropriate of the corresponding service on the battle grounds. For examples, the drawing of the lorry-makers (for war work) is accompanied by a picture of a line of auto trucks wending their way along a French highway; the shell turners are paired with a scene depicting the use of their output; the women painters are accompanied by camouflage artists, etc. Bus conductresses, lift girls and others are reminded in like manner of the war service of the men they were employed to replace. The bus driver shown in one plate actually transported soldiers through France, while the plate layer or trackman is a veteran of Mons.

These sketches are auto-lithographs, being drawn by the artist directly on the stone. Each employee has received a copy of the sketch depicting his or her line of work, and complete sets of twelve have been made up for the officials of the companies mentioned, under the direction of the advertising department.

It is reported that there is in process of formation in Great Britain an association for the reduction of industrial accidents. Presumably this will be formed along the lines of the National Safety Council whose work has been so successful in this country.

First 1917 Census Figures Out

Reports for Electric Railway Lines of Six States Show the Heavier Burden of Expenses in Later Years

IN THE CASE of six states preliminary figures of the forthcoming quinquennial report on electric railways have been given out by Director S. L. Rogers of the Bureau of the Census, Department of Commerce. The statistics all indicate the tendency of operating expenses to increase more rapidly than operating revenues.

The statistics relate to the years ending Dec. 31, 1917, 1912 and 1907, but only those for the decade are reproduced in the accompanying table. The totals include electric light plants operated in connection with electric railways and not separable therefrom, but they do not include mixed steam and electric railways or electric railways under construction.

During the decade 1907-1917 and the five-year period 1912-1917 Vermont showed substantial gains in the number of passengers carried and in revenues from railway operations. The marked increase in operating expenses for 1917, however, resulted in a decrease of 69.1 per cent in net income as compared to 1912, although there still remained a gain of 57.4 per cent over 1912.

The statistics for Arizona and New Mexico, it is said, show general increases at each successive census. Those for Idaho and Wyoming show small gains in trackage, equipment and income for the semi-decade 1912-1917, but they are far below the gains made during 1907-1912.

The figures for Mississippi show substantial gains during the decade 1907-1917, but the growth was chiefly confined to the first half of the period, the railway revenues in 1917 being slightly less than in 1912 and the operating expenses materially greater. In the case of Colorado, there were marked losses for 1917 as compared to 1912 which more than offset the gains made in 1912 as compared to 1907. Oregon suffered decreases in traffic and income for 1917 as compared with 1912, with marked increases in operating expenses and overhead charges, in contrast with large gains for the preceding semi-decade 1907-1912.

Connecticut Engineers Meet

THE thirty-fifth annual meeting of the Connecticut Society of Civil Engineers, held in New Haven on Feb. 18 and 19, was the largest gathering in the history of the association. William R. Dunham, Jr., engineer maintenance of way Connecticut Company, has been president during the past year.

During the two-day session two topics of electric railway interest were presented to the association. One was a paper read on the afternoon of Feb. 18 on "Street Railway Track Reclamation" by H. J. Tibbet. The other was an address at the annual banquet by J. K. Punderford, vice-president and general manager Connecticut Company, in which the speaker described the difficulties under which electric railways are contending. Charles J. Bennett of Hartford was elected president for the ensuing year.

PRELIMINARY 1917 STATISTICS OF CENSUS BUREAU FOR ELECTRIC RAILWAYS IN SIX STATES

	Vermont		Arizona and New Mexico		Idaho and Wyoming		Mississippi		Colorado		Oregon	
	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907
Number of companies (all operating)	9	.....	[b] 6	.....	[g] 6	.....	11	.....	15	.....	8	
Miles of line	92.60	*20.7	[c] 57.49	[e] 52.0	[h] 120.01	[j] 179.1	[l] 112.36	40.8	337.15	63.4	416.28	145.9
Miles of single track	107.95	*13.2	[d] 63.84	[f] 56.3	[i] 127.70	[k] 188.7	[l] 122.79	42.1	499.87	57.5	596.23	135.3
Miles of single track in state [a]	125.47	10.7	.....	.....	.....	.....	124.17	43.7	.....	.....	603.13	132.9
Cars	156	*1.9	66	65.0	88	.....	187	34.5	817	29.5	1,431	113.6
Passenger	112	*11.1	62	59.0	68	.....	169	36.3	564	19.0	744	59.7
All other	44	33.3	4	300.0	20	.....	18	20.0	253	61.1	687	236.8
Electric locomotives	.....	.....	.....	.....	.....	.....	2	.....	7	.....	22	.....
Number of persons employed	311	16.9	224	138.3	204	.....	627	29.8	2,402	38.2	3,057	151.4
Salaries and wages	$259,205	65.6	$221,711	.....	$189,209	.....	$392,600	47.6	$2,126,531	47.7	$2,976,798	178.6
Total horsepower	8,394	54.0	989	*16.2	.....	.....	16,035	48.3	58,139	166.8	113,950	.....
Steam engines:												
Number	1	.....	1	*75.0	.....	.....	20	.....	26		12	.....
Horsepower	200	*92.6	525	*55.5	.....	.....	16,035	48.3	55,739	180.0	33,950	.....
Water wheels:												
Number	14		.....	.....	.....	.....	.....	.....	8	.....	24	.....
Horsepower	8,194	198.0	.....	.....	.....	.....	.....	.....	2,400	27.6	80,000	.....
Internal combustion engines:												
Number	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Horsepower	.....	.....	464	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kilowatt capacity of dynamos	7,727	58.5	665	*45.9	.....	.....	12,575	82.2	39,770	191.7	64,880	.....
Output of stations, kilowatt-hours	11,601,930	180.7	1,526,960	35.8	.....	.....	20,022,367	37.0	98,227,472	133.3	218,086,315	.....
Current purchased, kilowatt-hours	10,152,558	.....	4,010,388	.....	6,587,229	.....	3,279,254	.....	13,281,070	.....	15,066,427	.....
Passengers carried	9,268,385	24.2	9,488,467	202.6	5,036,166	234.1	12,215,749	18.4	102,882,744	9.8	91,926,694	43.8
Revenue	8,738,378	23.0	8,969,329	206.0	4,736,414	256.9	10,730,801	18.1	84,623,896	15.2	67,222,935	36.7
Transfer	483,389	35.2	403,128	159.6	207,759	32.1	1,191,255	11.5	16,785,922	*8.6	22,229,134	83.0
Free	46,618	.....	116,010	145.5	91,993	297.8	293,633	82.9	1,472,926	*20.9	2,474,625	6.4
Revenue car mileage	1,865,039	3.0	1,729,926	48.2	1,796,833	365.5	3,990,356	42.5	17,021,284	16.6	22,528,731	49.9
Railway operations—revenues	$596,983	35.3	$446,218	.....	$521,988	†	$617,527	23.5	$4,728,732	39.9	$4,999,601	83.0
Auxiliary operations—revenues	229,586	.....	146,795	.....	.....	†	583,515	83.6	1,051,044		2,102,832	.....
Non-operating income	48,489	277.0	20,320	.....	2,194	†	24,670	*72.1	46,736	*86.7	184,711	*79.4
Income from all sources	$875,058	92.6	$613,333	171.8	$524,182	†	$1,225,712	35.2	$5,826,512	30.0	$7,287,144	100.9
Operating expenses	$599,446	91.0	$456,542	184.7	$375,858	†	$890,006	66.5	$3,404,817	62.8	$4,240,891	158.9
Deductions from income	239,724	103.8	123,947	.....	132,786	†	455,148	83.6	2,211,329	73.7	3,674,831	270.2
Net income	$35,888	57.4	$32,844	.....	$15,538	†	*$119,442	.....	$210,366	*81.1	*$628,578	.....

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* Decrease or deficit. † Figures not available.

(a) Excluding track lying outside of state but operated by companies within state, and excluding track in state operated by outside companies.

(b) Arizona, four companies; New Mexico, two companies.

(c) Arizona, 46.87 miles of line; New Mexico, 10.60 miles of line.

(d) Arizona, 52.89 miles of single track; New Mexico, 10.95 miles of single track.

(e) Arizona, increase in miles of line, 64.9 per cent; New Mexico, 12.8 per cent.

(f) Arizona, increase in miles of single track, 72.0 per cent; New Mexico, 84. per cent.

(g) Idaho, four companies; Wyoming, two companies.

(h) Idaho, 98.24 miles of line; Wyoming, 21.77 miles of line.

(i) Idaho, 104.65 miles of single track; Wyoming, 23.05 miles of single track.

(j) Idaho, increase in miles of line, 128.5 per cent; Wyoming had no mileage in 1907.

(k) Idaho, increase in miles of single track, 136.6 per cent; Wyoming had no mileage in 1907.

(l) Including 4 miles of line and single track not operated.

Getting Good Results in Lubrication of Air Compressors

Careful Selection of Lubricating Oil, Proper Quantity to Use and Cleaning Cylinders and Piping Are Important Factors

By H. V. CONRAD

Mechanical Engineer and Secretary of the Compressed Air Society, New York City

TO SECURE satisfactory lubrication of air compressor cylinders friction of moving parts should be reduced to a minimum and the carbonization of the oil should be eliminated as far as possible. For the proper reduction of friction the oil chosen should have sufficient body to sustain the weight of the moving parts and to form a seal between the piston rings and the cylinder walls and still not absorb excessive power in the overcoming of the viscosity of the oil itself. Carbonization of the oil allows the accumulation of deposits of carbon which are sticky in the early stages of their formation but hard and flinty later. Such deposits accumulate on the cylinder valves, in the cylinder passages, in the pipes and eventually in the air receiver.

The formation of excessive carbon deposits may be due to (1) ill-advised use of oils of too great viscosity which do not atomize readily and therefore remain too long upon the hot cylinder walls, thus breaking down to sticky carbon deposit; (2) use of too great quantities of oil which have the same effect as the use of too heavy an oil as far as the carbonization is concerned; and (3) failure to provide a proper screen over the air intake of the compressor.

QUANTITY OF CYLINDER LUBRICANT NECESSARY

For average normal conditions the oil should be a medium-bodied pure mineral oil of the highest quality, not compounded with fixed oils such as animal or vegetable. It should be carefully filtered in the final process of manufacture. Quite a range of oil composition is permissible for lubricants suitable for this work which are manufactured under the above conditions. Primarily a distinction must be made between those oils having a paraffin base as distinguished from those having an asphaltic base.

From an operating standpoint strictly some lubricant manufacturers claim there is no distinction between the two classes of lubricants as to their desirability provided the process of manufacture is carefully carried out. If any carbon should be formed, however, such carbon deposited by the asphaltic base oils is of a light fluffy nature and is easily cleaned out, whereas that deposited by the paraffin base oil is very adhesive and characterized by the hard flinty nature.

QUANTITY OF LUBRICATING OILS NECESSARY

The quantity of lubricating oil necessary for the air cylinders of compressors cannot be stated in exact terms due to the varying viscosity of different oils, the heat of compression and the size of the cylinder. It may be stated in general, however, that after the cylinders have acquired smooth and polished surfaces the quantity should be reduced to the lowest limits to avoid the possibility of the accumulation of carbon and sooty deposits within the system due to use of excessive quantities of oil.

A leading authority on compressor engineering states: "The best way to determine the proper amount of lubrication is to take out the valves from time to time and examine the cylinder. If the parts feel dry the lubricators should be adjusted to feed a little more oil, whereas if oil lies in the cylinder and its parts show excessive oil thereon, the quantity set by the lubricators should be reduced. By thus examining the machine a few times the proper amount of oil can be determined to suit the characteristics of the particular lubricant used and the conditions under which the machine operates."

PERIODICAL CLEANING IS NECESSARY

The best of lubricating oils will cause the deposit of enough carbon in the compressor system to necessitate the periodical cleansing of it. For the removal of carbon a good cleansing solution is made of one part soft soap to fifteen parts of water. The suds should take the place of oil for a few hours and be fed into the air cylinders about once a week either by means of a hand pump or through the regular lubricator at a rate of about ten times as rapidly as that of the oil. Air valves should be inspected periodically and these will indicate whether more or less frequent applications of the soap suds should be made. After soap suds have been used the drain cocks of the air receiver, and of the intercooler in case of compound machines, should be opened to draw off any accumulated liquid. Oil should be used again for a half hour before shutting down the machine in order to prevent rusting of the cylinder and fittings. Kerosene, gasoline or lighter oils should never be used in an air cylinder for any purpose whatever because of their volatile nature under heated conditions.

Glasgow's Extraordinary Gear Life

DURING seventeen years of electric operation, the number of gear wheels scrapped by the Glasgow Corporation Tramways, due to all causes and regardless of the makes furnished, has approximated the extraordinarily low figure of 1 per cent per annum. The chief defects which necessitate scrapping are given by the management as follows:

1. The splitting of hubs at the keyway. This defect is largely due to the fact that the wheels were designed originally for 3¾-in. axles. Subsequently the bore of the hub was increased to 4⅛ in. to fit the increased size of the axles which the Tramways had found it necessary to use. This change, of course, weakened the hubs.
2. Broken teeth.
3. Cracked arms or spokes.
4. Distorted rims.
5. Worn-out teeth, which are responsible for the scrapping of approximately 0.1 per cent of gears per annum.

Careful maintenance and lubrication are assigned as the reasons for the great longevity of Glasgow's gears. By careful maintenance are understood frequent and systematic inspection and overhaul; the selection of the best bearing metal procurable; strict attention to the fit of armature shaft and axle bearings; maintenance of the mesh of the wheel and pinion to the full depth of the teeth and lubrication with oil.

Recent Happenings in Great Britain

England Proceeding to Orderly Reconstruction—Traffic Increases Rapidly—Many Inquiries for Cars

(From Our Regular Correspondent.)

With the beginning of the year the new British government began to manifest activities in various directions in connection with the work of reconstruction after the war. Among other things, we are promised a Ministry of Ways and Communications, with Sir Eric Geddes, lately First Lord of the Admiralty and formerly a noted steam railway manager, at the head of it. Hitherto there has been no such ministry in this country, and such of its functions as were performed were carcied out as part of the duties of the ried out as part of the duties of the partment has been responsible for supervision of railways and tramways so far as they have been supervised, while automobile road vehicles have been under the care of the local government board and of the home office. Presumably it is intended that all sorts of vehicular traffic, whether on rails or on the highways, shall come under the purview of the Ministry of Ways and Communications. The change should put a stop to overlapping and effect greater efficiency in administration.

INEXPENSIVE LIGHT RAILWAYS PROPOSED

During January the Ministry of Reconstruction made public a scheme for providing the agricultural districts with a system of cheap light railways intended mainly for the benefit of farmers and rural industry. To distinguish these lines, which are to be of only 2-ft. gage, from all others, it is proposed that they should be called "agrails," which may be regarded as short (very short) for agricultural light railways. It is proposed that an "agrail" board should be set up, which in conjunction with the local authorities should devise schemes and get them authorized by the ordinary procedure before the light railway commissioners. The cost of construction, which would be kept down as much as possible, would be borne partly by the Development Commissioners and partly by the local authorities. The lines when built would be leased to operating companies. Generally, in fact, the Belgian system of light railways, so widely and favorably known before the war, would be followed. Either steam or electric traction will be employed according to local service. Passengers will be carried, but the main purpose is to convey goods. The lines are to be laid as far as possible on roadside wastes, but where necessary they will be constructed on the roads themselves or on private land. The cost of compulsory land acquisition is to be cheapened.

A TIP FROM THE U. S. A.

The scheme looks promising. It reminds one also of the efforts which are being made in the United States to cultivate good traffic on existing interurban electric railways. In this country we have next to no interurban electric railways and the suggested "agrails" would serve a useful purpose. Among the reasons why cheap light railways are preferable to motor lorries or trucks is that the latter wear out the country roads and that the owners of them are likely in the future to be called on to pay much more for road maintenance than they have in the past. Already, however, the automobile interests are protesting against the scheme and maintaining that road motor lorries would be preferable. I am strongly reminded of a very forcible leading article on corresponding contentions which appeared in your pages a year or two ago under the title "The Mantle of Ananias."

LEGISLATIVE PROGRAM PROPOSED

Possibly before these lines meet the reader's eye the British government will have submitted proposals to Parliament for dealing with the whole of the railways and with the production of electric power for all purposes. The Prime Minister told a deputation of railway employees in January that legislation of this sort would be passed as soon as possible, and therefore he asked them to suspend their further demands for improved conditions of labor. Whether the government proposals will amount to out-and-out nationalization or whether there is to be a more modest scheme of state ownership and unification with leasing to operating companies remains to be seen.

VALUE OF UNIFICATION REALIZED

Among reports by government committees there have been none recommending complete railway nationalization, but the great advantages of a unification of the railway systems of the country have been pointed out. One story goes that the new Ministry of Ways and Communications will simply be given powers to deal with the matter. That may mean further inquiry and delay. As regards the generation and distribution of electric energy for all purposes, there have been two important reports, recommending a national scheme requiring only a few power stations, but these to be of an enormous capacity, and the formation of one general and a number of district boards for carrying out and administering a scheme calculated to produce an enormous saving in coal, the electrification of steam railways, and the development of industries of all sorts by a cheap and abundant supply of electric power. What relative authority the state, the local authorities and private enterprise will have in the matter remains to be seen when the government proposals are tabled. Such proposals will be the carrying out of general promises given by the Prime Minister during the recent general campaign.

In any event the day of small extravagant electric power stations, many of them owned by municipalities, will be ended. Municipal authorities, of course, regard the scheme with a jealous eye, but the railways and the industries generally will probably welcome it. The possible economies are enormous.

ELECTRICAL INDUSTRIES REVIVING

The revival which is already taking place in British electrical industries is indicated by the fact that according to a semi-official statement electrical manufacturing firms in Great Britain had under construction at the end of 1918 plants representing 700,000 kw., which is equal to more than 30 per cent of the capacity of the plants now in existence in the country. So far as tramways are concerned, January saw a beginning of the coming demand for new rolling stock. Quite a number of tramway undertakings are in the market for cars and also for motor omnibuses. These could not be secured during the war, but manufacturing for civilian purposes is now being rapidly resumed. As soon as supplies are abundant the demand for rails will be very heavy, as a great proportion of track is quite worn out. Prices, however, do not promise speedily to come down. Talking about prices, I notice that the government is offering to sell stocks of aluminum (which it accumulated while the war was in progress) at £150 a ton.

LABOR SITUATION SERIOUS

In the end of January the labor situation alike in England, Scotland and Ireland was very menacing. There were extensive strikes in the shipbuilding and engineering trades and efforts were being made by the agitators to draw tramway employees into the whirlpool. The latter, however, if they do not break away from their trade union leaders—rather a prevalent practice nowadays—were not in a position to strike immediately, because the unions and the company and municipal tramway authorities were negotiating over a demand by the employees for a forty-four-hour week. The nominal cause of all or most of the strikes was a demand for shorter hours, but there was a revolutionary sentiment abroad. Some of the strike leaders were political extremists of a dangerous type. The tension of the war and of war work having relaxed, it is difficult to say how far some of the working classes may be led.

Meanwhile traffic on the electric tramways in all parts of the country continues almost overwhelming in its volume, and it can only be by degrees that sufficient men and rolling stock can be secured to deal with the sudden and extraordinary demand which has arisen.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Favors City Ownership

Cleveland Mayor Not Satisfied with Results Under the Much-Heralded Service-at-Cost Plan

Mayor Harry L. Davis advised the City Council of Cleveland, Ohio, in a communication read at the regular meeting on Feb. 24, of his conviction that the city should purchase the property of the Cleveland Railway. A resolution, providing that the question should be submitted to a vote of the electors on Nov. 4 was introduced and referred to the street railway committee.

RENEWAL OF FRANCHISE NECESSARY

The company's franchise must be renewed by May 4 next for a period of not less than fifteen years, the time the present franchise has yet to run, or the company may take over the control of operation from the city and fix a rate of fare that will insure dividends and a renewal fund for the time it will continue to operate the road. Mayor Davis proposed a renewal for a period of one year, so that the question of municipal ownership may be submitted to a vote and, if carried, the property may be purchased at an early date. J. J. Stanley, president, has stated that the company will not accept a renewal for a short period, as nothing of the kind is provided for in the Tayler franchise.

In his communication the Mayor says that the present franchise has shown a number of advantages, but there have also been many disadvantages. Among the latter he notes as the most serious the tendency of a fixed return to produce a lukewarm attitude on the part of the owners, lack of incentive toward efficiency and a desire only to look after the upkeep and thus insure their own security.

PAYMENT OUT OF EARNINGS SUGGESTED

The company, he says, has refused proposals for extensions in outside territory, one of the things that is required by the growth of the city. Divided responsibility as to expenses and the city's lack of power as to wages and working conditions have produced awkward results that have become apparent in the last year. Under municipal ownership, the people will be able to regulate the rate of fare, decide upon extensions, and, in fact, have the road operated as they want it. It is suggested that the payment for the property be made out of the earnings, instead of by the issue of bonds.

The Tayler ordinance provides that the city may take over the property by paying the company $110 a share for the stock. On the outstanding stock, aggregating $27,780,000, this would amount to about $30,560,000. In addition a bond issue of $5,495,000 would have to be assumed, making in all, with the addition of a deficit of $500,000 in the interest fund, $36,555,000.

As yet there has not been much comment on this suggestion.

For several weeks murmurings in regard to amendments to the Tayler franchise have been heard. For the most part these have referred to additional power of control for the city. Company officials have not made any public comment on this as yet.

The company has been planning to spend between $3,000,000 and $4,000,000 for improvements and extensions, in order to furnish a more efficient service. Mr. Stanley said, however, that the company cannot go ahead with its plans unless the franchise is renewed in accordance with the terms of the Tayler grant.

Colonel Byllesby Defends Private Ownership

In a telegram to the Oklahoma Utilities Association in convention at Oklahoma City, Col. H. M. Byllesby, president of H. M. Byllesby & Company, Chicago, said:

> The trend of events in the utility situation is one which should command our most earnest, thoughtful and active attention. It seems to me that only two courses are open to the utility business; first, that the laws be so adjusted as to enable these companies to make such a fair return upon their investment as will enable them to find capital continuously for the further extension of their enterprises which the growth of the community served and the improvements in the art render increasingly necessary. These laws and regulations at the hands of commissions or other properly authorized bodies should encourage in every proper way the spirit of enterprise and provide some profitable return beyond the mere bare interest on the cost of the properties in order to bring to bear the very best inventive and enterprising capacities of all those engaged in this business.
>
> If the laws and regulations cannot provide for this situation then it seems to me that the only alternative for the various communities is that they take over the properties at a fair and suitable compensation to the owners, as I am confident that at bottom no real American wishes to rob anyone or to take possession of any property without making due, proper and fair payment therefor. This latter course is one which I sincerely trust will not be adopted as it involves all the evils which years of experience have shown always attach to governmental operation of enterprises of this nature.
>
> The very best results to the community, to those who pay for the service rendered, will as always be found in private ownership, where this ownership, while being regulated along proper lines, is still allowed full scope for the exercise of ingenuity and enterprise; and in order to do this they must be allowed, as I have previously stated, not only a standard return for the capital invested in other enterprises of any nature at all similar, but in addition to this some fair, reasonable allowance to compensate for the exercise of painstaking continuous industry, ingenuity and enterprise.

Mr. Witt Declines

Flatly Refuses Buffalo Designation Which Would Have Made Him a Partisan Representative

Peter Witt, Cleveland, Ohio, has declined to serve as the representative of the city of Buffalo on the board of arbitration which will attempt to formulate a plan whereby the International Railway, Buffalo, will be placed under municipal control. Mr. Witt declined the designation of the City Council for three reasons; first because of his present work for the Philadelphia (Pa.) Rapid Transit Company; second, his tentative engagement to undertake work of a similar nature for another city, and, third, because he was asked to be the city's partisan representative on the board instead of being asked merely to serve as an impartial member of the board. James E. Allison, Jr., St. Louis, will be the company's representative on the board. So far there has been nothing like agreement on the part of the representatives of the city with respect to a successor to Mr. Witt.

HOPE IN ARBITRATION

How long the International Railway can continue to operate under a 5-cent fare is beginning to be a serious question with company officials. The arbitration proceedings hold out some hope that a permanent agreement can be reached between the city and the company, but a clause in the arbitration agreement provides that either side can reject the final report of the board. Thus after months of delay it would be possible to disregard the final valuation of the company's properties within the city to be used as the basis of an agreement whereby the city will participate in control of the railway.

On May 1 the company will have interest to pay on its 5 per cent refunding and improvement bonds. Whether or not it can again borrow sufficient money to pay the interest is a question.

BEHIND IN ITS TAXES

The International Railway is now face to face with still another problem. It must raise $323,049 to pay municipal taxes. Of this amount $259,330 represents the special franchise tax and $63,718 the tax on its real estate within the city of Buffalo. The municipal authorities have served notice on the company that unless the taxes are paid March 1, a penalty of 5 per cent will be added and its property advertised for sale. The taxes have been due since July 1, 1918. Under the law unless the taxes are paid, the property can be sold by the city to the highest bidder on May 1, 1919.

A $211,000,000 Port Plan

Electrification Would Play an Important Part in Mr. Lindenthal's Proposal for New York

Gustav Lindenthal, consulting engineer and builder of the Hell Gate Bridge at New York, presented before the New Jersey-New York Port and Harbor Development Commission on Feb. 13 his solution for the transportation problems between New York and New Jersey entering into the general port development project.

The plan proposed by Mr. Lindenthal would entail an expenditure of more than $200,000,000. It would have as its dominating feature the long-discussed North River Bridge, between the New Jersey shore and Manhattan, at Fifty-seventh Street. It includes a proposed solution of the West Side problem presented by the New York Central Railroad tracks, to take the form of an elevated railroad. It proposes also a great classification yard in New Jersey, in the meadows back of the cities along the Hudson shore, and a union passenger terminal in Manhattan, at Fifty-seventh Street and Tenth Avenue.

ESTIMATES OF COST OF THE COMPONENT PARTS OF THE PROJECT

Double track belt railroad, from near Perth Amboy to Undercliff terminal on the Hudson, with switchyards at intersection with railroads, about 35 miles long	$20,000,000
Classification yard in Jersey meadows and approaches to North River Bridge	15,000,000
Multiple track high level bridge over North River	75,000,000
West Side elevated railroad in Manhattan, eight tracks, with stations and market halls, 4½ miles long	15,000,000
A pair of tunnel tubes under North River at Battery Place to Communipaw	12,000,000
Connection with New York Central going north at Fifty-seventh Street	5,000,000
Union station in Manhattan...	25,000,000
Moving (conveyor) platforms under Fifty-seventh Street..	5,000,000
A pair of tunnel tubes at Greenville, with yards and approaches	14,000,000
Audubon tunnel and bridge over Harlem River, including right-of-way	5,000,000
Power plant equipment and locomotives	20,000,000
Total	$211,000,000

There would be a marginal railroad along the West Side of Manhattan, with a freight discharging and loading station every half mile; a belt railroad in New Jersey similar to that proposed by the Port Commission's engineers, but taking in Perth Amboy and having a tunnel connection with Staten Island, this link leading to another tunnel connecting with Long Island and enabling the linking up of railroads north and south of Manhattan.

Other features of the project are a freight tunnel from the Battery to Jersey City, forming a loop over which, by gravity, freight cars brought over the proposed high level general traffic bridge could be sent back to the mainland. Another loop would take the proposed marginal railroad entirely around Manhattan, and a short connecting railroad to link the New York Central's main line with its Putnam and Harlem divisions northwest of the city, in suggested. The Manhattan loop and the Putnam-Harlem link, however, are only tentative features.

Mr. Lindenthal pointed out that while the present time is not propitious for construction, on account of the high prices of material, the work of studying and preparing plans should commence at once, likewise the negotiations with the railroads, which will have to be shown that the plan will produce ultimately a very large saving over present methods.

Further Negotiations Futile

Detroit Commission Rejects Counter Leasing Proposal of Railway—Will Map Out a Future Course

Mayor Couzens and the Street Railway Commission of Detroit, Mich., have rejected the rental proposal in a letter to Frank W. Brooks, president of the Detroit United Railway. Mr. Brooks had offered a plan for the company that the city rent the lines at an annual rental of $2,010,000 a year, based on the company's valuation of $33,500,000. This was in the nature of an alternative for the purchase proposal from the city which was regarded by the company as unfavorable. The following communication has been sent to Mr. Brooks.

At a meeting of the Board of Street Railway Commissioners, held in the Mayor's office to-day (Feb. 22) at 10 a. m., it was directed that the following reply to your proposal of Feb. 18 be addressed to you:

This commission has carefully considered your letter of Feb. 18. It will be useless, apparently, for us to discuss with you the question of valuation of the property because you advise us that your company, unanimously, concludes that the price we offered you was "wholly inadequate," and you further make the comment that a fair valuation of the property would involve fixing the reproduction value of the property on the basis of the average price of material, labor, etc., over a period of five years immediately preceding this date. That is, of course, your opinion of a fair valuation, but that is not our opinion, because the property has not been replaced or anywhere near so in a period of five years. We are firmly of the opinion that the offer we have made is entirely fair and adequate.

As we stated to you during our meetings, the amount of money that you have put into the property is not a factor in the discussion, because you elected to put it in on the streets of Detroit at your own risk, where your franchises had expired and, therefore, of necessity had to take your chances, and if since then your property had deteriorated in value through obsolesence and depreciation, the city should not be asked to compensate you for it. This, so far as valuation is concerned.

Secondly, we have considered your suggestion of leasing the property to the city and, in view of the past experience the city has had, we must respectfully reject the suggestion in its entirety.

Thirdly, we have also considered your final suggestion to proceed under an arrangement to be made to construct the several extensions and beg to advise that under no circumstances are we willing to consider any such plan.

In view of the fact that the many efforts of the city to reach amicable adjustment with the Detroit United Railway during a period of more than twenty-five years have resulted in nothing tangible and your rejection of the city's last offer to purchase its property, it seems to the commission that further negotiations will be futile.

The commission announced that on Feb. 25 it expected to make public a statement about its future action.

New Deal in Akron

Franchise Proposal Which Includes Fare Increase Meets with Favor of City Officials

Director of Service Morse of Akron, Ohio, has presented recommendations to the City Council for a revised franchise for the Northern Ohio Traction & Light Company, with a rate of fare of six tickets for 35 cents and 6 cents cash, provided that an agreement be reached on service and betterments. When the earnings reach 7 per cent on the appraised value as set out by Hagenah & Erickson in their recent report, the rate of fare is to be reduced.

Mayor I. S. Myers said the plan appears to be workable and that he will sign it, if passed. The city, he said, needs extensions and better service. The measure may be repealed if it is found that the expected results are not being secured. Officials of the company, it is said, have tacitly agreed to the proposed plan, which is set out as follows:

1. Six-cent fare with six tickets for 35 cents.
2. Appraisal of power plant and electric power stations to be made at city's expense, to fix rates for current.
3. N. O. T. to pay the city $5,500, covering the cost of the Hagenah & Erickson survey.
4. Surface survey to be made at joint expense of city and N. O. T. to (a) Recommend changes in rerouting, number of cars, schedules, etc. (b) Recommend regulation of jitneys. (c) Recommend extensions.
5. That N. O. T. make a monthly report to the city of its earnings, according to the system used by Hagenah & Erickson.
6. Repairs of paving and street opening within N. O. T. "devil strip," to be made by the city and charged to the company.
7. Future track construction of N. O. T. to be of the best standard practice and must be approved by the city, N. O. T. to pay the costs of city inspection.
8. Extra cost of street cleaning due to N. O. T.'s use of sand shall be charged to the company.
9. N. O. T. to replace tracks in 1919 as follows: (a) East Market Street from Case Avenue to Cambridge. (b) West Market Street from Corson to Portage Path. (c) Repair South Main Street track from Long Street to Ira Avenue and Thornton to Crosier.
10. (a) Build a single or double-track line on West Exchange from Five Points to Delia Avenue. (b) Renew the present line on Manchester Road from South Street to the corporation limits.
11. Whenever company reports for three consecutive months show earnings of 7 per cent, the company shall proceed immediately on construction work on extensions as recommended as a result of the surface survey. This 7 per cent shall be on appraised value of the system of $4,810,840, as reached in the Hagenah & Erickson report.
12. The company shall set aside 3 per cent of gross earnings monthly into a sinking fund which shall be used for betterments and replacements, so that the property will not be allowed to run down.
13. When reports show that the company has earned in excess of 7 per cent for three consecutive months the rate of fare shall be adjusted downward to bring it to a 7 per cent basis. If it develops later that the new rate does not produce sufficient revenue to earn 7 per cent, the rate may be readjusted upward again. Any excess over 7 per cent earned by the company is to go into the sinking fund.
14. The service director, with the approval of the Mayor shall appoint a commissioner of street railways who shall be paid by the city not to exceed $5,000 a year, and the city reimbursed for this salary by the traction company. The N. O. T. shall provide free office room and clerical help for him.
15. The city to reserve the right to repeal the measure after one year in case it is not satisfactory, in which case the N. O. T. will operate under the present franchise agreement.

Likes One-Man Car

Secretary of Bridgeport Chamber of Commerce Indorses Operation by Connecticut Company

The Chamber of Commerce of Bridgeport, Conn., thinks well of the safety-car line put in operation on Feb. 2 and described in the issue of this paper for Feb. 15. In a recent letter replying to an inquiry from the Chamber of Commerce of Norfolk, Va., M. B. Russell, assistant secretary of the Bridgeport Chamber, says in part:

> While the Birney type one-man car has been in operation in Bridgeport for a comparatively short time, it now seems as if it would be in a fair way of solving our very serious transportation problem, and I think that no city having a similar problem would make a mistake in adopting it, especially where streets are narrow and congested. The cars here are running on one line, which comprises a portion of the wealthier residential section, and at the other end the working population, to a very considerable extent, and it has already built business in both sections. Cars are operated on a five-minute headway and are making an average rate of 8⅓ m.p.h. One mile of the route is through what we believe to be the most densely congested traffic in New England.
>
> The cars are exceedingly elastic in traffic, as they stop quickly and start with the same speed as a jitney, if not faster. This operation is practically cutting the former headway in two and the public seems to be mighty well pleased with the cars. The employees of the Connecticut Company are also pleased with the cars, having bid in all the runs and are so enthusiastic over them that motormen and conductors of long service have applied for assignment to this line when more cars are added. The company is paying the men 5 cents an hour more for the operation of these cars, which will mean a better grade of employees. The operation of the cars has improved business on the line, and a rather unique testimonial came to my attention the other day from a man who had formerly used his automobile in going to and from his office in the center of the city. He states that he finds the Birney cars quicker and more comfortable as a means of transit and he now leaves his car in the garage and uses the Birney car. It seems good policy where the installation of these cars is anticipated to replace the large cars in the ratio of three for two and that attention should be given to the matter of public co-operation to the extent of having the exact change ready for payment of fare. This has been accomplished here through a public educational campaign, with very excellent results and the trolley company has had to put on additional help to carry the silver to the bank, whereas formerly it came in the form of bills, which without further comment is an indication of the added earning capacity of these cars. They have apparently not increased the accident rate and by the quickness of operation have to a considerable extent alleviated traffic congestion of other vehicles.

Returned Soldiers Demand Recognition

Toward the end of January, the city of Winnipeg, Man., passed through a very unusual and unpleasant experience. On Jan. 27 returned soldiers to the number of 2000 under the cry "Out with the alien enemies" drove all those suspected of Bolshevism to cover and did $30,000 damage to general property. Then followed a general demand upon all employers of labor by the returned soldiers for the discharge of alien enemies in their employ.

The heads of all the large industrial firms in the city were approached by the returned men. The ultimatum was to clear out all the alien enemies within forty-eight hours. As many hundreds of such men are employed in Winnipeg, the situation became very threatening. Finally the returned soldiers and the employers got together with the result that by Feb. 4 returned men were being placed in positions in all industries as rapidly as possible.

Not once during the heat of the moment did the returned men have anything to say against the Winnipeg Electric Railway, the largest individual employer of labor in the city. This was undoubtedly due to the educational campaign A. W. McLimont, general manager, had launched prior to the outbreak by the returned men. On Jan. 25 Mr. McLimont issued a poster which was placed prominently on railway premises and advertised elaborately in the local newspapers. At the same time Mr. McLimont gave orders for the flying of a returned soldiers' flag from the top of the company's building. The figures 300 are in blue, and represent the number of returned soldiers in the company's employ. The border of the flag and the maple leaves are in red, while the background of course is white.

Through the advertising and other publicity, the returned soldiers knew exactly where the Winnipeg Electric Railway stood with regard to its employees, and its treatment of the returned men. A full page in the *Public Service News*, the organ of the railway, distributed on the street cars, was devoted to a review of the efforts of the Winnipeg Electric Railway to take care of the returned soldiers. It pointed out that no fewer than 118 former employees who enlisted had been reinstated. Another huge flag hangs over the door to the company's downtown offices. The one being flown from the flag pole is illumined at night by a powerful floodlight.

Cincinnati Preparing for Work

Representative Federman has prepared a bill which, if made a law, will temporarily release the city of Cincinnati, Ohio, from the payment of a rental of $32,000 a year for the use of the bed of the old Miami & Erie Canal as a part of the roadbed for the rapid transit loop. It is probable that construction work would have been begun on the rapid transit line before now, had it not been for the intervention of the war. The payment of rental has imposed a burden upon the city, from which its officials feel that it should be relieved.

W. C. Culkins, director of street railways, has asked the Cincinnati Traction Company to reduce its running time on several of the long routes and also to shorten the layovers. It is said that cars are held at the ends of some of the routes for thirteen minutes, when the union contract in no instance calls for more than seven.

The Cincinnati Traction Company has agreed to purchase 2 miles of track belonging to the Interurban Railway & Terminal Company, between Norwood and the northern boundary of Kennedy Heights. The price is $36,000. This was done in order that the company might comply with the city's request for an extension of service to Pleasant Ridge and Kennedy Heights. Negotiations are now in progress as to terms for operating interurban cars over this section of track and the business the interurban line will lose through the sale to the city line.

All Is Harmony in Boston

The trustees of the Boston (Mass.) Elevated Railway after a conference with leaders of the union on Feb. 20, issued a "joint statement" declaring the trustees and the union men were in perfect harmony, were working for the best possible operation of the system, and would continue so to work.

The statement issued after the adjournment of the conference reads:

> At a meeting held this morning between the trustees and Messrs. Vahey, Higgins and Timmins, representing the carmen's union, the parties were in entire harmony.
>
> The statement of the chairman of the board of trustees before the legislative committee said nothing more than that the trustees would endeavor, when any question arose, to make an equitable adjustment on the wage question with their employees.
>
> Both parties are now bound by an award of the National War Labor Board, which will end when peace is declared by executive proclamation. Until that time, neither party can take up the wage question.
>
> They are all assured it will be taken up in a fair and just way whenever an opportunity arises, if it does.
>
> The trustees made no suggestion that the wages should be changed from the War Board award. The relations between the trustees and the employees are perfectly harmonious, and the men are working in entire co-operation and sympathy with the efforts of the trustees to give better service under the public control act.

Public Service Accepts Collective Bargaining

The Public Service Railway on Feb. 26 announced its acceptance of the principle of collective bargaining, as approved by the National War Labor Board. Notices to this effect were sent to the employees of the several departments. The plan to be followed is similar to that used by the Philadelphia Rapid Transit Company.

To secure closer co-operation the company is giving the employees an equal voice in the settlement of grievances or questions pertaining to working conditions. All such matters will be handled by committees, one-half the members being elected by the employees and the other half named by the company. Arbitration is provided in the case of a deadlock, and if the arbitrators cannot be agreed upon, the Public Utility Commission of New Jersey, where the company operates, is to be asked to act, its decision to be final.

The company also announced a new Co-operative League to take the place of its present welfare plan. Membership will carry with it $1,000 life insurance and sick benefits of $2 a day for not exceeding ninety days in a year. The league will be directed by a co-operative council made up equally of employees and company representatives. Membership in the league is voluntary, and no restrictions are imposed upon affiliation with any union.

News Notes

Service Resumed in Butte.—Service on the Butte (Mont.) Electric Railway, which was suspended on Feb. 10, when the men refused to take out their cars because of alleged threats by striking miners, was resumed on Feb. 15.

State Will Report on Electric Railways.—Both Houses of the General Assembly of Connecticut have passed a bill providing for the appointment of a commission to inquire into the electric railway situation in the State and make a report early in April.

Preparing for Service-at-Cost.—The city of Muskogee, Okla., will soon vote on an amendment to the city charter providing for a public utilities board of five members, to be elected by the people to serve without pay and to have control of all public utilities. This is said to be an initial step toward securing service-at-cost franchises for the utilities.

Viaduct Contract Signed.—Mayor Cowgill of Kansas City, Mo., has been authorized by the Council to sign a contract with the Kansas City Railways under which that company will operate its cars over the Inter-City Viaduct. The rental agreed upon for Kansas City's share of the viaduct was $3,360 a year. The contract will run until Dec. 19, 1922.

Increase for Municipal Railway Employees.—An increase of 50 cents a day to trackmen and car repairmen of the Municipal Railway, San Francisco, Cal., has been approved by the public utilities and finance committees of the Board of Supervisors. The increase will add $23,739 to the annual payroll of the municipal lines. Trackmen have been receiving $4 a day and repairmen $4.50.

Favors Loan for Mexican Rehabilitation.—Elmer R. Jones, newly-elected president of the express firm of Wells, Fargo & Company of Mexico, says that Mexico needs about $400,000,000, mostly for the rehabilitation of railroads and tramways and harbor development. He believes the value of commerce between the United States and Mexico in a single year would justify the loan.

Wage Hearing Concluded.—The hearings on the application of the employees of the Pacific Electric Railway, Los Angeles, Cal., for increased wages were concluded on Feb. 11. It is estimated that the transcript of the testimony will contain 680,000 words. The typewritten summary was to have been completed by Feb. 21. Ten days are then allowed for the attorneys of the railway company to submit a written brief.

Licenses for Motormen Opposed.—Labor and the transit companies of New York State on Feb. 19 opposed the Link bill which provides for the State licensing motormen on surface, subway and elevated railroads, and, further, for compulsory arbitration of labor differences. One representative of the railways said that the law now demanded that the companies employ only competent men, and that if the bill were made a law the companies would simply refuse to accept responsibility for the men employed.

Would Label Cars for Identification.—A committee of the Senate of New York is working on a modification of Senator Charles E. Russell's bill which seeks to establish the ownership of a street, elevated or subway car upon which a personal injury is received. Senator Russell introduced a bill which would force a corporation to carry the name of the operating company (the company that is held responsible in negligence actions) on every car. A compromise bill is being worked which would require the corporations to file schedules of all cars with car numbers in the county clerk's office.

Arrests in Dynamiting Case.—Operatives from the Department of Justice have arrested Curtis J. Rees and Lawson W. Millwee, following an investigation of the dynamiting of the carhouse of the Kansas City (Mo.) Railways on the night of Dec. 29, when several persons were injured. The two men were arraigned before United States Commissioner Arnold, but declined to enter pleas before having had time to consult attorneys. The specific charge against the men was conspiring to violate the federal explosive act, a war statute prohibiting the possession of explosives without a federal license.

Would Elect Jersey Commissioners.—Election of the public utility commissioners by the people instead of appointment of them by the Governor is provided for in a bill which will be introduced in the Senate of New Jersey. The measure proposes the creation of six utility districts, each of which will be under control of a commissioner, who will be elected by the people living in that district. The bill provides that the new elective board members shall have the same qualifications, powers, privileges and compensation and be subject to the same limitations as govern the present appointive board.

Will Reinstate All Its Men.—Every star in the service flag of the Connecticut Company, New Haven, Conn., will be "made good," says a statement issued from the executive offices of the company. When the armistice was signed there were 524 employees of the Connecticut Company in the military and naval service of the United States. This was about 12 per cent of the entire personnel of the company. Up to Feb. 21, 118 of these men had been returned to their old jobs. Their old jobs, or other work, are waiting the return of the remaining 406 employees of the company who are still in the service.

Fewer Women Employees in Brooklyn.—Since November when the armistice was signed there has been a decrease of 229 women employees in the service of the Brooklyn (N. Y.) Rapid Transit Company. On the surface car lines in November there were 222 and now there are only 144, a drop of seventy-eight. On the elevated and subway, eastern division, there were 141 and at present only ninety-five and on the elevated and subway, southern division, there were 475 and a few days ago 370, a decrease of 105. This does not necessarily mean that they all quit, as the women are subject to the same regulations as men in regard to discipline and efficiency.

Electrification Bill Killed.—The Senate of Washington recently killed a bill designed to give the Chicago, Milwaukee & St. Paul Railway permission to electrify its line over the tracks of the Columbia & Puget Sound Railroad, from Cherry Valley into Seattle. For this distance, the Milwaukee uses the Columbia Company's tracks under a contract providing that, for a certain sum, the Milwaukee may operate its steam trains over the rails. When the contract was made the Milwaukee officials had no idea they would later want to electrify the lines. The smaller road has asked the sum of $12,000 a mile before granting permission to electrify. The Milwaukee refused this proposition and introduced a bill in the Senate, giving the company power to condemn the line of the other railway. The Senate committee asked the indefinite postponement of the bill.

Compromise on Commission Proposed.—Senators Foley, Walters, Sage and Thompson conferred recently on the proposition of what to do with the two Public Service Commissions in New York State. It was agreed, although not definitely, to permit the Governor to name a member of the First District Public Service Commission who should complete the subway system as planned and who would in effect be a rapid transit commissioner. Other than this it is understood the commission for the first district as at present constituted will stand. The law is to be amended in several particulars. The republicans insisted on retaining the two commissions.

Program of Meeting

New York Electric Railway Association

The president and executive officers of the New York Electric Railway Association have decided not to hold a quarterly meeting of the association this year, which heretofore has been held in the month of March.

This action was taken on account of the financial stringency confronting the electric railways throughout the State, and the further fact that a meeting of the New York association at this time would come too close to the mid-winter meeting of the American Electric Railway Association.

Financial and Corporate

Operating Expenses Soaring

Western Group Shows Big Decline in Net, but One Eastern Group Has Increase

The outstanding features of the operating returns of electric railways for November, 1918, as reported to the information bureau of the American Electric Railway Association, are the accelerated rise in the cost of operation and the depressing condition of affairs prevailing in the Western District. While the revenues, with the exception of the Western District, showed an encouraging increase as compared with the corresponding month of 1917, the margin of profit thus created was more than eaten up by the abnormal increase in operating expenses. The result was a further decrease in the net earnings and operating income.

The decline of the influenza epidemic, which had such a disastrous effect upon the October earnings, was reflected in the return to an almost normal increase in revenues throughout the country with the exception of the Western District. A slight actual decrease in the volume of business showed the lingering of the plague in that section of the country.

COSTS OUTDISTANCE REVENUES

The United States as a whole showed an increase of 8.11 per cent in operating revenues as compared with November, 1917. Operating expenses increased 18.88 per cent, and as a consequence net earnings fell off 13.80 per cent. Among companies reporting taxes the showing was not quite so favorable; the net declined 18.77 per cent, taxes increased 1.59 per cent and the operating income fell off 25.53 per cent. The operating ratio for the country increased from 67.22 in November, 1917, to 73.92 in November, 1918. For companies reporting taxes the increase was from 70.20 to 77.59.

The showing of the Western District was by far the most unfavorable. Accompanying the decline in the operating revenues noted above was a more than average increase in the expenses, 25.53 per cent, producing a falling off in the net of 50.76 per cent. This district also suffered the largest increase in taxes. For companies in the West reporting taxes the returns showed a falling off in revenues of 2.22 per cent, an increase in expenses of 25.97 per cent and a decline in net of 51.32 per cent. Taxes increased 3.96 per cent, producing finally a decrease in the operating income of 62.33 per cent. The depressing state of affairs in the West is further shown by the operating ratio, which for the general group rose from 63.89 in 1917, to 81.85 in 1918, a high record even for the West.

EASTERN DISTRICT BETTER

In the Eastern District the outlook was more favorable. The net earnings fell off 2.50 per cent, it is true, but when it is remembered that the district was probably still suffering in some degree from the epidemic, these figures become distinctly favorable. The increase in operating expenses was below the average increase for the country, while the increase in revenues was above it. If the companies reporting taxes were considered by themselves, the result would be an actual improvement for the month. The net earnings of these companies increased 1.13 per cent, taxes remained stationary and the operating income increased 1.62 per cent.

In the Southern District the most remarkable feature was the extraordinary increase in operating expenses, 43.52 per cent. Although the district showed the largest increase in revenues, this advantage was more than wiped out, and the net earnings declined 24.11 per cent. The disproportionate increase in expense was also shown in the operating ratio, which increased from 55.81 per cent in 1917 to 70.49 per cent in 1918.

The returns are shown in detail in the accompanying table. They are classified according to the following geographical grouping: Eastern District—East of the Mississippi River and north of the Ohio River. Southern District—South of the Ohio River and east of the Mississippi River. Western District—West of the Mississippi River.

Financial Applications Passed

The Public Utilities Commission of Illinois has received and acted upon a large number of petitions recently, most of which relate to the financial operations of the electric utilities of the State. The Jacksonville Railway & Light Company (Illinois Traction System) has been authorized to issue $183,000 of first mortgage 5 per cent gold bonds. The Illinois Central Traction Company (Illinois Traction System) has been authorized to issue 6 per cent cumulative preferred capital stock to the amount of $245,000 and general mortgage 6 per cent gold bonds to the amount of $254,000. The Chicago, Ottawa & Peoria Railway (Illinois Traction System) has been authorized to issue $576,000 of first consolidated and refunding mortgage 5 per cent gold bonds. The Northern Illinois Light & Traction Company has been authorized to issue $90,000 of general mortgage 6 per cent gold bonds.

COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR NOVEMBER, 1918 AND 1917

Account	United States				Eastern District				Southern District				Western District			
		Per Mile of Line				Per Mile of Line				Per Mile of Line				Per Mile of Line		
	Amount, November, 1918	1918	1917	% Increase Over 1917	Amount, November, 1918	1918	1917	% Increase Over 1917	Amount, November, 1918	1918	1917	% Increase Over 1917	Amount, November, 1918	1918	1917	% Increase Over 1917
Operating revenues	$10,836,375	$1,812	$1,959	8.11	$8,252,403	$2,121	$1,925	10.18	$750,538	$1,525	$1,342	13.62	$1,833,434	$1,598	$1,631	*2.02
Operating expenses	8,005,883	1,218	1,448	18.88	5,976,070	1,536	1,325	15.92	529,116	1,075	749	43.52	1,500,697	1,308	1,042	25.53
Net earnings	2,830,492	594	512	*13.80	2,276,332	585	600	*2.50	221,422	450	593	*24.11	332,737	290	589	*50.76
Operating ratio, per cent	1918, 73.92; 1917, 67.22				1918, 72.42; 1917, 68.83				1918, 70.49; 1917, 55.81				1918, 81.85; 1917, 63.89			
Av. No. miles represented	1918, 5,530; 1917, 5,530				1918, 3,890; 1917, 3,891				1918, 492; 1917, 492				1918, 1,147; 1917, 1,147			

COMPANIES REPORTING TAXES

Account	United States				Eastern District				Southern District				Western District			
Operating revenues	$7,136,136	$1,834	$1,698	8.01	$4,848,583	$1,916	$1,717	11.59	473,089	$1,838	$1,649	11.46	$1,814,464	$1,630	$1,667	*2.22
Operating expenses	5,536,038	1,423	1,192	19.38	3,721,182	1,470	1,276	15.20	329,943	1,344	924	45.45	1,484,913	1,334	1,059	25.97
Net earnings	1,600,098	411	506	*18.77	1,127,401	446	441	1.13	143,146	494	725	*31.86	329,551	296	608	*51.32
Taxes	496,257	128	126	1 59	339,824	133	133	0.00	39,452	161	162	*0.62	116,981	105	101	3.96
Operating income	1,103,841	283	380	*25.53	787,577	313	308	1.62	103,694	333	563	*40.85	212,570	191	507	*62.33
Operating ratio, per cent	1918, 77.59; 1917, 70.20				1918, 76.72; 1917, 74.32				1918, 73.12; 1917, 56.03				1918, 81.84; 1917, 63 53			
Av. No. miles repreeented	1918, 3,890; 1917, 3,890				1918, 2,531; 1917, 2,531				1918, 246; 1917, 246				1918, 1,113; 1917, 1,113			

*Decrease.

Cincinnati Falls Back

Inclement Weather and Loss of Men to Government Reduce Receipts $273,263 From Previous Year

The gross receipts of the Cincinnati (Ohio) Traction Company for the calendar year 1918 showed a decrease of $273,263 or 4.8 per cent as compared to those of 1917. Operating expenses and taxes increased, and the net earnings under the newly revised partnership agreement with the city were only $229,987 for 1918 as compared to $885,668 for 1917.

It is well to point out that in the early part of 1918 weather conditions reduced riding to a great degree. Moreover, during the year the absence of 20,000 or more men in various branches of war work was felt.

The following statement of operation of the Cincinnati Traction Company for 1917 and 1918 includes the earnings and expenses of the Millcreek Valley Lines:

	1918	1917
Gross receipts—C. T. Co.	$5,468,176	$5,741,440
Gross receipts—M. C. V. lines	271,814	285,407
Total	$5,739,992	$6,026,847
Operating expenses—C. T. Co	$3,481,813	$3,220,833
Operating expenses — M. C. V. lines	218,003	217,888
Total	$3,699,816	$3,438,721
	$2,040,176	$2,586,126
Taxes, except city of Cincinnati — C. T. Co.	$486,331	$419,700
Taxes, except city of Cincinnati— M. C. V. lines.	21,334	17,584
Total	$507,665	$437,284
	$1,532,510	$2,150,842
Rentals—C. T. Co	$1,134,337	$1,134,337
Rentals—M. C. V. lines	100,600	100,600
Totals	$1,234,937	$1,234,937
	$297,573	$915,905
Interest on equipment notes	$47,021	$29,050
Interest on floating debt	20,564	1,186
Total	$67,585	$30,236
Net earnings under ordinance	$229,988	$885,669

Only one change was made in the directorate at the recent annual meeting. C. J. Livingood was elected to succeed Julius Fleischmann, who retired because of his leaving Cincinnati.

Common Stock Bankers' Shares

Henry L. Doherty & Company, New York, N. Y., and Montgomery & Company, Philadelphia, Pa., as syndicate managers, are forming a syndicate to underwrite 200,000 Cities Service Company common stock bankers' shares.

Each ten bankers' shares represent one share of Cities Service Company common stock which will be deposited with the Bankers' Trust Company as trustee under a depositary agreement. Dividends paid in common stock on the deposited shares will be sold and dividends on the bankers' shares will be paid monthly in cash, the first dividend to be paid April 1 to bankers' shares of record of March 15. The issue of these bankers' shares was made in response to a general request that some method be devised whereby Cities Service Company common stock would be obtainable in smaller units than the shares of $100 par value, which are now selling above 340.

New Bay State Control May 1

It is expected that the board of public trustees will take control of the Eastern Massachusetts Street Railway, the successor company to the Bay State Street Railway, on May 1. The Bay State Street Railway reorganization plan is dated Jan. 9. The public control act directs the trustees to cooperate with the security holders in arranging the transfer of the Bay State property to the new company, and requires their approval of the amount of capital of the new company. According to the Boston *News Bureau* the new company will probably have about $50,000,000 of capital, which on a 6 per cent basis would call for an annual interest and dividend charge of $3,000,000.

One of the formalities to be complied with before the Bay State Street Railway property can be sold to the new company is an affirmative vote of two-thirds in interest of each class of Bay State Street Railway stock. Another is a requirement of the act that Bay State Street Railway security holders must put up $1,000,000 for securities of the new company to be used in rehabilitation of its lines or for other corporate purposes; also provision must be made for sale of serial bonds to the amount of $2,500,000. Arrangements for this financing will be included in the reorganization plan.

Correction Regarding Portsmouth, Dover & York Railway Service

C. H. Nottage, assistant to the general manager of the Portsmouth, Dover & York Street Railway, Portsmouth, N. H., has written to correct a statement made recently in this paper about the company abandoning service. Mr. Nottage says:

> In the issue of the ELECTRIC RAILWAY JOURNAL dated Feb. 8, under the heading of "Into Hiding for the Winter," I notice that the Portsmouth, Dover & York Street Railway is out of business until April 30, 1919.
>
> With due respect to the editor of the York *Transcript*, I wish to correct this statement, for we are maintaining our regular schedule from Portsmouth to Dover and from Dover to South Berwick and Portsmouth to Kittery Point, serving the Navy Yard at Kittery, Me., and two shipbuilding plants, one at Portsmouth and one at Newington, N. H. The branch that is not in operation is from Rosemary Junction to York Beach.

W. G. Meloon, the receiver, says:

> We have no intention of discontinuing operation of the York line permanently, which should be evident to the York *Transcript*, as during the last year we joined the town of York in entirely rebuilding a 600-ft. bridge across the York River on the Dover and York Beach division and also the draw over the York River on the Portsmouth and York Division.
>
> The order of the court reads "from Jan. 20 to May 1, 1919." The property is being improved and we have to make unusual efforts to handle the large number of Navy Yard and shipyard workmen.

Boston Deficit $219,629

Cost Per Passenger on the Boston Elevated Railway in January Was 8.97 Cents and Receipts 8.17 Cents

The financial report for January, 1919, made public by the trustees of the Boston (Mass.) Elevated Railway, shows a deficit of $219,629 as compared to a deficit of $149,903 for December, 1918. The cost for each passenger carried during the month was 8.97 cents, of which labor cost constituted 4.13 cents. The revenue passengers numbered 27,517,066, and the receipts per revenue passenger were 8.17 cents.

$3,292,294 DEFICIT IN SEVEN MONTHS

The deficit for the seven months ended Jan. 31, 1919, was $3,292,294. The total receipts for this period were $13,702,326. The total cost of service was $16,994,620. The cost of service as compared to the corresponding seven months of the previous year showed an increase of $5,471,075. The chief items entering into this increase are as follows:

Wages	$2,251,445
Coal (8246 tons additional)	59,229
Coal (increased cost)	346,083
Insurance	43,752
Depreciation	969,000
Contracts, material and other operating expenses	615,785
Rent of subways and tunnels (Dorchester tunnel)	287,297
Dividend — rentals under the act	775,232

The statement of the Boston Elevated Railway for the month of January is as follows:

RECEIPTS AND COST OF SERVICE OF BOSTON ELEVATED RAILWAY TO JANUARY, 1919

Receipts:	
From fares	$2,189,323
From special cars, mail pouch service, express and service cars	7,552
From advertising in cars, on transfers, privileges at stations, etc	24,244
From other railways for use of tracks and facilities	4,366
From rent of buildings and other property	7,923
From sale of power and other revenue	10,550
Total receipts from direct operation	$2,243,958
Interest on deposits, income from securities, etc	4,600
Total receipts	$2,248,558
Cost of service:	
Maintaining track, line equipment and buildings	$196,445
Maintaining cars, shop equipment, etc	230,514
Power (including 28,020 tons of coal at $5 815, $162,949)	239,881
Depreciation	167,000
Transportation expenses (including wages of car employees, carhouse expenses, etc.)	800,395
Salaries of administrative officers	6,895
Law expenses, injuries and damages and insurance	98,619
Other general expenses	76,752
Total operating expenses (of which $1,135,210 represents wages)	$1,816,501
Taxes, proportion	77,351
Rent for leased roads (exclusive of subways)	216,098
Proportion of rent of subways and tunnels to be paid to the city of Boston (exclusive of Cambridge Subway owned by company)	124,828
Interest on Boston Elevated Railway bonds and notes	111,104
Miscellaneous items	2,325
Proportion of dividend rentals under acts of 1918	116,997
Accrued interest on unpaid taxes	2,983
Total cost of service	$2,468,187
Net loss for January	$219,629

Before a Special Master

St. Louis Receivership Case Will Be Conducted Before Former Supreme Court Judge

Henry Lamm, Sedalia, Mo., former Judge of the State Supreme Court, has been appointed by United States District Judge Dyer as special master, to take testimony in the receivership suit of John W. Seaman and other stockholders against the United Railways, St. Louis, Mo. The exact time and the place for the hearing have not been announced.

The appointment of a special master to hear the receivership case has been in prospect since Judge Dyer recently announced that he would not himself hear the testimony, as he did in the former case of the same character. Judge Dyer dismissed that case, by sustaining a demurrer.

After dismissing the original suit for a receivership and an accounting, Judge Dyer gave the petitioner leave to amend and refile the petition, and this was done. When the attorneys for the United Railways offered dilatory motions, Judge Dyer gave them four days to make an answer to the receivership petition, and this answer was filed on Feb. 7.

The chief allegations in the receivership petition were that the company's contracts for water power from the Keokuk dam cost $400,000 a year in excess of a reasonable charge; that the practices of the company's legal department were wasteful, especially in the mill tax litigation; that the claim department is unreasonably costly; and that a system of interlocking directorates makes the company operate for the sole benefit of the North American Company, New York, N. Y., which controls the United Railways through that company's common stock.

A supplemental bill was filed in court recently, setting forth reasons for the appointment of a receiver, in addition to those contained in the petition already before the court.

Third Avenue Earnings

Revenues Are Back to 1913 Basis, But Expenses Are $1,000,000 More Than in That Year

The strike of 1916 on the lines of the Third Avenue Railway, New York, N. Y., and the competition of subway and elevated extensions so abnormally distorted the operating figures for the fiscal years ended June 30, 1917, and 1918, that a comparison of results in the last two years would be of little value.

It may be remarked, however, that subway and elevated competition and other causes have reduced operating revenues practically to the 1913 basis, but the increased cost of labor and materials has increased operating expenses for 1918 approximately $1,000,000 above those for 1913.

For the first six months of the fiscal year ended June 30, 1918, it was found that there had been earned above operating expenses, taxes and interest on underlying bonds $494,386. To preserve the company's credit in the face of constantly decreasing earnings combined with large and continued increases in the cost of operation, it was deemed necessary and advisable to set this amount aside to secure the proper, safe and adequate maintenance, equipment and operation of the road and to preserve its earning capacity.

INCOME STATEMENT OF THIRD AVENUE RAILWAY FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918	*1917
Operating revenue.....	$10,234,988	$8,972,648
Maintenance of way and structures..........	$1,186,997	$998,770
Maintenance of equipment..............	860,333	709,637
Depreciation accruals...	....	225,962
Power supply..........	940,255	781,086
Operation of cars.......	3,047,828	2,726,243
Injuries to persons and property..........	830,974	862,804
General and miscellaneous expense..........	468,532	983,338
Total operating expense............	$7,334,919	$7,287,840
Net operating revenue...	$2,900,069	$1,684,808
Taxes.............	836,098	794,450
Operating income.......	$2,063,971	$890,358
Interest revenue......	158,847	164,925
Gross income..........	$2,222,818	$1,055,283
Deductions for interest, rentals, etc.........	2,679,322	2,677,609
Deficit for the period....	$456,504	$1,622,326

* This period includes, and the figures reflect, the period of the strike in 1916.

For the last six months of this fiscal year, there was earned above operating expenses, taxes and underlying interest, the sum of $175,910. This was less than 1 per cent, the minimum amount that can be declared payable as interest under the adjustment income mortgage. Furthermore, the reasons which influenced the directors to set aside the reserve of the previous six months for contingencies had become still more urgent, and, accordingly, the above amount was set aside for the same purposes.

The Receiver's Dilemma

The second installment of back wages due on Feb. 1 to the employees of the Rhode Island Company, Providence, R. I., under an amended decree of the War Labor Board, has not yet been paid. It amounts to $72,000. The third installment, which is also the final payment, is due on March 1. Receiver Frank H. Swan has petitioned the Superior Court for permission to make the payment due on Feb. 1, but to date the court has rendered no decision. A conference was held recently between Receiver Swan and the attorney and representatives of the union in the office of Presiding Justice Tanner of the Superior Court, as a result of which the union men are not appearing too sanguine of receiving the money due.

In addition to the sums due the employees for back wages, the Rhode Island Company owes the United Traction & Electric Company a balance of $47,500 on rentals due on Dec. 24 and also $180,000 due on Feb. 24, payment of the latter usually providing the funds for the payment of interest on bonds of the United Traction, but it is a foregone conclusion that the interest will not be paid at present.

Taxes due the city of Providence and the State of Rhode Island are other accumulated debts which confront the receiver and tend to increase the difficulties which he must solve with the aid of the court.

Financial News Notes

Would Issue Improvement Bonds.—The Georgia Railway & Power Company, Atlanta, Ga., has filed an application with the Georgia Railroad Commission for permission to issue $633,000 of refunding and improvement mortgage bonds, which are part of a total authorized issue of $30,000,000.

Dismantlement Completed.—Thomas Flynn, who some months ago bought the property of the Bluffton, Geneva & Celina Traction Company, which formerly operated between Bluffton and Geneva, Ind., has shipped the rails and other iron and steel material to Shreveport, La., where they will be used in the construction of a new railroad.

Plans to Reorganize Claremont Company.—A bill is pending before the Legislature of New Hampshire proposing to grant a charter to the Claremont Street Railway, which is to take over the properties of the Claremont Railway & Lighting Company. In the meantime the company is being operated by a receiver. It is expected that it will be some weeks before the reorganization will be effected.

Utah Lines Consolidate.—At a recent meeting of the stockholders of the Utah-Idaho Central Railroad, Ogden, Utah, an agreement to consolidate the properties of the Utah-Idaho Central Railroad and those of Cache Valley Railroad, contained in a resolution adopted by the board of directors on Dec. 27, was ratified. The present officers were retained but the board of directors was reduced to nine members. A total of approximately 17 miles of trackage is added to the Idaho Central lines by the consolidation.

Preparing for Bay State Reorganization.—Friendly proceedings, designed to facilitate the reorganization of the Bay State Street Railway, Boston, Mass., now in the hands of a receiver, have been begun in the Federal Court in that city by the Old Colony Trust Company and the American Trust Company. The trust companies have filed bills in equity seeking foreclosure of the 4 per cent refunding mortgages of the Old Colony Street Railway and the

Boston & Northern Street Railway, which were merged into the Bay State Company in 1911. Judge Morton ordered the bills consolidated and set Feb. 28 as the date for a hearing.

Reorganization Declared Operative.—The reorganization committee for the Oakland & Antioch Railway, Oakland, Antioch & Eastern Railway and San Ramon Valley Railway, Oakland, Cal., has announced that the reorganization plan published in the ELECTRIC RAILWAY JOURNAL for Jan. 12, page 103, has been declared fully operative. The plan has been signed by fully 85 per cent of the security holders of the various classes, and the committee says it will proceed to carry the plan out in full. The plan, heretofore announced, provides for the formation of a new corporation to be known as the San Francisco, Oakland & Sacramento Railway, which will take over the reorganized properties.

Bondholders Adjust Differences.—An agreement has been reached between the rival committees representing holders of the 4 per cent collateral trust bonds of the International Traction Company, Buffalo, N. Y. Under the provisions of the agreement the local committee headed by Harry T. Ramsdell, president of the Manufacturers & Traders' National Bank, purposes to turn over the bonds it holds to the protective committee of which Elliott C. McDougal, president of the Bank of Buffalo, is chairman. All bondholders are now advised to turn over their securities to the protective committee. The interest payment due on Jan. 1, 1919, on the traction company's 4 per cent bonds was not met and the bondholders on March 1 will be in a position to start foreclosure proceedings.

St. Joseph Valuation Figures. — A study of the valuation by engineers for the Missouri Public Service Commission of the property of the St. Joseph Railway, Light, Heat & Power Company, reveals the book valuation to be $11,714,197 and $5,737,800 to represent the bare reproduction cost of the physical property as estimated by the engineers. Both valuations include not only the property of the railway in St. Joseph, but also of the heating, lighting and power plant. The valuation placed upon the railway property by the engineers is $2,181,800. This represents the estimated cost of reproduction, less depreciation. As there are 48.84 miles in the St. Joseph system the average value per mile is $70,000 according to the estimate of the engineers.

Abandonment Prevented at Present.—The Court of Appeals on Jan. 24 rendered an important decision in the case of the city of Bowling Green and Warren County against the Southern Traction Company preventing the defendant from disposing of its plant as junk. The court held that the railway is not compelled to operate its cars at a loss; that if the system, operating economically and efficiently, would not produce a fair income to its owners, the company could sell its plant and remove its rails and wires from the streets. If it could be determined, after a year under a receiver, that the system could not be operated except at a loss, the owners would then have a right to dispose of the property as junk, provided the streets were left in as good condition as when the rails were laid.

Securities for Reorganization Approved.—The Public Service Commission of Indiana has authorized the Evansville & Ohio Valley Railway and the Evansville Railways to issue securities in the amount of $2,150,000 as follows: $75,000 of 5 per cent thirty-year first and refunding bonds; $750,000 of general mortgage thirty-year income bonds; $150,000 of ten-year 6 per cent notes; $200,000 of 6 per cent preferred non-cumulative stock; $300,000 of common stock. The reorganizers asked for a common stock issue of $1,000,000 but this was lowered to $300,000. First mortgage bonds to provide funds to rehabilitate the property will be issued only under special separate authorization of the commission. The plans for the reorganization have been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Financial Readjustment Not Contemplated.—Reports that a readjustment of the New York city transit situation is imminent, involving the granting of higher fares through legislative action, the refinancing of the local operating companies and the liquidation of the Interborough Consolidated Corporation, the holding company, have been denied by Theodore P. Shonts, president of the Interborough Rapid Transit Company. Mr. Shonts said: "There is no truth whatever in the story published regarding the readjustment of the Interborough affairs and the abolishment of the Interborough Consolidated Corporation, the holding company. We have no intimation of any plan of this character. We are asking for increased fares, not that we want to make any big profit, but want sufficient returns to warrant revenues on the basis which was promised us when we became a partner with the city."

No Action on Interborough Dividend.—The directors of the Interborough Rapid Transit Company, New York, N. Y., took no action on Feb. 25 regarding the quarterly dividend which was due for consideration. Interest on the Interborough - Metropolitan Company 4¼ per cent bonds is dependent upon the dividend declaration of the Interborough Rapid Transit Company. It has been suggested in unofficial quarters that the April 1 interest payment on the Interborough-Metropolitan bonds might be paid out of surplus of the Interborough-Consolidated Corporation, but an advertisement in the New York papers of Feb. 28 noted the formation of a protective committee for the holders of the Interborough-Metropolitan Company collateral trust 4½ per cent bonds. This committee was formed in order that bondholders might be in a position to take concerted action if occasion should arise. The committee asked for deposit of bonds on or before March 31 with the Guaranty Trust Company.

Electric Railway Monthly Earnings

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$189,780	*$177,213	$12,567	$38,844	†$26,277
1m., Dec., '17	183,517	*139,407	44,110	35,625	8,485
12m., Dec., '18	2,140,210	*1,874,699	265,511	439,252	173,741
12m., Dec., '17	2,158,478	*1,557,664	600,814	428,516	172,298

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$11,605	$10,937	$668	$508	$160
1m., Jan., '18	10,832	12,994	†2,162	484	†2,646

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$6,125	*$8,250	†$2,125	$1,441	†$3,566
1m., Dec., '17	8,910	*10,038	†1,128	1,318	†2,446
12m., Dec., '18	101,429	*116,317	†14,888	16,833	†31,721
12m., Dec., '17	124,316	*124,778	†462	14,755	†15,217

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$51,173	*$37,181	$13,992	$6,632	$7,360
1m., Dec., '17	46,120	*27,356	18,764	6,535	12,229
12m., Dec., '18	513,005	*392,410	120,595	78,506	42,089
12m., Dec., '17	464,081	*298,247	165,834	78,652	87,182

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$95,506	*$63,397	$32,109	$14,535	‡$17,879
1m., Nov., '17	75,990	*39,308	36,682	12,109	‡27,465
12m., Nov., '18	1,105,724	*641,632	464,092	161,992	‡312,552
12m., Nov., '17	928,068	*512,588	415,480	134,441	‡297,874

* Includes taxes. † Deficit. ‡ Includes non-operating income.

JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$98,461	*$76,999	$21,462	$17,050	$4,412
1m., Dec., '17	69,590	*44,919	24,671	15,866	8,805
12m., Dec., '18	945,568	*709,667	235,901	199,066	36,835
12m., Dec., '17	698,123	*469,712	228,411	188,896	39,515

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$249,511	*$167,163	$82,348	$27,283	‡$64,647
1m., Dec., '17	294,207	*147,871	146,336	28,950	‡126,969
12m., Dec., '18	2,929,759	*1,883,833	1,045,926	337,788	‡823,138
12m., Dec., '17	2,582,113	*1,445,663	1,136,450	348,744	‡816,455

PENSACOLA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$50,756	*$41,520	$9,236	$9,293	†$57
1m., Dec., '17	35,081	*20,282	14,799	7,829	6,970
12m., Dec., '18	506,050	*360,382	145,668	99,923	45,745
12m., Dec., '17	350,458	*203,680	146,778	93,668	53,110

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$110,394	*$92,320	$18,074	26,319	†$8,245
1m., Dec., '17	92,611	*58,317	34,294	24,832	9,462
12m., Dec., '18	1,182,891	*856,151	326,740	302,947	23,793
12m., Dec., '17	968,173	*645,592	322,581	290,549	32,032

TAMPA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$103,665	*$56,538	$47,127	$5,293	$41,834
1m., Dec., '17	87,952	*50,019	37,933	5,085	32,848
12m., Dec., '18	1,062,546	*620,276	442,270	61,433	380,837
12m., Dec., '17	1,001,311	*563,540	437,771	56,118	381,653

Traffic and Transportation

Columbus Wants Increase

New Management Renews Fare Plea With Imposing Array of Evidence to Prove Its Needs

Charles L. Kurtz, president of the Columbus Railway, Power & Light Company, Columbus, Ohio, made application to the City Council on Feb. 18 for permission to increase the rates of fare from eight tickets for a quarter to 5 cents cash fare, with transfer, and six tickets for a quarter without transfers. He stated that the new rates will be necessary to take care of the expenses and make improvements and extensions. Dividends were not considered in the rates that have been requested.

PRESIDENT EXPLAINS COMPANY'S NEEDS

On Feb. 21 Mr. Kurtz explained to members of Council, as a committee of the whole, why the increase is needed. It is estimated that the new changes will increase earnings about $618,815 for the year. In the first place he pointed out that in addition to the loss sustained in 1918, amounting to $440,000, the January statement showed a deficit of $46,000. Within the next two or three years the company will be required to expend approximately $1,034,000 for the improvement of Main, Fourth and Broad Streets, for back pay to the men and for the redemption of cash fare slips issued during the period when the railway company was collecting a straight 5-cent fare.

All of these things the company wants to do. In addition it wants to maintain its credit during the remaining seven years of its franchise. Furthermore, it wants to build extensions and make improvements on its present tracks and rolling stock, so that more efficient service may be given. A temporary increase in the rate of fare will not meet the requirements. The credit of the company rests upon the privilege which it has to operate in the streets of the city and upon the efficiency of its service.

EARNINGS MUST PROVIDE FUNDS FOR IMPROVEMENTS

Mr. Kurtz feels that it will be impossible to make further bond issues at present for the purpose of obtaining funds for improvements and that any money which is expended must come from the earnings. He says that the equipment is worn and the property generally run down because of lack of funds to keep it in shape. It might be possible to strengthen, or even restore, the credit of the company through the adoption of reasonable rates of fare, so that money might be borrowed later, but this will not be possible if the Council grants the increases and then makes the rates subject to modification or revocation at any time.

Expenditures for the present year should include $697,422 for paving Broad, High, Fourth and Main Streets; $143,146 for redemption of cash fare slips; $81,590 for back pay to employees; $62,000 for rebuilding ten open cars and expenses on other equipment; $50,000 for placing general car equipment in good order, making $1,034,158 which must be considered in connection with the yearly deficit of about $440,000 under the old rate of fare.

OTHER CITIES A CRITERION

Mr. Kurtz called attention to the rates of fare prevailing in other cities at this time, while his company is receiving the pre-war rate, lower perhaps than the rate in any other city in the country.

It is stated that the three members of Council who have consistently opposed everything in the way of an increase in rates in the past—Griffin, Alcott and Zimpfer—will continue to maintain that attitude in regard to the request of the new management. Other members of the body have not expressed themselves.

So the Public May Know

The annual meeting of the stockholders of the New York & North Shore Traction Company, Roslyn, N. Y., was held on Feb. 18. The following directors were elected for the ensuing year: George A. Stanley, New York and Flushing; George F. Scofield, Cleveland, Ohio; Elmer G. Story, Bayside; Charles S. Colden, Whitestone; John G. Moran, Flushing; Watson B. Robinson, New York City; Dr. Joseph H. Bogart, Roslyn; Jules P. Kunz, Flushing, and George P. Allen, Roslyn.

Messrs. Story and Colden will represent the Seven-Cent Fare League on the board. This is the league whose activities in favor of a 7-cent fare for the company have been reviewed recently in the ELECTRIC RAILWAY JOURNAL.

Mr. Story is the president of the league whose members are voluntarily paying a 7-cent fare on the company's lines within the limits of the city of New York. A few weeks ago Mr. Stanley, president of the company, said he would like to have the public represented on the board of directors in order that the people who use his company's cars might know how the road is conducted.

Dr. Bogart is president of the Bank of Hempstead Harbor and health officer of the town of North Hempstead. He is the citizens' representative on the board of directors of the company from Nassau County.

More About Boston Zones

Boston Elevated Trustees Will Proceed With New System Unless Legislators Intervene

Unless the Massachusetts Legislature convince them of error, the trustees of the Boston Elevated Railway will put a zone system into effect in the near future. This was announced by Chairman James F. Jackson, who appeared with other members of the board at a legislative conference on the company's affairs on Feb. 21.

Two proposed inner zones are under consideration, one having a radius of about 2 miles and the other 3 miles from Boston City Hall. The former includes 20 per cent of the riding public and the latter about 50 per cent. The present intention of the trustees is to collect all fares in the inner zone on the pay-as-you-enter system, and passengers riding beyond the limits of the first zone will be obliged to pay their second fare when leaving the car. The pay-as-you-leave system will be applied to persons boarding cars in the second zone and leaving within that zone.

The trustees believe that with such a system a larger percentage of the fares will be collected than now obtains. Some of the present leakage, Mr. Jackson said, is due to conductors, and some to the traveling public. Without a zone system a flat fare of 9 cents is inevitable and a 10-cent fare is probable. Mr. Jackson said that even if the road should be relieved of subway and tunnel rentals, an 8-cent fare would be the lowest that would enable the company to break even in operating expenses.

Final Chicago Fare Hearing

The question of whether the Chicago (Ill.) Surface Lines shall be permitted to charge a higher rate of fare now rests with the Public Utilities Commission of Illinois. Final evidence and arguments were introduced on Feb. 13 and 14, after which the case was taken under advisement.

A feature of the closing session was the formal notice from the company that the appeal in the United States Supreme Court attacking the jurisdiction of the commission over service matters would be dismissed. This is taken to mean that there will be further discussion of the order entered several years ago directing the Chicago Surface Lines to put on trail cars and other additional facilities.

Attorneys for the company pointed out the danger of bankruptcy and receivership if more revenue is not secured.

The city's lawyer made his principal fight on the valuation of the properties, claiming that a fair return on the actual investment would not call for an increase in the rate of fare.

Chicago is now in the midst of a fight over the mayoralty. As usual, the traction question and the fare situation are leading topics in the campaign speeches.

Zones or Abandonment

In conference with the Common Council of Yonkers, N. Y., on Feb. 14, S. W. Huff, president of the Third Avenue Railroad System, declared that unless a zoning plan was adopted it would be practically impossible to increase fares on the Yonkers Railroad without abandoning a substantial amount of the lines in the outlying section of the city. The single fare, he contended, could not be increased enough to carry these lines without the danger of driving away passenger traffic altogether and thus making the situation worse than it is at the present time.

In a letter to the City Clerk of Yonkers, Mr. Huff said in part:

> You will note from the report of your expert that even at the low valuation of the physical property as made by him, and without taking into account the numerous other items which must form a basis for the establishing of an equitable fare, he has found that the company is operated at a tremendous deficit and that this deficit is increasing at an alarming rate, notwithstanding that your expert finds that the property is being operated economically and efficiently and has no changes to suggest that might improve the situation, other than a modification of a contract for the operation of trackage outside of the city of Yonkers, which contract was approved by the Supreme Court and by both Public Service Commissions, after persons representing all the equities involved, including the city of Yonkers, had negotiated and agreed upon the contract.
>
> You will further note from the report that the conclusion is reached that "some of the lines obviously could not be operated profitably on a 5-cent fare, nor even on a 10-cent fare."
>
> This brings us to the real difficulty of the whole situation. With the spirit of optimism on the part of the city and on the part of the railroad company, there have been extensions of lines that should never have been made, and as the author of the report very properly says, they cannot be operated profitably on a fare even twice as much as that being now charged. The question which forces itself upon us all is this: Is it possible to tax the remaining lines with a fare sufficient to carry these unprofitable lines?
>
> Our feeling is that it is probably not possible to place a sufficient single fare on the lines of the company as a whole to carry these outlying lines. To place the necessary fare on the lines as a whole would probably be to drive away travel to such an extent as to defeat the very purpose you and we would have in mind in making such increase. It would therefore seem to us that the only hope outside of a zone system which the city regarded unfavorably, lies in the abandonment of a substantial amount of outlying trackage and the determining of a fare which would be sufficient properly to support the remainder of the property.

Cannot Lift Old Tickets

Attorney-General Atwill of Massachusetts has issued an opinion as to the duties of common carriers concerning books of reduced fare tickets and their use after an increase in fares is allowed. Under this finding the Attorney-General states that companies are forbidden by law to accept tickets sold previously to the increase in fares, but that each company is bound to redeem such tickets at their pro-rata value before the increase went into effect.

Many inquiries had been addressed to the Public Service Commission of Massachusetts on this point, notably from patrons of the Bay State Street Railway and Boston & Worcester Street Railway. It was contended by ticket-book buyers that when the fare was increased, the old tickets should be accepted for the new fare until used. The companies refused so to honor superseded tickets. Instances were shown where speculators purchased from one to two dozen such books under the old rates of fare and held them until the increase went into effect with the purpose of selling them back to the companies at a price equal to the new fare scheduled.

Experimental Fare Continued

The Public Utilities Commission of Rhode Island has authorized the Rhode Island Company, Providence, to continue in force the increased fares which it was authorized to charge as an experiment from Oct. 23 to March 1. The period of grace allowed extends to May 1. This action was taken to enable the receiver to get his bearings without having as an additional burden the difficulties attendant upon rate increase agitation.

The commission ordered the Rhode Island Company to establish commutation rates for regular patrons outside the 10-cent zone limits and also to prepare a schedule of excursion rates on heavily patronized lines. The company is ordered to submit these schedules to the commission by April 1. The excursion rate is to apply particularly to lines which are engaged in summer traffic.

Incidentally there is scheduled for a hearing on March 14 the case of the city of Cranston and the towns of Johnston, East Providence, Warwick and North Providence protesting against the increase in fares.

Cincinnati Fare Going Up

Fares in Cincinnati will probably be increased to 6 cents on April 1, W. Kesley Schoepf, president of the Ohio Traction Company, predicted in his recent annual report to stockholders. The Ohio Traction Company owns and controls the Cincinnati Traction Company, which leases the Cincinnati Street Railway.

In speaking of the fare situation Mr. Schoepf said in part:

> It is one feature of the Cincinnati franchise that allows increases of fares by half-cent stages. The increases did not begin to be made until the new arrangement had been tried out for three months at the old rate of 5 cents. The first increase was made on Jan. 1,, 1919, to 5½ cents for tickets and 6 cents cash. It is anticipated that another increase will be made to 6 cents flat on April 1.

As to the wage situation the speaker said:

> As to what will result in the next few months cannot be foretold. The War Labor Board's award is for the period of the war with the privilege of opening the question at the end of six months. It is believed that with adequate pay more satisfactory work can be gotten out of the employees. More honest, capable, industrious and courteous employees will be secured and retained if they are paid a good wage.
>
> It is the hope of the management of the company that economies in operation and efficiency in all of its departments will make it possible to postpone any efforts to readjust wage scales, unless a natural readjustment and a general readjustment comes about, coincidental with the lowering cost of living, when readjustments would be made as a matter of course.

Shore Line Reduces Fares

For the experimental period of six months from April 1 a new schedule of fares on the Shore Line Electric Railway system affecting the lines from New London, Conn., northerly to Willimantic, Conn., is to be put into effect. They show a reduction from the rates now in force.

The new schedule of fares was decided upon after a series of conferences between the officials of the railway, the selectmen and counsel of the towns of Norwich and Sprague and the members of the Public Utilities Commission.

A partial comparison of the old and new rates follows:

	New	Old
From Parade or any portion of city of New London to College.	5	5
To Best View	7.5	10
To Quaker Hill	10	10
To Alexander's	12.5	15
To Sanitarium	30	34
To Norwich	35	43
Franklin Square, Norwich, to Sanitarium	5	5
To Trading Cove	7.5	10
To Gallivan's	10	12
To Cook's	12.5	15
To Derry Hill	15	18
To Montville	17.5	20
To Dr. Fox's	20	23
To Alexander's	22.5	26
To Quaker Hill	25	29
To Best View	27.5	32
To College	30	35
To Parade, New London	35	43
To Ocean Beach	43	48
From Franklin Square or other section of Norwich to St. Mary's Cemetery	5	5
To Baldwin's store, Taftville	7.5	10
To Taftville	10	10
To Lillibridge Road	17.5	19
To Baltic	20	22
To Willimantic	45	53
Franklin Square, Norwich, to sanitarium	5	5
To Averay's Lane, Bean Hill	7.5	10
To Yantic	10	10

In its memorandum accompanying the decision the commission said:

> The present schedule of rates and method of collection present a very complicated system, more or less confusing for conductors and unintelligible to the traveling public. On the line from New London to Willimantic there are five different zone rates, namely, 5 cents, 4 cents, 3 cents, 2½ cents and 2 cents.
>
> The proposed rates retain the present 5-cent zones in the cities of New London and Norwich, and establish uniform 2½-cent or one half nickel zones on suburban runs. The initial or minimum charge of 5 cents entitles the passenger to ride through two suburban zones, and for 7½ cents to ride through three such zones, etc. In traveling into or out of either city, the rider is entitled to travel through the city zone and the next outside zone for 7½ cents, with transfer privileges in the city.
>
> In view of pending railway legislation and for any sufficient cause shown the commission reserves the right and jurisdiction over said matter, to annul, modify or amend this temporary order at any time. The rates hereby approved shall not be changed by the company without the approval of this commission. A detailed finding and final order will be issued by the commission within — days after the expiration of said six months unless otherwise previously disposed of by final order of the commission.

Louisville Wants More

T. J. Minary, president of the Louisville (Ky.) Railway, called on Mayor Smith recently to acquaint him with the plight of the company. He made no formal request for an increase in fares, but later stated that a committee will call upon the Mayor and make such a request. No date has been fixed for the formal conference.

One-Man Cars or Nothing

So strong was the opposition which developed against amending the existing ordinance so that the operation of one-man cars on the streets of Norfolk, Va., would be legal, and so conflicting the evidence adduced as to the efficiency of the one-man car, the Council on Feb. 11 decided not to pass on the matter until it was better understood.

A committee from the Council will confer with Admiral Coffman and officials of the United States Housing Bureau, which is financing the purchase of new cars for Norfolk, in which the one-man car will be discussed from all angles.

The attitude of the government officials who have charge of traction matters and the officials of the Virginia Railway & Power Company is that Norfolk must take the one-man car or nothing. That attitude was clearly expressed in the meeting of the Council when W. A. Mellin, of the housing bureau, stated that standard cars could have been ordered at the time the one-man car was ordered, but the traction and housing bureau officials considered that the one-man car was the better.

The chief objection, which has so far developed in the mind of the City Manager regarding this type of car, is the difficulty which will come in the enforcement of the Jim Crow law. It was shown the City Manager, that white passengers now always have to pass through a group of colored passengers on the standard car and that there would be little difference experienced in the colored passengers passing through groups of white passengers.

The City Manager has also suggested that an impartial committee be sent to a city where the one-man car is in operation to ascertain at first hand how the traffic is handled. This committee could report back to the Council and its report might have a large effect upon the decision of the Council.

About $48 Each for Being Careful

Two hundred and seventy-one platform men of the San Diego (Cal.) Electric Railway have recently received their "Safety First" checks. The sum of $13,139 was distributed among the platform men, each man's check based on the number of hours of actual service during the year. The amount represents the savings from the 1918 accident fund.

Each year a certain per cent of the gross passenger earnings of the company is set aside as an accident fund. Out of this fund payments for personal injuries and damages are made and the amount left after this is done goes to platform men.

The total amount saved for the carmen this year exceeds that of last year, which amounted to $12,225. The saving is considered all the more remarkable because of constant changes in the personnel necessitated by men leaving to go into government work or in the service. Chairman Allen of the safety committee said:

> This condition has improved materially with the return of former platform men from the service. The outlook during the coming year would be bright indeed from the standpoint of eliminating accidents if we could by some means receive a closer co-operation from drivers of automobiles on the city streets as well as from the men and women patrons in boarding and alighting from cars. Accidents in which automobiles are involved and those resulting from people jumping on or off moving cars regardless of warnings and pleas of car men to wait until cars stop, continue to be the greatest stumbling blocks to our efforts toward saving life and limb.

Another Indiana Interurban Increase

The Public Service Commission of Indiana on Feb. 18 granted the Fort Wayne & Decatur Traction Company permission to increase its passenger fares from 2½ to 2¾ cents a mile. The increase was to become effective on Feb. 20, and to continue until Sept. 1, when the company is ordered to report its operating expenses and receipts to determine if the increase is to be made permanent.

Richmond Comes Into Its Own

Mayor Ainslie of Richmond, Va., has approved the ordinance granting increased fares to the Virginia Railway & Power Company, and soon afterward the board of directors of the company passed a resolution accepting the conditions laid down by the city. Changes made by the ordinance are as follows:

Six-for-a-quarter tickets for the general public are abolished, and a straight 5-cent cash fare is substituted.

Labor tickets at 2½ cents each and good between the hours of 6 a. m. and 7 a. m. are abolished. Instead labor tickets will be sold at the rate of six for a quarter, and will be valid between the hours of 6 a. m. and 8 a. m.

School tickets and transfers remain as at present.

In November, 1917, the company filed with the City Council an application for increased rates. The application was referred to the committee on streets, and there were many public hearings, the opposition to increased rates being chiefly led by representatives of the Central Trades and Labor Council.

The two Council branches and the committee on streets played battledoor and shuttlecock with the matter but this finally came to an end in the City Council, when the Board of Aldermen passed the relief measure by a vote of ten to one.

The ordinance allows the company to maintain the increased rates for the period of one year, and at the end of that time the new law automatically comes to an end. The City Council, however, has the right to repeal the ordinance at any time that it may deem proper. One of its provisions, as accepted by the company, gives the city the right to examine the books, vouchers and methods of management of the company.

Transportation News Notes

Watchful Waiting.—The hearings on the application to the Public Utilities Commission of Illinois of the East St. Louis (Ill.) Railway to charge a 7-cent fare have been completed and the company is waiting for the decision of the commission.

Want Seven Cents in Boise.—The Boise (Idaho) Railway, operating in the city, and the Boise Valley Traction Company, city and interurban, will ask the Utilities Commission of Idaho for permission to install one-man cars and to raise fares to 7 cents.

Service Hearing Concluded.—The hearing of the Trenton & Mercer County Traction Corporation, Trenton, N. J., before the Board of Public Utility Commissioners for failure to render proper service has been concluded. The matter has been taken under advisement.

Ten Cents on Georgia Line.—The petition of the Albany (Ga.) Transit Company for a 10-cent fare, ten tickets for $1, has been allowed by the State Railroad Commission. The petition of the company was not opposed. In fact, the City Council of Albany sent a resolution asking that the increase be authorized.

Governor Approves Fare Increase Measure.—Acting Governor L. F. Hart of Washington on Feb. 17 approved a law passed by the Legislature, authorizing the Public Service Commission to exceed the 5-cent limit on railway fares within city limits and giving City Councils the same authority over municipally-owned lines.

Wants Service Maintained Pending Inquiry.—Employees of the Des Moines (Iowa) City Railway have petitioned the City Council to prevent any curtailment of service on the part of the Des Moines City Railway until such time as a complete survey of conditions can be made to determine whether or not such curtailment is necessary to meet the forced 5-cent fare.

Wants Auto Line Restrained.—The Aurora, Elgin & Chicago Railroad, Chicago, Ill., has filed a complaint with the Public Utilities Commission of Illinois charging that the Inter-City Motor Express Lines, operating over public highways and streets in and between Chicago and Elgin and Aurora, is conducting its business without having obtained a certificate of convenience and necessity from the commission.

Public Authorities Divided.—The City Commission of Millville, N. J., has decided not to oppose the application of the Millville Traction Company for an increase of fares between Millville and Vineland from 10 cents to 14 cents and a raise in fares in Millville from 5 cents to 7 cents before the Board of Public Utility Commissioners on March 11, but the Borough Commission of Vineland, N. J., has instructed Solicitor Hurd to protest the advance.

Lockport Granted Fare Increase.—The Public Service Commission for the Second District of New York at its regular session on Feb. 20 passed an order permitting the International Railway to increase its rate of fare in Lockport to 6 cents, the order to become effective on March 1, 1919, for a period of one year and thereafter until the further order of the commission. It was pointed out that in 1918 the company sustained a deficit of $9,978 and this was regarded as sufficient evidence to warrant the action taken by the State authorities.

Suburban Fare Increase Suspended.—The Public Service Commission for the Second District of New York has ordered suspended from Feb. 24 to and including April 30 rates of fare on Rochester lines of the New York State Railways under a complaint filed by Supervisor Louis J. Dubelbeiss, of the town of Irondequoit. The railway filed a tariff proposed as effective on Feb. 24 applying to one-way and round-trip cash and ticket fares on the Rochester and suburban lines to Irondequoit. Commissioner Barhite is investigating the proposed new fares.

Very Successful Experiment in Publicity.—One of the features of the recent ball by the employees of the United Railways & Electric Company, Baltimore, Md., was an extra edition of *Trolley Topics*, the company's semi-monthly paper. The copy for the paper was obtained at the ball and was rushed to the printer, who quickly ran off 3000 copies. These were hurried back to the hall and distributed by volunteer newsboys. The paper was a surprise to the guests, because it illustrated and told about things that were happening as those in attendance read about them.

Elm Grove Company Wants Increase.—The West Virginia Traction & Electric Company, Wheeling, W. Va., has petitioned the Public Service Commission of West Virginia for an increase in the fares on the City & Elm Grove Railroad. The present fare from Wheeling to Elm Grove is 10 cents, divided into one 6-cent zone and a 4-cent zone. The application is for a fare of 15 cents, the distance being divided into three 5-cent zones. One hearing on the matter has been held at Charleston, before the commission, and a second meeting will be held in the near future at Wheeling.

Fare and Traffic Conference Called.—The Public Service Commission of the State of Washington has called a conference for Feb. 28 at Tacoma, Wash., of city officials, representatives of commercial organizations and electric railways of the State, for the purpose of discussing fares and other traffic problems. Senate Bill No. 18, passed by the present Legislature and signed by the Acting Governor on Feb. 15, eliminates the 5-cent fare clause of the public service act of 1911. It is considered probable that the commission is preparing to establish uniform rates in all cities.

Fare Case at Houston Appealed.—The Houston (Tex.) Electric Company has appealed from the decision of the District Court of Harris County wherein it was held that the City Council of Houston was within its authority when it passed an ordinance repealing the 6-cent fare ordinance that it had previously enacted, the latter action being based on a referendum to the people in which a vote opposed to the 6-cent street-car fare was expressed. The case was taken before the First Court of Civil Appeals at Galveston and a motion by the company to advance on the docket was granted. The case is set for argument on March 6. An early decision is expected.

Service Order Extended.—The Public Service Commission for the Second District of New York has ordered that the time within which the New York State Railways was directed to restore service upon its lines in Rochester during the non-rush hours be extended until Feb. 17, at which time the company was to restore service as provided by the commssion's order of Feb. 6. The company applied to the commission for an extension of time upon the ground that it had been impossible to prepare the necessary time-tables within the time stated in the original order and that according to an agreement in force between the company and its employees, the company is required to post the changes in service for a period of at least five days. The time within which the service was directed to be restored in the order was not sufficient to enable the company to comply with the terms of the order.

Combination Bus and Railway Service Proposed.—The City Council of Seattle, Wash., has requested Senator Daniel Landon to introduce in the Legislature a bill authorizing municipalities owning city railway systems to own and operate auto bus lines or jitneys, either in connection with the street railway or as supplementary to such service. Senator Landon states that the Council asked him to submit the bill, the city believing that it will be requested to operate jitney lines to connect with the city-owned railway system. The bill was drawn by Walter F. Meier, Corporation Counsel, at the request of the special legislative committee of the City Council. A member of the legislative committee states that the bill does not mean that the city contemplates a general jitney business, but that if the city takes over the railway system, it will do all in its power to provide adequate transportation for the public.

Indiana Lake Shore Line Wants More.—The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has petitioned the Public Service Commission for permission to charge passenger fares on a basis of 3 cents a mile for one-way travel between points on the line in Indiana. The company received permission from the commission last May to increase its basic charge from 2 to 2½ cents a mile. It obtained permission from the Interstate Commerce Commission last July to charge on the basis of 3 cents a mile for interstate traffic. A number of electric lines in Indiana have petitioned the commission for increases to 2¾ cents a mile for passengers since the recently granted increase to 2½ cents from the regular fare of 2 cents. The Chicago, Lake Shore & South Bend Railway, however, is the first to ask for a 3-cent basis. The line is said to be operating under conditions more peculiar to steam lines than other electric lines in Indiana.

Wants Sliding Fare in Jacksonville.—Officials of the Jacksonville (Fla.) Traction Company are considering plans to secure an amendment to the company's franchise, at a special election, so as to permit an increase in fares. The proposed amendment would place into the hands of the City Council the power to decrease or increase the rate of fare from time to time, as conditions justify. In speaking of the plans a representative of the company is reported to have said: "We are simply putting the proposition up to the people themselves, whether or not the company is entitled to just consideration, and asking only for a fair deal which will prevent bankruptcy. We are operating at a financial loss, due to the greatly increased cost of material and labor. There must come relief that will justify a continuance of the service. The progressive people fully appreciate the reason we are seeking relief, and there can be no just objection to permitting the people to determine the question."

New Publications

McGraw Electric Railway List for February, 1919

273 pages. This list is published in February and August. By McGraw-Hill Company. Price $7.50 a year.

Many important changes were made in this issue. They include: 1300 changes in the officials and chief operating men of the electric railway industry, 400 changes in power-plant equipment, 150 notes on substation equipment not published before, twenty notes on receiverships, dismantlements and suspensions, 300 changes relating to company connections and points reached and 700 population changes from latest state figures. The numerical indexes to companies and to individuals have also been rearranged. These changes were made from new reports received from 95 per cent of the 950 companies listed.

Personal Mention

Changes on Inland Empire Railroad

J. F. Gannaway has been appointed superintendent of the Spokane & Inland Empire Railroad with offices at Spokane, Wash. The appointment was made by F. E. Connors, the receiver of the railway. Mr. Gannaway was formerly assistant superintendent of the company.

F. S. Elliot has resigned as chief operating officer of the Spokane & Inland Empire Railroad, Spokane, Wash. This office has been abolished and the affairs of this position will hereafter be assumed by the receiver himself.

Waldo G. Paine, chief traffic officer, has become treasurer.

Elmo Edwards, formerly auditor, has assumed the duties of secretary of the company.

Mr. Paine and Mr. Edwards will have offices in Spokane.

Robert Crosbie, formerly secretary and assistant comptroller, and Paul McKay, treasurer and purchasing agent, with offices at Portland, have resigned.

The duties of purchasing agent for the railway have been taken over by the receiver.

W. R. Burns has been appointed auditor of the Dallas (Tex.) Railway to succeed L. W. Richards.

Charles F. Smith has been appointed auditor of the Sand Springs Railway, Tulsa, Okla., to succeed R. J. Guillan.

H. C. Lang has been appointed secretary and treasurer of the Western Ohio Railway, Lima, Ohio, to succeed R. B. Cook.

Lieut.-Col. L. V. Patch has been named a member of the Utilities Commission of Idaho, succeeding John W. Graham, resigned.

M. Cummings has been appointed auditor of the Springfield & Xenia Railway, Springfield, Ohio, to succeed J. F. Egolf.

William Reiser has been appointed treasurer of the Electric Bond & Share Company, New York, N. Y., to succeed A. E. Smith.

R. A. Hock has been appointed auditor of the United Gas & Electric Corporation, New York, N. Y., to succeed G. F. Bauer.

W. E. Eppler has been appointed comptroller of the United Traction Company, Albany, N. Y., to succeed W. H. Davies.

A. B. Eimer has been appointed auditor of the Niagara Gorge Railroad, Niagara Falls, N. Y., to succeed E. H. Buddenhagen.

Lee F. Swartout, who has been connected with the Michigan Railway, Jackson, Mich., and the predecessor company since 1910, has been appointed clerk to the general manager.

G. A. Richardson, general superintendent of the Puget Sound Traction, Light & Power Company, Seattle, has been engaged by the Brooklyn (N. Y.) Rapid Transit Company to make an examination of properties and equipment of the Brooklyn Rapid Transit System and submit a report to that company.

Thomas Gibson, who has been master mechanic for the Reading Transit & Light Company, Reading, Pa., for the last three years, has resigned to accept a position as general manager of the Frankford, Tacony & Holmesberg Street Railway, Philadelphia, Pa. Mr. Gibson will assume the duties of the new position on March 1. His office will be at Tacony, Philadelphia.

Henry T. Ledbetter, formerly auditor of the Toledo Railways & Light Company, Toledo, Ohio, has been appointed secretary of the company to succeed A. C. Van Driesen, who, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 23, 1918, resigned to become assistant treasurer of all the properties of Henry L. Doherty & Company in Toledo, in active charge of all financial matters of the company.

L. K. Sherman, chief engineer of the Housing Corporation, has been appointed director of the Bureau of Industrial Housing and Transportation, United States Department of Labor, to succeed Otto M. Eidlitz, whose resignation is referred to elsewhere. Mr. Sherman is forty-nine years old, a native of Massachusetts, and was graduated from the Massachusetts Institute of Technology as a civil engineer in 1892. His experience for the last twenty-seven years has been as an engineer or executive on construction. His offices are in Chicago.

Otto M. Eidlitz has resigned as director of the housing bureau of the Department of Labor, L. K. Sherman, Eastham, Mass., who has been chief engineer of the bureau for some time, will succeed Mr. Eidlitz as director. Mr. Eidlitz is resigning to return to his building interests in Brooklyn, N. Y., which he laid aside at the outbreak of the war to manage the government's housing program. The housing bureau is one of the agencies which came into existence at the beginning of the war. How long it will remain in operation is uncertain.

George B. Dobbin has resigned as secretary of the Michigan Railway, Jackson, Mich., to become comptroller and chief accountant of the Northern Ohio Traction & Light Company at Akron, Ohio. He has been connected with the company at Jackson since 1912. As a mark of the existing friendship and in recognition of Mr. Dobbin's favorite pastime, he was presented a handsome fisherman's outfit. A. J. Bray, now treasurer of the Michigan Railway, made the presentation speech. In addition Mr. Dobbin was given a testimonial, signed by his associates, attesting further the esteem in which he is held.

Harley L. Swift, formerly assistant superintendent of way and structures of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been promoted from first lieutenant to captain and placed in command of Company C, Sixteenth Engineers (Railway). He has served continuously with this regiment since its arrival in France in August, 1917. During this period the company has constructed a large advance depot and yards; built standard and narrow-gage railway behind the British lines during March and April; constructed the Nevers cut-off and reclaimed Boche narrow and standard-gage railway during the Argonne and Meuse push, just previous to the end of the war.

A. J. Bray, at present auditor for the Michigan Railway, Jackson, Mich., has been appointed treasurer of the company to succeed J. W. Glendening, who has been made secretary. Mr. Bray entered business as a clerk in a bank at Elkhorn, Wis. After holding this position two years, he became chief clerk of construction work for the Bell Telephone Company in Wisconsin, acting as auditor of the estimates of that company. He was connected with the telephone concern for one and one-half years. In 1906 he became connected with the Michigan Railway. In January, 1911, he was made chief clerk and in August, 1912, he was promoted to auditor, which position he has filled until the present time.

Edward F. Seixas has been appointed general manager and official representative at Monterey, Neuvo Leon, Mexico, for the Monterey Railway, Light & Power Company, succeeding Lewis Lukes, heretofore vice-president and general manager, with offices at Toronto. Mr. Seixas has been general manager of the Niagara, St. Catharines & Toronto Railway since 1911. He was born in New York City in 1870. He entered business as a student with the General Electric Company, Schenectady, N. Y., and was connected successively with the World's Fair at Chicago, with the Amsterdam Railway, Light, Heat & Power Company, Amsterdam, N. Y., and then with the Niagara, St. Catharines & Toronto Railway.

Guy E. Tripp, assistant chief of ordnance, who resigned recently from the service to return to his duties as chairman of the board of the Westinghouse Electric & Manufacturing Company, on Feb. 13 was presented with a distinguished service medal by Secretary of War Baker. The presentation took place in the Secretary's office in the War Department. The citation as published in the army order follows: "Guy E. Tripp—As chief of the production division of the Ordnance Department, and later as assistant chief of ordnance, he displayed fine technical ability and broad judgment in systematizing methods and practices, resulting in the efficient co-operation of industries producing articles of ordnance for the army."

William A. Mellen, formerly assistant manager of the transportation division of the United States Housing Corporation, has been appointed manager of the transportation division to succeed Major G. F. Wells, who recently resigned. Mr. Mellen was born at Fall River, Mass., on Jan. 14, 1880. He received his education there and was connected with the street railways of Fall River, where he worked under the direction of George W. Palmer. At the outbreak of the war Mr. Mellen was appointed supervising engineer in the United States Navy in charge of passenger transportation for the navy. He later resigned to accept the position as assistant manager of transportation of the United States Housing Corporation.

J. W. Glendening, who has been connected with the Michigan Railway, Jackson, Mich., since 1912, acting in the capacity of treasurer and assistant to John F. Collins, the general manager, will succeed G. B. Dobbin as secretary of the company and will also become secretary of the Saginaw & Bay City Railway. He is at present treasurer of this organization. Mr. Glendening came to Jackson in 1912 from Saginaw where he had been treasurer for four years, of the Saginaw & Bay City Railway and also treasurer of the gas and electric companies operating in Saginaw and Bay City. Previous to coming to Saginaw he was in the railway accounting department of the Public Service Corporation at Camden, N. J.

Peter J. Abt, special agent of the Detroit (Mich.) United Railway, has with four of his men been awarded the French "Croix de Guerre" for extraordinary services in capturing a nest of Germans, garbed as French soldiers, in the act of destroying a train of sustenance stores. Later he was given the "Distinguished Service Cross" by the American forces for the same act. Since President Wilson has been in France Captain Abt and the same four men have been on secret service guard attached to the President. On leaving for France Captain Abt was sent as a casual officer unassigned. Arriving "over there" Captain Abt was immediately placed in charge of a secret service detachment consisting of enlisted policemen and detectives from all parts of the United States.

William L. Sause, recently promoted by Mayor Craver of Youngstown, Ohio, from service director to be the city's first street railroad commissioner under the new service-at-cost plan of operation for the Mahoning & Shenango Railway & Light Company, was born in Youngstown thirty-six years ago. His first business connection was with the American Bridge Company. After spending five years with this company in Youngstown Mr. Sause was sent to Toronto by the company. He remained there three years. Following this came four years with the General Electric Company when Mr. Sause had charge of part of the drafting and engineering department. While with this company he prepared for a wider future by taking a course in structural and bridge designing. Next came a position in the engineering department of the Brown Hoist Machinery Company. Three years after joining the Brown company, Mr. Sause returned to Youngstown on a visit to develop some property he owned in the East End of the city. A little more than a year ago the newly-elected Mayor made him service director.

A. W. McLimont, who in September, 1917, was appointed to succeed Wilford Phillips in charge of the active management of the Winnipeg (Man.) Electric Railway, has been elected vice-president of the company. He has also been made a director. Mr. McLimont is a Canadian by birth. He is very well known in electric railway and engineering circles in the United States. He has been connected at various times with the Michigan United Railways as vice-president and general manager, the San Francisco-Oakland Terminal Railways as vice-president and general manager, the Chicago & Milwaukee Electric Railroad as general manager. He entered public utility work in 1885 with the New England Telephone & Telegraph Company. Later he became connected with the Thomson-Houston Company, Boston, with which he served until 1903. After much work in organizing, installing and operating electric railway and electric light properties in the United States, Mr. McLimont entered the foreign department of the General Electric Company. His work abroad included service in Central America, Argentina, Mexico and at Lima, Peru. After his return to the United States from his work in foreign fields, Mr. McLimont became electrical and operating engineer of the Public Service Commission for the First District of New York.

A. W. McLIMONT

Obituary

Minor Q. Woodward, treasurer-manager of the Pine Bluff (Ark.) Company, is dead.

Horace G. Allen, for many years a member of the Boston (Mass.) Transit Commission, died at Boston on Feb. 12. He was sixty-three years of age. Mr. Allen was prominent in legal circles.

Robert K. Black, who assisted in the building of the first section of elevated railroad in New York City and who was for many years roadmaster of the Manhattan Elevated Railway, now included in the system of the Interborough Rapid Transit Company, New York, N. Y., died on Feb. 22 at his home in Scarsdale at the age of eighty-two years.

Bruce W. Duer, traffic expert for the Public Service Commission of Maryland, died on Feb. 15 of pneumonia. Mr. Duer was born at Princess Anne, Md., fifty-one years ago, and was educated at the Princess Anne Academy, entering railway service in 1884 with the New York, Philadelphia & Norfolk Railroad, serving consecutively as agent, operator, and dispatcher for several years, then going with the Baltimore & Ohio, working up to the position of superintendent of the Pittsburgh Division. He was vice-president of the Georgia & Florida Railway, with office in Augusta, Ga., for some time, before settling in Baltimore.

Edie B. Wade, captain of engineers, finance, accounts and contracts section of the American Expeditionary Forces, died of pneumonia at Coblenz, Germany, on Feb. 5. Captain Wade had been on the staff of Ford, Bacon & Davis, engineers, for a number of years. From September, 1914, to August, 1916, he was in their New Orleans office as engineering accountant on the construction of the cotton warehouses and terminal and grain elevator and also in the preparation of a report on the operation of the port, for the Board of Commissioners of the Port of New Orleans, and reports for various other clients including a report on the harbor of Mobile. In December, 1916, Captain Wade became attached to the New York office of Ford, Bacon & Davis and from there was sent to their San Francisco office, where he specialized on valuation work as engineering accountant. In May, 1918, he enlisted in the engineering corps at San Francisco, receiving a commission of captain. He was immediately sent to France with the American Expeditionary Forces, and has been doing important work at various points in France and England. At the time of his death he had just been sent to Germany. Captain Wade was well known in electric railway and professional engineering circles. He is survived by his widow and two children.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Railway Export Field Is Gradually Opening Up

Inquiries from Every Section of the Globe Show Increasing Attention Paid to System Maintenance

Although the export field for electric railway material is not normally active at the present time so far as actual orders reported for maintenance and new line material are concerned, according to the numerous inquiries which manufacturers and agents have received the outlook is very promising. Throughout the past few years the foreign field, the same as the domestic field, has shown great hesitancy in purchasing electric railway supplies, and many railway electrifications already planned have been held up pending a cessation of hostilities and a more favorable price market. Nevertheless, some small amounts of necessary maintenance material have already been shipped.

EUROPEAN EQUIPMENT A FACTOR

A large field for railway equipment is open in South America. Some of the countries of that continent have much British and German stock invested in railways, and these two countries naturally have found an outlet for their own material which the United States may be able successfully to combat at the present time while Britain and Germany are returning to peace pursuits. This is true especially of railway motors which, it is reported, England is not now prepared to manufacture in large quantities; the necessary control for these motors however they are able to turn out.

The South American market is rather more active now than any of the others. To these southern republics there have been recent shipments of orders for rail welding and bonding equipment and pole line hardware and porcelain. Inquiries have been reported on many different materials, notably bare trolley wire, rail bonds and track specialties, such as switches, frogs, cross-overs, etc.

Canada also is rather active in the railway field. Negotiations are at present under way for a number of safety cars for Toronto, and practically all types of materials have found inquiries. Canada is the only country reported in the field for safety cars—South American countries have not yet come to the point where this class of service appears to be required. It is very noticeable that these southern countries demand little in the way of refinements in equipment, and the cheaper grades of materials consequently have found a better market than higher priced goods. This lower grade of material has been pushed very strongly by the British and German manufacturers.

Porto Rico is a buyer of wire fence for rights-of-way, and the Dutch East Indies is in the market for track equipment.

The European market is beginning to show signs of activity. One of the largest fields for American manufacturers is that of electric rail welding and bonding, for there is reported only one European manufacturer of metallic electrode rail welders and that is a British firm. Much interest has been manifested recently in this equipment by Norway. Switzerland is in the market for copper-clad wire for railway transmission, telegraph, telephone and signal purposes, and for wire for manufacturing into fences for rights-of-way.

The confidence in the immediate field for electric railway equipment is further shown in the number of individuals who have recently been reported as seeking agencies for various kinds of equipment for foreign fields. The diversity of countries from which orders and inquiries are coming gives further evidence that railway development is not localized in any one continent but is in general world-wide.

Increase in Maintenance Supplies Since 1914

Figures on One Road Show Virtually Same Volume of Goods Bought Per Car-Mile in 1918 as in 1914

A particularly interesting set of figures showing quantities and prices of typical maintenance material purchased in 1914 and 1918 by a road of 303 miles of track in 1918 and operating virtually the same car mileage in the two years, namely 8,836,333 car-miles in 1918 and 8,853,958 car-miles in 1914. The amount spent for this material in 1914 was $161,774.44 and in 1918 was $303,160.25. The increase in unit price in 1918 over 1914 was 105 per cent. This road, the Worcester (Mass.) Consolidated Street Railway, it will be seen from the figures, purchased in the two years about the same volume of material. With the car-miles virtually the same in each year it is interesting to note that in this case the volume of supplies purchased per car-mile was the same. The individual items, of course, showed different volumes of purchases but on the whole the quantity of goods was the same per car-mile in each of the years for which figures are shown.

TYPICAL MATERIAL QUANTITIES AND PRICES

Material	Per Cent Increased Price	1914		1918	
		Quantity	Unit Price	Quantity	Unit Price
Axles	135	36	$11.73	72	$27.58
Field coils	127	624	21.09	752	47.80
Armature coils	105	480 sets	33.36	1,200 sets	68.23
Steel wheels	111	132	18.25	252	38.50
Chilled wheels	108	1,248	7.48	1,155	15.53
Controller segments	138	4,457	.064	1,520	.152
Trolley wheels, 4¼ in	159	2,532	.58	5,040	1.50
Trolley wheels, 5½ in	108	996	.93	960	1.93
Shoe heads	144	1,140	2.25	795	5.50
Truck castings	94	113	3.09	250	6.00
Steel castings	119	67 lbs.	.09	395 lb.	.197
Malleable iron castings	74	1,904 lbs.	.0575	3,025 lbs.	.10
Commutator segments	117	36 sets	21.56	96 sets	46.85
Malleable-iron armature bearings	87	312	.70	296	1.31
Malleable-iron axle bearings	46	264	1.07	769	1.56
Trolley wire No. 00	92	253,667 lbs.	0.1495	16,658 lbs.	.2868
Copper bonds	82	1,632	.82	1,036	1.49
Steel pinions	132	636	3.52	900	8.15
Steel gears	113	192	10.45	348	22.30
Trolley wire No. 0000	96	69,690 lbs.	.1701	13,872 lbs.	.3335
Canvas	158	1,944 yds.	.71	1,367 yds.	1.83
Babbitt metal	236	15,672 lbs.	.33	8,650 lbs.	1.11
Brakeshoes	24	15,852	.54	19,525	.67
Cold-rolled steel	100	4,917 lbs.	.05	4,100 lbs.	.10
Norway iron	181	17,939	.0267	5,900 lbs.	.075
Glass	103	2,168 lts.	.335	2,200 lts.	681
Trolley bases	90	20	12.60	58	24.00
Signal switches	30	20	20.00	30	26.00
Mechanical ears 4/0	161	1,914	.115	420	.30
Plain ears 4/0	100	1,104	.31	2,460	.62
Plain ears 2/0	146	3,588	.2156	4,320	.53
Trolley harps	67	444	.60	640	1.00
Friction tape	89	5,028 lbs.	.19	5,535 lbs.	.36
Trolley rope	134	1,956 lbs.	.32	2,853 lbs.	.75
Ties	30	64,614	.46	50,441	.60
Brake cable	249	3,896 ft.	.0459	7,024 ft.	.16
Overhead frogs	263	120	1.15	121	4.18
Journal bearings	81	768	1.36	1,380	2.46
Tie rods	179	1,419	.164	1,260	.457
Controller fingers	33	3,224	.30	3,520	.40
Axle collars	93	73	2.59	164	5.00
Brush holders	38	267	2.55	344	3.53
Gear cases (malleable)	139	84	15.92	372	38.00
Car paint	18	324 lbs.	.22	1,475 lbs.	.26
Rubber-covered wire	105	49,045 ft.	.0402	110,500 ft.	.0826
Trolley poles	116	228	1.25	385	2.70
Brass axle bearings	74	120	7.25	417	12.65

Rolling Stock

Rutland Railway Light & Power Company, Rutland, Vt., will during the year equip two one-man cars.

Goldsboro (N. C.) Electric Railway expects to purchase this year two single-truck closed cars.

Tidewater Power Company, Wilmington, N. C., expects to purchase this year equipments for two suburban cars.

Savannah (Ga.) Electric Company reports that it expects during the current year to purchase twenty one-man cars.

Kensington (Md.) Railway reports that it will purchase this year one double-truck passenger car if costs drop to the old base.

Kansas City, Lawrence & Topeka Railroad, Kansas City, Kan., during this spring will change one single truck car to one-man pay-as-you-enter type.

Winona Interurban Railway, Warsaw, Ind., will purchase this year ten 40-ft. freight trail cars. All city car equipment is to be changed over for one-man operation.

Capital Traction Company, Washington, D. C., has received and is now operating the twenty new cars ordered last summer, specifications of which appeared in these columns on April 20, 1918.

Southwestern Gas & Electric Company, Texarkana, Ark., has received ten new cars of the latest improved pattern, to replace those destroyed in the fire that recently burned the company's carhouse, as noted in these columns on Feb. 1.

Washington Railway & Electric Company, Washington, D. C., lost part of its Eckington carhouse and twelve cars in a recent fire. Most of the burned cars were of the old hand-brake type, but several were of the large type operating the Maryland and Rockville lines. The trucks of the latter, however, were saved. The company has put in operation twenty-one of the fifty new cars ordered last summer, specifications of which were given in the issue of this paper for May 4, 1918. Several more car bodies and trucks have been received and are in storage awaiting delivery of motors, some of which have now been shipped.

Trade Notes

Chicago (Ill.) Pneumatic Tool Company has moved its Cleveland district office from Room 813 to Rooms 406-408 Engineers Building. Ross Watson is district manager.

Independent Pneumatic Tool Company announces that after March 1, the Eastern branch of the company will be located at 1463 Broadway, at Forty-second Street, New York City. This change, the company states, has become necessary owing to its increased business in the East.

American Car & Foundry Company, St. Charles, Mo., has moved into its new machine and pattern shop, recently completed by the Dickie Construction Company of St. Louis. The building is a fireproof structure, costing approximately $150,000, and covers 240 ft. x 95 ft. of floor space.

James N. Hatch, consulting engineer, Chicago, has formed an association with Henry C. Eckland, to act as architects and engineers under the firm name of Henry C. Eckland & Company. Mr. Hatch will also continue his consulting practice of public utility and industrial engineering as heretofore.

Carl P. Dennett, Major, U. S. A., treasurer of the Griffin Wheel Company at Boston, has returned to this country and is resting up in the South. He was chosen by Henry P. Davison of the American Red Cross as its representative in complete charge of the welfare of American prisoners in Germany.

The Wagner Electric Manufacturing Company, St. Louis, Mo., has made arrangements to distribute 3000 shares of stock to officers, department executives, and their immediate principal assistants, at par, according to an announcement by President W. A. Layman. The stock is now quoted in the market at $125 a share.

Major Ainslie A. Gray has retired from the Ordnance Department and under the firm name of A. A. Gray & Company has opened offices at 1547 Marquette Building, Chicago, Ill., where he will assist manufacturers in solving their problems of production, advertising and selling and distribution. Before the war Major Gray was a member of the firm of Gray & Benjamin of Chicago, and prior to the establishment of that firm was editor of the *Electrical Review.*

NEW YORK METAL MARKET PRICES

	Feb. 13	Feb. 27
Copper, ingots, cents per lb	17.50	15.25
Copper wire base, cents per lb	20.75	18.75to19.00
Lead, cents per lb	5.00	5.25
Nickel, cents per lb	40	40.00
Spelter, cents per lb	6.80	6.65
Tin, cents per lb	†72.50	†72.50
Aluminum, 98 to 99 per cent., cents per lb	31.50	31.50

† Government price in 25-ton lots or more' f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Feb. 13	Feb. 27
Heavy copper, cents per lb	14.50 to 15.00	13.00 to 13.50
Light copper, cents per lb	11.50 to 12.00	11.00 to 11.25
Heavy brass, cents per lb	8.00 to 8.25	7.50 to 7.75
Zinc, cents per lb	5.25 to 5.50	5.25 to 5.50
Yellow brass, cents per lb	6.50 to 6.75	6.00 to 6.50
Lead, heavy, cents per lb	4.75 to 4.25	4.75 to 4.87
Steel car axles, Chicago, per net ton	$28.00 to $30.00	$28.00 to $30.00
Old carwheels, Chicago, per gross ton	$22.00 to $23.00	$22.00 to $23.00
Steel rails (scrap), Chicago, per gross ton	$16.50 to $17.50	$15.50 to $16.50
Steel rails (relaying), Chicago, gross ton.	$50.00 to $55.00	$15.50 to $16.50
Machine shop turnings, Chicago, net ton	$6.00 to $6.50	$5.50 to $6.00

ELECTRIC RAILWAY MATERIAL PRICES

	Feb. 13	Feb. 27
Rubber-covered wire base, New York, cents per lb	25	23
Weatherproof wire (100 lb. lots), cents per lb., New York	31.25 to 33.75	28.75 to 33.75
Weatherproof wire (100 lb. lots), cents per lb., Chicago	30.75 to 35.75	30.75 to 37.35
T rails (A. S. C. E. standard), per gross ton	$60.00 to $65.00	$60.00 to $65.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton	$57.00 to $60.00	$57.00 to $60.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$55.00 to $60.00	$55.00 to $60.00
T rail, high (Shanghai), cents per lb	3[illegible]	3[illegible]
Rails, girder (grooved), cents per lb	4[illegible]	4[illegible]
Wire nails, Pittsburgh, cents per lb	3[illegible]	3[illegible]
Railroad spikes, drive, Pittsburgh base, cents per lb	3.90	3.90
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	3	3
Tie plates (brace type), cents per lb	3	3
Tie rods, Pittsburgh base, cents per lb	7	7
Fish plates, cents per lb	3	3
Angle plates, cents per lb	3	3
Angle bars, cents per lb	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb	4.90	4.90
Steel bars, Pittsburgh, cents per lb	2.70	2.70
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.55	4.55
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.60	5.60
Galvanized barbed wire, Pittsburgh, cents per lb	4.35	4.35

	Feb. 13	Feb. 27
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	77%
Car window glass (single strength, first three brackets, B quality), New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York discount.	79%	79%
Waste, wool (according to grade), cents per lb	13 to 20	13 to 20
Waste cotton (100 lb. bale) cents per lb	11 to 13	11 to 13
Asphalt, hot (150 tons minimum) per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	$43.00	
Asphalt filler, per ton	$45.00	$30.00
Cement (carload lots), New York, per bbl	$3.20	$3.20
Cement (carload lots), Chicago, per bbl.	$3.34	$3.34
Cement (carload lots), Seattle, per bbl	$3.68	$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.48	$1.48
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.55	$1.55
White lead (100 lb. keg), New York, cents per lb	13	13
Turpentine (bbl. lots), New York, cents per gal	71½ to 72	70 to 71

† These prices are f. o. b. works, with boxing charges extra.

Franchises

Buffalo, N. Y.—The Frontier Electric Railway Company, owned by the International Railway, is seeking by the provisions of a bill introduced in the State Legislature at Albany, an extension of two years within which to begin construction of its proposed line between Buffalo and Niagara Falls. The company also seeks a two years' extension of life of its franchise.

Track and Roadway

Oakland, Antioch & Eastern Railway, Oakland, Cal.—As a result of the negotiations for the reorganization of the Oakland, Antioch & Eastern Railway, the Oakland & Antioch Railway and the San Ramon Valley Railway, which have extended over a number of years, a new corporation to be known as the San Francisco, Oakland & Sacramento Railway is to be formed to take over the properties of the reorganized companies, announcement to this effect having been made. The reorganization plan presented to holders of the securities of the three companies for their approval a year ago was declared to be fully operative, 85 per cent of the holders of the various classes of securities issued by the companies having given their assent to the plan.

Waterbury & Milldale Tramway, Waterbury, Conn.—The Waterbury & Milldale Tramway plans to extend its line to connect with the line of the Connecticut Company at Dickerman Corners, Milldale Township.

East St. Louis Suburban Railway, East St. Louis, Ill.—The East St. Louis & Suburban Railway Company will install about 7 miles of new double track due to city street improvement plans. The rail will be a 7-in. 91-lb. T-rail laid on both concrete and ballast foundation. It is expected that the work will commence about May 1.

Charleston, Mo.—It is reported that the construction of a line from Charleston to the Mississippi River opposite Hickman, Ky., is under consideration by local capitalists. The Charleston Commercial Club may be able to give information.

New York Municipal Railway, Brooklyn, N. Y.—The Committee on Transit of the Board of Estimate recently approved the Ashland place connection between the Fulton Street elevated line and the Fourth Avenue subway in Brooklyn. The connection calls for the construction of an incline from the Fulton Street line under Fulton Street from Cumberland Street to Ashland Place.

Buffalo & Depew Railway, Buffalo, N. Y.—The Public Service Commission for the Second District of New York recently passed an order approving the construction by the Buffalo & Depew Railway of a single track extension, sidings, etc., of the company's line from Burlington Avenue and Ellicott Road in the town and village of Lancaster, easterly in Ellicott Road to Central Avenue and along Central Avenue in Lancaster Village to 50 ft. north of the New York Central Railroad.

Niagara Junction Railway, Niagara Falls, N. Y.—Plans are being made by the Chamber of Commerce of Niagara Falls to have the Niagara Junction Railway extend its electric line so as to skirt the city and make a belt line loop of the city's industrial section. The Niagara Junction Railway operates considerable trackage for its electric locomotives along Buffalo Avenue and it is planned to extend the line so as to tap the lower milling district. The city would be asked to allow the company to operate its locomotives over certain tracks of the International Railway so as to connect with certain proposed tracks. The road is electrified and the Chamber of Commerce believes the proposed extension would meet with practically no opposition.

London (Ont.) Street Railway.—The London Street Railway is contemplating the reconstruction of some of its lines in London.

Morristown, Tenn.—Plans have been prepared for the construction of an electric railway from Morristown to Pressmen's Home, about 30 miles, and an extension to Kyle Ford, making a total length of about 50 miles. John N. Adams, Nashville, chief engineer.

Dallas, Tex.—The organization of an electric railway company for the purpose of building a line through the Mount Auburn and Park View additions to the city of Dallas has been undertaken. This action was decided on when the Dallas Railway Company declined to grant the petition of property owners of these additions for a street car line. The proposed company will be capitalized at $150,000 and will build and operate a line about 1½ miles long to connect with the Dallas Railway Company's line near Fair Park. The proposition is being promoted by Henry G. Wills, and one-half the capital stock has been subscribed. Application will be made at once to the Secretary of State for a charter, after which the line will be built.

Northern Texas Traction Company, Fort Worth, Tex.—It is reported that the Northern Texas Traction Company plans to construct an extension to the Santa Fe station.

Waco, Tex.—D. T. Shaw of Hillsboro, is taking steps to promote a company for the purpose of building an electric interurban line from Waco through Hillsboro and Cleburne to Fort Worth. The Tarrant County Traction Company operates a line from Fort Worth to Cleburne. Mr. Shaw plans to purchase this line and extend it to Waco.

Monongahela Valley Traction Company, Clarksburg, W. Va.—The Monongahela Valley Traction Company contemplates the extension of its line from Wolf Summit to West Union or Shirley.

Power Houses, Shops and Buildings

Shore Line Electric Railway, Norwich, Conn.—Work is under way by the Shore Line Electric Railway on the construction of a substation at West View. The power house at Mystic will be discontinued, the new building obtaining power from Greenville.

Potomac Electric Power Company, Washington, D. C.—Plans have been completed and contracts are now being awarded by the Potomac Electric Power Company, controlled by the Washington Railway & Electric Company, for a second extension of the turbine room at its Bennings plant, consisting of the installation of one 20,000-kw. G.E. turbo-generator and Worthington surface condenser. The company recently completed an extension of its turbine and boiler rooms, the work consisting of the installation of one 15,000-kw. Westinghouse turbo-generator, Worthington surface condenser and six 1000-hp. Babcock & Wilcox boilers with Taylor stokers, together with coal and ash handling equipment, boiler feed pumps, heaters, etc.

Hamilton Utilities Company, Benton, Ill.—A new substation, outdoor type, equipped with three 100-kva. transformers, is being erected by the Hamilton Utilities Company, operated by the Central Illinois Public Service Company of Mattoon.

Illinois Central Electric Railway, Canton, Ill.—Plans have been made by the Illinois Central Electric Railway for the construction of an office building, including freight house and waiting room, at Canton.

Water, Light & Transit Company, Carrollton, Mo.—The installation of a water filtering system and other improvements to its properties is contemplated by the Water, Light & Transit Company.

Kansas City, Mo.—The firm of Wight & Wight, architects, Kansas City, has been employed by the Interurban Central Station Company to design the proposed interurban passenger terminal at Tenth and McGee Streets. Contracts for the project will probably be let in the early summer.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—This company has installed an additional feed pump and coal crusher at its power house. A new boiler will also be installed.

New York Municipal Railway Corporation, Brooklyn, N. Y.—Bids will be received by Lindley M. Garrison, receiver of the New York Municipal Railway Corporation, until March 4 for the installation of electrically driven, automatically controlled seepage and emergency pumps, etc., in the pump rooms of the Sixtieth Street and Montague Street tunnels. Plans and further information may be obtained at the Municipal Railway's offices at Room 412, 85 Clinton Street, Brooklyn.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, March 8, 1919 *Number* 10

Will the Automobile Supplant the Electric Car?

RECENT figures of the registration of automobiles in the United States during 1918 discloses the notable fact that there were in that year 5,945,442 automobiles registered. This is an average of more than one automobile to every twenty inhabitants for the country as a whole. Even more noteworthy than these aggregate figures is the increase during the last few years, since the number of registrations in 1915 was only 2,423,788 or only about 40 per cent of those in 1918. This means that the annual increase of cars in active service during the past three years have been at the rate of more than 1,000,000 cars, and this in spite of the fact that for two years of that time this country was engaged in war. It is in this increase in independently driven vehicles that one reason for the falling off in traffic on the electric lines of this country must undoubtedly be found.

What significance do these figures carry to the electric railway companies? Do they mean that the electric car is becoming obsolete for city or interurban service and will soon be superseded in large part by the private or public automobile? We think not, for reasons which have already been given at length in these columns. Nevertheless, everyone should realize that people purchase automobiles to use them and that superior attractions must be offered by the electric railways to make the automobile rider patronize the electric car. In our opinion, this situation is a strong argument for frequent electric railway service with light high-speed cars.

There are several optimistic conclusions to be drawn from the large number of automobiles in this country. One is that their very number, which is constantly increasing, must hasten the adoption of regulations controlling their use, particularly in city streets. Many of the larger cities in this country now have stringent rules regarding the use of certain busy streets in the downtown districts by automobiles, forbidding the parking of automobiles in certain sections except for limited periods, etc. These rules will have to become stricter and more widespread with the increase in the number of cars, or all street traffic will be blocked. But it is fair to conclude that the right-of-way will always have to be given to the electric car, partly because of its common carrier character and partly because it is the most economical in space per passenger carried of all the users of the streets. Hence, it may soon develop that the electric car will be a more speedy as well as a more convenient carrier in city transportation for the average length of ride than even the private high-powered limousine or sedan, and it will always be cheaper to operate per passenger than any automobile.

We are glad, in this connection, that the Transportation & Traffic Association is planning at its October convention to give special attention to two problems which are especially involved in automobile competition, namely, the use of safety cars considered from the transportation standpoint and traffic regulations designed to promote greater reliability of electric railway schedules.

Testing Unskilled Workmen as a Means for Combating Lack of Efficiency

IN A RECENT editorial we called attention to the decrease in productive ability of unskilled workmen despite increases in wages. It was stated incidentally that many wage earners seem not to think it necessary to earn more when paid more. Now there certainly must be some point beyond which no employer can afford to go in making wage increases if production is either to stand still or, as often seems to be the case, to decrease somewhat according to an inverse ratio. Production cannot be allowed to decrease, hence employers must do something to counteract the tendency referred to. One way of doing this is to exercise more care in the selection of men, particularly for work which does not require great skill. This is a part of human engineering which in the past has not had the attention which it deserves.

The situation was clearly presented in a letter from A. G. Drury of Cincinnati, Ohio, printed in the July 13, 1918, issue of this paper. Mr. Drury carefully rated the production of laborers digging a standard-size gas trench under similar soil conditions and over a period of four years, or from 1914 to 1917 inclusive. He found that the effectiveness of the men decreased 23 per cent during that period, with a sharp decrease of 11 per cent between 1916 and 1917. Wages were increased 20 per cent during that period, the last year of which was, of course, our first year of war. The important point to be noted here is that the men were probably not so strong or able bodied in 1917 as in 1914, due, of course, to the fact that the more able-bodied and younger men were going to the front or were seeking jobs in munitions and other war work. The men secured in their places simply could not keep up the pace required to maintain satisfactory production.

The above facts should lead to the study of the economy which would result if some physical tests were required of laborers, say to cover stature, alertness and other desirable characteristics. Perhaps the railways may yet find that they should test laborers just as they now test trainmen, motormen and employees of other classes. In other words, the laborer should be selected for his capacity to do work intelligently rather than just because seemingly he can wield a pick and shovel. The joke about the wheelbarrow being a piece of machinery always provokes a laugh, but it requires a sturdy man to handle a loaded wheelbarrow all day long, and it is far from economical to expect undersized old men and mere boys to do men's work of this kind. Such false economy should be abandoned, and the needed steps should be taken to secure able-bodied efficiency in doing ordinary work about the electric railway.

Skilled Labor Must Be Selected Carefully Also

WHAT is true in the case of the unskilled laborer applies to the mechanic or other skilled workman whose productive ability has fallen off also in spite of large wage increases. Electric railways of fair size require skilled employees in many lines of work, and under prevailing conditions it has been difficult to secure them. The railways have not been able to offer the highest wages for skilled employment although this handicap is partly offset by the steady character of the work.

In order to get good work done, some tests should be applied to men who claim to possess skill to determine their fitness for the specific lines which they desire to enter. This accomplished, the next step is to make it apparent that lack of training for their work will not only prevent employment at first-rate wages but will hinder advancement. Men who are taken on as helpers or in other grades of work lower than that of first-class workmen must understand that to receive good wages they must develop their ability to advance to higher grades. To some degree the training needed for advancement must be provided by the employer and this to an extent much larger than has been the rule. It will probably even be necessary to pay the men while training, just as motormen and conductors are now paid as "students."

P. T. Clayton, clerk of the House committee on labor of the Sixty-fourth Congress, states that six reasons for inefficiency in production are these: Power failures, equipment and repair failures and limitations, lack of instructions, lack of training, failure to supply materials and lack of an effective personnel. Of these the employer can or should control the first, second, third and fifth. He must begin to supply the fourth. The sixth element has been found to be negligible as compared with the others in an examination of a plant which has a very high reputation for efficiency. Here it was found that the men produced but 35 per cent of what they could readily have produced but for the impedance caused by the factors mentioned. The output usually consisted of three hours' value for nine hours' work.

If the foregoing case is typical, it shows that there is a great opportunity for bringing up production. Aside from the investigation of the needs for improvement in plant, power and material supply, the employer must take steps to see that proper superintendence and instructions are provided. Above all the selection and training of employees must be made the subject of special study.

There's a Fine Chance Now for Good Engineering

ONE of the partial compensations for the destruction of property caused by the war has been the realization that preventable wastes which had been going on for years would have to be reduced. And they have been reduced, or it would not have been possible to do what has been done lately in the electric railway and other fields. Any person who has a practicable plan for accomplishing any saving now is sure of a hearing, as was illustrated by the way in which the Central Electric Railway Association listened to and discussed a paper by G. H. Kelsay on "Power House Economies," at the Cleveland meeting last week. The speaker cited so many instances in which savings, large and small, could be made that one member in discussing the paper said humorously that if they could all be put in force power could be obtained for almost nothing. Mr. Kelsay covered ground which has been familiar to engineers for a long time, but it has not always been possible heretofore for them to obtain the savings that their better judgment told them ought to be had. Furthermore, he showed clearly that a few simple instruments will furnish the equipment necessary for intelligent operation of a power plant, given which it is necessary only to apply sufficient brain power and a reasonable amount of money to insure good results.

It is very apparent, when one considers the ways in which power plant savings are to be made, that real engineers are needed in the power department. Such men are not found in large numbers on electric railway properties for several reasons. They and their work have been considered in many instances an unnecessary refinement as long as the "practical" men could keep the plants going. Hence the compensation offered, if offered at all, has not been attractive compared with the possible earnings in construction, engineering sales work, manufacturing and the like. In fact, the manufacturers have been far ahead of the operators in their appreciation of engineering talent and training. Another thing is that the engineer has often felt himself circumscribed as to opportunity for advancement to executive positions. Such opportunity, even if advantage is not taken of it, is one of the greatest possible incentives to initiative and enterprise. After all, an ambitious, rising man is the only kind that is worth while in any position of potential importance.

Now a man of the rising type is not expensive, at any reasonable salary, if he can bring about the savings which Mr. Kelsay has listed. After he secures these he will look around and find "more worlds to conquer." This is a fine time to give the engineer a chance to show what he can do. He ought to make an excellent showing, particularly in view of the facts that fuel is high in price and poor in quality and that it will probably never reach the price level which prevailed during the pre-war period.

Keep the Tracks Clear from Vehicles as Well as Snow

WE HAVE already referred to the intention of the Transportation & Traffic Association to appoint a committee to report at the October convention on the subject of a code of principles designed to promote reliability of railway schedules. No subject in the transportation field demands more prompt and thorough attention by a committee than this. While a code of principles in itself will not clear the tracks of obstructions, we have no doubt that discussion of this very important topic will lead to effective education of the public and the authorities who have to do with highway regulation.

Unusually favorable weather conditions in the past few months have been a Godsend to the suffering street railway companies and undoubtedly have been the means through which some companies have kept out of receivers' hands. In fact, it is only by contrast with the storm blockades of last winter that a proper realization can be had of the beneficial effects of a clear right-of-way. In a lesser degree the helpful results from efficient traffic regulation in all kinds of weather are shown in such cities as Cleveland, where the people have been so insistent on keeping down the cost of service that they have learned to appreciate the value of unimpeded movement of the street cars.

In a very elaborate report made a few years ago by the Chicago Traction & Subway Commission there was presented a classification for one year of reported delays of more than five minutes' duration on the surface lines of that city. This showed a total of 9104 delays, amounting to 126,143 minutes, which included only cases reported to the switchboard calling for wreck-wagon assistance or other company supervision, and not referring to the much larger number of minor delays which were cleared up without such help. Analysis of these reported delays showed that in more than 50 per cent of the cases the company was not responsible. The conclusion of the commission was that "this subject is a matter purely for police regulation, but it is pointed out as an important item in the securing of satisfactory service to the traveling public. Delays of ten or fifteen minutes, particularly on long routes, such as the through routes used in this city, necessarily break up the uniform interval that should obtain between cars of the same route."

Avoidable interruptions to service are common on all large city railway properties. Cars are sent out from the depots on time, and their operators earnestly endeavor to maintain a schedule laid out to cover each and every run. Every day they run into unforeseen delays such as blockades at railroad crossings, tie-ups due to wagons and other vehicles breaking down on the tracks, wires down, fire hose across the tracks, etc. The result to the company is more costly operation for nonproductive car-hours and the loss of traffic which could be retained if the cars moved on time. The effect on car patrons is irritability of temper and the loss of many valuable hours.

Delay-proof schedules are, of course, not to be expected, but proper co-operation on the part of the authorities and the general public is bound to minimize to a great extent interruptions to service. During the past year there has been much discussion of cost-of-service, and we believe the time is ripe when the car patrons should have brought home to them a full understanding of the items which make it necessary to request a higher transportation charge. We hope a workable code of principles may be developed speedily through the T. & T. Association and that its results will be beneficial.

Electric Railways Should Not Be Asked to Subsidize Their Competitors

"OF ALL THE CRIMES ever committed against the car rider, that is the crime of crimes, making him pay for another man's pavement. There is one thing the Legislature of this State should do this winter, it should repeal every act that commands a transportation company to put down one paving stone in any street or road in the State of Massachusetts." This is the forceful way in which Peter Witt stated the case of public burdens borne by railway companies, in a recent address before the New England Street Railway Club. In equally strong language Mr. Witt condemned the practice of requiring these companies to sprinkle their right-of-way.

The subject of making the car rider pay for non-transportation charges is one which will not down. For years the transportation companies—which in the final analysis means the passengers—carried such burdens without complaint. Originally, of course, there was justice in such requirements because in the horse-car days the companies were responsible for stirring up dust as well as for wearing out the pavement between the rails. With the advent of cable and electric cars, however, this was no longer the case, but the companies were making money and there was no special reason for seeking to lift unwarranted charges from the nickel fare. Then came the time for resorting to every possible economy, and public service commissions began to see the unfairness of this old practice. The necessity for a change was especially evident where service was being provided at cost.

There is more and more talk of laying general taxes to aid the car rider. This subject was emphasized in a recent recommendation of the Massachusetts commission to the State Legislature, wherein it was proposed that the deficit arising from operation with a not unduly high fare should be met by a tax levy. This is an indication of a growing understanding of the fact that adequate transportation facilities are a necessity not only to the regular passengers but to the community as a whole. This is a theory which we believe will find more supporters as time goes on. Likewise, we look for a more general adoption of the policy established by Mr. Witt in Cleveland of having adjacent property owners pay for street railway extensions until the new lines are on a self-supporting basis. There is surely more equity in such a practice than in the provisions of the Chicago ordinance which require the building of some 20 miles of new extensions each year regardless of traffic demands and with no direct financial assistance from the property owners who are benefited.

State commissions and municipalities should give careful consideration to these suggestions. No one will accuse the authorities of being over-zealous to grant higher rates to public utilities, and they will find less necessity for advancing rates if all unwarranted burdens are first removed from the cost of transportation.

The Zone Fare in Practice—Glasgow

BY WALTER JACKSON

This Section Describes the Layout of the Tramway System, the Service on Different Lines as Regards Speed and Headways and the Application of the Zone or Graded Fare—How the Combination of Service and Zone Fares Has Produced the Extraordinary Traffic of Nearly Twenty Passengers per Car-Mile Due to the Great Proportion of Short-Haul Riders

PART TWO

Extent of System; Character of Service and Riding; Fares

FEW electric railway systems, private or municipal, can show such an excellent financial and operating record as the Glasgow Corporation Tramways. Indeed, the Glasgow system was well known in the United States more than a decade ago when James Dalrymple, then and now its general manager, was invited to help solve the Chicago traction situation during the term of Mayor Dunne. Therefore, the operating standards of Glasgow have long been considered as embodying the best principles that British tramway practices have to offer. In some respects, especially car equipment, we may have little to learn; but in such basic matters as frequency of service and fares that almost eliminate walking, there may be much from which we can benefit.

HISTORY AND GROWTH OF THE TRAMWAYS

Glasgow's first tramway line was constructed by the municipality and opened for traffic on Aug. 19, 1872. In 1871 the city had leased the privilege of operating any tramways to be constructed to the Glasgow Tramway & Omnibus Company for a period of twenty-three years, or to 1894. Five years before the expiration of this lease negotiations were opened for its renewal. However, the elections of 1890 and 1891 showed so strong a sentiment for complete municipal control that the municipality resolved on Nov. 12, 1891, under the power conferred by the tramways act of 1870, to undertake the operation of the tramways itself. The municipality offered to take over, at a valuation, as a going concern, the whole of the company's heritable property, horses, plant and general equipment on the termination of the lease. This offer was not entertained, and the city had to build depots and obtain the necessary staff and equipment before July 1, 1894.

The first electrified line was opened on Oct. 13, 1898, and the last horse car had disappeared by the end of April, 1902. Aside from the expenditures directly due to electrification, such as power house and substations, distributing system and rolling stock, the municipality has continually been raising its track standards to keep pace with its heavy traffic. For this reason, the 79-lb. girder rail of the 1894 period has been succeeded by heavier rails until the attainment of the present standard—a 110-lb. rail laid in 60-ft. lengths, 4-ft. 7¾-in. gage, on a bed of Portland cement concrete 6 in. deep and extending 18 in. beyond the outer rails.

By the time the Glasgow Corporation Tramways had electrified its lines, it had written off the complete investment in horse traction, and the fiscal year ending May 31, 1917, saw the conclusion of payments to sinking fund and interest on capital for the electrical investment. For this reason, the report for the fiscal year ending May 31, 1918, shows only the following non-operating accounts: depreciation, permanent way renewals, parliamentary expenses, income tax and proportion of traffic receipts due the Paisley District Tramways Company, Ltd. It is largely because of this wonderful record that the Glasgow system has not found it necessary to raise the rates of fare during the war and reconstruction eras, and, in fact, even paid over to the general municipal fund termed the Common Good the sum of £177,552!

When the city took over the lease, Glasgow had only 60 miles of single track. Now it has 196 miles and as soon as materials are obtainable it is prepared to add 42½ miles, making 238 miles of single track in all. Of the total length of the tramways made and authorized, about 25 per cent is outside the present enlarged city limits, extending into the burghs of Clydebank, Renfrew, Paisley and Rutherglen, and into the counties of Lenark and Renfrew. The city forms practically one community with most of these places, and it has consequently been glad to accord them the same facilities as to the citizens of Glasgow. The layout of the existing electric railways is shown in an accompanying map. This map also shows the routing of the steam and cable belt lines described later.

THROUGH ROUTING AND TURNBACK PRACTICES

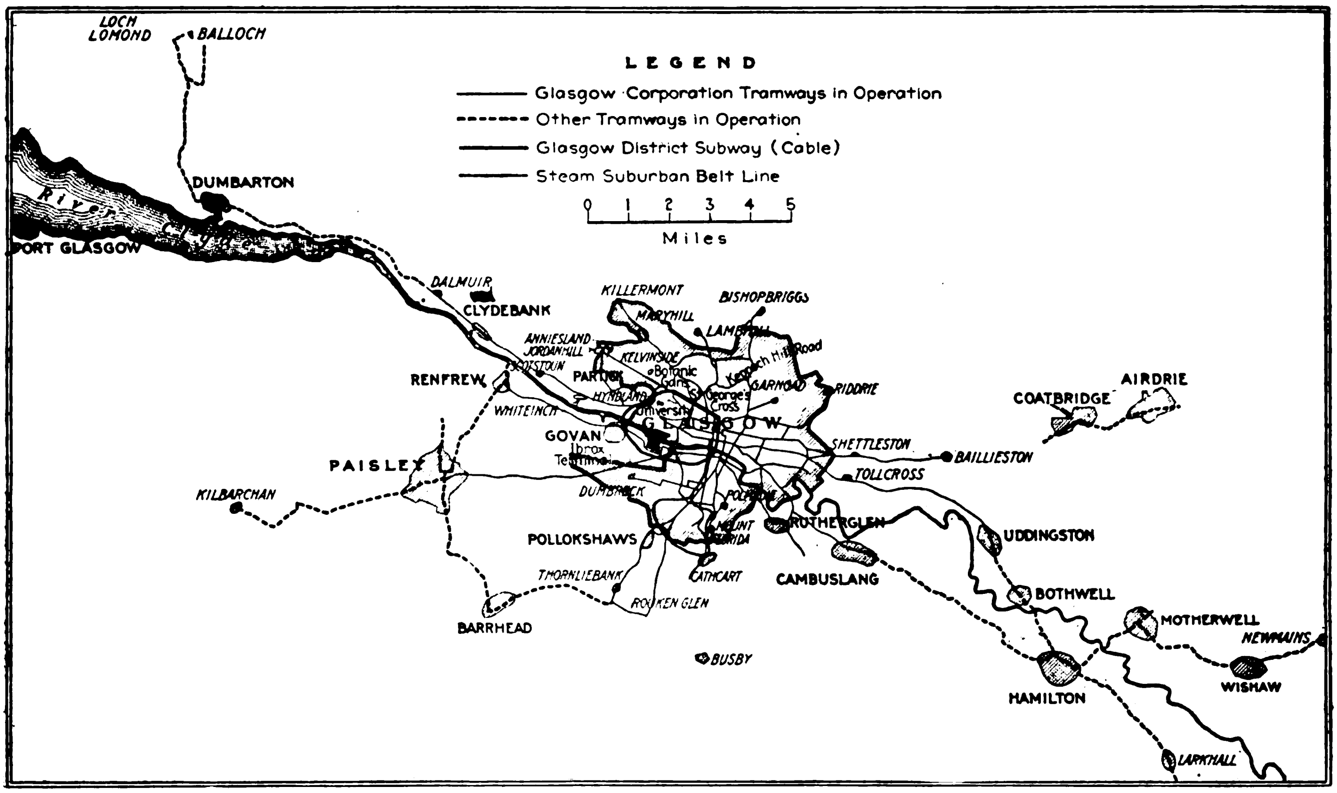
Practically all routes are double-track, run through from one end of the system to the other, and are amply provided with cross-overs, both at the terminals and along the routes, to insure the utmost flexibility of service. Because of the cultivation of the short rider, even in the outer districts, the turning back of non-tripper cars is not extensively employed except at or near the city limits where there may be a sharp falling-off in traffic. For example. the Paisley-Uddingston line, which is 14½ miles long, has a two-minute service on the 4½-mile section between Tollcross and Ibrox; a six-minute service between Ibrox and Paisley and an eight-minute service between Tollcross and Uddingston. In such instances the only complaint comes from terminus riders who find that they cannot board through cars sometimes because the latter may be crowded with short-haul riders. The through rider is less inclined than Americans to board a short-line car and then get on a following through car at the city line because this means a second fare transaction instead of the presentation of a transfer ticket.

To carry 430,946,566 passengers during the last fiscal year, the Tramways operated 26,261,231 car-miles with 861 cars, leading to the high average of 16.41 passengers per car-mile. This density, because of growth of traffic and war shortage of cars, reached the extraordinary figure of 20.33 passengers per car-mile for the week ended Dec. 14, 1918. Actually the number of cars in use is 750 on weekdays, 800 on Saturdays, 560 on summer Sundays and 500 on winter Sundays. As many as ninety-six cars were off the schedule at one time.

The present rates of fare, whereby the half-penny (1 cent) stage was lengthened from about ½ mile to an average of 1.16 miles, were instituted in December, 1911. This is also the minimum fare for children between the ages of five and fifteen years, although half-fare is permissible otherwise. Up to 1902, workmen got a three half-pence (3 cents) ride for 1 penny before 7 a.m. and between 5 and 6:30 p.m. With so low a base fare as a half-penny, the complexity of such discriminatory fares, of transfers and of overlaps is eliminated. With a distance charge in vogue, the transfer is unnecessary as it makes no difference whether the passenger is going to continue in the same general direction, to the right or to the left. He simply pays for what he gets. As for overlaps, there are only two in all Glasgow. These occur at a junction where the boundaries of several routes happen to come within a few hundred feet of each other. Every car carries on the inside bulkhead a schedule of the fares between all the stages on the route.

The spacing of the fare boundaries is not affected by the density of travel in given sections. Such variations as occur are due to the desire to place the fare boundary at the natural traffic-gathering points along each route. These boundaries are indicted by enameled signs carried on the trolley poles, if convenient, or on metal standards as illustrated on page 452.

The maximum fare to-day is 4 pence, as shown by the reproduction of the eight denominations of fare tickets used at Glasgow. The detail of the conductor's and auditor's duties in connection with the accounting of zone fares will be presented later. It will suffice to state here that the regular passenger simply calls for a fare of a given denomination while the stranger mentions his destination first. In each case, the passenger on paying fare receives a fare receipt for the same amount. This receipt is torn off of a nailed pad. The conductor then inserts the ticket in a bell punch and counter in order to perforate the section of the ticket which shows the limit to which the passenger is entitled to ride. Fares are collected only within the car. In fact, the conductors are instructed not to impede speed of entrance and exit by collecting fares on the platform.

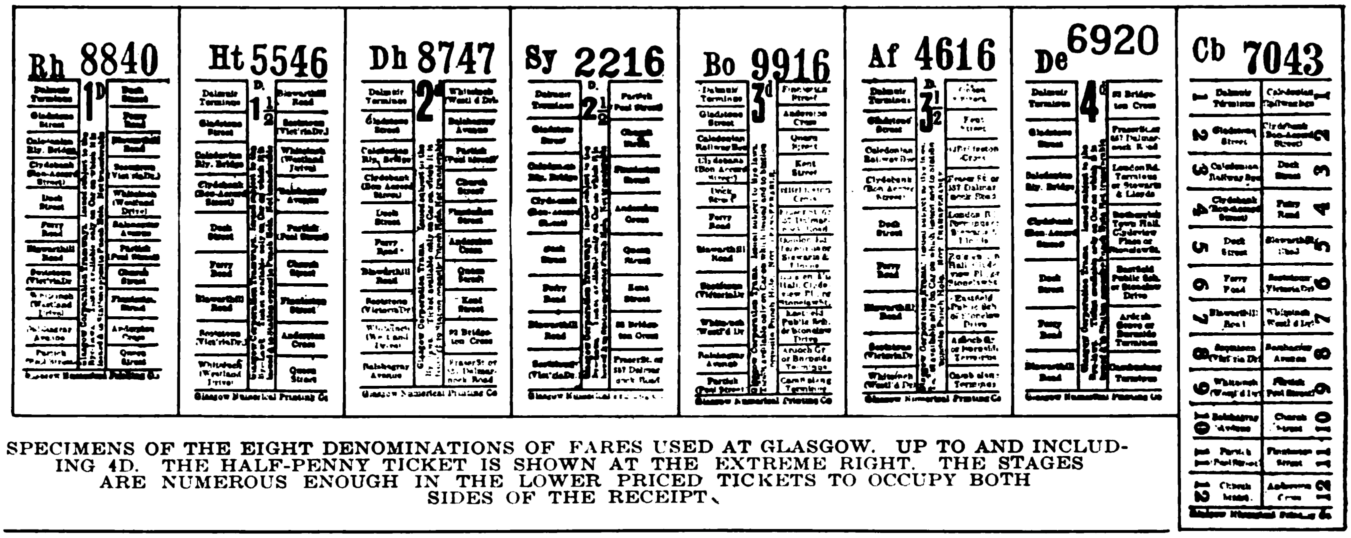

LOCH LOMOND
BALLOCH
LEGEND
Glasgow Corporation Tramways in Operation
Other Tramways in Operation
Glasgow District Subway (Cable)
Steam Suburban Belt Line
0 1 2 3 4 5
Miles
DUMBARTON
River Clyde
PORT GLASGOW
DALMUIR
CLYDEBANK
KILLERMONT
BISHOPBRIGGS
MARYHILL
LAMBHILL
ANNIESLAND
JORDANHILL
SCOTSTOUN
KELVINSIDE
Botanic Gdns.
Keppoch Hill Road
RENFREW
PARTICK
HYNDLAND
St. George's Cross
GARNGAD
RIDDRIE
AIRDRIE
COATBRIDGE
WHITEINCH
University
GLASGOW
GOVAN
Ibrox Terminal
SHETTLESTON
BAILLIESTON
PAISLEY
TOLLCROSS
KILBARCHAN
DUMBRECK
POLMADIE
MOUNT FLORIDA
RUTHERGLEN
UDDINGSTON
POLLOKSHAWS
THORNLIEBANK
CATHCART
CAMBUSLANG
BOTHWELL
ROUKEN GLEN
BARRHEAD
MOTHERWELL
NEWMAINS
BUSBY
WISHAW
HAMILTON
LARKHALL

LOCAL TRANSPORTATION LINES OF GLASGOW DISTRICT, SHOWING MUNICIPAL AND OTHER TRAMWAY LINES, STEAM SUBURBAN BELT LINE AND UNDERGROUND CABLE BELT LINE

While no figures on the rate of passenger interchange are available, it is obvious to the observer that it must be very quick as two persons can readily board or leave the car at the same time by way of the rear platform, which is the only one available for the passengers. As the average step height is about 12 in., it is not uncommon to see women with babes in arms jumping on and off moving cars. Needless to say, this practice is not encouraged as it is a prolific source of accidents. By far the greater number of passengers tender cash. However, fiber disks (celluloid before the war), blue for half-penny fares and white for penny fares, may be purchased at full price in quantities of 5 shillings ($1.25) or more. These tokens are bought chiefly by the post office, by warehousemen and other large employers who have employees doing considerable riding on business.

The construction of the cars prohibits front-end fare collection with the aid of a second conductor, nor have any prepayment areas at factories been considered necessary. Loading in queues is practiced only occasionally at summer resorts.

It might be supposed that fare collection and change-making would be a rather cumbersome process. As a matter of fact, it is not because copper coins appear to be so plentiful. From time to time, passengers have been urged through car posters or newspaper advertisements to present the exact fare—particularly when women conductors came in—and it is evident that a large proportion do so. One permanently effective incentive to have the exact fare lies in the weight and size of British copper coins, for a passenger does not relish getting change in copper for a coin no greater than 2 shillings.


Rh 8840
1D
Ht 5546
1½D
Dh 8747
2D
Sy 2216
2½D
Bo 9916
3D
Af 4616
3½D
De 6920
4D
Cb 7043

SPECIMENS OF THE EIGHT DENOMINATIONS OF FARES USED AT GLASGOW. UP TO AND INCLUDING 4D. THE HALF-PENNY TICKET IS SHOWN AT THE EXTREME RIGHT. THE STAGES ARE NUMEROUS ENOUGH IN THE LOWER PRICED TICKETS TO OCCUPY BOTH SIDES OF THE RECEIPT.

Once the passenger has received his fare receipt with its identifying serial number he is expected to keep it for visé any time during the trip, either by the conductor or a ticket inspector. This is really no different in principle from the American practice of asking a passenger to hold on to his transfer ticket. In fact, where the prepayment or postpayment system is not used, as on some lines in Brooklyn, many passengers ask for a transfer simply to prove that they have paid fare.

With the zone system, the principal sources of loss are over-riding by the passenger and missed fares. Dishonesty in conductors is made extremely difficult by the receipt system and is punished by instant dismissal. About the only way the conductors could steal would be to re-issue an old ticket, and this is an extremely hazardous undertaking. Missed fares, due to the rapid interchange of traffic on a double-deck car carrying a maximum of sixty-two seated and six standing passengers, have increased with the advent of women conductors. This may be ascribed partly to their lack of experience and partly to the feeling that when war conditions are settled they will return to their old pursuits.

To minimize the losses from over-riding, some forty to fifty uniformed men are employed as ticket inspectors. As indicated by the form shown on the opposite page their duty is to board cars within a given section or beat, at discretion, to examine the conductor's waybill or trip sheet and the receipts of the passengers to see that they have the proper serial numbers on their tickets or that they are not riding beyond the place punched thereon. The records show that these men board from forty-four to seventy-seven cars a day and that the average is fifty-five cars. This figure would be greater if the ticket inspector did not have other duties. His report covers boarding and leaving times and places, number of passengers and the conductor's signature. There is also space for remarks.

In case of over-riding detected, the conductor simply requests the passenger to pay for a second fare receipt. If the passenger objects, the conductor may call a policeman to arrest him. No placards are posted to warn against over-riding on the psychological principle that it is not good policy to suggest an evil action. It is worth mentioning that while overriding is common enough, no one dares to use an old receipt a second time as that would be clear evidence of fraud, and not mere forgetfulness.

Long before the paper-saving campaign due to the war, Glasgow passengers were asked to throw their defunct receipts into boxes provided on each side of the platform, but enough of them fail to do it to give the car floors a rather untidy appearance in these days of labor shortage and less exacting platform employees.

NEARLY TWO-THIRDS OF PASSENGERS ARE ONE-ZONE RIDERS

When the half-penny a mile fare was established in December, 1911, there were many who expected the direst results. Instead, the traffic increased at such a rate that the revenue per car-mile showed a slight decrease only the first year or so. Thereafter it exceeded the former figures as shown in Table I.

TABLE I—GLASGOW TRAFFIC RETURNS SINCE MAY 31, 1911

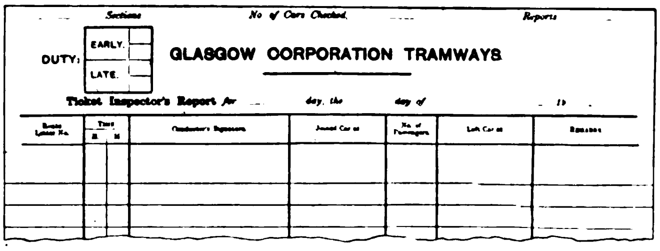
Year to May 31	Cars in Use Sixteen-Hours Daily	Car Mileage	Passengers	Receipts	Pence per Car-Mile
1911-1912	582.19	22,435,076	275,610,385	£987,280	10.56
1912-1913	606.04	23,335,008	311,480,086	1,007,652	10.36
1913-1914	629.69	24,403,482	336,654,624	1,078,691	10.61
1914-1915	628.20	24,214,460	336,260,758	1,070,694	10.61
1915-1916	650.65	24,963,309	362,371,464	1,149,264	11.05
1916-1917	674.51	25,786,047	388,294,876	1,245,507	11.59
1917-1918	685.01	26,261,231	430,946,566	1,404,110	12.83

TABLE II—NUMBER OF AND REVENUE FROM EACH CLASS OF PASSENGERS, YEAR ENDED MAY 31, 1918

Fare	Passengers Carried		Traffic Receipts	
	Number	Per Cent	Amount	Per Cent
½d	272,902,138	63.33	£568,546	40.49
1d	110,608,645	25.67	460,869	32.82
1½d	28,462,112	6.60	177,888	12.67
2d	9,332,956	2.16	77,774	5.54
2½d	4,351,666	1.01	45,329	3.23
3d. and upward	5,289,049	1.23	73,301	5.22
Sundries*	....	.....	400	0.03
Total	430,946,566	100.00	£1,404,110	100.00

* Principally chartered cars.

The overwhelmingly large proportion of riders who travel a mile or less is directly indicated for the whole system in Table II. These figures are, of course, derived from the sales of tickets and do not indicate the relative density of travel along different portions of each route. No surveys with that end in view have been made in recent years. However, nothing is more obvious to the observer in Glasgow than the heavy pick-up or in-between travel. The ratio of the different classes of riders both in numerical and revenue relations is also most effectively shown in two accompanying diagrams reproduced from the official report for the fiscal year ended May 31, 1918. It must be clear that the consequence of such travel as this will be reflected in the passengers per car-mile statistics, and it surely is. For the fiscal year ending May 31 last, the number of passengers per car-mile for the entire system was 16.41 with nearly twenty-three passengers per car-mile on the Paisley Road and Alexandra Park line! The average passengers per car-mile for the week ending Dec. 14, covering the entire Glasgow system, reached 20.33. American operators who check these figures against their own will wonder whether the zone system can be so complex as assumed, if it is capable of handling such dense traffic. Statistics alone do not tell the story. A few typical incidents may be quoted to bring out the short-ride habit among a people who have never had a reputation for wasting their money. Apparently, car riding is considered cheaper than shoe leather. On a trip inbound from Scotstoun to Glasgow between 11 and 11:30 a.m., the writer observed that a soldier and himself were the only males on the car. Even the crew were women. Many of the passengers were women with empty market baskets who actually rode half a mile or less. Here was little more than shopping travel, yet the car changed its load twice in four zones or less. Evidently for every Glasgow man who goes to work someone is left at home to do the marketing; and under the Glasgow combination of short-ride fares and frequent service, the homekeeper rides quite as often as the wage earner.


Sections No. of Cars Checked Reports

DUTY: EARLY. LATE.

GLASGOW CORPORATION TRAMWAYS

Ticket Inspector's Report for day, the day of 19

FORM OF REPORT MADE BY TICKET (FARE RECEIPT) INSPECTOR

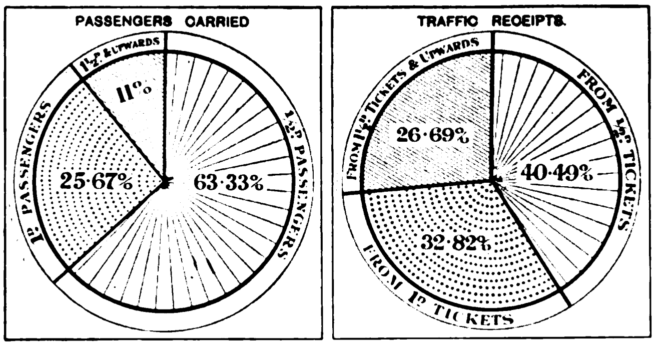
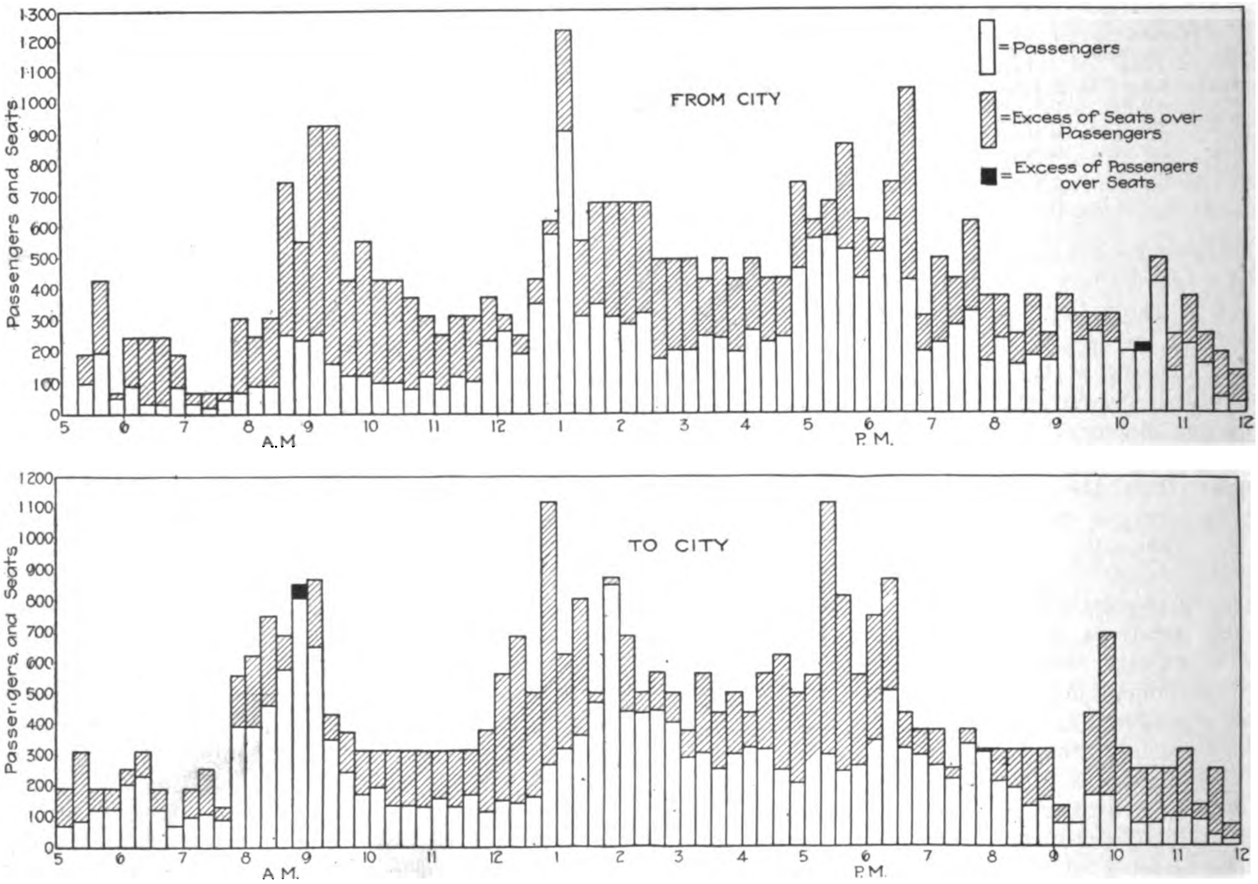


Fig. 1 Fig. 2

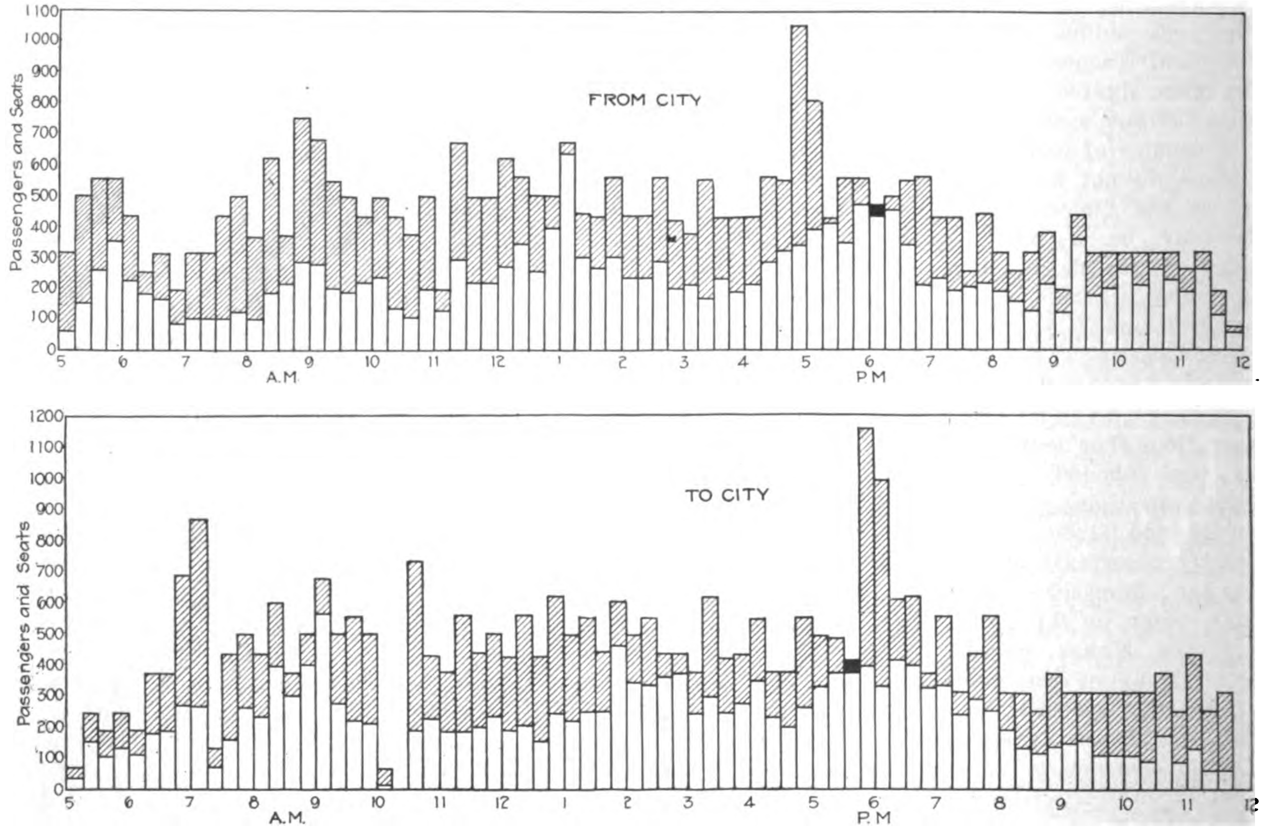
FIG. 1—RELATION OF DIFFERENT CLASSES OF PASSENGERS TO TOTAL CARRIED. FIG. 2—RELATION OF PASSENGER CLASSIFICATION TO RECEIPTS

On trips taken in the industrial sections during the noon hours, a conspicuously large proportion of the riders were grime-covered workmen who were traveling to and from lunch as a matter of course. Later in the afternoon, the travelers were women shoppers and school children. Again and again, one was struck by the contrast between empty sidewalks and loaded cars which were running on a two- to three-minute headway. Those who have noted the wonderful increase of traffic produced in stagnant American communities through the inauguration of additional service with one-man automatic cars will agree that the extremely short headways prevalent in Glasgow are entitled to some credit for the heavy travel. Thus a person who starts to walk along the first outbound zone along Jamaica Street will be passed by cars at the rate of 145 an hour and even in the second fare zone outward bound he will be passed by cars at the rate of one or more every minute. Almost anywhere within a mile of the center of the city, there is at least one car every minute. Under such circumstances, who will be hard-fisted enough to walk? As shown in the Table III, two-, three- and four-minute headways on individual lines are the rule, while the longest headway is only twelve minutes. The Finnieston line is the only one-man car service on the system. That riding is heavy regardless of the wealth of the inhabitants may be gathered from the fact that the Dumbreck line serves a residential section of high grade; Botanic Garden, a residential section in the west and a workingmen's district in the east; Netherlee, a district of business men and clerks, overlapping with the Langside line for a two-minute combined service for 4 miles; Dalmuir-London Road and Dalmuir-Rutherglen, serves the principal industrial plants along the Clyde and adjacent thereto.

No more striking examples of the effect of short-haul riding on the amount and variation in traffic throughout the day could be furnished than the accompanying four graphs, which are from a series prepared by the Glasgow Corporation Tramways in January, 1917,



CENSUS OF PASSENGERS CARRIED AND SEATING ACCOMMODATIONS TAKEN DURING FIFTEEN-MINUTE PERIODS ON DUKE STREET EAST OF HIGH STREET, THURSDAY, JAN. 11, 1917. FOR HOURLY FIGURES SEE TABLE IV



CENSUS OF PASSENGERS CARRIED AND SEATING ACCOMMODATIONS TAKEN DURING FIFTEEN-MINUTE PERIODS TAKEN ON ARGYLE STREET, WEST OF ANDERSTON CROSS, TUESDAY, JAN. 16, 1917. FOR HOURLY FIGURES SEE TABLE V to determine the relation between seats furnished and passengers carried. The corresponding tables are Tables IV and V. At the time mentioned (January, 1917) the increase of traffic without new cars shows a less favorable relation of seats to passengers, but the service is still being carried out according to the rule of twenty-four passengers on the lower deck with six standees permissible and thirty-eight passengers on the upper deck with no standees. Usually, when capacity has been reached, the conductor lowers a "Full" sign from the hood and directly over the step. Only at the discretion of the traffic officer on special occasions, like blockades, in the standee rule broadened.

Referring now to the first two graphs, with corresponding Table IV, it will be noted that they show the inbound and outbound traffic respectively on Thursday, Jan, 11, 1917, at Duke Street, east of High Street, a point 1 mile from Jamaica Street, which is the traffic center of Glasgow. The cars charted on these records serve a clerical and working-class section. The reader will at once note the startling difference from daily load records of large American cities. The first point to attract attention is the midway travel which outbound reaches its maximum at 1 p.m. and inbound at 2 p.m. The workers of Glasgow have every encouragement to ride home for lunch when for 1 penny they can ride out for 2 miles without waiting more than a minute or two for a car. Luncheon hours are fairly well staggered. Like some private employers the Glasgow municipality encourages home eating by granting a cne and one-half-hour luncheon period. It believes that this makes for greater efficiency than obliging its women employees, in particular, to depend upon restaurants. Glasgow office hours are generally 9 a.m. to 5 p.m. daily and to 1 o'clock on Saturdays. Shopkeepers have their half-holiday on Tuesday afternoons.

Further checking of the afternoon hours of both the inbound and outbound graphs shows an excellent traffic due almost entirely to women shoppers, school children, agents, commercial travelers, etc. Because of the continuance of short-headway service, the evening peak outbound is nowhere nearly as severe as where the letdown of midway service imposes much of this miscellaneous travel on the rush hours.

The second pair of graphs and corresponding Table V were derived from data taken at Argyle Street west of Anderston Cross and ½ miles from Jamaica Street. These graphs cover working-class travel almost entirely.

TABLE III—WEEKDAY ROUTES AND SERVICES, GLASGOW CORPORATION TRAMWAYS

Route	Service in Minutes					
Botanic Gardens and Oatlands	5.18	7.29	4	5	4	5
Dumbreck and University	4.99	7.48	6	6	6	6
Netherlee and Kirklee Langside and Hyndland	7.74	8.15	2	3	2	3
Alexandra Park and Hyndland	4.57	8.06	8	8	8	8
Rouken Glen and Bishopbriggs	12.15	8.35	2	3	2	3
Paisley Road and Alexandra Park	4.89	7.72	6	8	6	6
Uddingston and Paisley	14.74	8.98	2	3	2	3
Renfrew and Lambhill	9.19	8.39	3	3	3	4
Cambusland and Anniesland	8.91	8.16	6	...	6	...
Dalmuir and Rutherglen Dalmuir and London Road	12.42	8.87	2	2	2	3
Burnside and Springburn	8.96	8.40	4	6	4	6
Anniesland and Dennistoun	7.25	8.21	2	3	2	3
Newlands and Maryhill	6.06	7.45	6	6	6	6
Sinclair Drive and Kelvinside Avenue	4.88	7.51	6	8	6	8
Mount Florida and Killermont	6.73	7.74	4	6	4	6
Springburn and Mount Florida	5.80	8.19	4	6	4	6
Garngad and Polmadie	3.27	7.85	12	12	12	12
Whiteinch and Keppochhill Road	5.21	8.77	7½	7½	7½	7½
Mount Florida and Paisley Road Toll	2.56	8.08	6	6	6	6
Finnieston and Stobcross Ferry	0.45	6.75	10	10	10	...

The characteristic feature of the inbound travel on this service is the breakfast riding. Many laborers who start work early in the morning will go home a few hours later for breakfast if not too far from their work—another example of traffic promotion through zone fares and short headways like two and one-half and three minutes. It is not difficult to see why the Glasgow Tramways find it easier than American street railways to lay out a fifty-one–fifty-four hour week for platform employees!

STOP SPACING AND SPEED RESTRICTION

Obviously a street railway that wishes to relegate the walking habit among the lost arts must seek the happy medium between too many stops and too few. The peace-time standard averages 600 ft., or between eight and nine per mile, with some spacings as high as 900 ft. to permit less than 600 ft. spacing of traffic-gathering points. To economize coal, 200 out of 1840 single stops were temporarily discontinued except on the extremely busy Paisley Road-Alexander Park belt line where short-ride traffic is so heavy that conductors sell 1400 or more half-penny tickets a day. The saving in coal has not been of any great importance, partly because most of the stops eliminated were not frequently made at any time and partly because the fluctuations in a large power plant are not materially affected by the elimination of a small percentage of stops. Most stops are near side.

"Stop" signs of the style illustrated on page 452

TABLE IV—CHECK TAKEN OF TRAFFIC AT DUKE STREET EAST OF HIGH STREET

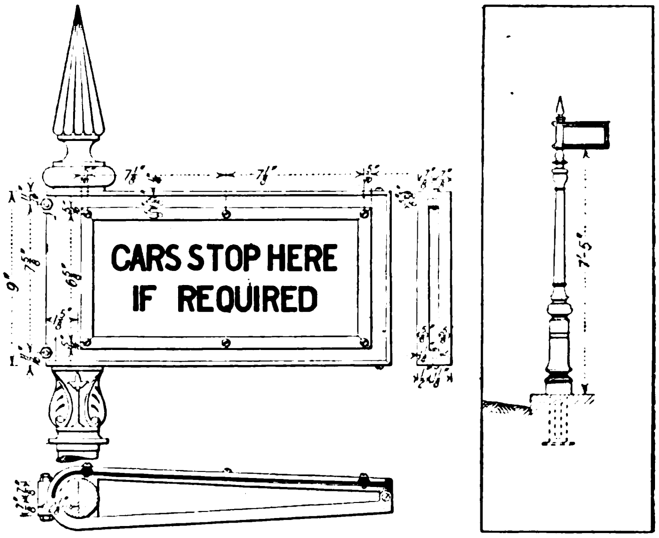
	From City			To City		
Period	Cars	Passengers	Seats	Cars	Passengers	Seats
5 a.m. to 6 a.m.	11	353	682	14	392	868
6 a.m. to 7 a.m.	15	246	930	13	629	806
7 a.m. to 8 a.m.	8	151	496	18	671	1,116
8 a.m. to 9 a.m.	30	662	1,860	46	2,277	2,852
9 a.m. to 10 a.m.	46	670	2,852	32	1,408	1,984
10 a.m. to 11 a.m.	25	404	1,550	20	583	1,240
11 a.m. to 12 noon	20	528	1,240	21	572	1,302
12 noon to 1 p.m.	26	1,377	1,612	46	706	2,852
1 p.m. to 2 p.m.	51	1,891	3,162	45	1,985	2,790
2 p.m. to 3 p.m.	38	995	2,356	36	1,706	2,232
3 p.m. to 4 p.m.	30	898	1,860	30	1,143	1,860
4 p.m. to 5 p.m.	34	1,200	2,108	34	1,080	2,108
5 p.m. to 6 p.m.	45	2,095	2,790	49	961	3,038
6 p.m. to 7 p.m.	43	1,768	2,666	39	1,463	2,418
7 p.m. to 8 p.m.	31	1,011	1,922	21	1,118	1,300
8 p.m. to 9 p.m.	20	742	1,240	20	679	1,242
9 p.m. to 10 p.m.	21	1,043	1,302	21	470	1,302
10 p.m. to 11 p.m.	18	968	1,116	17	351	1,054
11 p.m. to 12 midnight	15	441	930	12	211	744
Total	527	17,443	32,674	534	18,405	13,108

TABLE V—CHECK TAKEN OF TRAFFIC AT ARGYLE STREET, WEST OF ANDERSTON CROSS

	From City			To City		
Period	Cars	Passengers	Seats	Cars	Passengers	Seats
5 a.m. to 6 a.m.	31	819	1,922	12	412	744
6 a.m. to 7 a.m.	19	654	1,178	26	736	1,612
7 a.m. to 8 a.m.	25	415	1,550	31	745	1,922
8 a.m. to 9 a.m.	34	770	2,110	31	1,322	1,910
9 a.m. to 10 a.m.	35	863	2,158	36	1,262	2,224
10 a.m. to 11 a.m.	29	666	1,790	20	416	1,220
11 a.m. to 12 noon	30	841	1,840	30	791	1,866
12 noon to 1 p.m.	35	1,253	2,170	33	778	2,020
1 p.m. to 2 p.m.	34	1,491	2,088	34	1,186	2,096
2 p.m. to 3 p.m.	30	947	1,848	31	1,408	1,914
3 p.m. to 4 p.m.	29	794	1,790	30	1,056	1,848
4 p.m. to 5 p.m.	42	1,147	2,592	30	1,040	1,852
5 p.m. to 6 p.m.	38	1,607	2,348	41	1,528	2,518
6 p.m. to 7 p.m.	33	1,453	2,034	42	1,477	2,592
7 p.m. to 8 p.m.	25	835	1,550	30	1,118	1,860
8 p.m. to 9 p.m.	20	669	1,240	20	580	1,240
9 p.m. to 10 p.m.	20	840	1,240	20	522	1,240
10 p.m. to 11 p.m.	20	940	1,240	20	448	1,240
11 p.m. to 12 midnight	13	600	806	16	252	992
Total	542	17,604	33,484	533	17,077	32,910

are carried from trolley poles or standards. Stops are regularly made at the zone boundaries, at track intersections and dangerous curves. Near schools it is customary to put up "Drive slowly" signs.

The Glasgow municipality's traffic rules are few and simple. As regards the relation of cars and other vehicles, rule 9 states that the usual plan of keeping to the right in passing another vehicle does not apply when the vehicle is following a street car. In that case, the vehicle desirous of passing the car must go by on the left except where there is sufficient reason for deviation. Rule 10 states that when a tramway car is standing at a stopping place, every driver of a vehicle who intends to pass on the left or near side of the car shall draw up immediately before arriving at the stopping place until the roadway is clear of passengers entering or leaving such car. It will be understood, of course, that in Great Britain, the standard traffic rule is to keep to the left instead of the right.



DETAILS OF STOP AND FARE-STAGE SIGNS CARRIED ON EITHER TROLLEY POLES OR STANDARDS AS CONVENIENT

In Glasgow there are no special speed restrictions for vehicles making less than 20 m.p.h. The schedule speed of the Glasgow tramway system as a whole is 8.18 m.p.h. which, in view of the dense traffic, and low motoring, is not so much below American speeds as one might expect. In the outer sections, the cars make schedules up to 16 m.p.h., but in the crowded downtown streets it is hard to do better than 4 m.p.h. Hence if part of the downtown travel could be diverted to parallel streets, the increase in schedule speed would make it unnecessary to consider special non-surface rapid transit. The high density of travel keeps the scheduled running times unchanged all day.

To facilitate the movement of traffic, policemen are stationed at all busy corners. While the cars receive no special preference over other vehicles, this traffic officer may pass across an intersection several cars at one time. The traffic control officers are paid directly by the police department.

Of the various means used to apprise the public of tramway facilities, the zone boundary and stop signs in the street and the rate-of-fare cards in the cars, shown on this page, have already been mentioned. Before the paper shortage brought on by the war became acute, the "Take One" box in every car also carried a condensed time-table of the line, showing the arrival times at terminals. Boards at the terminals show the times of departure of last cars and the like. The native is still able to pick out his car in daylight by its combination of body and superstructure coloring. Of course, a scheme like this means some extra expense in painting and is likely to be embarrassing when emergency traffic conditions call for the transfer of cars to other routes. All cars are provided with roller-type destination signs, in addition to which some of the cars carry roller-type route number signs—complete equipment having been interrupted by the war. These destination signs are readily visible within easy braking distance during the daytime but they are not directly illuminated. A roller destination sign is also installed on each side of the car interior, while the route of the car is indicated by painted wooden boards on the outer sides of the car.

For the stranger in Glasgow, the Tramways publish a 113-page guide book which is sold for the nominal sum of 6 cents (3 pence). About 500,000 copies had been printed with the issue of the fifth edition. This guide tells the story of Glasgow's past and present glories, route for route, with ample illustrations. A moderate amount of advertising matter helps to defray the cost of publication.

SHELTERS FOR WAITING PASSENGERS

Because of the extremely short headways, the Tramways have not gone extensively into the provision of shelters for waiting passengers. In fact, there are but two on the entire system. At Eglinton Toll Road, the shelter is little more than a glass-partitioned shed forming a flatiron extension of the building at this particular junction. At Catchcart and Battlefield Roads there is a more elaborate structure. This is at the junction of two important roads and in the vicinity of several public institutions. It is finished in tile inside and out and has large glazed areas and benches for waiting passengers. Those who prefer to stand outside have the shelter of a wooden marquise. The station includes a news and stationery shop, which, curiously enough, opens out only on the street instead of the waiting room as well. The original plan was to have the stationer act as caretaker in lieu of rental, but later it was decided to have him pay a fixed rental and leave the care of the structure to discharged soldiers who work in two shifts. The cost of this shelter was shared with the

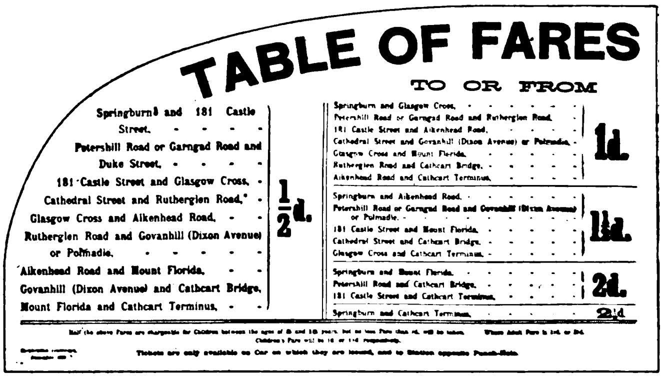


TABLE OF FARES

TO OR FROM

Springburn and 181 Castle Street. Petershill Road or Garngad Road and Duke Street. 181 Castle Street and Glasgow Cross. Cathedral Street and Rutherglen Road. Glasgow Cross and Aikenhead Road. Rutherglen Road and Govanhill (Dixon Avenue) or Polmadie. Aikenhead Road and Mount Florida. Govanhill (Dixon Avenue) and Cathcart Bridge. Mount Florida and Cathcart Terminus.	½d.
Springburn and Glasgow Cross. Petershill Road or Garngad Road and Rutherglen Road. 181 Castle Street and Aikenhead Road. Cathedral Street and Govanhill (Dixon Avenue) or Polmadie. Glasgow Cross and Mount Florida. Rutherglen Road and Cathcart Bridge. Aikenhead Road and Cathcart Terminus.	1d.
Springburn and Aikenhead Road. Petershill Road or Garngad Road and Govanhill (Dixon Avenue) or Polmadie. 181 Castle Street and Mount Florida. Cathedral Street and Cathcart Bridge. Glasgow Cross and Cathcart Terminus.	1½d.
Springburn and Mount Florida. Petershill Road and Cathcart Bridge. 181 Castle Street and Cathcart Terminus.	2d.
Springburn and Cathcart Terminus.	2½d

TABLE OF FARES, AS POSTED ON BULKHEAD OF CARS ON SPRINGBURN-CATHCART ROUTE statute labor department which has charge of the public lavatories, but the maintenance is borne entirely by the Tramways.

ACCIDENTS AND SAFETY WORK

Like the average American, the people of Glasgow are hustlers and always ready to take a chance to save a minute or two. Therefore, accidents have always been plentiful. In recent years, the decrease in the number of experienced employees, the darkening of the streets for air-raid protection and the more intensive use of the cars available, have aggravated the difficulties. The climatic conditions of Glasgow—especially the long winter nights, the heavy rainfall and the smoke-laden fogs—are not encouraging either.

Previous to June, 1914, the Tramways carried accident insurance through the underwriters at a fixed sum per 1000 car-miles, and in case of an accident it simply turned over to them all papers for a settlement. On deciding to carry the risk itself, the railway started a safety-first campaign along the most approved British and American lines, but the rapid loss of experienced men made it impossible to get the full benefit of such work. This campaign will be renewed, however, when "the boys come home" from the demobilization camps. The value of a safety campaign was quickly demonstrated by the fact that during the first year of the work there was a great increase in the number of accidents *reported* but not in the number of accidents *occurred*.

From June, 1914, to June, 1915, there were 2434 boarding and 4281 alighting accidents; from June, 1915, to June, 1916, 1952 boarding and 3623 alighting accidents; from June, 1916, to June, 1917, 1703 boarding and 3541 alighting accidents; from June, 1917, to June, 1918, 1889 boarding and 2842 alighting accidents. Although the number of accidents has decreased, the cost per accident has increased. This is the direct result of war-time wages. Most of the accidents occur to workmen who are receiving greatly increased wages and they reckon the value of lost time accordingly. The higher cost of labor and material has also raised the cost of vehicular collisions. The fact that Glasgow people are intensely proud of their tramways does not deter a certain element from trying to mulct the city with the aid of the ever-ubiquitous ambulance chaser. Litigation of this character is much more costly to the defendant than to the plaintiff.

THE NON-TRAMWAY RIDING IN THE GLASGOW DISTRICT

In spite of the extraordinarily heavy riding on the Glasgow Corporation Tramways, two other means of transportation enjoy the patronage of the city. One of these is the Glasgow District Subway, a cable road, and the other is the system of steam suburban lines.

The cable line is operated by the Glasgow Subway Railway Company. It is a double-track belt line, only 6½ miles long, which encircles the core of Glasgow on both sides of the Clyde River. Trains consisting of a grip car and trailer are operated on a three-minute headway from the starting of the first train at 5 a.m. to midnight. The round trip is made in thirty-five minutes.

Up to December, 1916, the company had a zone fare which allowed a ride of one station for ½d., of five stations for 1d. and of more than five stations for 1½d. At present, the fare is 1d. for a ride of any length for adults while children under twelve, as before, ride for ½d. That this line has never been able to make much headway against the tramway service is apparent from the fact that its traffic over a long period of years has remained almost stationary whereas the street-car travel has grown enormously. For example, even the war curtailment of tramway service did not bring more than 17,948,170 riders for the year ended Dec. 31, 1917. As long ago as 1908, the cable subway carried 17,206,790 passengers. The receipts in 1917 were £73,413 and in 1908, £68,916, a slight increase per passenger because of the change to a flat or universal fare. The total train mileage for 1917 was 1,180,356 miles or 15.2 passengers per train-mile.

The traffic is not likely to increase greatly, even in case of electrification, as the distances covered are too short to warrant a person going up and down stairways when he can board a surface car within the belt-line territory practically inside a minute! The present owners can hardly be making a fortune, judging by the fact that the preferred shares earned only 2½ per cent during 1917.

Although the necessities of the great war brought about a reduction in the steam railroad suburban service, the competition from this source is by no means negligible. Unfortunately, separate suburban figures are not published. Trains are run at frequent intervals, however, to points within the 10-mile radius, the headway in some cases being as low as ten minutes. In addition to the radial steam lines there is an important double belt line to the south, serving the Langside district. This line is shown on the map on page 447. but the other steam lines are omitted.

The rates on the steam lines are considerably higher than those by tram. The rate to Renfrew, for example, is 7d. by steam and only 2½ to 3d. by tram.

The number of taxicabs and horse cabs in Glasgow has never been proportionately as large as in other big British cities. As for buses, there are none at all. In this connection, the writer asked N. O. Fulton, managing director of the Albion Motor Car Company, Ltd., Scotstoun, Glasgow, why Glasgow had no buses. He replied that the tramway service was too frequent to encourage the idea of competition. In some other cities the buses had taken hold because of unsatisfactory car service or because of congested street conditions and they were fulfilling requirements better than the vehicles which were tied inflexibly to a given line of track. The very short headways, the low fares and the public ownership of Glasgow's tramways had proved great factors in fostering the habit of using the cars—and the habit was one not easily broken.

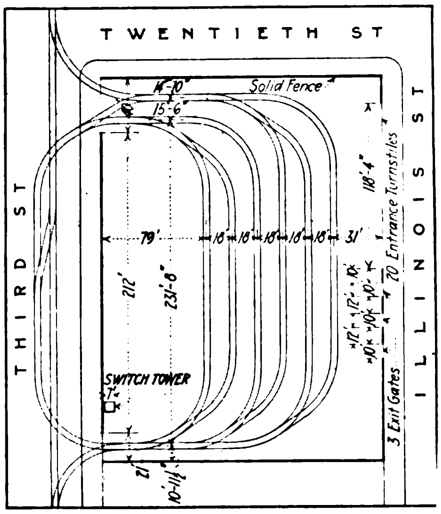
Although no buses are operated in Glasgow at this time, there is a likelihood that several services will be instituted in the future as auxiliaries rather than competitors of the street car service.

The third, and concluding, article on Glasgow will deal with the type of rolling stock, the transportation employees including supervisory petty officers, the schedule department and the auditing of fare receipts and cash turned in by the conductors.

Prepayment Area in San Francisco

Six-Track Loop Constructed to Handle Peak Load Gives Quick Service to Shipyard Workers

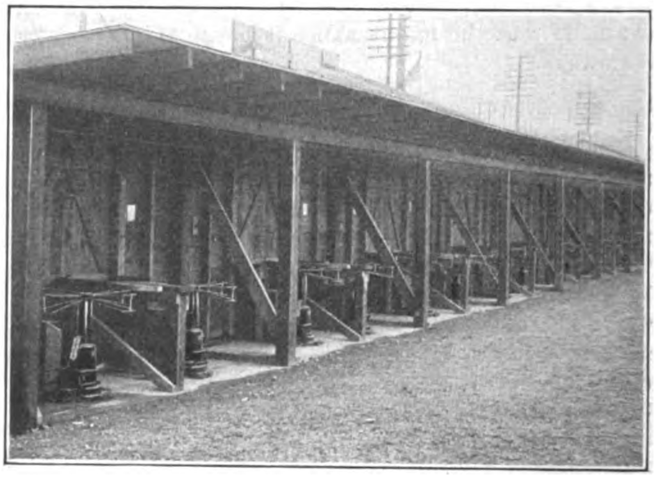
THE Union Iron Works in San Francisco now releases about 18,000 employes at 4.40 p.m. each working day and about 85 per cent of them take the cars of the United Railroads which serve this locality. To expedite handling this sudden peak load the traction company has built a six-track loop in a prepayment area 100 ft. x 273 ft., the entrance to which is through turnstiles.



PLAN OF PREPAYMENT AREA

The arrangement of the loops, as shown in the accompanying drawing, is such that southbound cars move over the three inner loops while northbound cars are loaded on the three outer loops. The capacity of the loops is thirty cars, allowing lanes between cars of width sufficient to afford easy access to the inner tracks. The cars move out of the yard on a twelve-section headway. The switches leading from the incoming track to the several loops are controlled by hand operation from the tower at the corner where the tracks enter the yard.

The twenty turnstiles occupy a length of about 200 ft. along the east fence of the inclosure. No booth for making changes has been installed. Collectors at the turnstiles make change when necessary, but it has been observed that the men have learned how to get through quickly and are usually prepared with the exact fare. At least there is no waiting in the lines, and by actual count a total of between 8000 and 9000 men have passed through the twenty gates and boarded the cars in twenty-three minutes.



THERE ARE TWENTY TURNSTILES

Preventing Corrosion of Iron Pipe Carrying Hot Water

The results of some tests on pipe corrosion have been prepared by the Pittsburgh Testing Laboratory, the tests covering 2-in. uncoated black steel pipe and 2-in. wrought-iron uncoated black pipe. These tests were made to show the results of deactivating or deoxidizing the water which flows through the pipe by means of the Speller system of the National Tube Company. The results showed that even while the oxygen removal had at times been incomplete due to the low temperature of the water, the corrosion in the deactivated hot-water line was practically negligible, whereas specimens of the same iron and steel pipe failed by pitting in less than a year in an unprotected part of the same hot-water line. The tests mentioned were begun on Nov. 22, 1916, and the pipes were opened on Dec. 24, 1917, and Jan. 3, 1919. There was a soft black coating inside the protected section.

In the protected section there was a soft black coating inside the pipes but no evidence of pitting even where the steel pipe was in contact with a brass union.

SIX-TRACK LOOP IN PREPAYMENT AREA FOR SHIPYARD WORKERS IN SAN FRANCISCO

Getting Better Economy in the Power House[*]

Substantial Savings Are Possible, Particularly in the Boiler Room, Where in the Past Some Very Simple Expedients for Fuel Saving Have Been Overlooked

By G. H. KELSAY
Electrical Engineer Union Traction Company of Indiana, Anderson, Ind.[†]

COAL is the source of power for practically all our properties. The United States possesses about one-half the coal supply of the world, sufficient to last us a period ranging from one hundred years to four thousand years. The first period is for a consumption increasing at the present rate, but the coal will last for thousand years at the present annual consumption. We have used to date about one-half per cent of this, as is shown graphically in Fig. 1.

One pound of coal of 11,000 heat units (B.t.u.) has stored in it, heat energy which if it could be changed to mechanical energy would lift a stout man ten miles or its own weight 2000 miles. If the energy in the coal could be converted directly to mechanical energy at the car wheels, a motorman could easily carry enough coal in his cab to propel his car, and handling it would be no more of a burden than handling baggage.

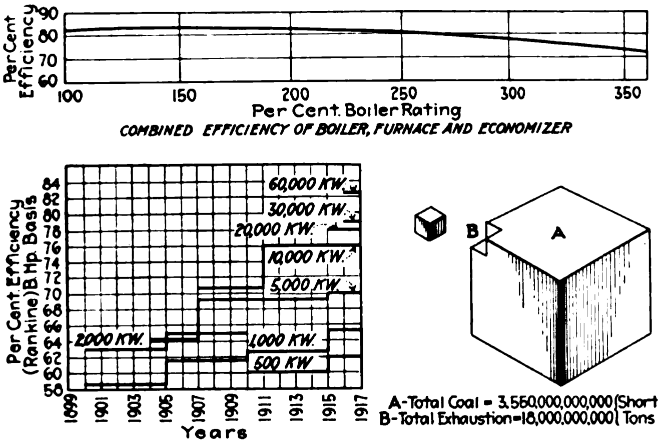


FIG. 1—RELATION OF BOILER LOAD TO EFFICIENCY, INCREASE IN EFFICIENCY OF STEAM TURBINES, AND RELATION OF COAL USED TO AVAILABLE SUPPLY

HEAT FINDS MANY STRAY PATHS

It is a duty of the operators in the mechanical and electrical departments to make every reasonable effort to deliver energy to the car with the least possible loss, and the purpose of this paper is to call attention to some of the practices that affect the efficiency of this process. Fig. 2 shows in a graphical way how the energy in the coal is consumed and what a small proportion is finally available at the car. The named losses are unpreventable, but they are all subject to decrease through intelligent selection and operation of equipment.

In one of its catalogs the Edge Moor Iron Company states that figuratively the boiler is that part of the power plant where "money is burned" to make power. From an economic standpoint it is where the greatest saving can be effected and where the greatest waste is possible. The efficiency of the boiler room may be represented by the formula:

$$E = S \times B \times O$$

where E is the over-all efficiency of the boiler room; S is the stoker efficiency, affected by design of grate or stoker and furnace, and adaptability of the stoker to the fuel burned; B is the boiler efficiency, including boiler and setting; and O is the operating efficiency, including that of both firing and maintenance labor.

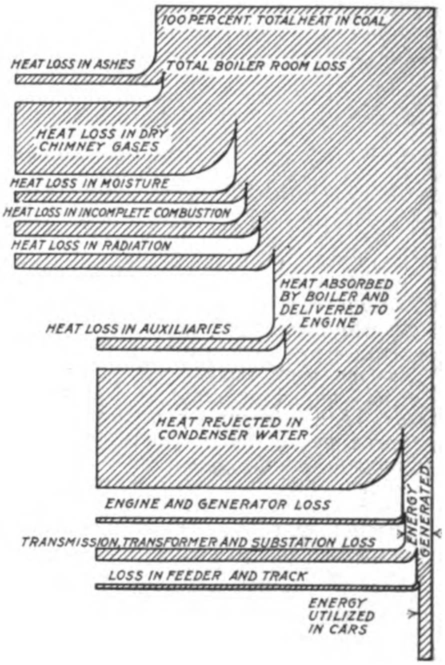

100 PER CENT. TOTAL HEAT IN COAL
HEAT LOSS IN ASHES
TOTAL BOILER ROOM LOSS
HEAT LOSS IN DRY CHIMNEY GASES
HEAT LOSS IN MOISTURE
HEAT LOSS IN INCOMPLETE COMBUSTION
HEAT LOSS IN RADIATION
HEAT ABSORBED BY BOILER AND DELIVERED TO ENGINE
HEAT LOSS IN AUXILIARIES
HEAT REJECTED IN CONDENSER WATER
ENGINE AND GENERATOR LOSS
ENERGY GENERATED
TRANSMISSION, TRANSFORMER AND SUBSTATION LOSS
LOSS IN FEEDER AND TRACK
ENERGY UTILIZED IN CARS

FIG. 2—DIAGRAM SHOWING HOW A LARGE PERCENTAGE OF HEAT IN FUEL IS DISSIPATED

In his book on "Steam Power Plant Engineering" Gebhardt gives the following as a heat balance for bituminous coal, based on coal as fired for average practice:

	Per Cent of Calorific Value of Coal as Fired
Heat absorbed by boiler	65.0
Loss due to evaporation of free moisture in coal	0.6
Loss due to evaporation of water formed by combustion of hydrogen	4.3
Loss due to heat carried away by dry flue gas	17.5
Loss due to carbon monoxide	0.5
Loss due to combustible in ash and refuse	4.5
Loss due to heating moisture in air	0.3
Loss due to unconsumed hydrogen, hydrocarbons, radiation and unaccounted for	7.3
Calorific value of coal	100.00

HIGH ASH CONTENT IN COAL CAUSES SERIOUS LOSSES

The reduction of boiler-room losses should start at the coal mines, as the greatest of these losses results from the high percentage of ash in the coal. This percentage has been subject to very great fluctuation during the past three years on account of the extreme demand for coal. The quality of the coal has not been so good and the coal has been less well adapted to particular plant conditions.

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[*] Abstract of paper read at annual meeting of Central Electric Railway Association, at Cleveland, Ohio, Feb. 28, 1919.

[†] On March 1 Mr. Kelsay became superintendent of power and equipment, Cleveland, Southwestern & Columbia Railway, Elyria, Ohio.

The effect of increased ash results in decreased heat value, increased tonnage consumption and increased necessary boiler capacity, as was well illustrated in an article prepared for the National Research Council, by W. A. Shoudy, of the J. G. White Engineering Corporation,* from which Fig. 3 was taken. Increase in ash content reduces the heat units in the coal; causes greater loss to the ash pit because more heat is carried off in the ashes; results in a larger loss of combustible to the ash pit; prevents the firemen from being able to burn as much coal on the grate. Thus the capacity of furnace and boiler is reduced, the boiler efficiency is lowered, more boilers are required for a given duty, spare equipment is reduced and there is a decided lowering of general efficiency and reliability of the power plant.

All operators of power stations will be relieved and the cost of power production will be reduced when coal cleaner and freer from ash can again be obtained. It is reliably estimated that coal now contains on an average about 5 per cent more ash than during a period previous to that of the present high price and recent shortage.

HOW COAL BURNS

In Technical Papers Nos. 137 and 135 the United States Bureau of Mines outlines the fundamentals of coal combustion thus:

> Combustion of coal is a chemical combination of the combustible ingredients of the coal with the oxygen of the air. The chief combustible ingredients of coal of economic importance are carbon and hydrogen in various combinations. Average commercial coal contains about 82 per cent of carbon and 4 per cent of hydrogen available for combustion. Air, without which the coal could not burn, contains approximately 20 per cent of oxygen and 80 per cent of nitrogen.
>
> When carbon burns completely the product is carbon dioxide (CO_2); when it is partly burned the product is carbon monoxide (CO). If more oxygen is supplied, carbon monoxide can be burned to carbon dioxide. The hydrogen of coal burns to water vapor, which condenses to water when cooled to atmospheric temperature. The furnace gases therefore consist mainly of oxygen (O_2), nitrogen (N_2), carbon dioxide (CO_2), and carbon monoxide (CO). Besides these there may be found near the surface of fuel beds a small quantity of hydrogen (H_2), methane (CH_4), and unsaturated hydrocarbons. By analyzing the gases at successive points in a furnace the progress of combustion can be studied.
>
> In practically all industrial furnaces the combustion of coal takes place in two stages, (1) combustion in the fuel bed, which includes the distillation of volatile matter and partial combustion or gasification of the fixed carbon; and (2) combustion of the gaseous and other combustible rising from the fuel bed in the combustion space.
>
> The processes of combustion in a hand-fired furnace can be best explained by reference to Fig. 4. Here the curves show the percentages of the different gases at various points in the fuel bed and in the combustion space. The changes in the percentage of each gas indicate the process of combustion. The fuel bed is shown to be 6 in. thick. The oxygen (O_2) is all used at about 3½ in. from the grate. At the same point the carbon dioxide (CO_2) reaches a maximum of about 12 per cent. Beyond this point the percentage of CO_2 drops and the percentage of carbon monoxide (CO) and other combustible increases rapidly, showing that the CO_2 is reduced by contact with hot carbon to CO. At the surface of the fuel bed the gases contain about 26 per cent of combustible, no oxygen, and about 8 per cent of CO_2. Air is added over the fuel bed and the combustible is burned in the combustion space. At the end of 7 ft. of the combustion space, the combustible gases are burned to 4 per cent and at the same time the CO_2 increases to 14 per cent. With a combustion space long enough the percentage of combustible would be reduced practically to zero.
>
> The three main processes in the fuel bed are the oxidization of carbon to CO_2, the reduction of CO_2 to CO, and the distillation of volatile matter. The zones where these three processes take place are indicated at the top of Fig. 4. These are called the oxidizing zone, the reducing zone and the distillation zone. The boundaries separating the three zones are not distinct, as the zones merge gradually into one another.
>
> The combustion investigations of the Bureau of Mines are carried on in two parts. One part is the study of the processes of combustion in the fuel bed as affected by the rate of supplying air through the fuel bed, by the character of the fuel as regards structure and composition, by the thickness of fuel bed, by the method of feeding the coal and the air, and by the method of heating the coal. Investigations so far completed show that the fuel bed in most industrial furnaces acts primarily as a gas producer. The gases rising from a level fuel bed contain 15 to 32 per cent of combustible gases, about 8 per cent of carbon dioxide, and practically no free oxygen. This is true even of 6-in. fuel beds and rates of combustion as high as 120 lb. of coal per hour per square foot of grate. The second part of the investigation is the study of the process of combustion of the gases and other combustible rising from the fuel bed in the combustion space, after a sufficient quantity of air has been added.
>
> The process of combustion in the combustion space is influenced by many factors, the most important of which are the following: The volume and shape of the combustion space; the kind of coal used, especially the character, and the amount of the volatile matter it contains; the rate of firing; the quantity of air supplied over the fuel bed; the rate of mixing the air with the combustible rising from the fuel bed; the rate of heating the coal; and the temperature in the combustion space.

The combustion process in the combustion space above and beyond the fuel bed is well illustrated in Fig. 5, reproduced from one of the above-mentioned bulletins, which gives the percentage of the main constituents of the furnace gases at various sections of the long combustion chamber. In connection with this the bulletin states:

> The length or the volume of the combustion space required for practically complete combustion seems to depend chiefly on the percentage of excess air, the rate of combustion and the kind of coal. It is mainly these three factors that have been investigated in the series of tests that have been reported in this bulletin.
>
> For given furnace and given fuel there is a percentage of excess air which gives the maximum over-all efficiency of a steam generating apparatus. If the supply of air is increased beyond this percentage the over-all efficiency drops because of the heat lost in heating this excess air. If, on the other hand, the air supply is decreased below this best percentage, heat losses increase on account of incomplete combustion. These are the two principal causes of heat not being available for the boiler, and the ones that are affected by air supply. The percentage of excess air giving the lowest sum of these combined losses varies with the size of the combustion space and the kind of coal. When the combustion space is large, smaller excess air is necessary to obtain a good combustion than when the combustion space is small. With coals having low percentage of volatile matter less excess air is needed for nearly complete combustion than when coals have high percentage of volatile matter.

WHAT QUALIFICATIONS MUST THE BOILER-ROOM OPERATORS HAVE?

It is evident from the foregoing that the proper combustion of coal is not simply a process of piling coal in the furnace, and the fireman should possess far more than individual strength sufficient to handle the required tonnage. It is a lamentable fact that our boiler-room forces, particularly during the past two years, have been composed of men picked off the labor market without particular qualifications for the work. The most intelligent man in the power plant should devote the major portion of his time in the boiler room, and the supervision of the fires should be his principal duty.

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*See issue of this paper for Sept. 21, 1918, page 504.

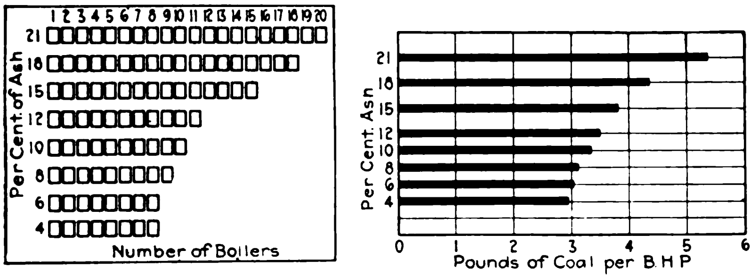

Fig. 3

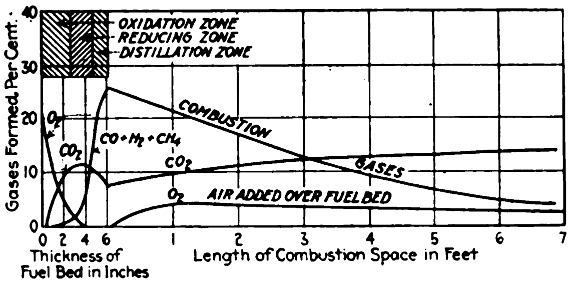

Fig. 4

FIG. 3—GRAPHICAL REPRESENTATION OF EFFECTS OF HIGH ASH CONTENT IN COAL. FIG. 4—PROCESS OF COMBUSTION OF COAL IN HAND-FIRED FURNACE

This is not the rule in most plants. Engineers find the boiler room a hot and unattractive place in which to spend their time, and they have not been encouraged by having sufficient equipment (see Fig. 6) supplied them to permit them properly to measure all the operations in the boiler room. Unfortunately the managements have been satisfied with such practices.

Firemen should understand the theory of combustion in the boiler furnaces as far as possible. Of course there is much that even specialists still have to learn as to the proper relation of furnace shape and volume, stokers and arches, and of the adaptability of all these to the coals of various heat value, physical and chemical characteristics, but a great deal of information is available. Obviously, to burn coal economically necessitates the use of proper equipment and the continuous exercise of good judgment.

BOILER-ROOM PRACTICE CAN BE IMPROVED IN SEVERAL WAYS

To return now to the subject of improvements that are possible we realize that we have available for selection in hand-fired furnaces many types of grates, and in mechanically-fired furnaces, many types of stokers. Usually for each locality there are several possible sources of fuel. The first consideration for the plant operator is the selection of fuel adaptable to his plant. One car of coal is not the same as any car of coal because it may contain the same tonnage. One ton of coal is not better than another ton because it is 50 cents cheaper. For the past year or two we have been fortunate to obtain tonnage to keep our plants going, but the opportunity to buy coal on a competitive basis may return because operators of inferior mines will wish to keep going the "operations" begun under war conditions. Although restrictions on coal supply by the government have been removed, my prediction is that coal will never return to the price level of four years ago, although if the operators do not restrict the output the price should drop somewhat. The law of supply and demand will again assert itself and operators will again see the necessity of furnishing well-prepared, clean coal. The question will be: What coal should a plant use? The answer is: It should be that which will "put the kilowatts on the switchboard" for the least money with careful consideration of all the items of expense involved.

To determine the fuel to use, the necessary evaporation tests on all the coals available should be made. The coals should be analyzed and such physical and chemical tests should be made as will determine the standard to be expected in future shipments. The purchaser should assure himself that the trial shipments are representative of the coal reasonably to be expected from a particular mine.

After good fuel supply comes good furnace handling.

HEAT LOSSES FROM UNINSULATED HOT SURFACES ROOM TEMPERATURE 70 DEG. FAHR.

Steam Pressure	Steam Temperature	Waste of Coal in Pounds per Square Foot per Year	Square Foot Surface That Wastes a Ton of Coal a Year
0	212	293	6.8
150	366	840	2.4
200	388	945	2.1
250	406	1,036	1.9

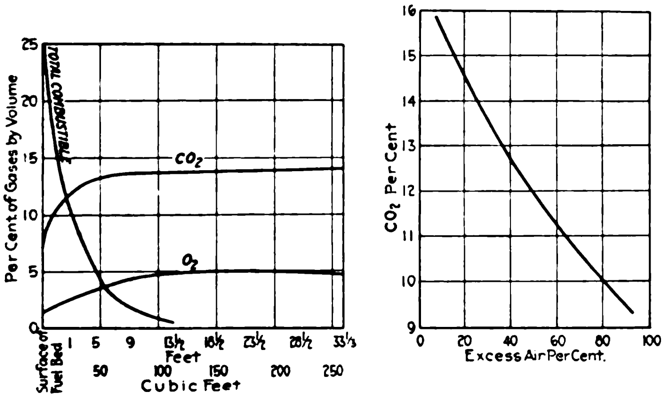

Fig. 5

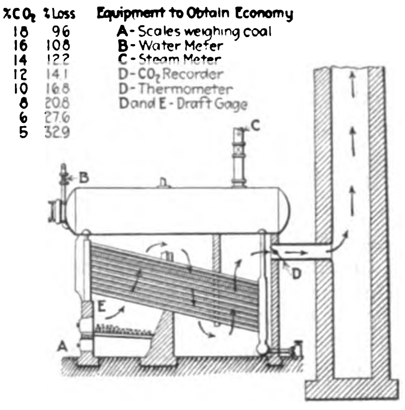

Fig. 6

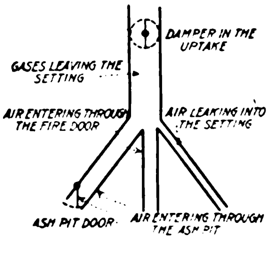
DAMPER IN THE UPTAKE
GASES LEAVING THE SETTING
AIR ENTERING THROUGH THE FIRE DOOR
AIR LEAKING INTO THE SETTING
ASH PIT DOOR
AIR ENTERING THROUGH THE ASH PIT

Fig. 7

FIG. 5—CURVES SHOWING PROGRESS OF COMBUSTION BEYOND FUEL BED AND EFFECT OF EXCESS AIR. FIG. 6—APPARATUS DESIRABLE FOR ECONOMICAL BOILER OPERATION (TABLE SHOWS LOSSES FOR VARIOUS PERCENTAGES OF CARBON DIOXIDE). FIG. 7—DIAGRAM SHOWING WHY DRAFT SHOULD BE CONTROLLED BY FLUE DAMPER.

Hand firing is common in the smaller plants but the labor costs and great difficulty of getting efficient firemen makes stoker-fired furnaces usually more economical where large quantities of coal are handled.

Since the fresh fuel of a hand-fired furnace is placed on top of a hot fuel bed the volatile gases are distilled over the entire fuel bed and there is a demand for additional air to consume these volatile gases that must be supplied through the shutters of the fire door. There is a great variation in the requirement of air over the fuel bed during the processes of firing, hence small quantities of coal should be fired at frequent intervals.

The control of draft on a hand-fired furnace should be by means of a damper, and not by the ash-pit doors. Fig. 7 shows why this is important. If the damper is closed the quantity of air entering under the fuel bed and through the fire door, and leaking through the boiler settings is reduced. If the ash-pit doors are closed to reduce the draft the amount of air entering through the ash pits is reduced, causing the grates to heat and increasing the tendency to produce clinkers, and the air entering through the fire door and leaking through the boiler settings is enormously increased. This excess air through the fire door and setting is seriously detrimental to efficiency because the excess air is not combined with fuel to produce heat but cools the gases in the furnace and boiler settings and carries large quantities of heat up the chimney.

In the stoker-fired plant there are the oxidization, reduction and distillation zones but in a somewhat different relation to one another. Each type of stoker equipment presents a somewhat different problem of air supply, arch construction and operation for efficient utilization of the fuel.

Fig. 8, from Bulletin No. 135 of the Bureau of Mines, shows four typical furnaces and indicates how important it is that the fireman should know the fundamental principles of his particular equipment so that he can operate his fires to the best advantage.

The general rules for efficient furnace operation are these: Always maintain a hot fire. Control the rate of combustion to meet the demand for steam by controlling the air supply to the fire. Give the operating forces sufficient equipment to permit them properly to measure the operations they perform and demand of them an understanding and a continual use of this equipment.

FLUE-GAS COMPOSITION MUST BE WATCHED

From what has been said it is evident that the condition of the flue gases gives a good indication of the way in which a boiler is being fired, hence the value of flue-gas analysis. Since combustion in coal is a chemical reaction the analysis of the products of combustion should show in definite degree the efficiency of such operation.

Frequently too much air is permitted to enter the furnaces, filter through the setting and carry away large quantities of heat of combustion. The combustion of one pound of carbon to carbon dioxide requires 11½ lb. of air, and the heat thus produced is 14,540 B.t.u. If 100 per cent excess air should leak into the furnace or combustion chamber the products of combustion would be cooled to about one-half their original temperature. The absorption of heat by the boiler would then be much less efficient and the heat discharged by the stack would be twice as great as if just sufficient air was supplied. The percentage of CO_2 in the stack gases is very nearly a direct measure of the excess air and in turn a relative measure of the chimney losses. The above table shows the relation of percentage of CO_2 and heat loss for a stack temperature of 500 deg. Fahr.

Percentage of CO_2	Loss in per Cent of Coal Fired
18	9.6
16	10.8
14	12.2
12	14.1
10	16.8
8	20.8
6	27.6
5	32.9

It will be observed from the table that as the CO_2 reaches very low values the losses due to excess air become very high.

If the air is not supplied in sufficient quantities or is not well mixed there may be carbon monoxide gas formed. The heat produced by burning one pound of coal to carbon monoxide is only 4050 B.t.u., and, therefore, it is important to have complete mixture and adequate combustion space such that all combustible gases will be completely burned. Tests of the flue gases may be made to show the amount of carbon monoxide.

BOILER SETTING NEEDS CAREFUL ATTENTION

Properly designed and constructed boiler settings are absolutely essential to efficient operation. The maintaining a high CO_2 percentage in the flue gases is most directly effected by the condition of the boiler settings. Air filters readily through porous brick walls of boiler settings and through the cracks that are often found around side doors, inspection openings and supporting columns. This cools the gases and carries away heat that would otherwise be imparted to the boiler. Walls should, at least, be coated with a heavy-body elastic paint to prevent filtering and all cracks should be carefully stopped to exclude all air.

Baffling in the furnace is also important because it forces the gases to sweep over the tubes and impart heat to the boiler. It is an easy matter for operating men to permit baffling to become bad and to neglect repairs. The chief engineer should regard it as his personal duty to inspect and order needed repairs to baffling, even if he has a competent repair man for this tedious work.

The necessity for insulating boiler settings and steam drums has not been fully appreciated in past practice. Every square foot of heated surface, such as side walls, tops and ends of steam drums, becomes a radiator of heat and the heat radiated is almost directly proportional to the difference of temperature between the hot surface and the air. Modern specifications provide for an inch or more of insulating covering over the entire brick setting and steam drums, applied and maintained as carefully as any steam-pipe covering. Sometimes the entire setting is inclosed in steel casing to prevent infiltration of air. It should be remembered that boiler radiation losses continue at about the same magnitude independent of boiler capacity. If the boiler is working at low rating, these losses are just as great as if boiler was working at full capacity.

CLEANLINESS IS A CONSIDERATION ALSO

For the heat of the hot gases to reach the water inside the boiler it must pass through five obstructing layers, namely, a film of gases, a coating of soot and ashes on the outside of the tube, the metal of the tube, a coating of scale on the inside of the tube, and a steam and water film between the scale and the water. Of these two can be removed.

Soot must be removed by blowers and mechanical scrapers, rather than by the use of the hand lance or other crude methods that have proved to be so inefficient in the past. There are few data of any value on the losses due to soot on the outside of tubes, but testimony from those having carefully studied this subject is overwhelmingly in favor of this conclusion. Many of us experience trouble with clinker formation on the tubes, particularly on the rows adjacent to the fires. This may become very troublesome and sometimes the clinker almost stops up the gas passages, necessitating the shutting down of the boilers for cleaning.

Draft-gage measurements over the fire and at the breaching of the boiler are very essential in determining the extent to which the gas passages are being stopped up, as are also temperature readings at the breeching. These indicate the degree to which the tubes are being coated with soot because the gases passing from the boiler become hotter since the boiler cannot absorb the heat. Thus there is great loss of heat to the stack. Soot is an excellent heat insulator.

Next in order comes scale in the tubes. Most all boiler depreciation and maintenance of tubes and drums are due to scale. Tubes are not burned unless they are dirty inside. If water must be treated chemically inside the boiler, it should be done scientifically, but the proper place for treating boiler feed water is outside the boiler. Materials that could cause an encrusting solid should be removed before they are pumped into the boiler. If such a process is carefully carried out it is most economical and successful. The effects of scale are somewhat uncertain but it certainly causes considerable losses.

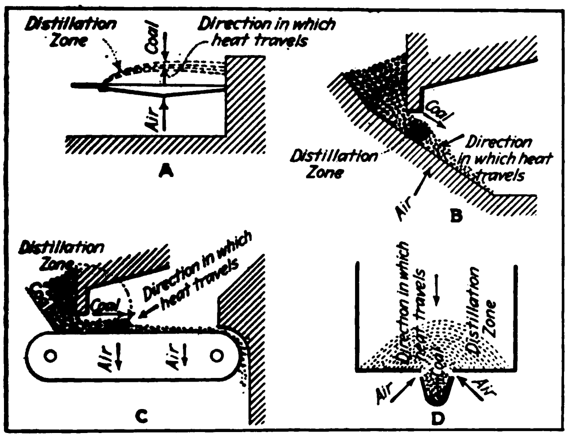
Distillation Zone
Coal
Direction in which heat travels
Air
A
Coal
Distillation Zone
Direction in which heat travels
Air
B
Distillation Zone
Coal
Direction in which heat travels
Air
Air
C
Direction in which heat travels
Distillation Zone
Coal
Air
Air
D

Fig. 8

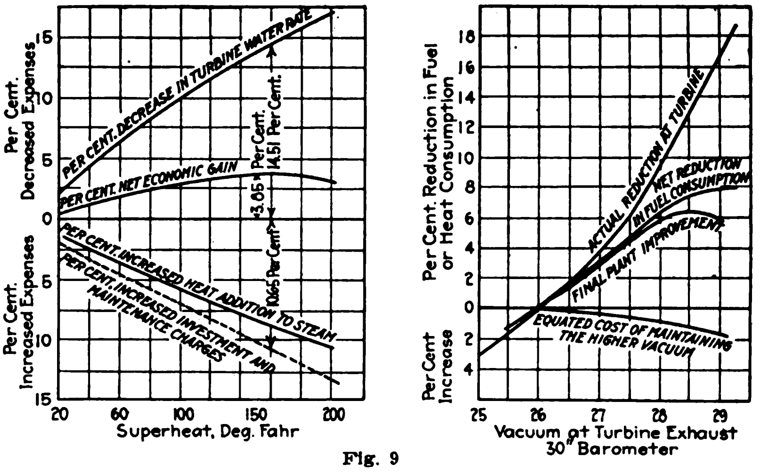

Fig. 9

FIG. 8—FOUR TYPICAL BOILER FURNACES—A, HAND-FIRED; B, OVERFEED, INCLINED GRATE; C, CHAIN GRATE; D, UNDERFEED. FIG. 9—EFFECTS OF SUPERHEAD AND VACUUM ON TURBINE OPERATING ECONOMY

Certain kinds of soft scale resist the flow of heat very little, whereas scales of other compositions may restrict it seriously. One authority gives us the following as the average loss on account of scale in boilers:

Average Thickness, Inch	Coal Wasted per Ton Fired, Pounds
1/50	100
1/32	140
1/25	180
1/20	200
1/16	220
1/11	300
1/9	320

Operating engineers should be on the lookout for leaks of boilers within the settings, such as those around nipples and tube ends, and in locations where they cannot readily be detected when the boiler is in operation. Blow-off valves are a source of considerable waste of heat. In addition steam pipes, feed-water pipes, steam drums, receivers, separators and miscellaneous equipment carrying steam or hot water should be covered to reduce radiation losses. The losses from bare surfaces may amount to very considerable per year, as shown in the following table:

HEAT LOSSES FROM UNINSULATED HOT SURFACES

Temperature of Surrounding Air 70 Degrees Fahrenheit

Steam Pressure, by Gage	Steam Temperature, by Gage	Waste of Coal in Pounds per Square Feet per Year	Number of Square Feet of Surface Waste a Ton of Coal in 1 Year
0	212	293	6.82
100	338	718	2.79
150	366	840	2.38
200	388	945	2.12
250	406	1,036	1.93

Above figures are based on boiler efficiency of 70 per cent, using coal with an assumed heat value of about 14,000 B.t.u. per pound.

Covering of proper thickness and quality will save from 75 per cent to 90 per cent of the above losses.

All engineers know that there is a substantial saving by heating boiler feed water because such heat as is put into the water before it enters the boiler does not have to be supplied by the fuel of the furnace. Many plants can increase the temperature of the boiler feed water by more careful conservation of the exhaust steam from auxiliaries and better maintenance of feed water heaters. In many plants full advantage is not taken of this source of saving. The saving will amount to about one per cent for each eleven degrees added to the boiler feed water.

SOME SAVINGS ARE POSSIBLE OUTSIDE THE BOILER ROOM

So far attention has been given only to the boiler room. There is not usually the chance of saving so much in the engine room. Turbine and engine equipment with reasonable care may operate nearer their maximum efficiency than boiler-room equipment. There are, however, many small sources for improved economy here also. The average engineer spends more of his time in the engine room than the boiler room and knows more about what is required to maintain efficiency there.

Reciprocating engines should be given particular attention to insure tightness of valves and pistons and correctness of valve setting for the conditions under which they must operate. Indicator cards should be taken at sufficiently frequent intervals. Regular inspections should be made of the valves and pistons to detect conditions that may not be shown by indicator cards.

The performance of turbines and engines is much improved by superheating steam. Where plants are equipped with superheaters an endeavor should be made to keep them in condition to furnish maximum superheat. The gain due to superheat in reciprocating engines comes mainly from reduction in cylinder condensation, while in turbines it results primarily from reduction in windage. In the turbine the steam consumption is improved about 1 per cent for every 6 to 14 Fahrenheit degrees of superheat. Fig. 9 shows these relations.

It is essential also that the most economical vacuum shall be maintained. Poor vacuum, where such occurs, is probably due to failure to keep condenser equipment tight and the air and circulating pumps in good working order.

Turbine economy drops off very rapidly for slight reduction in vacuum. Fig. 9 shows the relation of vacuum and heat reduction for a typical turbine installation. In general there is a decrease of steam consumption of about 5 per cent for each inch of vacuum between 25 and 27 in. vacuum, 6 per cent between 27 and 28 in., and 8 to 12 per cent between 28 to 29 in.

Another fruitful source of loss is through leaky steam traps. Valves and valve seats of steam traps wear and leaks may develop that may not be observed by the chief engineer. Other leaks which may develop are those in packing around valve stems and pipe line joints. These may not appear important, but they are so easily neglected that they are often allowed to continue for a long time. A leak never mends itself and the final cost of repairs is equal to what it would have been at the time the leak developed. Hence, the loss, whatever it is, is a complete one and oftentimes it goes on at an accelerating rate. The following table is suggestive:

LOSS DUE TO STEAM LEAKAGE

Size of Orifice, Inch	Pounds of Steam Wasted per Month	Total Cost per Year
1/4	300,000	$840.00
1/8	75,000	204.00
1/16	19,000	53.00
1/32	4,800	13.30

Steam pressure 150 lb; coal at $3.50 a ton.

Permitting leaks to continue in the plants develops careless maintenance and a careless operating force. One reacts on the other until ofttimes conditions become deplorable. With the present high price of fuel, high cost of labor and keen competition we should all do our very best to reduce our power station loss to a minimum.

Merchandising of Transportation Is Lacking*

Greatest Need of Electric Railway Freight Business Is Active Traffic Organization and Proper Merchandising Methods Based on Public Psychology

By A. B. COLE
Westinghouse Electric & Manufacturing Company

FREIGHT transportation, as a commodity to be marketed, must be considered from all angles for electric railways to be most benefited. Usually when speaking of freight, we think immediately of the shipper. Let us analyze, however, a few other important factors that must be considered.

Law-Making Bodies: Many lines throughout the country are suffering from unjust restrictions imposed by national, state and municipal authorities. By proper cultivation and some missionary work, these should be made to see that the electric railway performs an economic duty inseparable from the welfare of those served. It seems the paramount duty of all railway operators to be active in chambers of commerce and as many business organizations as possible, so that the business public will find that they are human and that there is a personality behind the business.

Public at Large: Make the public think the "electric way," and it will soon realize that electric railway freight is delivered with despatch and often at a more convenient point than by other agency. In other words, advertise service—not rates. Why has the motor truck been able to interest the public so completely? Aggressive and effective publicity surrounded the motor truck with a "veil of romance," and it hitched patriotism and service in the same team, making them almost inseparable. The electric railway needs only to tell and keep on telling its story of service.

Shippers: These need to be fully informed of the freight service in all of its ramifications. They should also be told that the service is backed by proper facilities and handled by an experienced traffic man who knows how to sell freight transportation.

Electric Railway Operators: In many instances the management thinks of only passenger traffic. Hence in many organizations it will be necessary to arouse interest in "freight service" before any appreciable results may be expected from the people.

Traffic Bureau: The sale of freight transportation can be most effectively accomplished through the institution of an aggressive traffic organization supported by effective advertising. Moreover, the traffic developed must be properly handled in order to be held. This is only possible through the co-ordination of all freight-handling facilities in the community and the proper co-operation of all railway managements involved in through-routing. Here the well-paid traffic manager is a valuable investment, for he must not only look after the development of freight business but also see that there is no break in the service. The freight solicitor proper should be used with considerable discretion. Usually, he is of the order-taker type, having only a general knowledge of rates and knowing little of the elements which make the service. In most cases the results of the experienced traffic manager's personal efforts are so singularly superior that solicitors are not needed.

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*Abstract of paper presented at annual meeting of Central Electric Railway Association, Cleveland, Feb. 28, 1919.

Service: The electric railway is in a position to give service superior to that of its competitors, but unfortunately it has failed to tell the public in a convincing way about this service. The electric railway excels in time of transit and in the handling of merchandise or despatch freight. The most profitable or car-load business, however, remains undeveloped to any great extent. Were the handling of bulk freight developed, the revenue derived would greatly increase that now received from the l.c.l. freight, which is the more expensive to handle.

Few lines handle sufficient cars in one train to justify the tonnage at the rate received. Much of the freight handled takes a high-class rate and is delivered in small quantities at the minimum supply. An analysis must be made to determine what classes of freight should be solicited in order to even up the revenue conditions or to eliminate the tremendous amount of freight minimums. All of this must be sold as "service," and when transportation is marketed on its merits, the rate charged will be secondary with the shipper.

Rates: In general electric lines have waited for the steam roads to take the initiative in obtaining increased rates. The electric railways have rarely fought for the broad principle of a special rate based upon the superior service rendered. Proper publicity and constructive work by the traffic departments often would persuade the public to pay the higher price that better service deserves. Early morning delivery of overnight shipments and accessibility to stations entitle the electric railway to a differential wherever speed is the essence of the contract. Often electric service is worth 25 per cent more than steam service to the same destination. Some utility commissions and chambers of commerce appreciate these inherent reasons for higher rates, but sales methods are required to market the superior product of freight transportation, build up more business and increase revenue regardless of steam rates.

Facilities: In order to secure and handle freight business, confidence must be inspired in the shipper. Proper facilities are necessary. Not only rolling stock, both motive-power and trailing, must be provided, but terminals and station layouts (according to the character of the business to be handled), including passing and industry tracks at way-stations. In many cases it is necessary for the company to assist in locating grain elevators, coal yards, lumber yards, stock yards and loading chutes, and sometimes these can be located on the railway's property with long term leases.

Two paramount results which must be accomplished before an extensive and flexible electric railway freight service can be profitably instituted in the various states, both for inter-state and intra-state traffic, are the standardization of freight rolling stock and the pooling of trailing equipment. The pooling system particularly applies to the handling of inter-line trailers, of which there is a drastic need at present. The Central Electric Railway Association has already done considerable pioneer work along both of these lines.

One of the things which has made possible the extensive development of freight interchange on the steam railways has been the flexible working of the interchange pool, which was operated on the per diem basis before government control. Some particular method will have to be adopted by electric railways in order more extensively to develop interline traffic. There must be no restriction as to destination so long as there is a pair of "electric" rails, reaching to points far and wide. This would be adhering to one of the fundamentals of economical freight operation, which is to keep freight on its original wheels as long as possible.

MERCHANDISING IS NEEDED

The lack of merchandising of transportation among electric railways is so evident that authorities in other fields comment on it. Recently *Printers Ink*, an important advertising magazine, printed the following editorial:

> What is the matter with the public utilities, especially the electric railways? Many of them seem to have a larger variety of troubles than ordinarily falls to the lot of any one business. They are abused and railed at from every side.
>
> On the one hand, they have lost the confidence and good will of the public, and on the other hand, they have won the suspicion and often the opposition of the state and city officials. From the back, investors are inclined to withhold their support, and in front, the companies are confronted with ever-increasing operating costs. In many cases, rate increases would seem to be a necessity, but because of the bitter feeling that exists toward the utilities it is impossible for them to get permission to advance their charges. The stopping of the war does not hold out any relief to them.
>
> What is wrong? Why should a business that renders the public such a necessary service be so mistrusted? In many cases at least the trouble is that the management of these companies lacks a modern merchandising viewpoint. It may be able to give fair service, but lacking the selling instinct it is unable to sell this service at an adequate price. In any properly advertised business, it is easy to get a just price for the product. When a business' customers are sold on its fairness, they are always willing to pay any necessary price advances.
>
> It would appear, therefore, that where a public utility is rendering satisfactory service, better selling methods would overcome many of its problems. In numerous cases, however, the poor service, that the companies are giving is the cause of their troubles. Here again we often find that the actual head of the operating end of the property is not a salesman. Often he has no real authority. The real bosses of the system are the financiers who control it. Frequently, these men have no direct connection with the sales end of the business. They have no knowledge of the physical needs of the property and no conception at all of the service requirements of the public. All they do is to look to the operating head to make the system pay, and, lacking authority to institute necessary changes, he is not able to accomplish anything. Thus the thing goes around in a vicious circle.
>
> What is needed is proper co-ordination between the financial and the operating ends of the business. Then as the active head of the system should be placed a man who in the first place can give adequate service, and after that is able to sell it and to get a compensatory price for it. This is the way our big industrial corporations are successfully managed. It is the way our harassed public utilities should be managed. Until they are thus managed, the cry for public ownership of these systems will keep on rising.

The question naturally arises as to whether freight service should be advertised. It would be wasteful for one line of a system to try to attract business from one of its other lines. But it is wrong not to inform the public generally on the matter of the quickest and the best route to market its goods, and tell whom to see when in trouble and where he is located, etc.

In the education of the farmer by the Bureau of Markets, pointing out to him how best to market his products, the electric railway can do much good by running in farm publications constructive advertising copy calling attention to its published pamphlets, schedules and general articles describing briefly its facilities. In view of the fact that a large number of the farm papers are more or less localized to certain sections of the country, covering only a few states, it is easily possible to find a medium that will effectively cover a railway's territory. The farmer has a drastic need for an effective marketing system for his products. The electric railway can help through its traffic bureau being definitely informed as to marketing conditions throughout the territory served. Much traffic can be attracted to lines by the freight personnel coming into intimate contact with associations of farmers and other business organizations which have to do with the marketing of products at some city or center. The traffic department can investigate conditions around the important markets and act in an advisory capacity, so that the farmer can feel safe in shipping his products to commission brokers recommended by the railway.

In some cities the steam railroads go so far as to provide a terminal where farm products are shipped to certain commission brokers for daily sale or reconsignment to local dealers. This same scheme is possible in the electric railway field. The scheme of the purely farmers' market in many cities has too often proved a failure to require any further comments at this point, other than that attempts to use the electric railway for handling produce to such markets generally have been expensive and in many cases unsatisfactory, unless it was possible to move all goods by carload lot.

Manufacturing industries also present great possibilities for development of electric railway freight traffic. These industries are located many times in centers of distribution so that carload shipments of products can be easily handled by the use of trailers to points on the electric line. This also holds good for large wholesale and distributing companies—for example, such as chain stores. In this case the main warehouse for a chain of stores may be located at some central point where the electric railway can handle all traffic to the various stores in the chain. This presents a continuous flow of traffic which insures the electric railway a profitable return, as most of this freight moves in large quantities and sometimes carloads.

COMPETING WITH THE MOTOR TRUCK

With the United States Railroad Administration economizing in its freight service, passing up the way stations and giving adequate attention to only the larger terminals, it behooves electric railways to see that the motor truck does not take advantage of the lack of service performed by the steam railroads to points which are inherently those covered by electric railways. In different parts of the country we now find motor truck lines well established for handling freight as well as passenger traffic. In the rarest cases do we find the motor truck acting as a feeder to electric lines. Generally it is taking the cream of the traffic which belongs to the electric railway.

Unfortunately, the advertising which was used by the Highways Transport Committee under the auspices of the Council of National Defense has done considerable unintentional harm to the electric railway industry in the way of furthering motor transportation. With this constructive literature not only went material explaining to the public in general that it was patriotic to use the motor truck in that this meant "saving a freight car for Uncle Sam," but there was also instructive literature published which would aid the motor-truck owner to establish freight routes.

Moreover, the establishment of the Return-Loads Bureaus was an attempt to stabilize motor-truck transportation. Not only the Council of National Defense, through the Highways Transport Division, did everything to promote this movement, but even the Post Office Department expressed considerable sympathy for it. The perfection of the return-load system was expected to prove a boon to manufacturers of specialties, who, for the very reason that they ship in less-than-car-load lots, have suffered most severely from the traffic jam on the railroads. Through this scheme of return loads, and other things, it has been possible for the motor truck to establish itself in the minds of the shipping public as being a first-class means of handling freight.

From the foregoing it can be readily seen that the motor-truck promoters are wide awake and aggressive. Therefore, it seems high time for united action from the electric railway industry. It is important that the industry be awakened to the fact that it will be necessary to co-ordinate all the available facilities and aggressive methods of conducting business in order to combat the encroaching competition from the motor truck.

Some of the more or less sane motor-truck operators feel that the function of trucks is to act as feeders to existing transportation systems, and especially to the electric railway, owing to its rapid transit. Possibly the ultimate solution of this problem lies in the regulation of the motor truck by the several states and in the use of the electric railway and the motor truck in one or all of three ways:

1. Let the motor truck be used as a direct feeder for l.c.l. freight to the electric railways.
2. Through a system of containers let the motor-truck operators, like forwarding agents at seaboard, collect freight from certain distribution centers to be shipped via the electric railway.
3. Let the motor-truck be used in shuttle service between electric railway systems that require a link for a through freight route.

The foregoing remarks have been made with the intention of pointing out a few fundamentals that will have to be considered in developing freight traffic. Much remains to be said about facilities, but the greatest action necessary is the provision for organizations to develop freight traffic, backed by proper merchandising methods and aggressive salesmanship based on public psychology.

Electric Railways in China

According to a recent report of the Department of Commerce, only three cities in China have electric railways at present—Shanghai, Tientsin and Hong Kong. Canton is considering the installation of one, and Mukden, in Manchuria, has a horse-car line. The line in Shanghai is the largest and in 1916 had 25.8 miles of track, ninety motor cars, seventy trailers and seven trackless trolleys. The company had a capital stock of $1,600,000 on which in 1916 it paid 10 per cent. There is a second line in the French concession and a native system in the Chinese city. Most of the development has been in the hands of the British and most of the equipment was made in England.

Power Plant Economies and Freight Discussed by C. E. R. A.

At Cleveland Meeting of Feb. 27 and 28 Papers by G. H. Kelsay and A. B. Cole Brought Out Much Further Information

A PARTIAL report of the proceedings of the annual meeting of the Central Electric Railway Association, held at Cleveland on Feb. 27 and 28 was given in last week's issue of this paper. It covered principally the Thursday program. On Thursday evening nearly 270 persons participated in a dinner-dance in the grand ball-room of the Hotel Cleveland. On Friday morning papers were presented by G. H. Kelsay, on "Power House Economies," and A. B. Cole, on "Development of Freight Traffic on Interurban Lines." The papers are abstracted in this issue.

J. T. BEASLEY SPEAKS AT BANQUET

The only speaker after the dinner on Thursday evening was John T. Beasley, an attorney of Terre Haute, Ind. The program was arranged thus to give the speaker ample time to cover his subject thoroughly and to permit early closing for the dance. Mr. Beasley's central topic was the fundamental essentiality of electric transportation, and its right to existence and protection. There are, he said, no fundamental legal barriers to the raising of rates if failure to raise them would constitute virtual confiscation. There is a reserve power in law and in government which will take care of the exigencies of a situation like that in which the electric railways now find themselves. Relief will be granted them because justice demands it.

Mr. Beasley pointed out, however, that success depends upon adapting equipment to the service which the public demands. We are in a time of change, but not all change represents progress. Real progress is the need of the hour. In view of the future that there is for the electric railway transportation industry there is every reason why managers should "stand by their guns" in its defense. They are trustees for the properties which they operate and they represent the interests of those who have invested funds in the enterprise.

FRIDAY MORNING DISCUSSION ON POWER PLANT ECONOMIES

A lively discussion followed the presentation of Mr. Kelsay's paper. In answer to a question as to the most economical vacuum to be maintained in a power plant, he said that this depends so much upon local conditions that no general average can be stated. Another question related to the possible advantage of a thin scale in boiler tubes to prevent corrosion. Mr. Kelsay said that such scale is not desirable.

L. P. Crecelius, superintendent of power Cleveland Railway, said that, as pointed out in the paper, the keystone to the whole situation is efficient operation of such facilities as are now available. It is quite likely that the price of fuel will remain higher than heretofore, as the two large items of high labor and transportation costs will operate to sustain the price of fuel some 60 to 70 per cent above the former level. As a consequence all attention must now be concentrated upon the judicious use of this fuel. Several means of doing this have not been generally used, but the time has now come when neglect to practice obvious economies cannot be justified or tolerated.

To the economies listed by Mr. Kelsay Mr. Crecelius added the following:

1. In boiler plants the addition of mechanical soot blowers may result in a saving of 5 per cent in fuel when these are properly installed and operated in conjunction with pyrometers whose thermal couples are so placed in the boiler setting as to yield a continuous record of the temperature of the gases escaping to the smoke stack.
2. In plants not already equipped with superheaters a fertile field for economizing exists. A moderate degree of superheat, say 50 deg. Fahr. at the throttle for reciprocating engines and 75 deg. for turbines, may yield a fuel saving of 5 per cent.
3. In general too little attention is given to the extravagant losses from excessive blowing-off of boilers and water columns, and neglect of maintaining control valves in good condition. A good plan is to gather every form of drainage from boilers into a common main which ends in a suitable tank. This should be provided with a recording pyrometer as a check against excessive blow-off intervals and duration, and to indicate leaks. With this arrangement the tank water will always be hot unless all leaks are stopped. Thus the blow-offs can be cut down to the minimum, the limit being set by the feed-water quality. Careful attention along the line indicated, including the stopping of safety-valve blow-offs, can save 5 per cent in fuel.

While the installations suggested may require some additional capital expense, the devices are not very expensive and their use is fully justified by the present high cost of fuel.

M. B. Lambert, Westinghouse Electric and Manufacturing Company, said while power house economies are important, economy in the operation of cars should not be overlooked. Charles L. Henry, Indianapolis & Cincinnati Traction Company, emphasized the necessity for taking advantage of the savings suggested in order to offset the increased cost of getting coal out of the mines. W. E. Rolston, Chicago, Lake Shore & South Bend Railway, said that car and power plant operation are so closely related that they must be considered together. For example, judicious use of trailers during rush hours might have a beneficial effect on the power plant load. Another speaker, referring to plant personnel, urged that positions in the power plant be made attractive to technically trained men. Otherwise the railways will be dependent upon men whose experience has not been sufficiently wide to enable them to secure the economies outlined by Mr. Kelsay. H. H. Norris, ELECTRIC RAILWAY JOURNAL, gave results of a sample calculation to show the importance of practicing economies in the boiler room, where the greatest savings are possible. He estimated that $45 per day could be saved in fuel in a 5000-kw. plant, with a load factor of 30 per cent and a coal cost of $6 per ton. Mr. Crecelius made the point that CO_2 recorders must be used in conjunction with intelligent flue-gas analysis. He also cited a case where in a coal contract provision is made for a price reduction when the ash content exceeds a prescribed amount.

DEVELOPMENT OF FREIGHT TRAFFIC ON INTERURBAN LINES DISCUSSED

F. D. Norviel, Union Traction Company of Indiana, opened the discussion on Mr. Cole's paper by pointing out some of the practical aspects of the situation. The cost of handling freight on electric lines had proved to be much greater than was originally supposed. The same situation was disclosed with respect to the steam roads in connection with their applications for rate revisions. The accounting end of the electric freight business had not received the attention it deserved. Mr. Norviel expressed approval of Mr. Cole's ideas regarding advertising, and said that publicity campaigns should be conducted by groups of electric railways rather than by individual roads. He believes that personal solicitation is even more effective than advertising, but that this should be supplemented by printed matter giving rates, schedules, points reached, etc. If the electric railways would pool their advertising expenditures much better results could be secured.

C. E. Morgan, Michigan Railway, showed the economy of handling freight at night, thus making possible the better use of the railway facilities. Early morning deliveries are greatly appreciated by shippers. Electric lines have now a great opportunity to develop this business on account of the present disinclination of the steam roads to cater to short-haul traffic. Prompt action will solve the problem of motor-truck competition. C. A. Laney, Northern Ohio Traction & Light Company, expressed the belief that the collection and delivery feature must be added to the freight service. He urged that legislation be secured to impose fair road taxes on the motor-truck owners, as it is lack of these that makes it possible for the trucks to take legitimate business from the railways. Mr. Morgan replied that collection and delivery add unwarranted expense to the service and he does not believe their use to be expedient. Bert Weedon, Interstate Public Service Company, made an informal statement for the Indiana committee on motor truck competition to the effect that the committee favors an aggressive advertising campaign. He believes in pick-up and delivery service.

PRESIDENT-ELECT COLLINS TAKES THE CHAIR

After the discussion on freight matters President Coen announced that Secretary-Treasurer Neereamer's report had been printed and that it shows the society to be in flourishing condition. He called for the report of the nominating committee which was approved unanimously and the candidates to office were declared elected. The list of names was printed last week.

In resigning the chair to his successor, Retiring-President Coen thanked especially those who prepared papers for this and previous meetings, and expressed appreciation for the co-operation which he had enjoyed. Mr. Collins, in taking the chair, expressed his desire particularly that the boat ride in July should be a great success. The meeting, which all present considered one of the best ever held, then adjourned.

Italy Prefers Straight to Zone Fares

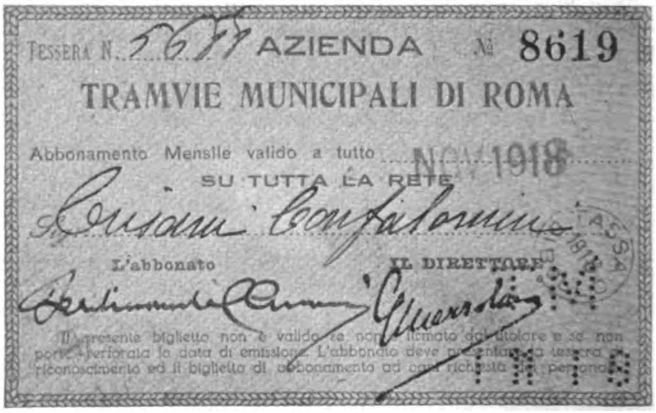
Application of Extended Zone Plan to One-Man and Other Recent Types of Cars Presents Difficulties

By FERDINANDO C. CUSANI
Milan, Italy

I HAVE read with much interest the letter from I. H. Moir, published in your issue for Dec. 21, and I would like to point out some facts relating to the controversy between zone versus straight fares.

While the zone system originated in Europe, it is by no means universal on this side of the Atlantic. Many of the largest street railways in Italy, for instance, have always been operating on a straight-fare basis, while there is a very strong movement toward the abandonment of zone fares in city transit service.

Most of the municipally-owned systems are operated on the basis of straight fares, and many private properties have adopted them, either wholly or in part, especially when they have had to fight municipal competition. And whenever new contracts or franchises are considered, the straight unit fare is always set as an absolute condition for city service, while a return to the zone fare is as far from the minds of the regulating bodies as the thought of returning to the horse cars of olden days.


TESSERA N. 5677 AZIENDA № 8619
TRAMVIE MUNICIPALI DI ROMA
Abbonamento Mensile valido a tutto NOV 1918
SU TUTTA LA RETE
Cusani Confalonieri
L'abbonato IL DIRETTORE
Il presente biglietto non è valido se non è firmato dal titolare e se non porta perforata la data di emissione. L'abbonato deve presentare la tessera di riconoscimento ed il biglietto di abbonamento ad ogni richiesta del personale.

COMMUTATION TICKET USED ON ROME MUNICIPAL TRAMWAY

Of course some of the special fare arrangements which seem so greatly to disturb rapid transit executives in the United States are not in use in this country. Transfers, for instance, are never issued so freely, and on some of the bigger systems (in Milan, for instance) they are not issued at all. Strip tickets also are wholly unknown. On the other hand, reduced early morning fares and commutation tickets are an almost universal practice in Italy.

These commutation tickets, which as a rule are issued for one month, three months, six months or one year and carry a perforated photograph of the bearer for identification, are good for any number of rides during the period for which they have been issued, either on one line or on a given number of lines or on the whole system, according to the price paid. On the Rome municipal lines, for instance, a commutation card good for one line and one month costs 6 liri and 20 centesimi (about $1.16) while a monthly commutation card for the whole system of ten lines costs 15 liri and 60 centesimi.

Italian straight fares average 15 centesimi (3 cents) for regular service and 5 centesimi (1 cent) for early morning traffic between 6 and 8 or 8:30 o'clock, with a few systems charging 10 centesimi (2 cents) for morning service, 20 centesimi (4 cents) for all-day service and 25 centesimi (5 cents) for owl service. With the exception of the morning fares, which aren't taxed, all other fares include a tax of 5 centesimi (1 cent) per ride levied by the government, which thereby assumes the burden of paying all war bonuses and wage increases to traction employees. When one realizes that many of these straight-fare street railway systems though having had to fight with a metal, materials and supply situation much worse than that which has taken place in America (girder rails for instance, whenever they could be found, up to last November were paid for at the average rate of 25 cents a pound) were actually making money, one cannot but speak highly of the popularity of this scheme over here.

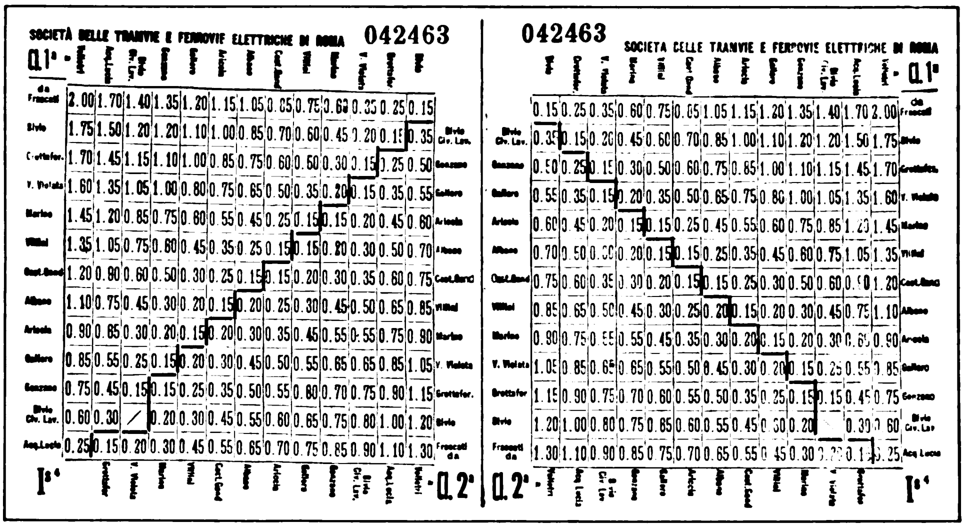
And now, talking about American railways, I should really like to see the happy results of applying the British zone ticket scheme to the latest designs of prepayment cars; let's say, for instance, to the Birneys or the Peter Witts. How could the passengers be checked up without undue complication? Or how could overriding efficiently be prevented without the addition of a very strong inspection force, which would necessarily entail the use of one more man for every few cars? The Mahoning & Shenango Railway seems to have resorted to the system (which seems only practicable on Peter Witt cars) of fare tokens distributed by the motorman when the passenger boards the car. Such a plan might be feasible in cities of such relatively small size as Youngstown, Ohio, but the same plan could hardly be carried out along Broadway or Forty-second Street in New York City, where the traffic and the operation of the car are bound constantly to absorb the attention of the motorman.

And how will the motormen-conductors of Birney cars deal with overriding passengers? Will they have to leave their post, thereby making an emergency stop, whenever a passenger attempts to ride farther than his ticket allows him? Or will they wait to nab him when he tries to get out, thus interfering with the collection of fares from entering passengers? And how will they manage to issue a number of widely different types of tickets, punch them and make change without considerably increasing the length of the stops, thereby absolutely "killing" all the good points and qualities which allow the one-man safety car to be a real relief during rush-hour congestion?

Mr. Moir seems to overlook one more fact; that is, that all of the modern traction equipment in the United States is built for and operated along the prepayment plan. The reason for this seems to have been both the promotion of safety and the assurance that all rides shall be paid for. Most all of these cars are equipped with door and step control of some kind, which must be operated by the conductor from a fixed point. All of them, barring the Peter Witts, afford only small capacity for prepayment while in motion, and the secret of their success lies only in the simplicity of fare-box and straight-fare collection. Would you like to imagine, for instance, a Montreal pay-as-you-enter train loading on a snow-storm day and the conductors fumbling with a series of tickets of the British type, that is to say, all different, small and capable of being punched only with difficulty? What would the prospective car riders think of the scheme, and wouldn't this be a splendid opportunity both for the jitneys and Henry Ford's "tin Lizzies"?

PREFERS PAY-ENTER-PAY-LEAVE PLAN

If I may express my humble opinion on this subject, I would say that the only scheme that seems rather fair and feasible is the two-zone pay-enter-pay-leave plan, as used in some American cities now. This system, though not perfect, seems to be the only method that may rather easily be applied to the thousands of prepayment cars now in operation all over the North American Continent. Such a plan is fair to the public in that it tends to keep the average short ride in the center of the city at the minimum fare while it puts an increased burden on passengers going or coming from the suburbs. It thus encourages the short haul which seems by far the most profitable and makes the long haul fairly and honestly pay for itself.



SOCIETÀ DELLE TRAMVIE E FERROVIE ELETTRICHE DI ROMA 042463

0.1ª

da Frascati	2.00	1.70	1.40	1.35	1.20	1.15	1.05	0.85	0.75	0.60	0.35	0.25	0.15	
Bivio	1.75	1.50	1.20	1.20	1.10	1.00	0.85	0.70	0.60	0.45	0.20	0.15	0.35	Bivio Civ. Lav.
Grottafer.	1.70	1.45	1.15	1.10	1.00	0.85	0.75	0.60	0.50	0.30	0.15	0.25	0.50	Genzano
V. Violata	1.60	1.35	1.05	1.00	0.80	0.75	0.65	0.50	0.35	0.20	0.15	0.35	0.55	Galloro
Marino	1.45	1.20	0.85	0.75	0.60	0.55	0.45	0.25	0.15	0.15	0.20	0.45	0.60	Ariccia
Villini	1.35	1.05	0.75	0.60	0.45	0.35	0.25	0.15	0.15	0.20	0.30	0.50	0.70	Albano
Cast. Gand	1.20	0.80	0.60	0.50	0.30	0.25	0.15	0.15	0.20	0.30	0.35	0.60	0.75	Cast. Gand
Albano	1.10	0.75	0.45	0.30	0.20	0.15	0.20	0.25	0.30	0.45	0.50	0.65	0.85	Villini
Ariccia	0.90	0.65	0.30	0.20	0.15	0.20	0.30	0.35	0.45	0.55	0.55	0.75	0.90	Marino
Galloro	0.85	0.55	0.25	0.15	0.20	0.30	0.45	0.50	0.55	0.65	0.65	0.85	1.05	V. Violata
Genzano	0.75	0.45	0.15	0.15	0.25	0.35	0.50	0.55	0.60	0.70	0.75	0.90	1.15	Grottafer.
Bivio Civ. Lav.	0.60	0.30	/	0.20	0.30	0.45	0.55	0.60	0.65	0.75	0.80	1.00	1.20	Bivio
Acq. Lucia	0.25	0.15	0.20	0.30	0.45	0.55	0.65	0.70	0.75	0.85	0.90	1.10	1.30	Frascati da

Iª 0.2ª

042463 SOCIETÀ DELLE TRAMVIE E FERROVIE ELETTRICHE DI ROMA

0.1ª

	0.15	0.25	0.35	0.60	0.75	0.85	1.05	1.15	1.20	1.35	1.40	1.70	2.00	da Frascati
Bivio Civ. Lav.	0.35	0.15	0.20	0.45	0.60	0.70	0.85	1.00	1.10	1.20	1.20	1.50	1.75	Bivio
Genzano	0.50	0.25	0.15	0.30	0.50	0.60	0.75	0.85	1.00	1.10	1.15	1.45	1.70	Grottafer.
Galloro	0.55	0.35	0.15	0.20	0.35	0.50	0.65	0.75	0.80	1.00	1.05	1.35	1.60	V. Violata
Ariccia	0.60	0.45	0.20	0.15	0.15	0.25	0.45	0.55	0.60	0.75	0.85	1.20	1.45	Marino
Albano	0.70	0.50	0.30	0.20	0.15	0.15	0.25	0.35	0.45	0.60	0.75	1.05	1.35	Villini
Cast. Gand	0.75	0.60	0.35	0.30	0.20	0.15	0.15	0.25	0.30	0.50	0.60	0.80	1.20	Cast. Gand
Villini	0.85	0.65	0.50	0.45	0.30	0.25	0.20	0.15	0.20	0.30	0.45	0.75	1.10	Albano
Marino	0.90	0.75	0.55	0.55	0.45	0.35	0.30	0.20	0.15	0.20	0.30	0.65	0.90	Ariccia
V. Violata	1.05	0.85	0.65	0.65	0.55	0.50	0.45	0.30	0.20	0.15	0.25	0.55	0.85	Galloro
Grottafer.	1.15	0.90	0.75	0.70	0.60	0.55	0.50	0.35	0.25	0.15	0.15	0.45	0.75	Genzano
Bivio	1.20	1.00	0.80	0.75	0.65	0.60	0.55	0.45	0.30	0.20	/	0.30	0.60	Bivio Civ. Lav.
Frascati da	1.30	1.10	0.90	0.85	0.75	0.70	0.65	0.55	0.45	0.30	0.20	0.15	0.25	Acq. Lucia

0.2ª Iª

DUPLEX ZONE INTERURBAN TICKET USED BY ROME ELECTRIC RAILWAY & TRAMWAY COMPANY

As for the forms of checks submitted by Mr. Moir, they do not seem to differ at all from the usual British pattern as supplied, for example, by the Auto-Ticket Company, Ltd., of Liverpool or by Whiting & Sons of London, from either of whom anyone interested could probably obtain very interesting catalogs and literature amply dealing with this matter.

Finally, the zone-punch ticket system requires a great deal of checking and accounting, a thing which by no means can be overlooked in the United States, where people seem to be rather busy and accountants, therefore, do not happen to be lying round the streets.

As of possible interest some tickets employed in and about Rome are shown. The largest is a form of duplex ticket, which is used on the interurban line of the Rome Electric Railways & Tramways Company, and is a real terror to the passengers, the conductors and the cashier's accountants. The right-hand side of this ticket is a stub retained in the book issued to the conductor, and these stubs are checked by the accounting department. The second illustration shows a commuter's ticket used on the Rome Municipal Railway. This card is carried by the commuter in an identification booklet bearing his perforated photograph and his and the manager's signatures. For single fares on the Rome municipal lines, the straight fare is in force, and half of the net earnings go to the employees on a very modern and efficient profit-sharing plan.

I hope that, if perchance Mr. Moir should read this article, he will excuse somebody living much farther than himself from the United States for not sharing his opinions about zones and all their blessings.

Safety-Car Operation in Seattle

Traffic Jumps on Capital Hill Line—Two New Lines Operated with Interpolated One-Man Cars

SAFETY-CAR operation on the Summit Avenue line in Seattle, which began in 1915, has given officials of the Puget Sound Traction, Light & Power Company a good idea of how these cars handle traffic.

The data given in Table I were compiled to show how the safety cars on this line fitted into the traffic schedule, what was the loading time and what percentage of the traffic they carried. The data, which were considered to be typical, were taken between 4 p.m. and 6 p.m. on July 17. The point of observation was on Third Avenue near Pike Street, before the diversion of cars which turn off Pike Street.

The power consumption on one of the Summit Avenue safety cars, equipped with G. E. motors, was 1.51 kw.-hr. per car-mile, averaged over 4626 car-miles. In considering this power consumption it should be noted that there is practically no level track on the Summit Avenue line. The grades are as follows:

2400 ft. of 3.4 per cent grade
1000 ft. of 4.5 per cent grade
600 ft. of 6.8 per cent grade
600 ft. of 6.0 per cent grade
300 ft. of 8.0 per cent grade
Remainder, from 1 per cent to 2.5 per cent

The length of the round-trip route is 4.89 miles. For the most part it runs through a residential and apartment-house district, averaging about nine stops of 6.6 seconds duration for each car-mile. The schedule speed, covering layovers, varies from 7.4 to 6.1 m.p.h.

On Aug. 5, 1918, as noted in the ELECTRIC RAILWAY JOURNAL of Sept. 28, 1918, the company interpolated five one-man cars over the densely settled portion of the Capital Hill line. It is interesting to note that about eight weeks after the installation a general traffic check showed that this line had gained 11 per cent in traffic while other lines during the same period showed a gain of only 4 per cent. It is believed that this increase, in large measure, represents passengers who traveled in private automobiles when car service was less frequent. The safety cars added 18 per cent to the car-hour total on the Capital Hill line.

Since the time when the Capital Hill one-man operation was begun, the company has installed one-man service on two additional lines running into the down-town district—the Kinnear Park line and the Broadway line. Data regarding operation on these two lines are given in Table II. Seattle now has four one-man car lines. On the Summit Avenue line operation is by one-man cars entirely, but on the other three lines one-man turnback service is operated in connection with two-man through cars.

TABLE I—ONE-MAN OPERATION ON SUMMIT AVENUE LINE IN SEATTLE ON JULY 17, 1918

	Two-Man Cars	Summit Line Safety Cars	Total
Number of cars operated	103*	17	120
Per cent of total	86	14	100
Actual average headway (minutes)	1.2	7	1
Headway for thirty minutes at Third Avenue and Pike Street (minutes)	0.9	4.0	0.9
Headway for thirty minutes at Third Avenue and Union Street (minutes—scheduled)	.....	. .	0.75
Number of passengers carried	6,298	649	6,947
Per cent of total	90.6	9.4	100.0
Passengers per car	61	38	58
†Loading time per passenger (seconds)	2.49**	3.02	.....
†Loading time per car (seconds)	30.7	22.7	.....
†Passengers loaded per car	12.3	7.5	.....

* This represents the total number of cars operating on six different lines approximately seventeen on each line.

** A front-end collector was on hand to help with two-man cars, but rendered no assistance to the one-man cars. The apparently excessive loading time of both types of cars was due to the crowded condition of the platforms, which interfered with the boarding passengers.

† These last three items were the results of observations covering a portion of the period mentioned (4 p.m. to 6 p.m.) on two successive days.

TABLE II. OPERATING CONDITIONS ON TWO NEW ONE-MAN CAR LINES IN SEATTLE

1. Kinnear Park Line:

	Two-Man Cars	One-Man Cars	Total
Number of cars scheduled	*123	16	139
Per cent of total	88.5	11.5	100
Average scheduled headway	1 Min.	7.5 Min.	52 Sec.
Number of passengers carried	4,936	299	5,235
Per cent of total	94.3	5.7	100
Passengers per car†	51	19	47

Length of round trip, one-man cars, 4.2 miles.
Scheduled speed, including layover time, 6.6 m.p.h.
Scheduled speed, not including layover time, 7.2 m.p.h.
One-man cars on Kinnear Line alternate with through two-man cars.

	A.M.	M.	P.M.
Headway previous to one-man operation	7	8	6
Headway with one-man operation	3½	4½	3½

2. Broadway Line:

Scheduled speed, including layover time, 6.6. m.p.h.
One-man cars alternate with through two-man cars.

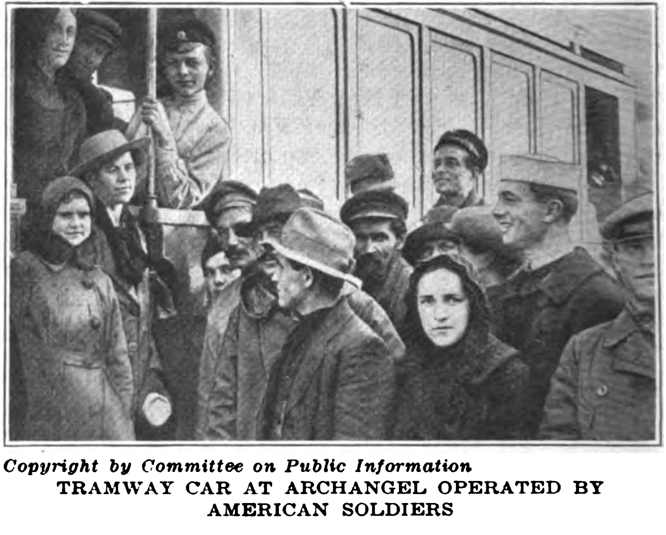
	A.M.	M.	P.M.
Headway previous to one-man operation	7	7½	4
Headway with one-man operation	4½	4½	3

NOTE—Number of cars scheduled northbound on First Avenue at Pike Street between 4 p.m. and 6 p.m. on week days.

* This includes eight different lines.

† Excluding Alki and Fauntleroy cars—practically empty at this time.

Unusual Tramway Operation in Russia



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TRAMWAY CAR AT ARCHANGEL OPERATED BY AMERICAN SOLDIERS

A STREET car strike in Archangel, North Russia, the headquarters of the American North Russian expeditionary forces, caused the military authorities to press soldiers into service to restore order. A car operated by an American soldier is shown in the accompanying photograph, while in the crowd surrounding the car are two American bluejackets. This is one of the first United States official pictures from the American front in North Russia.

Six Hundred Safety Cars in Sixty Cities

New England Street Railway Club Is Told How Use of Safety Car Is Still Spreading Rapidly — Safety Cars Are Revenue Producers, Expense Cutters and Good Will Gainers

SAFETY cars occupied the center of the stage at a meeting of the New England Street Railway Club in Boston, Mass., on Feb. 27. In introducing J. C. Thirlwall, consulting engineer General Electric Company, as the first speaker, President R. W. Perkins pointed out that the safety car offers the operating man an opportunity to regain the good graces of his patrons—something greatly needed at this time.

Mr. Thirlwall said he could not refrain from recalling a prediction made in October, 1917, that the widespread use of the safety car was slated for early realization. About fifty Birney cars were in operation at that time in six cities, and data as to their service results were relatively few. Today more than 600 such cars are in service in more than sixty cities, ranging in size from towns of 20,000 population to towns of 400,000 like Seattle, and even Brooklyn, where certain lines are operated with safety car units.

A striking feature, Mr. Thirlwall said, is that the use of safety cars has spread rapidly after the initial installations. Thus, from one car at Seattle, three in Bellingham and two in Everett, Wash., thirty are now on order for Seattle, sixty for Tacoma, thirty for Bellingham and fourteen for Everett, with others adopted in Vancouver, Astoria, Aberdeen, and Portland, Ore. The most "historic" installation, that at Fort Worth, has been in service for three years, and all but one of the sizeable cities in Texas are using safety cars. This exception, San Antonio, apparently did not install the service properly, making the mistake of placing the fare box too far away from the motorman and thus slowing down the schedule to a point which aroused popular disfavor.

The safety car is in use in about twenty cities of the Middle West. The East has been slower to take up the idea, but early installations at Plymouth, Mass., and Bangor, Me., are giving good service. Within the last two months large success has been attained in their use at Bridgeport, Conn. Brooklyn and Trenton are also falling into line.

According to Mr. Thirlwall, the success of the safety car now merely depends on the adaptability to a particular installation, the questions being how many lines should be equipped in this way, what lines are best suited to safety-car service and what sort of results may be expected.

SAVINGS IN POWER AND MAINTENANCE

The reduction in power consumption is practically in proportion to the saving in weight in comparison with the older types of cars. Sixty per cent of the power bill is saved by the 13,000-lb. safety car, compared with the 40,000-lb. two-man car. This means that two safety cars can be run and power cost saved. Where three safety cars are run instead of two of the old type, the power bill is cut in half. Power costs today are terrific. On an exceptionally well-managed road the cost of producing power has risen in the last two years from 0.4 cent to 1.4 cents per kilowatt-hour. Power is to-day costing the average small road nearer 2 cents per kilowatt-hour than the latter figure named. It is even more important than two years ago to use equipment which will best conserve power.

Regarding maintenance, Mr. Thirlwall said that the first twenty-five or thirty cars have been in service about three years. Some on the Pacific Coast has averaged 60,000 miles per year and have "stood up" as well as older cars in every detail of the equipment, including the safety features. Compared with the ordinary type of four-motor city car, the safety car will require not more than one-half the outlay as to maintenance for equal mileage. Even with a greater number of safety cars on a line the total maintenance cost may run less with these units. It is too early to draw specific conclusions as to the reduction of overhead and roadway maintenance by the use of safety cars.

Turning to the suitability of safety cars for New England, the speaker pointed out that the average wage is today not far from 45 cents per hour for motormen or conductors in that section, or 90 cents per hour per crew. Even by paying the operator of a one-man car 50 cents per hour there is accordingly a saving of 40 cents. Operating costs exceed 40 cents per car-mile in many cases, and receipts on some lines run as low as 15 to 20 cents. On a line earning 15 cents it would be hard to show a profit by the use of safety cars, but these would at least cut down the losses. Lines earning from 25 to 30 cents per car-mile in normal times could about pay their operating costs. By the use of safety cars such lines could probably in many cases be made profitable.

At Fort Worth the net increase in earnings by the use of thirty safety cars was $78,000 per year, the car-mileage having been increased 20 per cent. To improved service was attributed $60,000 increased revenue. At El Paso, in February, 1918, safety cars were placed on two lines, and 20 per cent more service was given. The receipts on these lines increased 37½ per cent, those of the other lines being unchanged. The power consumption was decreased 45 per cent, and twelve carmen were required for the lines in question instead of twenty-two. At Tacoma, Wash., thirty-two safety cars on three lines rendered 50 per cent increased service, reduced the platform labor from fifty to forty-two and increased the gross receipts 40 per cent. Ten of the safety cars on a Seattle line are now giving 55 per cent increased mileage and 67 per cent increased receipts, and require twenty-two carmen instead of twenty-nine. At Terre Haute, Ind., the power savings of twenty-two safety cars pay 12 per cent on their cost. At Everett, Wash., eighteen safety cars are being operated daily compared with a former rush-hour total of thirteen of the two-man type. In a four-months' period in 1918 compared with a like portion of 1917, the car-mileage rose 24 per cent and the receipts about 40 per cent. At the same rate per year, the use of these cars (fourteen new cars at $6,000 each and four remodeled at $4.000 each) would yield increased revenue and operating economies sufficient to pay 75 per cent on the total safety car investment, and in a city of stationary population during the two periods under contrast.

Mr. Thirlwall said that with a car equipment maintenance cost of 4.5 cents per car-mile for an ordinary 20-ton car operated by two men, the maintenance cost of a Birney car would be about 1.5 cents; the power costs would be 6.5 and 2.7 cents respectively, and the crew wages, at 8 m.p.h. schedule speed, 11 and 6 cents respectively. Thus, power, maintenance and wages cost, through the substitution of one Birney car for one 20-ton two-man unit, would be reduced from 22 to 10.2 cents per car-mile. An all-day car making 8.5 m.p.h. and running eighteen hours daily would run 56,000 miles per year, with $12,400 operating cost for a 20-ton car as compared with $5,700 for a Birney car. If three Birney cars took the place of two two-man units, there would be an estimated saving of about $3,800 in yearly operating expenses on the basis of each car displaced.

A car earning 80 cents per mile and running eighteen hours per day earns about $16,800 per year. With Birney cars there should be obtained certainly 50 per cent increased service and 20 per cent more revenue, or $3,300 additional, making a total net increase of $7,000 per year per car displaced. On weaker lines, say with earnings of 20 cents per car-mile, the yearly revenue per car would be about $11,200. Increased service with the safety car should bring $2,200 more revenue, which, added to the $3,800 saving in operation, would yield $6,000 per car. The net increase in revenue and decrease in expenses for three safety cars on a former two-car four-man line would be $12,000 to $14,000 per year, and the safety cars would pay for themselves in from eighteen to twenty-four months. On light service lines a car-for-car replacement is generally desirable, but where shorter headways and increased speed would build up traffic better, a 40 to 50 per cent increase in units is good practice.

In closing, Mr. Thirlwall said be doubted the wisdom of buying new safety cars for tripper service, in view of the usefulness of remodeled units in the rush hours and on holidays. About 400 former two-man cars have been changed over so far. Answering inquiries, he said that in some cases it had become necessary to add another turnout where safety cars had been installed, but in others no changes were necessary. Where snow scrapers have been installed, safety cars have made good records even in severe winter weather. Data as to average power consumption, drawn from different roads, were as follows: In the southwest, something under 1 kw.-hr. per car-mile; in the north, in winter, 1.5 kw.-hr., and in summer, 0.9 kw.-hr The point was brought out that the safety car will start more quickly than an automobile in traversing a railroad crossing at grade.

WHY SAFETY CARS SUCCEED

W. G. Kaylor, Westinghouse Traction & Brake Company, New York, N. Y., then read a paper describing how the safety air brake and control equipment work. Continuing he said in part:

> So many things contribute to the success of the safety car that it is not only difficult to enumerate them but more difficult to discover them. For instance, increased earnings have been charged to more frequent and faster service and more comfortable riding, but there is another factor that affects the receipts. The collection and registering of fares is performed in full view of all the passengers. This encourages honesty in the handling of the company's money. Passengers on a safety car are interested in everything that goes on. They watch the operator handle the car and the passengers getting on and off. If there is a delay they know why the car is held up. For that reason they do not kick about the service as they do on a two-man car where they cannot see what is taking place on the rear platform.
>
> The higher schedule speed of the safety car has been charged to more rapid accelerating and braking, fewer stops, the quick opening and closing of the door and a higher free running speed, but there are other contributing factors. For instance, entrance at the front enables the operator to "spot" the car when bringing it to a stop so that no time is lost by the passenger walking half the length of the car to reach the door. This little detail also adds to the comfort of the passenger, particularly if the street is muddy and he is standing on a crossing.
>
> The traffic officers like the safety car. They have no difficulty in seeing when the door is closed and the car ready to start.
>
> There are many reasons why the men like to handle the safety car. There is no drudgery about it. It is simple and easy to operate. The one man is in sole charge of the car. It is his car. He is dividing responsibillity with no one. He does not have to wait for the bell but starts when he is ready. He is kept comfortably busy all the time. This causes him to take more interest in his work. It keeps him alert and attentive to his job.
>
> On a large eastern line where safety cars have been in service for about a month an interesting situation has developed. Some of the younger men are complaining that there is too much work to do and they wish they were back on their old cars. Upon investigation it has been found that this was propaganda on the part of the younger men to discourage the older men with seniority rights from bidding for safety-car runs.
>
> When getting ready to start safety-car service it has been found that there is danger of too much importance being attached to newspaper publicity. There is no harm in a small amount of conservative publicity properly handled. If publicity is started too soon, however, there is danger of enthusiasm dying down and speculation arising before the cars are ready for service. The men get together and criticize the car before they know anything about it. On the other hand, if one gives them time to speculate, it is remarkable the number of objections the public can raise and the number of old laws they can discover prohibiting the operation of cars with one man.
>
> A practical demonstration is the best possible publicity. When the cars are all ready and the men instructed—say a few days before the date set for starting safety-car service—invite the newspaper men for a ride around town in one of the new cars. The next day take out the Mayor and other public officials. Then start operation when enthusiasm is at its height. After the second day of operation all objections have faded away, the company is realizing the benefits of more economical operation and the public is pleased with the better service.
>
> The uninitiated electric railway manager still finds it hard to believe all he reads and hears about the success of the safety car. He still clings to the old adage that they may be all right somewhere else but would never do on his line. His patrons would never stand for them. The grab handle is unsuitable, the platform too small, the aisle too narrow, etc. His final objection is that the standard safety car is not the last word in street cars. Maybe not—the inventor would be a greater genius than anyone has given him credit for being if that were the case. But why wait? Why hypothesize? Put them in service and then try to improve on them.

Maj. Gardner F. Wells, consulting engineer, New York City, was then called upon to give some observations upon the safety-car service instituted under his supervision at Bridgeport. Nine cars were put in operation on Feb. 2, 1919, on two of the "thinnest" lines in the city, where no jitney service existed. A five-minute headway was adopted in place of a former ten-minute headway, the length of line being 2.75 miles and the schedule speed 8.5 m.p.h., due principally to cars being held up by large cars and jitneys on Main Street. At the end of the first week's operation a 20 per cent increase in gross earnings was noted on these lines, the other lines showing a slight decrease. The second week of operation showed 25.3 per cent increase in gross, with a slight decrease on other lines. For the first week the earnings per car mile were 22.5 cents, and for the second week 23.9 cents. In 1918, the Bridgeport division earned 31.62 cents per car-mile and the expenses were 28.47 cents. The Birney cars, which weigh 7 tons compared with 15 to 20 tons for the old equipment, have resulted in a reduction of the operating costs to practically half.

FAVORABLE RECEPTION IN BRIDGEPORT

J. W. Colton, publicity representative the Connecticut Company, described the results of operation in Bridgeport in remarks which follow in part:

> Criticism of electric railway operation in Connecticut was most rabid in Bridgeport. This spirit of hostility, however, has almost entirely disappeared in the last two months in Bridgeport. The change of sentiment is due to several things, but much credit is due to the good service given by the safety cars and the feeling that more of these cars will be operated in Bridgeport. Persons who used to walk downtown or depend on automobiles, now go on the trolley car because it accelerates so rapidly and covers the ground so quickly that everybody seems to feel sure he will get to his destination speedily and conveniently We have not yet heard a single complaint regarding the operation.
>
> Thus far the safety cars in use have tended to create that which all electric railways most need—public good will. We are confident that when we have tried them out in Hartford and New Haven, where they will begin operating next week, the public will demand more of them. Safety cars are the best eliminators of criticism we have found, because the public is prone to complain more about slowness of service, long waits for cars and so-called minor deficiencies than about the big things that bother the railway men themselves. Anything that will create good will is extremely valuable to the railways at this time, and I would put the safety car at the top of the list of the good-will producers.
>
> As far as preparing the public for safety-car operation is concerned, we gave car riders about a month's notice of the coming improvement. The cars were thoroughly described by means of news articles. When the operators were being trained, the newspapers were given items as to the progress. Three days before the cars went into actual service, advertisements were printed in all the papers to announce the new service, the advertising continuing through the Sunday on which the new service began. Several days before the service began, placards were put in the car windows on the two lines concerned and an additional sign, "Please Have Exact Change Ready for Your Fare," was placed in the cars. The new cars were run over the route without any passengers but on regular schedule on the day before their use. Consequently, everybody on the streets saw the cars, and everybody who read the newspapers knew the cars were to be operated. The result was that they began operation under the most favorable circumstances, all prejudice against them having been removed in advance.

Major Wells then read extracts from many letters from representatives of city governments as to their opinion of the success of the safety car in their communities. At Austin, Tex., "these cars are popular, enabling the railway to secure substantial savings in operation without impairing the service." El Paso, Tex., cites the "quick starting and easy stopping, and undivided responsibility secured by this greatest improvement in street car service for several years." Houston, Tex., reports the cars a success if not overcrowded.

Tampa, Fla., says that the people are on the whole pleased with safety cars, commends the safety devices and objects only to a few jerky starts and stops due apparently to careless handling. Kansas City, Mo., has safety cars on eleven lines; twenty-nine cars have been converted to "safeties," and twenty-five new safety cars will soon be put on the system. Fort Worth reports a success in every way from the public point of view, the cars being "fast, quick in acceleration like a racing automobile." Tacoma, Wash., and Waco, Tex., cite the improvement in service, with noteworthy savings in operating expenses. At Bridgeport cases have arisen where automobile owners admit putting up their autos and patronizing the safety cars instead, and the service of this new rolling stock is giving the jitneys a hard run for their money.

Major Wells also presented the following notes and figures on the safety-car practice of some companies under Stone & Webster management:

> While quite a number of Stone & Webster companies are operating safety cars, there are only two operating practically all one-man cars, at Bellingham and Everett, Wash. At Bellingham the equipment at present consists of twenty safety cars purchased new, eight safety cars built by the company, and eight two-man cars. The two-man cars are not all in use, however, an average of two being operated at the present time. The eight safety cars built by the company are similar to the Birney type, the only important difference being that the trucks are somewhat heavier than those ordinarily used. All but one of this company's lines are operated with safety cars, this line representing not much more than 10 per cent of the total operation.
>
> The Everett company operates fourteen lightweight safety cars, seven rebuilt one-man cars and two two-man cars. The seven rebuilt cars are considerably heavier than the ordinary safety car, having been made over from single-truck closed cars originally operated with two men. All but one line of this company are operated with one-man cars, this line representing about 7 per cent of the total operation.
>
> In both cities interurban cars operate within the city limits over tracks of the local company, but the expense of operating these cars is not included in the figures given in the accompanying table except so far as maintenance of track and overhead would be affected by this operation.
>
> The power expenses per kilowatt-hour, it will be noted, are somewhat higher for Everett than for Bellingham. This is due to the fact that the former purchases practically all of its energy, while Bellingham generates more than half of its energy by water-power and purchases almost all of the remainder at a low rate.
>
> As far as the question of depreciation is concerned, no definite data are had at the present time, but it is assumed in various estimates that one can count on a life of about fifteen years for safety cars. These cars cost about $6,000, which works out on the straight line basis to $400 per year depreciation. On an assumed yearly mileage per car owned of 40,000, this gives 1 cent per car mile. Interest at 8 per cent would give an amount of 1.2 cent per car mile additional.

DATA ON BELLINGHAM AND EVERETT SAFETY CAR SERVICE

	Cents per Car-Mile 1918	
	Bellingham	Everett
Way and structures	1.44	1.82
Equipment*	1.20	1.03
Power	0.85	1.33
Conducting transportation	[illegible]	6.84
Traffic	0.01	0.20
General and miscellaneous	3.02	3.72
Total expense	13.10	14.99

*Not including I. C. C. depreciation charge.

A brief discussion followed the presentation of the foregoing data. It was pointed out by C. C. Pierce, General Electric Company, Boston, that the traffic load-factor is improved by safety cars installed on a higher ratio than 1 to 1. Merchandising transportation through increased service is the great need of the day. It was stated that 26-in. wheels are used in New England safety car practice, and this helps to maintain service under snowy conditions. It was also said that within three months about twenty-five safety cars will be in service on the Philadelphia Rapid Transit System.

Beating the Strikers at Kansas City

Third Strike in Sixteen Months Caused Replacement of Practically the Entire Organization—Domination of Outside Labor Agitators Completely Broken

MANY items concerning the recent strike of employees of the Kansas City (Mo.) Railways have been appearing in ELECTRIC RAILWAY JOURNAL. Because of the unique situation, however, a review with additional information concerning certain developments should be of interest to all electric railway operators.

On Aug. 16, 1917, after a strike lasting eight days, the Kansas City Railways recognized the Amalgamated Association of Street & Electric Railway Employees and entered into a contract for one year. In March, 1918, the men went on a sympathetic strike with the laundry workers' unions for five days. Some employees who had never joined the Amalgamated and others who placed their loyalty to the company above unionism refused to strike. These men banded together and in April, 1918, formed the Kansas City Railways Employees' Brotherhood.

PURPOSE OF LOCAL BROTHERHOOD

The constitution of this brotherhood states that the employees are able to manage and take care of their own affairs and to look after their own interests without interference, advice or dictation by any individual or foreign organization, and that their employment is of a quasi-public nature which is too necessary for the public welfare to be interrupted by strikes of any nature whatsoever.

Active membership in this organization is limited to the following classes:

1. White employees permanently employed. Office employees, officials or those acting in a supervisory capacity shall not be eligible for membership except as honorary members.
2. Persons who do not belong to any other labor organization and who voluntarily express themselves in entire agreement with the principles of the brotherhood without any mental reservations. Applications for membership must be indorsed by the membership committee, and the members must be elected at a regular meeting by a majority of those present and voting.
3. The privileges of honorary membership may be extended to any officials and employees who subscribe to the constitution and whose applications are indorsed and voted upon in the same manner. Such honorary members have no vote and may only be heard by previous invitation or by majority consent.

The association is unalterably pledged to the principle that it is not to affiliate with or become a member of any other labor organization. Members joining any other labor organization forfeit their membership. The affairs of the association in its dealings with the Kansas City Railways are to be conducted wholly through its own officers or committees without aid, advice or interference from persons who are not members. The association is committed to the settlement of all difficulties with the company by conciliation and friendly arbitration.

Members of the brotherhood grew in number to 500 for all departments. They held sick and accident insurance paying $15 a week and paid a total of $1.75 a month dues. Meetings were held every two weeks in a local hall.

HOW THE WAGE QUESTION AROSE

When the time came for the renewal of the contract with the Amalgamated Association, Aug. 17, 1918, the company voluntarily offered an increase in wages of 5 cents an hour, amounting to $560,000 out of the $1,000,000 expected to result from the increase in fares from 5 cents to 6 cents. The increase placed the scale at 30 to 38 cents. The employees refused to accept the offer, and the matter went to the National War Labor Board subject to the famous articles of submission in part as follows:

> It is agreed by and between Division No. 764 of the Amalgamated Association of Street and Electric Railway Employees of America and the Kansas City Railways that the matter of wages and schedules shall be placed before the National War Labor Board for adjustment, subject to the general financial condition of said company and its financial ability under present revenues or any future increases allowed, pursuant to action or recommendation of the War Labor Board or otherwise to pay any wage increase which may be granted.
>
> The decision of the War Labor Board shall be in force for one year from the expiration of the present contract, Aug. 17, 1918, to Aug. 17, 1919, and under the conditions herein set forth to be valid and binding upon the Kansas City Railways and the said association and all the members thereof."

This agreement, made on Aug. 17, 1918, was signed for the company by P. J. Kealy, president, and for the Amalgamated Association, Division No. 764, by E. F. Machael, president, and Sam Wallace, Allan Nelson, J. S. Smithey and W. H. Miles, wage committee.

The War Labor Board on Oct. 24 granted an increase to from 43 cents to 48 cents. In handing down the decision, however, the board noted its conditional aspect in the following words:

> Under the agreement of submission between the company and its employees, this award is made conditional upon the granting of an increase in the rate of fare to be charged per passenger by the company and subject to the financial ability of the company to meet the requirements of the award.

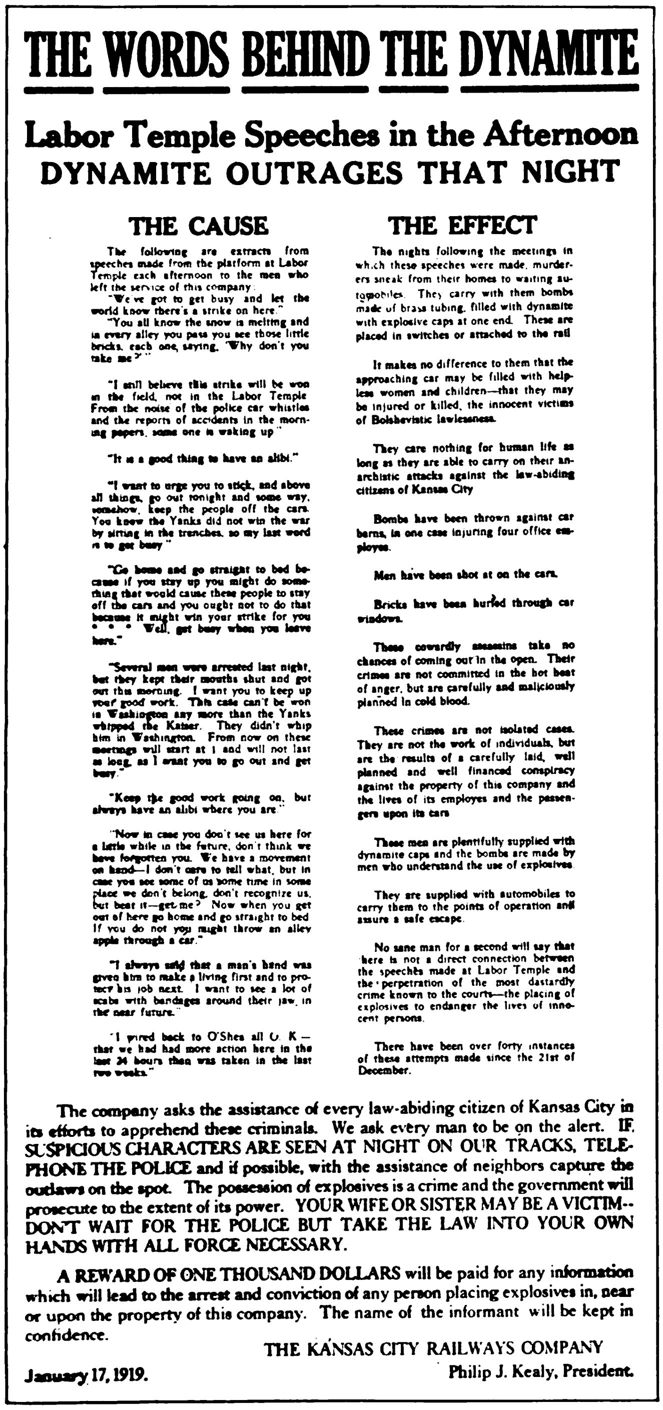
The wage increase amounted to $1,300,000 a year over the increase offered by the company and, if paid without a further increase in fares, would have resulted in a deficit of $1,600,000.

Immediately the railway filed a petition in the Federal Court asking an injunction to restrain the States of Kansas and Missouri, the two Kansas Cities and the two Public Utility Commissions from interfering with the collection of an 8-cent fare which the company declared necessary to pay the award of the board. The company also asked for a construction of the award of the board. On Dec. 3 the court denied the injunction, declaring that the award of the board was not mandatory.

The company then appealed to the United States Supreme Court and to the Public Utility Commissions of Kansas and Missouri. The appeal to the Supreme Court, it is said, was dismissed at the suggestion of the employees, and the Missouri commission refused to take action because its jurisdiction was then in question. During this period an intensive advertising campaign to gain public support for the 8-cent fare and to secure higher wages for the employees was being simultaneously carried on.

OUTSIDE AGITATORS STIR UP TROUBLE

About this time some outside labor leaders appeared on the scene and befogged the issue by making the employees believe that the award of the board was unconditional. A union committee met with President Kealy on Dec. 9 and discussed the action to date. President Kealy told the committee that the company could not pay the increase in wages until an increase in fare was obtained, and it was decided the committee should call on the Mayor to seek city support for an increased fare. Instead of doing this the employees belonging to the Amalgamated Association met on the night of Dec. 10 and voted to strike at 4 o'clock the next morning. No notice from the association was given to the company.



THE WORDS BEHIND THE DYNAMITE

Labor Temple Speeches in the Afternoon
DYNAMITE OUTRAGES THAT NIGHT

THE CAUSE

The following are extracts from speeches made from the platform at Labor Temple each afternoon to the men who left the service of this company:

"We've got to get busy and let the world know there's a strike on here."

"You all know the snow is melting and in every alley you pass you see those little bricks, each one saying, 'Why don't you take me?'"

"I still believe this strike will be won in the field, not in the Labor Temple. From the noise of the police car whistles and the reports of accidents in the morning papers, some one is waking up."

"It is a good thing to have an alibi."

"I want to urge you to stick, and above all things, go out tonight and some way, somehow, keep the people off the cars. You know the Yanks did not win the war by sitting in the trenches, so my last word is to get busy."

"Go home and go straight to bed because if you stay up you might do something that would cause these people to stay off the cars and you ought not to do that because it might win your strike for you * * * Well, get busy when you leave here."

"Several men were arrested last night, but they kept their mouths shut and got out this morning. I want you to keep up your good work. This case can't be won in Washington any more than the Yanks whipped the Kaiser. They didn't whip him in Washington. From now on these meetings will start at 1 and will not last as long, as I want you to go out and get busy."

"Keep the good work going on, but always have an alibi where you are."

"Now in case you don't see us here for a little while in the future, don't think we have forgotten you. We have a movement on hand—I don't care to tell what, but in case you see some of us some time in some place we don't belong, don't recognize us, but beat it—get me? Now when you get out of here go home and go straight to bed. If you do not you might throw an alley apple through a car."

"I always said that a man's hand was given him to make a living first and to protect his job next. I want to see a lot of scabs with bandages around their jaw, in the near future."

"I wired back to O'Shea all O. K.—that we had had more action here in the last 24 hours than was taken in the last two weeks."

THE EFFECT

The nights following the meetings in which these speeches were made, murderers sneak from their homes to waiting automobiles. They carry with them bombs made of brass tubing, filled with dynamite with explosive caps at one end. These are placed in switches or attached to the rail.

It makes no difference to them that the approaching car may be filled with helpless women and children—that they may be injured or killed, the innocent victims of Bolshevistic lawlessness.

They care nothing for human life as long as they are able to carry on their anarchistic attacks against the law-abiding citizens of Kansas City.

Bombs have been thrown against car barns, in one case injuring four office employes.

Men have been shot at on the cars.

Bricks have been hurled through car windows.

These cowardly assassins take no chances of coming out in the open. Their crimes are not committed in the hot heat of anger, but are carefully and maliciously planned in cold blood.

These crimes are not isolated cases. They are not the work of individuals, but are the results of a carefully laid, well planned and well financed conspiracy against the property of this company and the lives of its employes and the passengers upon its cars.

These men are plentifully supplied with dynamite caps and the bombs are made by men who understand the use of explosives.

They are supplied with automobiles to carry them to the points of operation and assure a safe escape.

No sane man for a second will say that there is not a direct connection between the speeches made at Labor Temple and the perpetration of the most dastardly crime known to the courts—the placing of explosives to endanger the lives of innocent persons.

There have been over forty instances of these attempts made since the 21st of December.

The company asks the assistance of every law-abiding citizen of Kansas City in its efforts to apprehend these criminals. We ask every man to be on the alert. IF SUSPICIOUS CHARACTERS ARE SEEN AT NIGHT ON OUR TRACKS, TELEPHONE THE POLICE and if possible, with the assistance of neighbors capture the outlaws on the spot. The possession of explosives is a crime and the government will prosecute to the extent of its power. YOUR WIFE OR SISTER MAY BE A VICTIM—DON'T WAIT FOR THE POLICE BUT TAKE THE LAW INTO YOUR OWN HANDS WITH ALL FORCE NECESSARY.

A REWARD OF ONE THOUSAND DOLLARS will be paid for any information which will lead to the arrest and conviction of any person placing explosives in, near or upon the property of this company. The name of the informant will be kept in confidence.

THE KANSAS CITY RAILWAYS COMPANY
January 17, 1919. Philip J. Kealy, President.

SHOWING THE PUBLIC THE REASONS FOR DYNAMITE OUTRAGES IN KANSAS CITY

Through some loyal employees the company was at once notified of the action. A large half-page advertisement, entited "A Strike Against the Community," was inserted in the morning papers. This advertisement featured the special strike clause included in the contract which the company had with the Amalgamated Association, as follows:

> In consideration of this agreement the members of the association hereby agree that they recognize that it is their duty to the public to furnish continuous and uninterrupted service, and to this end they shall under no circumstances cause any interruption of this service, and that there shall be no strikes, lockouts or concerted cessation of work for any cause during the entire term of this contract, and should any question arise that cannot be amicably settled, it will be arbitrated as provided in Section 1.

President Kealy wired W. D. Mahon, president of the Amalgamated Association, that the men had broken their contract and demanded that the contract be lived up to.

STRIKE FAILED AFTER TWO DAYS

Approximately 1800 men walked out on the morning of Dec. 11, leaving the entire system paralyzed. The power house remained shut down for about twelve hours, and then some of the employees belonging to the Employees' Brotherhood resumed partial service. The Mayor, the police commissioner, the city member of the Board of Control, the Employers' Association and other public organizations took a firm stand and offered assistance to the company. Representatives from the Department of Labor were denied a conference with the Mayor, who said that as the men did not consult him when they struck in the night they need not consult him when they were looking for a "sled to ride out on."

The cars remained in the carhouses until Dec. 13, when at 7 a.m. the Brotherhood men began the operation of sixty-nine cars and continued this operation between the hours of 7 a.m. and 5.30 p.m. until Dec. 28, gradually increasing the number of cars as new men were accepted for employment and trained. Two policemen were assigned to each car and police patroled the division points, as considerable disorder accompanied the beginning of service.

From the beginning the company had about 400 applications a day, having wired advertisements to newspapers in St. Louis, Chicago, Denver, Omaha, Des Moines and other cities in the Middle West. Strike breakers were not imported and no business was done with any strike-breaking organizations, it being felt that the class of men so furnished were generally not desirable. Any men who came in from outside sources were put through the regular employment routine and given permanent employment. About 600 soldiers and sailors were employed.

At the beginning a bonus of $5 a day for the transportation department was paid over and above the regular wages. The bonus for the power-house, track, and shop employees was $2 a day, it being assumed that the platform men were placed in more dangerous positions. The shops did not begin active work until a week after the beginning of the strike, owing to the fact that all available shop and even office employees were drafted into platform and instruction work.

On Dec. 16 the company notified the men that if they did not return to work at once they would lose their seniority rights. Forty or fifty came back, tore up their union cards and threw away their buttons, although the company announced that no discrimination would be made against any man because of any union affiliation.

There was little violence during the early part of the strike because the Federal Court issued an injunction restraining the strikers and their leaders from interfering with the operation of the cars and prohibiting picketing and loitering about the property of the company. Moreover, the Seventh Regiment of the Missouri National Guard was placed on duty patrolling the lines with motor cars containing four men each with fixed bayonets.

On Dec. 18 a committee including the Mayor, the city counselor, two representatives of the Amalgamated Association, two of the Brotherhood, President Kealy, the president of the local Chamber of Commerce, the president of the Employers' Association, the representative of the National Department of Labor and one public-spirited citizen met and unanimously adopted the following resolution, which the company has followed:

> That the company take back all old employees with clean records whose places have not been filled and that preference in immediate employment be given all old men with clean records whose places have not been filled.

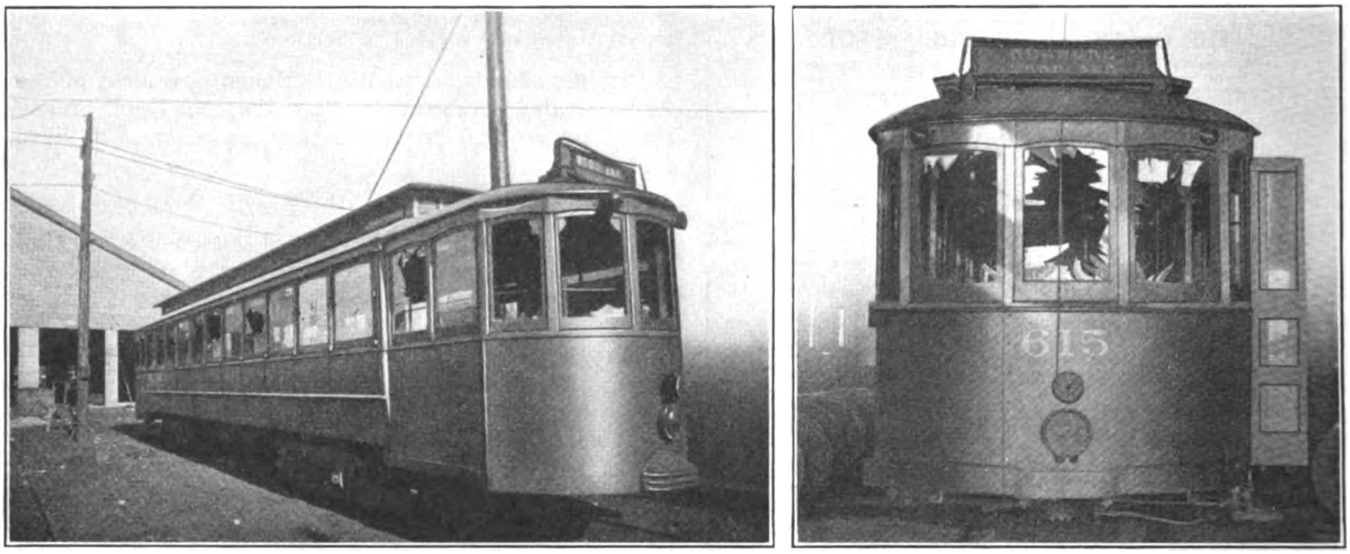
Late in December the strikers realized that they were losing out as the Mayor, all commercial and public bodies and President Kealy refused any further attempts at arbitration. The company continued to hire men at the rate of more than 100 a day, and car service was gradually increased. Then dynamiting began outside company offices and carhouses.

Many cars were dynamited, causing much damage to equipment and buildings and injuring many persons. In Kansas City, Kan., platform men were sworn in as deputy sheriffs. Some strikers were shot. The outrages continued until four strikers, leaders in the dynamiting, were arrested by the government and confessed, dynamite being found, it is said, in the division headquarters of the local Amalgamated Association. Five other arrests for dynamiting were made later, all the men pleading guilty.

The average number of cars injured so seriously by collision as to be useless until repaired was for some time about two a day, although as many as eleven cars were turned in in one day.

Early in January another conference was held at which the company informed the strikers that employees could belong to any union they desired without discrimination being shown by the company, and that the company would agree not to hire additional women conductors, but that it would never sign another contract with any union and would not permit the wearing of union buttons.

The strikers then appealed to the War Labor Board to reopen the case, asserting that the company had not been diligent in an effort to increase fares. The city counselor and the Mayor appealed to the board not to reopen the case, but it assumed jurisdiction and set Jan. 14 as the date of hearing at Washington if the strikers would immediately return to work in a body. The company refused to accept them except in accordance with the resolution previously adopted, and furthermore contended that the board had no further jurisdiction.



TYPICAL APPEARANCE OF KANSAS CITY CARS AFTER DYNAMITING

On Feb. 3 the board ordered that the company take all strikers back and that the previous wage increase award should become effective as of Jan. 5 without condition. By this time the company had employed more than 2000 new men and had the building up of an entirely new organization well in hand. It therefore refused to comply with the order.

As far as the company is concerned the strike is now over. The strikers still hold their daily meetings but are losing interest. In spite of the fact that the Amalgamated Association guarantees them $5 a week after the first two weeks, they had on Feb. 15, it is said, received a total of only $15 each.

The company is still hiring a few men every day to replace those who do not prove satisfactory. It is believed that the domination of outside labor agitators has been broken at Kansas City.

Distribution of Materials and Supplies

Great Opportunities for Economy Lie in Improved Methods of Distribution and Proper Use of the Storeroom — If a Reduction in Total Stock Required Can Be Effected, It Means an Unnecessary Investment Saved

By B. J. YUNGBLUTH
General Storekeeper for Receivers, Pittsburgh Railways

WHILE the war was in progress it was imperative to anticipate long in advance the materials required for maintenance and operation. Because deliveries were so uncertain, it was necessary to carry much larger stocks of all standard materials and supplies, with the result that, disregarding the increased prices of materials, investments in materials and supplies increased probably 50 per cent. If to this is added an increase of approximately 75 per cent in the cost of materials, the amount of money tied up, as compared with the pre-war period, increased approximately 125 per cent. While prices will probably recede slowly, manufacturing conditions should soon be such that it will be unnecessary to look so far in advance. Prompt deliveries being obtainable, stock balances ought to be considerably decreased. It is time to trim sails.

SUPPLY SUFFICIENT FOR REQUIREMENTS

Even now, when the financial condition of some, or I might say all, companies is a matter of grave concern, the managements are undoubtedly prepared to supply for maintenance and operation the materials and supplies that are necessary. But can you blame them if they are unwilling to provide more than will suffice? It should be borne in mind that prices now are abnormally high and apparently on the decline, and each day, week, or month that the purchase of additional supplies is deferred will probably mean that less need be paid. May we not assume, then, that the problem is so to distribute what is on hand or must be purchased, that none of the many different groups of men working at shops, track repairs, stations, offices, etc., may be inconvenienced by lack of any material? This means that we must be particularly careful that no one group of men has more than is necessary for immediate requirements, for if the total available supply is sufficient to meet the requirements of the property as a whole, an over-supply at some points would mean privation at others.

LEARN FROM WAR REGULATIONS

Everyone is familiar with the activities of the food, fuel and railroad administrations set up by the government shortly after the United States entered the war for the purpose of properly distributing, during that abnormal time, the amount of food, fuel and transportation available, so that each industry and each individual might secure what was really necessary but no more. Perhaps most of us will remember the activities best by the recollection of the regulation of the supply of sugar. Now that it is all over and the inconvenience somewhat removed, I think we will agree that each of us received all the sugar that was necessary, even though it came to us in small packages quite frequently, instead of in large quantities every once in a while. During that period hoarding, as will be remembered, was discouraged, because had there been any hoarding many of us would have been without a supply a great part of the time. Perhaps we can learn from these experiences many things that, in so far as they affect materials and supplies, can be adapted to electric railway operation.

All men like to be surrounded by as much material of the kind they are using as they can get hold of, and while it is in demand it occupies a place uppermost in their minds, but as soon as they have no further need, it ceases to engage their attention. Consequently they seldom think to send the surplus back to the distributing point so that someone else may be benefited. When there is talk on a railway property about economic shortage of materials and complaint that work is held up in consequence, it will rarely be found that the company is unwilling or unable to remedy an actual scarcity of material. Instead, it will usually be found that the system of distribution is at fault.

TENDENCY OF FOREMAN TO ACCUMULATE MATERIAL

The distribution of material on a railway is based upon requisitions made by the foreman in charge of the activities at each of the hundreds of points on the property. If each of the foremen has no guide but his desires and no specific instructions, no constant supervision on the ground or no scrutiny of his requests for replenishing his supplies, it will be found in nine cases out of ten that he has more material than is absolutely required.

It is not uncommon to encounter the fellow who feels that all of the material of the kind that he uses, even though he is the only person who employs it, should be piled up at the end of his bench or somewhere in his particular department, and he therefore draws from the storehouse all that is available. The next time he needs some, he is surprised to find that, since there is no apparent demand, the storekeeper is unprepared to supply him. The storehouse records must reflect the demand for material not in a spasmodic way but from day to day so that a supply to replenish the stock may be ordered at the proper time.

Aside from material of such a nature that it must be held in stock for infrequent uses or for possible breakdowns, it would be uneconomical to stock quantities of material for which there is no continual demand. On account of rapid changes in types of equipment and adoption of improved practices, one must always be watchful of items that are gradually becoming obsolete, so that when a change is made there may be a minimum stock and no unnecessary loss.

Before a foreman can make an intelligent requisition he must know the probable volume to be used, the quantities he has on hand and those that are still due him on previous requests. Such information should be shown for each item on the requisition. To assist him it is necessary to establish some sort of schedule so that he will know on what dates requisitions should be prepared and on what dates delivery will be made, with the additional privilege, in case of necessity, of procuring special deliveries without too much formality. Given this information, he should be held to strict accountability for the stock of material he has on hand, and this can only be done by frequent inspection right on the ground.

APPROVAL OF REQUISITIONS OFTEN PERFUNCTORY

It is probably true in the majority of cases that persons having the duty of approving requisitions, because they come in an unceasing stream, delegate such work to subordinates who frequently do not have sufficient knowledge to pass upon the requests so that, in the absence of occasional checks, the approval becomes altogether perfunctory. I have known men engaged to pass on requisitions who have thought it their duty to reduce practically all items requested by 50 per cent, thinking that was the way to regulate the amount of material furnished, forgetting that their job was not to cut down the amount of material but to furnish what was required and not a whole lot more. An occasional intelligent question asked by the approving officer of the requisitioner makes him careful to exercise much more judgment in preparing requisitions.

Usually when quantities of material are allowed to accumulate where work is in progress, the place gets in a rather untidy condition with the result that when a piece is needed it is easier to go to the storehouse for it than to locate it in a pit or elsewhere.

The shops which the writer has visited having the best reputation as producers were conspicuously the ones that had the decks cleared for action like a battleship. It is vitally necessary that from each of these points all materials in excess of those required for current use should be returned to one point, the storehouse, which acts as a reservoir to keep the supply lines filled.

It may be acknowledged that men do the best they know how, and if not told to the contrary, they will assume that the way they follow is the best way known by their superiors. The whole condition is one demanding enlightenment.

WORN-OUT EQUIPMENT SHOULD BE RETURNED

During the war a great deal of apparatus had to be scrapped because it was impossible to get it repaired on account of the scarcity of shop labor. Now that the labor situation is so rapidly improving, it will be possible to undertake much of this work, and the repaired equipment can be turned in to the storehouse to reduce purchases. The volume of material required for stock is appreciably cut down if certain goods are handled on an exchange basis, that is to say, if the company requires the delivery of an old piece every time a new one is delivered. Included in the items so handled might be placed journal bearings, field coils, armatures, trolley poles, trolley catchers, headlights, tools and many similar pieces of apparatus capable of being promptly repaired, turned into stock and reissued.

Articles have appeared in recent periodicals describing the savings made by the reclamation section of our army in France. Is our need less?

HOW TO CONDUCT A "PICK UP" CAMPAIGN

Winter will soon be over and spring housecleaning time will be upon us. For the past ten years our company has conducted periodical "pick up" campaigns which have been nothing more nor less than a systematic housecleaning of the whole property. Those will understand what I mean who have moved occasionally and found in the attic and in the cellar articles of furniture or household use that had been placed there intended for some possible future use. Perhaps it was a baby carriage, and the baby had grown to be ten years old, or perhaps an old phonograph or an old heater, all of which were promptly discarded rather than moved to the new home.

We form a committee of the storekeeper, division superintendent, track supervisor and division master mechanic, and they, with a gang of men, visit every shop, office, station or other point where material is used and go into each corner from cellar to attic. It is determined right on the ground what is useless at that particular point, and such items are loaded up and taken back to the storehouse. They might be simply surplus stock, material not required at that point on account of a change in the equipment operating from there, or they may be obsolete because of change in design. By far the larger percentage of all the material thus collected is good and capable of being used elsewhere. The rest of it may be scrap for which ready market is always found.

When the plan was started, considerable opposition developed until the nature of the work was understood. But when the local officials learned that they were not to be deprived of anything they required, they welcomed the idea, realizing that we were helping them to do things they themselves should have done but were prevented by lack of time or by not conceiving the idea. They also knew that as their immediate superior was along and helped to determine what should be taken, they would be relieved of adverse criticism for not keeping enough material on hand.

It was not unusual for us to pick up from $10,000 to $15,000 worth of materials on such trips. On trips soon after the scheme had been started many items were gathered that had been unnecessary or obsolete for five years or more. There is a double incentive for making a "pick up" campaign this spring.

NEEDS SHOULD BE CAREFULLY ANTICIPATED

When a job is contemplated which requires extraordinary quantities of material or materials not usually carried in stock, it is well to make up a "bill of material" and not attempt to proceed with the work before sufficient stock is available to avoid interruption. Furthermore, before arrangements are made for the purchase of such materials, it is well to be reasonably sure that the proposition will hold water and be prosecuted to a finish. Everywhere one finds that plans are made involving the use of considerable material purchased for the purpose which fall flat for various reasons and the result is that materials unsuitable for other purposes remain on hand, usually involving a total or very considerable loss.

Why not concentrate the responsibility for the stocks of unapplied materials for the property as a whole, regardless of where they are located? Give the officer in charge corresponding authority and the full co-operation of the management, have him sign all requisitions for materials to be purchased as assurance that such materials are not available from some other portion of the property so as to avoid purchase, and look to him for results?

Appreciation Means Much

Suggestions as to How the Efficiency of the Work Done on an Electric Railway Property Can Be Increased

BY EDW. C. SPRING
Superintendent of Transportation, Lehigh Valley Transit Company, Allentown, Pa.

"Render to Cæsar the things that are Cæsar's and to God the things that are God's."—Mark xii, 17.

NO MAN lives unto himself alone, neither does any business these days. We are prone to forget and lose sight of the deeds of others, to forge ahead expecting results to follow in our path without first paving the way for efficient work. We are not willing to give credit where credit is due, to recognize the ability of those that make up our organization and encourage them by our appreciation of their meritorious acts.

Appreciation and encouragement are vital essentials that help make efficiency in service. Where there is the chief of a department whom the chief executive of a railway company cannot or will not encourage, the department should have a new chief.

The secret of co-operation in large undertakings lies in the appreciation of service from the managerial head. The manager of a large industry is placed there for his ability to encourage his subordinates to the highest degree of efficiency.

It is universally admitted that the successful man is the one who can get the most out of his subordinates. This is considered to be the basic requirement of any executive.

A splendid example of this was in the placing of Charles M. Schwab as director general of the Emergency Fleet Corporation. Mr. Schwab's great success lies in the encouragement of others, by showing his appreciation of service rendered by others. He is a co-worker with all, from chief assistant to clerks.

"No man ever worked for me in my lifetime, but many thousand men have worked with me, and that is what I want you men to do. We in Washington do not deserve the credit for this," said Schwab, addressing the Camden clans who put the *Tuckahoe* over in record-breaking time, "it is the management here. It is the foreman on the ship, the foreman under the ship and the workmen in all parts of the ship that deserve the public credit for what they have done here, and I shall be the one to see that they get it. The people are winning the war. God please, you workmen have your hearts as full of patriotism as mine, and to hell with the Kaiser every time you drive a rivet."

Mr. Schwab keeps his wholesome humanity at all times. Always a democratic person, it is largely this trait that has put him at the head of the country's greatest steel industry.

Appreciation costs little but accomplishes much; it is the vital asset to great results.

We are living in an era when much must be accomplished by the little and what we lose by diminution of our ranks must be met by speeding up on the part of the others. It is a time when the seemingly impossible must be accomplished, when heads are called upon to meet conditions which are entirely new and which must be worked out in the quickest possible time. Power and equipment increase, and difficult transportation problems, not to speak of the grave financial difficulties attendant upon high costs and insufficient revenues, are all potent factors which must be met and solved with the greatest dispatch and accuracy.

This calls for the combined efficiency of the entire organization, necessitates that each man must be made to believe in his individual importance in speeding up production. He must be encouraged and spurred to the fullest action that his highest efficiency may be given to the work to be done. A word of appreciation to an employee will bring about a hundredfold in results. It is appealing to the man's human side, and when you do this you hit the vital spot in his make-up.

Are we doing our part in our various organizations in speeding up to meet and keep apace with the great commercial activities of the hour?

We have run our properties too much like unto a machine with each employee as a necessary cog in the wheel, without regard to his possibilities. Let us give the needed encouragement, and then we will have added greater efficiency and, what is more, can also demand it.

The air is full of encouragement, encouragement to our boys who have so nobly represented our country overseas. The great generals in the World War have realized the imperative need of the fighting element being keyed to the highest possible point in the life of the soldier. To this end the award of medals for bravery and distinguished service has been made so that it has been the highest ambition of every man in the service to obtain one of these coveted prizes. The foreign nations have always set us an excellent example in this respect.

Heads of industrial concerns have offered bonuses in the form of stocks in the company, together with promotions to stimulate the personnel of their organizations. All of this is along the right lines. The more closely you keep the employee in touch with his company, the sooner he will feel his part in the big game, and where he has a personal interest, say as a stockholder, you can more forcibly put home to him the economic side of the operation. It is wrong for us to class our employees as machines, what we want are real human beings with red blood, who can think and act quickly, ready to meet and cope with any emergency.

A large proportion of the electrical industries of the country have not looked far enough into the future of their properties in the encouragement and appreciation of the work of their employees. We are being called upon to-day, as during the war, to develop and produce ways and means for power, light and transportation to meet the abnormal demands of the country, to carry to completion problems of enormous magnitude. To bring about the best results in our individual work, we must give the encouragement and the appreciation to others which rightfully belong to them. This will incite to greater efforts and is creative of that most valuable business asset, loyalty, which builds up a spirit of teamplay in any business force.

Begin now to appreciate others, and the results which every manager is looking for will surely follow.

Watch the results of this business efficiency and feel the effect upon yourself, as you observe the new light break upon one in your employ who has needed that little word of encouragement to develop those talents most necessary to your interests.

There may not be much in the things that you say—it's the way that you say them;
The kind of games that you play doesn't count, it's the way you play them.
In palace or cottage, in office or ditch or wherever you're working,
The test of your manhood is answering this, Are you striving or shirking?
And Life at the best only gives back again to you that which you gave it;
So high life or low life means nothing at all—it's the way that you live it.

LETTER TO THE EDITORS

A Subscriber for Thirty-Five Years Renews

NEW YORK CITY, Feb. 24, 1919.

To the Editors:

I have been interested in the energetic efforts the ELECTRIC RAILWAY JOURNAL has recently made in spreading the work you are doing in keeping up and increasing its circulation, and while such efforts will doubtless prove profitable to its owners, it will also serve its purpose in keeping all who are directly or indirectly connected with street surface and interurban railways unusually well informed on all subjects so important to those interests.

In looking back I recall the encouragement I gave to the undertaking of the STREET RAILWAY JOURNAL (the prior title of your publication); I felt it would accomplish just such beneficial results as it certainly has done, upon which it gives me great pleasure to congratulate you and your able staff as well as those of your predecessors.

If my recollection is correct, the first issue of the STREET RAILWAY JOURNAL contained the obituary of my honored father who had served the Brooklyn City Railway Company as its secretary in the early age of street railways, and who died in October, 1884. The notice and his picture appeared on the front page of that issue.

I very distinctly remember, as an operator of horse and electric railways, your journal furnished me a serviceable implement in the progress of my work.

As a manufacturer of railway supplies, it served me as an important factor in enlarging that business.

As a broker, in the placing of full issues of public utility securities and arranging loans on such securities, it proved of value, keeping me in close touch with the rapid and many developments and operations in this important field.

I trust the response to your efforts will be handsomely rewarded by a substantial increase in subscribers, and that your journal may continue to lead in usefulness as it has for so many years in so ably presenting to its readers all matters affecting the interests and welfare of electric railways.

Inclosed find check in renewal of my thirty-sixth yearly subscription. DANIEL F. LEWIS.

AMERICAN ASSOCIATION NEWS

Mid-Year Meeting Announcements

A CHANGE has been made in one of the speakers for the annual dinner of the American Electric Railway Association on March 14. Senator Harding, who was scheduled for an address, will be unable to be present and in his stead the committee has secured an acceptance as a speaker of Francis Burton Harrison, governor-general of the Philippine Islands.

The dinner for the ladies at the mid-year meeting will be served in the East room at the Waldorf-Astoria at 7 p.m. The charge will be $5 a plate and applications for dinner tickets should be sent at the earliest possible moment to the offices of the association. As mentioned in the program published last week, before the speaking in the main Banquet Hall begins, the ladies will be conducted to seats in the gallery boxes, and at the termination of the dinner, an informal dance will take place in the Astor Gallery, adjoining the main ball room. Mrs. J. H. Pardee will head the list of patronesses, assisted by the following ladies: Mrs. R. M. Campbell, Mrs. E. D. Kilburn, Mrs. N. M. Garland, Mrs. E. N. Chilson, Mrs. E. S. Fassett, Mrs. J. J. Sinclair, Mrs. W. P. White, Mrs. George Keegan, Mrs. C. R. Ellicott.

Information for Company Section Members

PRESIDENT L. S. STORRS of the Connecticut Company has supplied to the members of the local company section, No. 7, some leaves for insertion in a loose-leaf notebook of pocket size containing information regarding the company and the electric railway industry. This first instalment is headed "Bulletin No. 1," is dated March 1, 1919, and is introduced with the following words:

"It is of the utmost importance that you should be familiar with every important fact of public interest concerning the Connecticut Company. For that reason you are asked to read carefully the slips which are sent you for insertion in the loose-leaf binder which was sent you some time ago. This information is for the purpose of making it possible for you to acquaint the public, when occasion requires, with our condition and the causes of it. If you have need of additional information, do not hesitate to call upon me for it."

Following are the sections comprising Bulletin No. 1: Present-day conditions; control of Connecticut Company; financial standing of company; burdens placed upon company; the jitney question; abandonments, receivership and foreclosures; fundamental causes of breakdown of industry; increased cost of material; care of property; importance of service, and question of fares to be charged.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Boston Committee Reports

Mayor Peters' Committee Recommends That Subway Rentals Be Continued and Dividends Reduced

A committee named by Mayor Peters of Boston, Mass., to investigate various financial questions associated with the operation of the Boston Elevated Railway recently made a report recommending certain proper courses of procedure. The committee as originally appointed consisted of Alexander Whiteside, chairman; Louis K. Liggett, Greenville S. MacFarland, Michael J. O'Donnell, Bentley W. Warren, Charles F. Weed, and Dr. William C. Woodward. Subsequently Thomas F. Sullivan was added and recently Mr. Weed resigned and Edmund D. Codman was appointed in his place. The recommendations made by the committee are summarized below:

1. The trustees and the management should be allowed a fair chance to work out their problems without further legislative or other public action, except possibly in regard to the proposed purchase of the Cambridge Subway by the State and the elimination or reduction of dividends to common stockholders of the Boston Elevated Railway and to stockholders of the leased West End Street Railway.
2. No staggering of hours should be attempted.
3. A careful study should be made by the trustees and by the Boston Transit Department of plans to relieve congestion at Park Street and other important points, special attention being given to the advisability of building a subway from Boylston Street to Post Office Square.
4. A careful study should be made by the trustees and the management of means to reduce the evils involved in stealing fares.
5. The present 8-cent fare should be continued unless and until a satisfactory and workable zone system can be established.
6. The system should not be operated under public control except as at present by the trustees, and a careful study should be made of the advantages and disadvantages of public ownership.
7. The State should purchase that part of the Cambridge Subway now owned by the company, but it should carefully consider whether the rental should not be 4¾ per cent of the purchase price instead of 4½ per cent.
8. The company should not be relieved of the obligation to pay subway rentals.
9. Until the company can be operated profitably, no dividends should be paid to Boston Elevated common stockholders or to West End preferred or common stockholders.

Messrs. O'Donnell, Sullivan, Whiteside and Woodward favored the last two recommendations, but Mr. Warren dissented and also from the part of the first one that related to the elimination of dividends. In a separate report he recommended the following substitutes for the sections dissented from:

1. The persons using the Boston Elevated Railway facilities should be relieved, during the period of public control, from all taxes, and all paving and street maintenance obligations, imposed by law upon the facilities of the company which are devoted to transportation, and also from a part certainly, and perhaps from all, of the expense of removing snow and ice from the highways.
2. It is wise public policy to postpone the consideration of the proposal to relieve the car-riders of the burden of paying the subway rentals during the period of public control, until the next session of the Legislature when the results of a full year's operation under that public control will be known and both the Legislature and the city will be better able to deal in an intelligent way with the question.

Rapid Transit Proposal Made

Cleveland Considers Asking Voters to Appropriate Money for Initial Rapid Transit Line

At a meeting of the Rapid Transit Commission of Cleveland, Ohio, with Fielder Sanders, Street Railway Commissioner, on March 3, the question of submitting a bond issue to a vote of the electors on Nov. 4 was discussed. The funds from the proposed issue would be used for the construction of the first unit of the rapid transit subway under the Public Square.

Subway Terminal Suggestions

M. M. Brinckerhoff, of Barclay Parsons & Klapp, who are making a survey of traffic conditions preliminary to recommending plans, outlined suggestions for a subway terminal and stated that the plans will be completed by May 1. This terminal will have five units, all arranged to make a complete whole, but the construction of only one at a time will be undertaken. Decision as to which shall be undertaken first will depend upon conditions at the time.

It is probable that the first bond issue will be for $5,000,000. As the work progresses other issues will be authorized, but the idea of the commission now is to build the terminal and short radiating lines which will relieve the congestion in the streets in the downtown retail and wholesale sections.

Mr. Brinckerhoff gave the locations of entrances to the subway terminal and said the tracks would be placed 28 ft. below the surface. Details of construction will depend somewhat upon the final decision as to building a union passenger station on the Public Square, as has been planned. Arrangements will be made for an underground entrance to that building, if it is constructed.

Municipal Ownership Resolution

At a meeting of the City Council on March 3 the resolution prepared by Mayor Harry L. Davis, arranging for the submission of the municipal ownership question to a vote of the electors, was referred to Director of Law Fitzgerald for revision. It is said the wording of the resolution may convey the idea that Council is committed to municipal ownership. The members do not care to create that impression at this time.

City Threatens Competition

Detroit Street Railway Commission Wants $10,000,000 for Initial Experiment in Municipal Ownership

The Street Railway Commission of Detroit, Mich., the Mayor and the members of the City Council met in executive session recently to go over the railway situation again in the light of the recent developments with respect to the commission's purchase proposal to the Detroit United Railway, the company's counter leasing proposal and the rejection of this last by the city. At the conclusion of the joint meeting it was announced that the Council had been asked to pass an ordinance amending the city charter in such a manner as to permit of the issuance of $10,000,000 of bonds to be rated as public utility bonds outside of the 4 per cent limit imposed by the new charter. This authorization will require submission to the electorate at the April election in the form of a charter amendment.

Two members of the commission have been delegated to map out a system of municipal lines with a view to presenting a plan to the commission soon.

The official communication from the Street Railway Commission to the Common Council contained this reference to the construction of municipal lines as the solution:

The railway company having rejected what we considered to be a fair and honest price for the property it appears to us that the course which the city should now pursue is the acquisition of a railway system by construction and by purchase of roadbed where franchises have expired. Accordingly we believe that at the April election a proposition authorizing the issuance of public utility bonds to an amount not to exceed $10,000,000 for the acquiring of a railway system should be submitted to the voters of this city. We believe that such an amount will permit the city to improve the transportation facilities greatly and, in time, allow us to make the city system exclusive.

The plan which we propose to your honorable body in the form of an ordinance has been made sufficiently broad to permit the city's making use, in part, of subway or elevated types of railway should such action be deemed advisable. Obviously, no routes could be specified in the brief time which the commission has had to prepare this measure, but it is our intention to plan immediately for the building of new railway lines in territory not now served as well as over territory now traversed by the Detroit United Railway on which its franchise rights have lapsed.

In consideration of this ordinance we will be pleased to supply your honorable body with all of the data and information of which we are in possession. Our earnest desire is to proceed with all possible sincerity on a course that we believe will end for all time the difficulties which have hampered the development of the city for many years.

It seems, however, that the field is not to be left entirely to the electric railway. There is a counter proposal that the city shall put its money into motor-bus lines.

Terms of London Strike Settlement

British Observer Reviews Peculiar and Interesting Features of a Strike that a Little Sagacity by Labor Might Have Prevented

In the beginning of February the whole of the great system of underground electric railways in London, England (with a minor exception under separate management), were paralyzed for a week by a strike of the employees. This was the first time in their history that such a stoppage had occurred. The inconvenience to the public was enormous, as the tramways and the motor omnibuses were quite unable to cope with the traffic thrown upon them. In the mornings business was disorganized through people being late in arriving at work; in the evenings the public were much delayed in getting home. Enormous numbers had to walk.

NO WARNING OF TROUBLE

The trouble began with little or no notice on the morning of Feb. 3 when the motormen refused duty because their half-hour interval for a mid-day meal was not to be counted part of their newly established eight-hour day. The men employed in the Chelsea power station, which supplies the underground railways, also knocked off, and for the first time in its existence that great establishment was motionless.

Never during their existence had the London tramways ever done such a business. The creditable nature of their performance and of the work of the management is the greater when one remembers the necessarily imperfect maintenance of track and rolling stock during the war and the shortage of employees. Perhaps even greater were the difficulties faced by the London General Omnibus Company, as it serves, among other areas, those not provided with tramways.

The strike lasted for a week, the service on the underground railways being resumed to a certain extent on the afternoon of Feb. 9, and more fully on Feb. 10 and following days.

CONDITIONS ON UNDERGROUND LINES

The conditions of work on the underground railways are different from those on the main steam lines, as the services are comparatively local, the men are never far from home, and there is no goods nor mineral traffic. In connection not only with the motormen, but the men on night shift carrying out running repairs on the trains, the agreement entered into after the general railway strike of 1911 (which only partially affected the London underground railways) when the scheme of conciliation boards was put into operation, was such that the length of the shift was reckoned at from nine to nine and one-half hours, inclusive of a short relief time for meals. Payment was at so much per shift, and in the event of overtime being worked the rate per hour was calculated as though there had been no relief time in the shift. That is to say, in the case of a nine-hour shift the rate per hour was reckoned at one-ninth of the amount received for the full shift. There should thus be no misapprehension as to the fact that meal times were paid for.

In August, 1917, a large section of the railway employees of the country made a demand for an eight-hour day. The government then as now was in control of the railways. It refused the request, but promised that a claim for a shorter working day if put forward immediately after the close of hostilities in the war would have sympathetic consideration. In consequence of this promise the principle of an eight-hour day for all members of the wages staff and the railways was conceded in December last. The government contended that what was granted was an eight-hour working day exclusive of meal times, and this apparently suited the existing conditions on the main line railways of the country, but not on the London local railway. The eight-hour day came into operation on Feb. 1, with a provision that all outstanding points and the methods of application were to be settled afterwards by conference between the trade unions, the Railway Executive Committee (which manages all the railways of the country under government control) and the government.

THE MEN'S POINT OF VIEW

Anger arising from personal inconvenience and dislocation of business rather blinded the public to the underground man's point of view, and certainly little prominence was given to it in the newspapers. No doubt it was unjustifiable to cause so much trouble and loss over a comparatively trifling subject, but on the other hand, the underground men felt that, while an advantage was being given to main-line men under the eight-hours scheme, what was given to them with one hand was being taken away with the other. There are two trade unions connected with British railway service, the National Union of Railwaymen, which has much the larger membership, and the Associated Society of Locomotive Engineers and Firemen, the members of which consider themselves the elite of the profession. The fact that there are two unions to deal with instead of one and that there is much jealousy and rivalry between them adds greatly to the troubles of the railway companies. When the A. S. L. E. called its men cut on strike on Feb. 3 people were puzzled, in view of an agreement which had been signed on Jan. 30. The union based its demand on the previous agreement made between the two unions and the government on Dec. 6 last which was as follows:

> 1. An eight-hour day for all railwaymen to be put into operation from Feb. 1, 1919.
> 2. All other conditions to remain as at present.

When it came near the time for application conferences were held on Jan. 29 between the president of the Board of Trade (representing the government), the railway executive committee and representatives of two trade unions. As a result the parties on Jan. 30 signed the following agreement:

> The principle of the eight-hour day for railwaymen is to be given effect to as from Feb. 1 on the basis of existing conditions of service, and where it is not found practicable to reduce the working hours to eight, overtime to be paid for all time worked after the expiration of eight working hours. In calculating the eight hours, time alloted for meals will not be counted in cases where time has hitherto been so alloted; for example:
>
> 1. A man hitherto booked on at 6 a.m. and working continuously until 4 p.m. will, if booked on at 6 a.m., cease working at 2 p.m., or if he works later will be paid at overtime rate from 2 p.m.
> 2. A man hitherto booked on at 6 a.m. and working until 5 p.m. with a meal hour between (say) 12 noon and 1 p.m., will, if booked on at 6 a.m., cease working at 3 p.m. (with an hour's meal interval), or if he works later will be paid at overtime rate from 8 p.m.
>
> Where a man's work has been arranged on a weekly basis overtime will be paid after forty-eight hours work; and as regards alloted meal times the principle set out in example No. 2 will apply, *i. e.*, alloted meal times will not be counted in calculating working hours.
>
> The above is without prejudice to the right of either side to claim different arrangements and the negotiations now pending.

Very possibly it was the case that the trade union representatives in signing this agreement had not in mind the peculiar conditions of the London underground service but were thinking only of the conditions on British railways generally which would not be so adversely affected. The total number of men employed on the London lines is, of course, small, compared with the number engaged on British railways generally. At all events the underground motormen got up in arms and the A. S. L. E. executive supported them. They declared, by referring to the agreement of Dec. 6, that the government had been guilty of a breach of faith.

UNCERTAINTIES

The wording of the original circular notices to the men was vague. The men assumed that the principle of the eight-hour day having been accepted, and all the other conditions being to remain in force, the eight-hour day was to include meal time (usually half an hour) in the same way as the nine or nine and one-half-hour day did. The agreement of Jan. 30 was considered as only applicable to the steam lines of the country on which goods and mineral traffic has to be dealt with. In fact it hardly seems conceivable that if the point had been directly brought before the secretaries of the two trade unions they would have agreed to a stoppage of pay for meal time on the underground railways.

The matter was further complicated by the fact that the agreement of Jan. 30 was not in the hands of the railway companies until Jan. 31, and that it was well known to the men that duty sheets had been drawn up on the basis of eight hours inclusive of meal time. The circular (for which the railway executive committee was responsible) stating that the eight-hour day meant eight hours work exclusive of meal time came as a bomb-shell on the underground employees. The motormen struck and so the N. U. R. men were thrown out of work, including the power station and workshop hands.

It seems pretty certain that the railway executive committee was afraid to grant anywhere an eight-hour day inclusive of meal time, even where meal time had previously been included and paid for in the shift, for fear the granting of it in one case would prejudice the position of the main line railway companies in their negotiations with the trade unions which began on Feb. 12 and were expected to last some time. In these negotiations payment for meal times on all railways is one of the points brought forward by the unions. The difference between the conditions on the London Underground Railways, which operate a vast frequent passenger service mainly in tunnel, and those on main line railways where relief periods cannot be arranged for short times, makes it difficult to think that trouble would be experienced on the main lines through the granting of a concession to the underground employees corresponding to that which they enjoyed for the last six years.

THE SETTLEMENT

The trouble of having to deal with two trade unions was made conspicuous in the settlement of the dispute. As the result of negotiations the Board of Trade, the Railway Executive Committe and the A. S. L. E. on Feb. 6 came to an agreement the essential point of which was:

> Meal time will not be included in the eight hours, but in the new conditions of the eight-hour day the companies will offer all reasonable facilities to meet the ordinary physical needs of the man.

This, like the previous agreements seems somewhat ambiguous, but it was adopted as a temporary arrangement pending the approaching consideration of the general conditions of service. When the public expected a resumption of the traffic on this solution being adopted, they were disappointed, as the N. U. R., which had previously condemned the strike, came on the scene, refused to accept the arrangement, and declared a strike of their men. Another conference was set agoing, with the result that early on the morning of Feb. 8 the N. U. R. executive agreed to exactly the same terms as those already accepted by the A. S. L. E. The additional provision secured was, however, that, pending the completion of new duty sheets, a man should be nominated for each railway to assist the companies in seeing to the proper carrying out of the arrangements for securing reasonable facilities to meet the ordinary physical needs of the men, which facilities are to be included in the eight-hour day.

The whole matter is a story of cross-purposes and the details may be instructive to railway employers and employed in America. Seeing that complete negotiations on every outstanding question were near at hand, a little patience would have saved all the trouble.

Promoting Better Labor Relations

Public Service Adopts Collective Bargaining—Increases Life Insurance, Sick Benefits and Pensions

The Public Service Railway, Newark, N. J., as briefly announced in last week's issue, has accepted the principle of collective bargaining approved by the National War Labor Board. All questions which arise between employer and employees are to be settled by giving the employees equal voice and vote in making adjustments, with ultimate arbitration if necessary.

In brief, the operation of the collective bargaining plan includes the creation first of branch committees representing the respective carhouses, shops or stations, to which the employees will elect two representatives and the company appoint two. These branch committees will form department committees. The members of each department committee for employees will elect two members to constitute a general committee, and the company will appoint an equal number of representatives for a like purpose. Thus, any question arising will be taken up by the proper branch committee at the point of origin and adjusted there or carried to the higher committees. Arbitration by disinterested persons is available when necessary, the Board of Public Utility Commissioners being the third arbitrator if one cannot be agreed upon by the arbitrators chosen by the two sections of the general committee.

Membership in the new Co-operative League will be voluntary and not restricted by union affiliations. No initiation fee will be required, but there will be dues of 50 cents a month. Permanent employees who receive less than $2,500 yearly compensation will be eligible for membership. Each member will be entitled to receive a Prudential Insurance Company life insurance certificate for $1,000, in his name, issued under the group plan. Should a member in good standing leave the service of the company he will be entitled to continue personally the $1,000 insurance, without medical examination, at rates based on the insured's then attained age. Or, in the case of total and permanent disability occurring before the member reaches sixty years of age from causes arising after the issuance of insurance, the $1,000 will be payable in monthly or yearly installments to the holder of the certificate.

The Public Service Railway, under its former welfare plan, paid out from Jan. 1, 1911, to Jan. 1, 1919, a total of $634,853 in sick benefits, life insurance and pensions. Under this plan, which it is proposed the Co-operative League shall supersede, $300 death benefits and $1 a day sick benefits were paid as compared to the $1,000 insurance and $2 a day sick benefits of the new plan.

Compensation for injuries will be paid as heretofore under the provisions of the workmen's compensation act. The minimum pension under the welfare plan was $20 a month. The company has raised the pension rate 50 per cent with a new minimum of $30 a month.

The company will continue to bear the costs it has previously borne, and, in addition, will pay into the Co-operative League treasury more than one-half of the added cost, leaving the membership dues to make up less than half of the extra expense involved.

Acceptance or rejection of the combination collective bargaining and co-operative league plans proposed by the Public Service Railway is a question for the decision of the employees and this decision will be final. This is the position taken by the railway and outlined by its representative, John L. O'Toole.

Toronto Buys Suburban Line

By the terms of an agreement arrived at between representatives of the city and the Toronto & York Radial Railway, Toronto, Ont., the city has arranged to purchase from the company for $590,000 the Yonge Street section of the Metropolitan Railway lying between its southern terminus near Farnham Avenue and the city limits, together with certain rolling stock, and the company's rights and franchise in connection with this section.

In return the city agrees to allow the Toronto Railway to carry on its lines the package freight and express goods of the Metropolitan, and upon its acquisition of the Toronto Railway to furnish and operate cars for the carriage of such goods from the city limits to terminal stations which, the agreement provides, will be established by the York Radial Railway at St. Lawrence Market and other points within the city.

The agreement to purchase is the result of private negotiations carried through on behalf of the city by Works Commissioner Harris, Finance Commissioner Bradshaw and City Solicitor Johnston. It awaits the approval of the City Council and ratification by the Provincial Legislature before becoming operative.

Mr. Starring in San Francisco

Mason B. Starring, president of the California Railway & Power Company, New York, N. Y., which controls the United Railroads, San Francisco, Cal., is in San Francisco in connection with the plans for the financial readjustment of the San Francisco company. He is reported to have said that the readjustment would in all likelihood be carried out on the plan made in September, 1916, and amended subsequently, providing for a reduction of the capitalization. With respect to the matter of the city taking over the lines of the company, Mr. Starring is reported to have said:

> About a year ago there was much talk of the city of San Francisco taking over the United Railroads. The city engineer was instructed to make a valuation for the purpose. I may say that the United Railroads is willing to accept a reasonable offer if the city wishes to make one. I

> believe that if the people of a city desire municipal ownership then municipal ownership is the right thing for such a city. I am absolutely in the dark as to the reason for the discontinuance of the plans for taking over the railroads. As I see the situation it is a matter between a willing buyer and a willing seller.
>
> I do not believe it will be necessary to raise the fares on the San Francisco railways, as has been done by traction companies in other cities. Though we have not paid dividends for several years, we are getting along on the 5-cent fares.

Other Preparatory Steps

Seattle Gradually Disposing of Details Standing in Way of Completion of Railway Purchase

A bill recently introduced in the Legislature at Olympia, Wash., by Representative Frank G. Myers of King County, offers protection for the deal made by the city of Seattle for the purchase of the railway lines of the Puget Sound Traction, Light & Power Company, the legality of which is now being tested in the Supreme Court. The measure validates utility bonds of cities and towns issued in the purchase of utilities, plants or systems. The bill provides:

> Whenever a city or town has entered into such contracts and has agreed by ordinance to issue utility bonds in payment and has by ordinance created a special fund and obligated the municipality to set aside and pay into it moneys from the gross revenue of any municipal plant, then owned, including the property required, such contracts and ordinances are ratified, approved and validated to the fullest extent possible under the constitution of the State.
>
> The corporate authorities of every city having such contract are empowered to consummate and perform all such ordinances, and contracts not yet fully completed.

The bill has been referred to the committee on municipal corporations of the first class.

A further move in the city of Seattle's purchase of the railway system of the Puget Sound Traction, Light & Power Company was recently made when the Council elected the Title Trust Company and the Washington Title Insurance Company to make the title search of the property involved.

City's Purchase Right Upheld

In a seven to two decision filed on March 5 the State Supreme Court of Washington upheld the legality of the proposal of the city of Seattle to purchase the railway system of the Puget Sound Traction, Light & Power Company for $15,000,000 in utility bonds. In anticipation of a favorable decision in the case both parties have gone ahead with the details. According to present plans the property will be delivered about April 1.

New Office Quarters in Sherman

The Texas Electric Railway has leased the entire building at Travis and Lamar Streets in Sherman, Tex., the first floor of which is now occupied by the company as ticket office and baggage room. The second floor will be remodeled and refitted for offices. All trains between Dallas and Denison will be dispatched from Sherman. A clubroom for trainmen will also be provided.

Utilities Are Facing Disaster

Governors' and Mayors' Conference in Washington Recognizes Need of Electric Railway Industry

Problems of industry and labor, now confronting the country were discussed in Washington by officials of the government, Governors of the states and Mayors of large cities at a conference called by President Wilson on March 3, 4 and 5. The conference was formally opened by President Wilson, who urged that the federal, state and local governments work together "in steadying and easing and facilitating the whole labor processes of the United States."

A resolution embodying the principal ideas offered by the delegates to relieve the present condition was adopted. This included recommendations for a reduction of freight rates on all building material; for a change in the present method of demobilization of troops, for the releasing of natural resources of the country, and for government assistance in averting serious consequences in the financial affairs of electric railways.

IMPERATIVE NEED OF UTILITIES

The critical aspects of the electric railway situation had again been brought to the attention of President Wilson. P. H. Gadsden, chairman of the committee on national relations of the American Electric Railway Association, on March 1 had sent to the White House a letter reading in part as follows:

> The electric railways of this country are faced with disaster. Already sixty companies, operating in twenty-nine states and representing one-tenth of the total electric railway mileage of the United States, have gone into the hands of receivers. A compilation of the operating statements of three hundred and eighty-eight of these companies for the first six months of 1918 showed a decrease in net income of more than 80 per cent. Since that statement was compiled, the National War Labor Board has fixed a standard of wages for the industry which has added over $100,000,000 to its already greatly increased operating expenses. Almost every other industry has prospered during the war, notwithstanding the increased cost of operations. The public utilities constitute practically the only exception to this rule of prosperity.

H. B. Weatherwax, president New York Electric Railway Association, had also sent to Governor Smith of New York a letter stating that the desperate condition of the electric railway industry constitutes one of the grave industrial and economic problems of the nation and more particularly of New York State. He urged the necessity of bringing this question up for discussion at the conference in Washington. A telegram to the same effect was sent to President Wilson.

The resulting action on the part of the conference in Washington was the following recommendation:

> The attention of the conference has been called to conditions existing in many parts of the country with reference to electric railways. During the war increases in pay were granted to employees through the intervention of the federal government. Society recognized that the high cost of living justified this action in the fullest sense. These corporations, however, found themselves bound by certain limitations in the way of franchise contracts with municipalities, and while the operating cost has vastly increased in many instances, the rates of fare have continued without change. This is noticeably true in states where no statutory provision has been made for an appeal to the state utilities commission. We disclaim any disposition to trespass on the rights of municipalities, but it is our earnest recommendation that the federal government continue its helpful offices with the view to averting serious consequences in the financial affairs of public utilities.

Eugene Meyer, Jr., managing director, War Finance Corporation, in the course of an address to the conference, made the following statement in regard to public utilities:

> The public utilities are one of the big problems confronting us now. It is a problem of national importance from a financial and economic point of view because of the magnitude of the industry, and because it employs such a very large number of men it is a matter of interest to the Labor Department. Under normal conditions, the industry represents so much in the way of materials for maintenance, for track-laying in steel and iron, for lumber in the ties, for copper in the transmission wires, for motors, for machinery, for all kinds of building materials, that it cannot be ignored by you who are in local contact with it or by the national government from the national point of view. It represents an investment of thousands of millions of dollars.
>
> Its credit, however, has been materially injured; its values have been materially impaired. While there have been in the past, no doubt, many examples of mismanagement, and it may be shown in some cases that difficulties are due to overcapitalization, nevertheless I can state that from our examination of cases presented to us, there are many instances where the difficulties arise from the economic influences which have been at work during the last four years, namely, constantly rising prices for materials and labor, combined with the difficulty of making adjustments to meet the changed conditions of costs.
>
> I have no patent way of solving the problem. I think it would be inadvisable for anybody in Washington to seek to impose any solution in a local territory for a local question. I simply want to state, as one having had intimate contact with the problem, that I do consider that it is a big problem, and that this body should recognize it as a problem. Whatever the action of this conference may be on the subject, I think it can hardly afford to ignore the problem as a problem of national importance, though of local administration and local physical and financial control.
>
> Is there anything that we in Washington can do? I am sure I can speak for Secretary Redfield as desiring to be helpful if called upon, and I know that Secretary Wilson is deeply interested, and Secretary Glass has manifested a disposition to recognize the problem as a problem of national interest. If there is anything, following the hint of the President, which you can suggest, you will find everybody here in Washington ready to do anything and everything within their power to help.

Sounds a Warning

Moses Blau, chief of the State bureau of inspection and supervision of public offices in Ohio, has called the attention of the Cincinnati officials to the fact that the actual cost of an extensive undertaking, like the proposed rapid transit loop, is always far in excess of the original estimate, and that it will be well for them to take this into consideration in making plans for its construction.

Computing the cost of the improvement at $12,000,000, instead of $6,000,000 as estimated, Mr. Blau states that the interest on bonds and the redemption fund will call for an annual payment of $726,000, unless the loop becomes self-sustaining at once. His opinion is given at this time in view of the unsettled condition of finances and the dubious problem of taxation.

News Notes

Would Heat Ohio Vestibules.—A bill requiring electric railways to heat car vestibules at not less than 60 deg. Fahr. between Oct. 31 and April 15 has been passed by the House of Representatives of Ohio.

Service-at-Cost Bill in Indiana.—A bill providing that a public utility may enter into arrangements with a municipality or with its customers to furnish service at cost has been introduced into the Senate of Indiana.

Women to Remain.—No more women conductors will be engaged by the Kansas City (Mo.) Railways, but none of those now employed who wish to remain will be discharged. There are now fifty women on the cars. Their work is satisfactory and has been so from the start.

Indictments Against Trenton Men Dismissed.—The Court of Errors and Appeals of New Jersey has dismissed the indictments against Rankin Johnson, president of the Trenton & Mercer County Traction Corporation, Trenton, N. J., and eight other directors and officials of the company for alleged usurpation of the streets of Trenton.

Storm Ties Up Traffic at Cincinnati.—On the afternoon of Feb. 28 a heavy wind storm, accompanied by rain, tied up many of the railway lines in Cincinnati, Ohio, for several hours and demoralized light and telephone systems for even a longer period. Several of the towns on the river below Cincinnati were also without service for some time and operation was hindered at Dayton, Ohio.

Wants Mexican Tramways Returned.—According to advices from Mexico City transmitted by way of Washington, representatives of the Mexico City Tramways have been sent to Mexico City by Canadian capitalists, principal owners of the company, to urge President Carranza to restore the property to the owners. The tramway was seized in 1916 while a strike was on in the city, and the government said it was acting to protect the property.

Public Control Act Pronounced Valid.—The Boston (Mass.) Elevated Railway public control act, passed by the Legislature last year, is constitutional, in the opinion of Attorney-General Attwill, as given to the Massachusetts Senate in response to a request from that body. He is quoted as saying that the provision for public management has the same effect as if the Commonwealth had taken a direct lease of the system, agreeing to assume interest charges and operating expenses and to pay the corporation a rental.

Accident Trial Started.—The trial of T. F. Blewitt, division superintendent, and five other officers and employees of the Brooklyn (N.Y.) Rapid Transit Company was started in the Supreme Court at Mineola, Long Island, on March 3 before Justice Seeger, who was designated to preside at the trial when the indicted men succeeded in having their cases transferred from the Brooklyn district. All are accused of manslaughter in connection with the wreck on Nov. 1, of a train on the Brighton Beach line when ninety-five persons were killed and more than 200 injured.

Not a Howling Success.—Jersey City's municipal jitney line up Newark Avenue from Exchange Place to West Side Avenue is not proving profitable and Director of Revenue and Finance Gannon may decide to cut down the fare from 7 cents to 5 cents to provide keener competition with the Public Service Railway. When the line was opened last month the fare was fixed at 7 cents in order to provide competition with the electric railway, which now charges 7 cents. Some of the jitneys have already been taken off the line.

Paying for Their Homes.—Of the 800 men who started buying homes in the Kansas City (Mo.) Railways Building & Loan Association not one case has come up in which the need arose for foreclosure. Under the Missouri law a man has six months of lapsed payments before he can be foreclosed and no man has ever been obliged to let his payments drop for that long. There has been no surrender or rights or ownership by any striker who was buying. The interests of these men are being guarded in view of their possible return.

Progress with Railway Brotherhood.—The Brotherhood of Trainmen of the Kansas City (Mo.) Railways is becoming more and more popular with the employees. The membership now numbers more than 500. During the past two weeks sixty-six were added to the roll. The organization is entirely in the hands of the men. A motorman is its president. This brotherhood is modeled after the Denver plan. Each member pledges himself not to strike, but to arbitrate all differences which may come up between the employees and the company.

Seattle Needs $73,082.—According to a report of A. H. Dimock, city engineer, the city of Seattle, Wash., is short $73,082 in funds necessary for the completion of the municipal elevated railway. According to Engineer Dimock, cash paid to date totals $312,000; due on contracts, $36,000; bills not rendered and unfinished work, $37,000; total, $385,000. The total appropriation for the construction is $311,917, leaving a deficit of $73,082. The line in question, which has been under construction since last spring, extends from First Avenue South and Washington Street to the West Spokane Street bridge over the West Waterway. Just what action the city will take to secure the needed funds has not been decided upon by the utilities committee of the Council. Street railway utility bonds in the sum of $400,000 were offered for sale by the city recently, but no bids were received.

Women Replaced in Cleveland.—The forty women on the cars of the Cleveland (Ohio) Railway as conductors retired at midnight on Feb. 28, as specified in the decision of the National War Labor Board. It was reported that they would bring suit to retain their positions, but Miss Rose Moriority, who has guided them in their fight, said this would not be done, as it would probably bring about another strike. What the women do expect, however, is a decision of the National War Labor Board, defining their rights of employment in the industries. They believe this will be so broad that it will result in their reinstatement as conductors. The National Women's Trades Union League, Washington, is pushing the matter and it is hoped to have a ruling in the near future. They feel that women's right to work will be greatly extended.

Review of San Francisco Municipal Railway.—More than half of the annual report of the city engineer of San Francisco, Cal., to the Board of Supervisors, which will be printed in the near future, is devoted to a comprehensive historical and statistical review of the Municipal Railway development in that city. There will be included operating statistics for the year 1918, during which time the system carried 62,500,000 passengers, and a statement of extensions and new construction. A series of charts will be used to set forth the nature of the various contracts awarded, condition of funds, increase in extent of the system and the amount of gross and net receipts. There will also be a discussion of the desirability of unified control and management of a city's street railway system and a review of the progress of the plan for purchasing the United Railroads, with which the municipal line is in competition.

Programs of Meetings

New England Street Railway Club

The annual banquet of the New England Street Railway Club will be held in Boston on the evening of March 27. It is hoped that the principal speakers will be Senator Watson of Indiana and Charles M. Schwab.

Wisconsin Electrical Association

The eleventh annual convention of the Wisconsin Electrical Association will be held at the Hotel Pfister, Milwaukee, Wis., on March 26 and 27. An attractive program has been arranged. It will be announced later. Following the established custom, a joint session will be held with the Wisconsin Gas Association on March 26. The gas association opens its convention on March 25.

Financial and Corporate

Record Figures for Dublin

Increased Costs Were Overcome by Higher Fares and Traffic Gain of 4,384,000

The Dublin (Ireland) United Tramways had record receipts and expenditures for the year ended Dec. 31, 1918. The receipts gained £91,218 over 1917, while the expenditures rose £69,982 in spite of the deferment of some renewal expenses and the incidence of high wages for only a portion of the last year.

As to the items making up the large expenses of £310,946, it may be explained that the coal bill, even on a rationed supply of coal, reached £38,906—an increase of £8,580, while the whole cost of the power-station operation, amounting to £47,106, showed an increase of £10,634. The total power station operation as late as 1912 amounted to only £21,279, which was exceeded last year by £25,827—an increase of 120 per cent in six years.

The total maintenance showed an increase of £30,542. This addition was mostly in wages, as there was so little new material available to spend money on. The company spent £28,145 in maintaining the track, though only a few new rails out of a small stock in hand were put into the road.

HIGHER FARES HELPED

If the tramway receipts had not been increased, the company would have been in a serious position, for the bare working cost for 1918 was at the rate of 11.13d. per passenger car-mile, which did not include any provision for standing charges such as debenture interest, and the total receipts per mile in 1917 were at the rate of only 11.08d.

In April the company for the first time increased the fares, which had been in many instances below the statutory limit. The company was also greatly helped by the general increase in traffic, owing to the large spending power of the public. This was shown by the fact that notwithstanding the higher fares charged, the company carried a total of 71,008,655 passengers or 4,384,329 more than in 1917.

As to how far this tendency to increased passenger traffic is going to continue, W. M. Murphy, chairman of the board of directors, says he cannot venture to forecast an opinion; but he is afraid that people are living through a period of artificial prosperity which must necessarily be of a temporary character.

The net available at the end of the year amounted to £117,492, and dividends, bonus and reservations absorbed £104,230 of this, leaving £13,262 to be carried forward to 1919. The reservations included £15,000 for the general reserve and £35,000 for relaying of track and replacing of ten cars.

SYSTEMS IN PRIVATE HANDS

The Dublin United Tramways is one of the few important systems in Great Britain and Ireland remaining in the hands of private owners. The Bristol Tramways are still in the hands of a company, but the purchase period—which expired at the beginning of the war—was postponed by act of Parliament owing to the difficulty of purchase in war times.

The London United Tramways, situated just outside the limits of the lines controlled by the city of London, is another undertaking of some magnitude in the hands of private owners. The finances of this company, however, have just been readjusted and its capital scaled down more than one-half.

A number of smaller undertakings still in private hands are being conducted with varying fortunes. Results of operation are very good in the manufacturing districts where large employment and high wages are to be had, but on the south and southeast coast the business from pleasure traffic is still poor on account of the air raids during the war.

Would Defer Bond Interest to Make Improvements

A very difficult situation has arisen in Pittsburgh in connection with the receivership of the Pittsburgh Railways. Urged on by the city of Pittsburgh the receivers of the railway practically petitioned Judge C. P. Orr in the United States District Court for permission to forego paying fixed charges for bond interest during the present year and instead to put the money into betterments of service in the different communities which the railway serves. Thus the issue as directly raised by counsel for the city is the matter of choice by the court between the interests of the community and those whose money is invested in the railway. Judge Orr from the bench, interrupting counsel for the city, said:

> The situation here is very troublesome, with its implication that these bondholders should receive nothing on the money they furnished to establish the company. You will never be able to get a dollar of future capital investment unless payments are made on these bonds. It is a horrible situation. I don't know where it is going to end. I am looking ahead to a time when the bondholders, coming together, will assert their rights. We cannot confiscate property without compensation.

On the other hand Special City Counsel Robinson, addressing the court, said:

> The choice must now be made between the interests of the whole community and of returns to private capital.

Anticipating Possible Default

Committees Formed of Security Holders of New York Company Which Apparently Faces Collapse

Announcement was made on Feb. 28 that, in view of the failure of the Interborough Rapid Transit Company, New York, N. Y., to declare the usual quarterly dividend and the consequent danger of a default on the interest due on April 1 on the Interborough-Metropolitan collateral trust 4½ per cent bonds, a bondholders' protective committee had been formed.

Later in the day it was announced that a committee also had been formed to protect the interests of the stockholders of the Interborough Consolidated Company, which is a holding corporation. The company has two classes of stock. The preferred consists of $45,740,000 of 6 per cent non-cumulative shares of a par value of $100. There are 932,626 shares of common stock outstanding without par value.

The bondholders' committee consists of six bankers. Grayson M. P. Murphy, senior vice-president of the Guaranty Trust Company, is chairman. The other members are John McHugh, C. A. Peabody, C. S. Sargent, Jr.; James A. Stillman and Frederick Strauss.

The stockholders' protective committee is headed by Eugene V. R. Thayer, president of the Chase National Bank. The other members are Chellis A. Austin, Harry Bronner, M. M. Buckner, Charles Hayden and Edwin S. Marston.

On behalf of the bondholders' committee Mr. Murphy issued this statement:

> The committee has been formed not only to protect the interests of the securities that it represents but also to endeavor to assist in straightening out a situation which threatens a great number of investors and which may seriously affect the credit of the city and State.
>
> The committee has no preconceived plans. A thorough investigation will be made at once, and the action of the committee will depend on the facts developed by that investigation.

With reference to the formation of the stockholders' committee the following announcement was made:

> In view of the unsettled and unsatisfactory position of the local transportation lines for some months, and particularly in view of the public announcement of the possibility of default on the semi-annual interest due on April 1 upon the Interborough-Metropolitan collateral trust 4½ per cent bonds, for the protection of which a committee has been organized, it has been decided to have a similar committee in the interests of the holders of the preferred and common stock of the Interborough Consolidated Corporation.
>
> Stockholders are requested to deposit their certificates with the Mercantile Trust & Deposit Company, New York, N. Y., which will issue the customary temporary receipts.
>
> A deposit agreement is in course of preparation, copies of which may be obtained from the depositary as soon as completed. The secretary of the committee is Charles B. Makepeace, 115 Broadway, while Rushmore, Bisbee & Stern are its counsel.

Interest on the Interborough-Metropolitan Company's collateral trust bonds is guaranteed by the Interborough Consolidated Company. The income of the latter company is derived from dividends the Interborough Rapid Transit Company, the operating concern, pays on its stock.

War Traffic Helps Richmond

Railway Revenues of Virginia Company Jumped $901,000 or 27.7 Per Cent—Expenses Up $597,000

The gross revenues of the Virginia Railway & Power Company, Richmond, Va., in both the railway and light departments, showed large gains for the fiscal year ended June 30, 1918. This was caused principally by the location of Camp Lee near Petersburg, the naval operating base at Norfolk and various other governmental activities in and around Richmond.

The gross operating revenues increased $1,413,034 or 23.38 per cent. The larger part of the increase resulted from the operation of the railway department. The gross revenues from this department gained $901,803 or 27.7 per cent, the passenger gain amounting to most of this or $857,057. The light, power and gas revenues advanced $511,231 or 18.4 per cent.

The total operating expenses rose $1,159,199 or 39.41 per cent, this increase being divided $597,757 or 31.8 per cent for the railway department and $561,441 or 53.0 per cent for the light, power and gas departments. As a result the income from operation gained only $253,835 and the net income $236,359.

In addition to the charges for maintenance of way and equipment, the sum of $447,451 or 6 per cent of the gross revenues was credited to the reserve for depreciation and charged against surplus. The balance in the reserve as of June 30, 1918, was $628,858. Capital expenditures for the year totaled $444,438, of which $256,745 was for the railway department.

On account of the necessity of making improvements and extensions to take care of war service demands, the directors decided it to be wise to conserve the cash resources. For that reason the dividend on the common stock, usually paid in April, was passed. Dividends of $479,952 on the preferred stock and the October, 1917, dividend of $179,242 on the common stock, however, were paid. The surplus at the end of the year was $1,270,776.

The revenue passengers in the year ended June 30, 1918, increased 12,838,418 to a total of 82,645,749, while the transfer and free passengers decreased 711,629 to 17,154,194. The average fare per passenger was 4.1 cents, a gain of 0.4 cent. The car-miles totaled 14,208,730, an increase of 661,086; and the car-hours 1,669,615, an increase of 51,400. The total revenue per car-mile amounted to 29.3 cents, a gain of 5.3 cents, and the operating expenses per car-mile 17.5 cents, an increase of 3.6 cents. The car-hour revenue was $2.491, a gain of $0.478, and the operating expenses $1.486, an increase of $0.322.

INCOME STATEMENT OF VIRGINIA RAILWAY & POWER COMPANY FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Revenue from railway operations	$4,158,594	55.76	$3,256,791	53.88
Light, power and gas revenues	3,298,935	44.24	2,787,704	46.12
Total operating revenues	$7,457,529	100.00	$6,044,495	100.00
Railway operating expenses:				
Maintenance of way and structures	$301,812	7.26	$238,681	7.33
Maintenace of equipment	264,283	6.36	201,849	6.20
Traffic expenses	7,915	0.19	8,707	0.27
Transportation expenses	1,494,949	35.95	1,095,157	33.63
General expenses	411,487	9.89	338,294	10.38
Total	$2,480,446	59.65	$1,882,688	57.81
Light, power and gas expenses	1,620,046	49.11	1,058,604	37.97
Total operating expenses	$4,100,492	54.98	$2,941,293	48.66
Operating income	$3,357,037	45.02	$3,103,202	51.34
Other income	115,865	1.55	98,391	1.62
Gross income	$3,472,902	46.57	$3,201,593	52.96
Taxes and licenses	$466,173	6.25	$387,672	6.41
Interest, sinking fund and rentals	1,458,204	19.55	1,429,385	23.65
Discount on securities	30,316	0.41	30,315	0.49
Miscellaneous	89,762	1.20	162,133	2.69
Total	$2,044,455	27.41	$2,009,505	33.24
Net income	$1,428,447	19.16	$1,192,088	19.72

Three Receivers for Rhode Island Road

Frank H. Swan, Theodore Francis Green and Zenas W. Bliss were appointed permanent receivers of the Rhode Island Company, Providence, R. I., by Presiding Justice Tanner in the Superior Court of Rhode Island, on March 4.

John J. Orr & Sons, the petitioners for the receivership, were represented by Attorney Edward A. Stockwell. He suggested that Mr. Swan's appointment be made permanent. The attorneys representing the respondents were in favor of the suggestion.

Rathbone Gardner, chairman of the federal trustees of the Rhode Island Company, whose terms expire in July but who have applied to the United States Court of the Southern New York District for an extension of time in which to dispose of the road, nominated Theodore Francis Green, secretary of the trustees, as co-receiver.

Attorney General Rice objected to Mr. Green's appointment, declaring that he was opposed to the selection of any person who had been connected with the conduct of the Rhode Island Company. City Solicitor Elmer S. Chace, Providence, said he would not offer any objection to either Mr. Swan or Mr. Green.

Attorney Frederick W. Tillinghast stated that N. W. Smith, attorney for the New Haven Railroad, was unable to be present, but that he had been assured by him the New Haven road, which is a creditor of the Rhode Island Company in the sum of $4,000,000 and in addition owns the entire capital stock of the Rhode Island Company, did not consider Mr. Green objectionable.

Attorney General Rice proposed the name of Zenas W. Bliss and no opposition was made.

John J. Fitzgerald, attorney for the carmen's union, stated that the three men named were favored by his clients. The carmen are vitally interested in the conduct of the Rhode Island Company, as at present there is a sum aggregating about $150,000 due them for back wages, which was awarded by the War Labor Board but not paid as the company went into the receiver's hands before the second installment was due.

Attorney Tillinghast informed the court that he had drawn an order to be entered in the form of a decree, if satisfactory to the court, defining the powers of the receivers. It had the approval, he stated, of Clifford W. Whipple, attorney for the Rhode Island Company, and others.

Walter F. Angell of Edwards & Angell, representing the United Traction & Electric Company, said that he had not examined the decree and he would like to do so before it was formally entered. Accordingly the matter was deferred.

Rhode Island Bondholders Organize

The United Traction & Electric Company, a New Jersey corporation owning the major portion of the railway lines operated under lease by the Rhode Island Company, Providence, R. I., for which permanent receivers have been appointed, has appointed a committee of the bondholders for the purpose of protecting the rights and interests attaching to the securities.

The Rhode Island Company has defaulted in payment of its rentals, aggregating $225,000, and as a consequence payment of interest on the 5 per cent bonds of the United Traction due on March 1 has been indefinitely deferred.

The holders of bonds are urged to deposit their holdings immediately with all interest warrants attached, with either the Rhode Island Hospital Trust Company, Providence, or the First National Bank, Boston, as depositories under a deposit agreement in course of preparation. The depositories will issue temporary certificates which may be exchanged for transferable certificates of deposit.

Philip L. Spalding is chairman of the committee. The other members are Stephen O. Metcalf, Henry D. Sharpe, Malcolm Chace, Eben N. Littlefield, G. C. Lee and W. P. Goodwin.

Eight Years of Progress

Philadelphia Rapid Transit Issues Summary Showing Gains Since Rehabilitation Began in 1911

The Philadelphia (Pa.) Rapid Transit Company has issued in the form of a postcard folder a striking summary of progress from 1911 to 1918, inclusive. In 1910 the company found itself with credit exhausted, earnings insufficient to cover fixed charges, labor threatening and service bad. The Stotesbury-Mitten management then took up the work of rehabilitation, with the results shown in the accompanying tables and the following summary:

Passengers Carried: Increased over 70 per cent or more than 320,000,000 passengers. This showing is deemed particularly gratifying in view of the greatly increased use of automobiles.

FARE, WAGE AND DIVIDEND STATISTICS OF PHILADELPHIA RAPID TRANSIT COMPANY DURING 1910-1918

Calendar Year	Passengers Carried	Fare per Passenger (Cents)	Wages of Trainmen (Cents)	P. R. T. Dividend (Per Cent)
1910*	445,599,008	4.13	23	None
1911	520,425,581	4.07	23¼	None
1912	553,471,846	4.03	25	None
1913	584,721,865	4.00	30	None
1914	585,364,297	3.95	30	None
1915	598,111,900	3.91	30	None
1916	672,959,447	3.91	32	2
1917	731,470,879	3.91	36	5
1918	767,758,406	3.98	48	5

* Last year before rehabilitation under Stotesbury-Mitten management.

Fares: Lowered from 4.13 cents per passenger through additional free transfer privileges, resulting in a total saving of $7,941,983 to the car rider. The increase to 3.98 cents per passenger in 1918 was caused by lesser use of free transfers by free-spending war-workers.

Wages: Increased to 43 cents per hour, July, 1918; thereafter voluntarily increased to 48 cents per hour by agreement with War Labor Board. Increases for trainmen alone were $7,692,844 in excess of wage scale effective following 1910 strike.

FINANCIAL STATISTICS OF PHILADELPHIA RAPID TRANSIT COMPANY DURING 1910–1918

Calendar Year	Gross Earnings	Fixed Charges — Amount	Fixed Charges — Per Cent Gross	Net Income
1910*	$19,232,622	$8,717,009	45.32	†$1,222,735
1911	22,147,974	8,842,771	30.93	†560,707
1912	23,282,408	9,032,948	38.80	72,342
1913	24,240,582	9,447,080	38.97	538,496
1914	23,961,408	9,698,125	40.47	201,340
1915	24,315,455	9,792,306	40.27	584,501
1916	27,279,516	9,785,653	35.87	2,377,552
1917	29,726,926	9,745,703	32.79	2,863,684
1918	31,704,427	9,800,039	30.91	1,534,816

* Last year before rehabilitation under Stotesbury-Mitten management.

† Deficit.

Dividends: None paid to P. R. T. stockholders until October, 1916. This stock is now on a 5 per cent basis. The total return of $3,597,578 so far received by P. R. T. stockholders represents less than 1 per cent per annum on their $30,000,000 from the dates upon which it was actually paid in.

Gross Earnings: Have greatly increased over expectations. These large increases were due in part to quickened service and the introduction of new cars, of which 1825 have been secured.

Fixed Charges: Required 45.32 per cent of gross earnings in 1910 to meet the rentals and interest account, and this condition left no equity whatever to P. R. T. stockholders. But 30.91 per cent of gross for rentals and interest account (as now) leaves P. R. T. stockholders with a substantial equity in the property.

Net Income: The sum of $4,482,119 was earned in excess of P. R. T. dividends paid. Co-operative efficiency lessened the number of accidents, thus reducing liability costs from 6.08 per cent to 3.47 per cent of gross earnings. This item alone saved $5,392,054.

Suspension Followed by Receivership

The Ohio River Electric Railway & Power Company, Pomeroy, Ohio, was placed in the hands of Harry Hartwell as receiver by the United States District Court at Columbus on Feb. 25. The proceeding was brought by the Columbia Avenue Trust Company, Philadelphia, trustee for the bondholders, to enforce payment of interest on the bonds, already defaulted.

The property has been suffering from the rising costs of operation without compensation through much needed increased revenues. Applications have been before the local councils for relief since Nov. 1, but the company has been unable to secure what is absolutely essential. The main difficulty lies in the fact that the company is obliged to deal with two municipalities at the same time. There is keen business rivalry between the places, and no co-operative spirit.

In November, 1917, increases in wages of 7 cents an hour were granted to the motormen and conductors, making the platform rates 30 cents to 35 cents an hour. On Oct. 24, 1918, the motormen and conductors were granted a further increase by a board of arbitration and effective Sept. 1 the following rates became operative: First three months, 38 cents; next nine months, 41 cents; after one year, 43 cents.

In November, 1917, the company was granted increased fares from 5 cents to 7 cents with four tickets for 25 cents, but in November last this rate was repealed by referendum vote and fare reverted to the rates in force when the road was put in operation nineteen years ago.

On Feb. 5 the company notified its men that it could no longer continue to pay the prevailing rates of wages and the men promptly struck. The road has not been in operation since that date. The receivership is the culmination of all these tragic occurrences. In all probability the road will not resume operation until some real settlement of the rate question is made.

Louisville Dividend Doubtful

Stockholders at Annual Meeting Are Told That Outlook Shows Lower Net for 1919

Stockholders of the Louisville (Ky.) Railway need expect no dividends in 1919, because the company's operating expenses will be increased and the operating earnings reduced. Such is the tenor of the annual report of President T. J. Minary submitted to the stockholders of the company at the recent annual meeting.

The company's gross operating revenues for the calendar year 1918 totaled $4,327,211 and its operating expenses, fixed charges and preferred dividends were $4,072,447. Thus there remained a margin of $254,764, of which $249,708 was paid out in common stock dividends, the balance being applied to discount on notes sold. The full statement of income of the company for the year ended Dec. 31, 1918, is shown in the accompanying table.

EARNINGS OF LOUISVILLE RAILWAY FOR CALENDAR YEAR 1918

Transportation revenue (city lines)	$3,556,031
Transportation revenue (interurban lines)	600,480
Revenue from mail, advertising, trackage and power (city lines)	151,658
Revenue from mail, advertising, trackage and power (interurban lines)	15,284
Other revenue (interest)	3,758
Gross income	$4,327,211
Operating expenses (city lines)	$2,383,971
Operating expenses (interurban lines)	499,150
Federal, State, county and city tax for twelve months (city lines)	355,369
Federal, State, county and city tax for twelve months (interurban lines)	31,957
Interest on debt, paid and accrued	627,000
Dividend on preferred stock, 5 per cent	175,000
Total expenses and charges	$4,072,447
Net income	$254,764
Dividends on common stock	$249,708
Discount on notes sold	5,056
	$254,764

The foregoing figure for operating expenses, it is said, contains a sufficient sum to pay back wages due under the award of the War Labor Board up to Dec. 31, 1918. These increased wages, however, are only from Aug. 16, 1918, so that their full effect upon net income will not be shown until the annual report of the company for 1919.

It is impossible, it is stated, to say what will be the earnings of the company for 1919, or how far they will be affected by the reduction of the number of soldiers occupying Camp Zachary Taylor. It is also impossible to say what will be the operating expenses for 1919. That the operating earnings will be reduced and the operating expenses will increase, due to the award of the War Labor Board, is, however, obvious, in the opinion of the company as expressed to the stockholders.

Financial News Notes

Charleston May Issue Common Stock.—The Charleston Consolidated Railway & Lighting Company, Charleston, S. C., is reported to be considering an increase in its common stock by $1,500,000, the proceeds to provide for extensive improvements recently made and now being installed.

Headquarters Removed to New Orleans.—General headquarters of the American Cities Company are to be transferred from New York City to New Orleans, La., in the near future. The executive committee is now composed of J. K. Newman, chairman; Leo Benoist, Crawford H. Ellis, Frank B. Hayne, Arsene Perrilliat and Lynn H. Dinkins, New Orleans, and Francis T. Homer, New York.

City Insists Upon Payment.—The Pittsburgh (Pa.) Railways must make provisions to pay for street repair work, the cost of which is estimated at more than $900,000, before it pays any more fixed charges, counsel for the city argued in an answer to a petition for payment of $152,825 in charges, filed with the Federal Court. Failure to meet this obligation might result in forfeiture of franchise, the city intimates.

New Member of Finance Committee.—J. J. Spalding, a lawyer of Atlanta, was elected to membership on the finance committee of the board of directors of the Georgia Railway & Power Company, Atlanta, Ga., at the annual meeting on Jan. 28. Mr. Spalding succeeds E. G. Stevenson, Detroit, Mich., who resigned. There was no other change among the personnel of the company's directors, committee members or officers.

Will Resume Temporarily. — The Washington Water Power Company, Spokane, Wash., has acceded to the demands of the City Commissioners that none of its electric railway lines be abandoned and the city's threatened suit in the Superior Court to enforce its demand for restoration has been withdrawn. D. L. Huntington, president of the company, who appeared before the City Council, verbally agreed to resume the asked-for service, but stated that the company made no promises for the future and it might later abandon such of its lines as it should see fit to do.

Would Charge Off Loss.—Application was made on Feb. 27 to the State Board of Public Utility Commissioners of New Jersey by the Morris County Traction Company to distribute over a period of years a loss suffered through the sale of its power plants at Dover and Chatham. The company at one time manufactured its power, but for some time past it has been purchasing electric energy. Two years ago it obtained permission to sell the power plants. It now desires to distribute this loss over twenty-nine years, the period during which a mortgage on the property still has to run. The commission has reserved decision.

Committee Against Akron Increase.—The railway committee of the Council of Canton, Ohio, has reported against an increase in fare to the Northern Ohio Traction & Light Company, with headquarters at Akron. When the question of municipal ownership was brought up A. C. Blinn, general manager of the company, said that the company was ready to sell. The report stated that since the company had rejected the proposal of the city made on Jan. 31, whereby the company was offered an increase if it made improvements to the lines at an estimated cost of $45,000, the committee was opposed to granting any increase in fare on the city lines.

Seattle Sells Bonds.—The city of Seattle, Wash., on Feb. 25 sold two utility bond issues totalling $1,150,000, to R. M. Grant Company, Chicago, Ill., and Oscar P. Dix & Company, Seattle, Wash. Both issues had been advertised earlier, but no bids were received. The issues covered $400,000 of municipal railway bonds and $750,000 of city light and power bonds, both sold on a 5 per cent basis, to admit of discount. The railway bonds are for the completion of the elevated railway and to pay for new cars recently purchased by the city. The issue also includes $37,500 to pay for condemnation awards on the elevated. The original $350,000 bond issue for the municipal elevated has been exhausted.

Foreclosure Sale March 12.—The property of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., will be sold on March 12 in Rochester to the highest bidder. This sale comes from a judgment of foreclosure entered by the Lincoln Trust Company, New York, for itself and other holders of the $2,799,000 in first mortgage bonds. Indications are that the bondholders will take the road over themselves. The road has been in the hands of the following receivers for several years: Milford W. Childs, Medina; John M. Campbell, formerly of Rochester, and Frank A. Dudley, Niagara Falls. The plan worked out for the reorganization of the company was reviewed in the ELECTRIC RAILWAY JOURNAL for Feb. 22, page 380.

Will Reduce Authorized Preferred Stock.—The stockholders of the Tennessee Railway, Light & Power Company, Chattanooga, Tenn., at the annual meeting to be held on April 1, will vote on a proposal to reduce the authorized amount of preferred stock from $50,000,000 to $10,250,000, the actual amount now outstanding. This reduction is expected to effect a material saving in taxes, according to an official of the company. Under the laws of Maine, where the company was incorporated, corporations are taxed on the amount of stock authorized. As the company does not contemplate increasing the amount of preferred stock outstanding, it was deemed advisable by officials to bring the figure down to the amount of preferred stock now actually outstanding.

$3,000,000 of Notes Approved.—The Massachusetts Public Service Commission has approved the petition of the Boston Elevated Railway for permission to issue $3,000,000 face value of notes or negotiable coupon bonds payable in a period not exceeding seven years and bearing interest not exceeding 7 per cent. The funds to be raised in this manner are to provide means for paying for construction and equipment and for funding floating debt and for the payment of the current debts of the company. The commission has also approved the petition of the company for the authority to spend for other capital accounts the unexpended balance received from a sale of bonds amounting to $132,147, approved by the Public Service Commission in November, 1915.

Electric Railway Monthly Earnings

FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$306,291	*$200,645	$105,646	$51,707	$53,939
1m., Nov., '17	268,643	*186,536	82,107	50,267	31,840
11m., Nov., '18	3,159,671	*2,228,955	930,716	559,836	370,880
11m., Nov., '17	2,559,445	*1,798,210	761,235	543,485	217,750

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$200,636	*$149,977	$50,659	$35,832	$14,827
1m., Dec., '17	167,571	*107,350	60,221	39,336	20,885
12m., Dec., '18	2,189,324	*1,593,083	596,241	432,861	163,880
12m., Dec., '17	1,786,011	*1,210,690	575,321	421,333	153,988

TWIN CITY RAPID TRANSIT COMPAY, MINNEAPOLIS, MINN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$874,584	$664,819	$209,765	$162,179	$47,586
1m., Jan., '18	841,724	662,165	179,559	160,515	19,044

* Includes taxes. † Deficit.

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$41,730	*$31,688	$10,042	$16,096	†$6,054
1m., Dec., '17	42,943	*29,133	13,810	11,565	2,245
12m., Dec., '18	553,360	*371,394	181,966	152,649	29,317
12m., Dec., '17	539,107	*339,045	200,062	140,038	60,024

AURORA, ELGIN & CHICAGO RAILROAD, AURORA, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$186,653	*$168,875	$17,778	$38,799	†$21,021
1m., Jan., '18	129,900	*148,608	†18,708	35,651	†54,359

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$1,853,598	$61,727	$1,791,871	$108,003	$1,683,868
1m., Jan., '18	2,031,462	30,971	2,000,491	205	2,000,286
12m., Jan., '19	22,102,203	552,242	21,549,961	380,377	21,169,584
12m., Jan., '18	19,429,505	366,471	19,063,034	2,770	19,060,264

Traffic and Transportation

Jersey Decision Affirmed

Highest Court Sustains Right of Commission to Fix Fares Sufficient Only to Prevent Deficit

The New Jersey Court of Errors and Appeals, by a vote of nine to three, on March 3 handed down a decision affirming the decision of the Supreme Court in the fare increase cases. As a result of the decision the right of the Public Service Railway, Newark, to charge 7 cents and 1 cent for an initial transfer is affirmed. At the same time the Trenton & Mercer County Traction Corporation's right to charge a 6-cent fare and to abolish the sale of the six-for-a-quarter tickets on its lines in the city of Trenton is also affirmed.

THREE JUDGES DISSENT

The opinion was written by Justice Bergen. Those who concurred in the findings were Chief Justice Gummere, Justices Trenchard, Parker and Minturn, and Judges Heppenheimer, Williams, Taylor and Gardner. Those who dissented were Chancellor Walker, Justice Black and Judge White.

Rebate slips for the return of the excess fare over 5 cents given by the two companies to the public will now be valueless in view of the decision of the highest court in the State. The main contention against the increase was that the Board of Public Utility Commissioners did not take evidence on the valuation of the Public Service Railway property on which to base a rate, and that in the Trenton case the commission accepted the company's own appraisal.

MAJORITY OPINION QUOTED

In filing an opinion covering the three cases, two of the Public Service Railway and one of the Trenton & Mercer County Traction Corporation, Justice Bergen said:

> The Board of Public Utility Commissioners in New Jersey is not required by the statute conferring its powers to in all cases making an appraisement and valuation of the property of a trolley company in order to ascertain what increase in the rates to be charged for transporting passengers is reasonable to provide a sufficient revenue to meet the increased cost of operation due to the enhanced cost of labor, material and governmental imposition of taxes to meet the cost of the war with Germany.
>
> Where the increase made in the rate over what was formerly a reasonable charge, is only sufficient to prevent a deficit in operation, no useful purpose can be served by a valuation of all the property of a public utility company, and it is not a pre-requisite when the statute does not require it.
>
> The concise question presented is: Has the Board of Public Utility Commissioners the power to increase the rate to be charged for transportation service in order to produce a sufficient additional income to meet increased expense in operation growing out of the great advance in the cost of labor and material, principally due to the conditions incident to our war with Germany, and if so was such power lawfully exercised?
>
> Assuming that the rate of 5 cents existing prior to the new conditions was a reasonable one, then the application of ordinary common sense will unhesitatingly lead every fair-minded person to the conclusion that it would not continue to remain reasonable if the cost of production so advances as to destroy the basis upon which it has rested. The solution of such a proposition does not require the aid of legal learning; it is a question of economics which any one of ordinary intelligence can apply.

On a question of whether the commission could properly fix a rate without having evidence before it of the value of the utility company's property, the opinion says:

> We are of the opinion that under the facts shown in this case a valuation is not required by law; that the board exercised a reasonable discretion within the legislative powers delegated to it and that no more is exacted from the public than the services rendered are reasonably worth it, if they are to be sufficiently served, or perhaps served at all. . . The judgments appealed from will be affirmed with costs.

Six Cents for Warren Upheld

In the case of the borough of Warren versus the Warren (Pa.) Street Railway, the Public Service Commission of Pennsylvania has held that the proposed increase in fares is just and reasonable so long as the present conditions obtain. The commission has therefore dismissed the complaint without prejudice to its renewal any time within one year.

The complaint was against an increase in fares by the railway and presented two questions: (1) the authority of the commission over rates fixed by a franchise ordinance; and (2) that the proposed rates were unjust and unreasonable. In its finding the commission says that its authority to control rates fixed by franchise or ordinance was decided in the case of the Borough of Wilkinsburg versus the Pittsburgh Railways (Complaint Docket No. 1883). The commission holds that where, from all the evidenced adduced, it clearly appears that the net revenue under the proposed rates would be insufficient to provide for the payment of interest on funded debt, obligations for street paving, renewals, depreciation and dividends, there is no need for the commission to find a fair value of all the respondent's property for a rate base.

The Warren Street Railway filed with the Public Service Commission and posted in its office in the Borough of Warren under date of July 27, 1918, to become effective on Sept. 1, 1918, a tariff (1) increasing the 3-cent tickets, which sold in strips of five, to 5 cents per ticket; (2) providing for the sale of books containing thirty-five tickets for $2, good on city cars only and for the individual purchaser; (3) increasing the single fare on all city cars from 5 cents to 6 cents to any point within the borough.

West Chester to Zone

Company in Suburban New York Asks Commission to Approve Ten Five-Cent Zones

The Westchester Street Railroad, White Plains, N. Y., on Feb. 27, filed with the Public Service Commission for the Second District, a petition asking to put into effect a new zone system under which it will receive increased revenue. Accompanying the petition by the company were certified resolutions by Scarsdale, White Plains and Mamaroneck and the towns of Greenburgh and Mamaroneck, approving the company's plan. Immediate action will be taken by the commission.

TEN FIVE-CENT ZONES PLANNED

The new plan provides for ten fare zones, each calling for a 5-cent fare. In urging favorable action by the commission the company says that for the year ended Dec. 31, 1917, its operating deficit was $36,456 and for the past year $14,712, and that the corporate deficit on Dec. 31, 1918, was $91,552 and that the corporate deficit from June 30, 1913, to Dec. 31, 1918, averaged $50,067 a year.

The company explains the apparent gain in operating deficit in 1918 or 1917 principally by the adjustment of depreciation charges and an abnormally heavy charge for injuries and damages as against a normal charge in 1918. Deficits during the past two years have been due to increase in wages and materials and the company believes these conditions will continue for some time and the estimated deficit for 1919 will be greater than in 1918, the company says, unless relief is secured.

Fare rates were increased in 1918 from 5 cents to 7 cents except from Tarrytown to White Plains, Mount Vernon and the town of Eastchester, but the company says the increases have not been sufficient to meet continuing deficits and consents have been obtained for further increased rates through a new zoning plan.

CHANGE WANTED FOR LIMITED PERIOD

The commission has been asked to approve the fares specified in the first, second, third, fourth, fifth, eighth, ninth and tenth zones. The company operates in the sixth and seventh zones under a contract with the Westchester Electric Railroad and approval of fares in these zones will be asked through that company. The present application is not for a permanent modification of the rate or a permanent rezoning, but for a limited period as indicated in the consents secured from the different municipalities.

The company operates about 30 miles of electric railway in Mount Vernon, Tarrytown, Mamaroneck, Silver Lake, Rosedale, Elmsford, Tuckahoe, Bronxville, White Plains and Scarsdale. It leases and operates the Shore Line Electric Railroad, White Plains, and in turn is controlled by the New York, New Haven & Hartford. It purchases energy from the New York Central.

Measure for Measure in Rochester

Has a Commission with No Authority Over Fares the Right to Require Greater Service Than Traffic Will Support?

The appraised valuation of the New York State Railways, according to evidence given on Feb. 26 before the Public Service Commission for the Second District of New York, is $53,326,235.

The valuation as given was brought out at a hearing on an order to show cause over service by the New York State Railways in Rochester. The company made the claim that the commission could not order service inasmuch as it has no power to increase fares and that if the commission has the right to order service without increased rates its action is confiscatory of the company's property.

The valuation of the company's property was by G. H. Paine, Chicago. It was made by the company for use in its 6-cent fare application. The total valuation of $53,326,235 Mr. Paine divided between the Rochester lines, $26,176,209, and the Syracuse, Utica and Oneida lines, $27,150,025.

Valuation of the Rochester lines included separate valuations as follows: Rochester city line, one-fare zone, $17,850,661; Rochester Electric Railroad, leased, $838,806; Summerville line, $586,136; Sea Breeze line, $677,234; Durand & Eastman Park, $57,875; Rochester & Sodus Bay, $2,996,253; Rochester & Eastern, $3,839,596; Ontario Light & Traction Company, $171,603. These valuations included the valuation of all tangible and intangible property, the cost of financing, value as a going concern and working cash capital required. The total of the tangible and intangible property of the Rochester lines was $21,731,448.

This valuation was made in 1917 and Mr. Paine explained the observed depreciation totaling $3,820,547 on the entire New York State Railways of which $1,641,114 is on the Rochester city lines, including $1,317,850 on the city fare zone, $49,249 on the Rochester electric line, $28,119 on the Summerville line, $27,601 on the Sea Breeze line, $1,755 on the Durand and Eastman Park, $93,567 on the Rochester & Sodus, $109,567 on the Rochester & Eastern, and $14,390 Ontario Light & Traction Company. The depreciation figures, Mr. Paine said, were not the result of an actual examination of the companies' properties, but from general observation. The valuation he considered a fair one by averaging the prices of the high and the low years. Mr. Paine was questioned closely as to the manner employed in making his computations, the results in half a dozen large volumes being submitted in the evidence.

Corporation Counsel Cunningham, for the city, wanted to know the scope of the investigation. He wanted time to file an answer. He said he was not prepared to cross-examine Mr. Paine and that if he did go into a cross-examination it would be necessary to employ an expert and perhaps examine the company's property.

Commissioner Barhite, who presided at the hearing, said the proceeding was in a determination of service in Rochester. The company says it cannot give better service without more revenue and the commission must have the record of the company's financial condition before it can pass on the question if it decides to do so. The railroad and the city, he said, should make the record. The commissioner said he could not tell Mr. Cunningham just what the commission was going to do.

J. M. Joel, auditor of the company, submitted a series of financial statements. They showed that for the year 1918 the operating income of the Rochester lines, without deductions other than taxes, amounted to $193,569. After deducting taxes and operating expenses, deficits on lines were given as follows:

Charlotte line, $31,989; Summerville, $12,270; Sea Breeze, $4,478; Rochester and Eastern, $16,771; Rochester & Sodus Bay, $61,261; and Glen Haven, $269. Mr. Joel was examined by Mr. Cunningham with the understanding that certain detail figures are to be furnished the city.

Harris, Beach, Harris & Matson represented the railroad. Supervisor Louis Lubelbeiss of Irondequoit was also called as a witness.

Mr. Beach said the company would have some additional evidence to submit, but the hearing was practically concluded except for the cross-examination by Mr. Cunningham. Mr. Cunningham said he wanted an expert to go over the evidence and the financial statements before he continued his examination.

It was agreed to adjourn until March 19 at Albany.

State Conference in Washington

City Authorities, Commission Officials and Railway Representatives Canvass Entire Railway Situation for a Solution

An informal conference was held in Tacoma, Wash., on Feb. 28 between members of the Public Service Commission and various city and electric railway officials of the State. Practically every community in which there is a railway was represented. City officials of Tacoma, Spokane, Bellingham and Seattle were there, and officials of the railway interests in these and other communities presented their case to the commission.

FIVE-CENT LIMITATION REMOVED

The conference was called following the passage of a law by the Legislature now in session removing the statutory 5-cent fare limitation. The commission decided upon this after receiving an application from the Washington Water Power Company, Spokane, for permission to charge a 7-cent fare with 1 cent for transfers. The conference was not held for the purpose of considering the Spokane application, but to obtain a general view of the electric railway situation, and to learn the needs of the various communities as well as their desires.

Last July the city of Tacoma, confronted by an intolerable transportation situation, decided to investigate electric railway conditions in that city. In order to assist the officials in an advisory capacity a citizens' committee of twenty-five representatives in its personnel, was appointed to carry on the investigation. That committee has not yet finished its work, but sensing the seriousness of the situation it recommended to the Council last August that relief be granted the Tacoma Railway & Power Company. The Council acted and granted a 7-cent fare as an emergency measure pending the completion of its work by the committee.

The chairman of the citizens' committee, Scott Henderson, reviewed for the conference the results of the work done in considering the Tacoma situation. He frankly confessed that it was a huge task and that he did not know, the city officials did not know and no one knew just what could or would be done even after the long period of study of the problem.

Increased wages granted by the company, he said, and other increased costs had exceeded the increased revenues from the increased fares, leaving the company a little behind where it was before the new fare went into operation. As a matter of fact the company is $82,000 farther behind after twenty-eight weeks under the 7-cent fare than it was at the end of the six months preceding that period.

The gross earnings increased $193,728 during the last six months of 1918, which was largely a 7-cent fare period, over the first six months of the same year, but in that same period wages increased $217,402 and other operating expenses increased $51,729, a total of $269,132. In other words the 7-cent fare increased gross earnings 30.5 per cent, but labor costs increased 73.1 per cent.

MANY SUGGESTIONS, BUT NO REMEDY

As Tacoma was the actual experimental community in the fare increase the results were made very largely the subject matter of the discussion, and while no one had a real remedy there were many suggestions for relief. As Mr. Henderson put it, the fare increase seemed to be only a shot in the arm administered to revive an expiring patient. He said that some scientific course of treatment would have to follow to restore the sick man of the public utility world to normal vigor. The suggestions ranged from municipal ownership to 8-cent fares together with transfer charges and relief from franchise burdens. The analysis to which all suggestions were subjected merely showed the impracticability of most of them, but it served to emphasize the need for immediate relief if urban transportation is to remain adequate to the requirements of the community.

Naturally each of the systems represented had its own peculiar problems, but all had a common ailment—insufficient revenues with which to meet the increased wage and other operating expenses. The demonstration of this fact seemed to be the only tangible result of the conference.

Bay State Trial Fares Approved

Supreme Court Refuses Argument of Receiver that Commission Fares Will Result in Confiscation

The Massachusetts Supreme Court on Mar. 3 sustained the Public Service Commission in its decision against the institution of a minimum 10-cent fare on the Bay State Street Railway. It will be recalled that in October, 1918, the receiver filed with the commission a schedule establishing enlarged city zones with a uniform cash fare of 10 cents and dividing the country lines into zones about 2 miles long with a minimum cash fare of 10 cents good for two zones, and 5 cents for each additional zone.

The commission refused approval of such rates and substituted for a short trial period a schedule of its own making, as reviewed in the ELECTRIC RAILWAY JOURNAL of Dec. 21, 1918. The commission, in brief, proposed a 7-cent ticket fare or a 10-cent cash fare for the combined outer and inner zones in cities, and a 5-cent fare for a 2-mile zone on the country lines, with the option to the company of a 5-cent cash fare or a 7-cent ticket fare for a single zone. These fares were to be tried for two months and with favorable results for another similar period. In the case of no gain in revenue, the commission said it would not further oppose the company's schedule. The receiver, however, appealed to the court on the ground that he was being obliged to charge confiscatory rates.

The Supreme Court now says that whether the rates of fare as presented in the schedule of the receiver be lowered or raised, cogent arguments might be advanced that the revenue likely to be raised thereby would be less than that which would be realized from the schedule of the receiver.

The court, however, also points out that the commission's purpose appears to be to deal fairly with the company, while at the same time having due regard for the interests of the public. Comparative revenue likely to be derived under the two schedules is largely a matter of prophecy. There appears to be good ground for the belief that the commission's plan will be as profitable as that set forth in the receiver's schedule. It cannot be proved that it will produce less additional revenue.

The situation, the court said, seems to bring the present case within the category of cases where the evidence as to the probable result of the rates in controversy would show that they were so nearly adequate, that is, so nearly equivalent to the amount likely to be realized from the schedules proposed by the receiver, that nothing but a practical test could satisfy the doubt as to their sufficiency.

Furthermore, the period of time for experimentation proposed by the commission (being not over four months in the aggregate and possibly not over two months) in order to determine by actual experience whether its rates yield as much as the estimates of those proposed by the receiver cannot be said to be excessive.

Continuing the court says:

> Where by all parties in interest the times are recognized as abnormal and the particular period as one of transition so that both the receiver of the railway and the public service commissioners by their words and conduct agree that any substantial return upon the capital honestly and prudently invested must, even under wisely economical management, be suspended temporarily, and that any rates established at the moment are likely to be impermanent and experimental, the public service commissioners are not, under either the constitution of Massachusetts or that of the United States, deprived of power to modify the schedule of rates, fares and charges proposed by the receiver. The public service commission may make such changes therein as in its judgment are required by the public interests and the rights of the owners of invested capital, when the revenue to be derived therefrom is not thereby substantially diminished below that likely to be derived from the rates proposed by the receiver.
>
> The rate-making power established by legislative authority is not stripped of all functions because extraordinary conditions have sprung into existence, which the owners of the privately-owned public utility recognize as preventing them from deriving any income for the time being from their investment; but it still may exercise its judgment for the protection of the public interests when it does not reduce substantially the revenue proposed to be exacted from the public by the owners of the public utility. Simply because such owners are for the moment failing to receive the just compensation to which in the long perspective they are entitled, they are not thereby necessarily at liberty to fix their own terms. Their property is still affected with a public interest.
>
> The result here reached appears to us in harmony with the decisions, to which reference has been made, and is fairly deducible from them. We perceive nothing at variance with it in Lake Shore & Michigan Southern Railway vs. Smith (173 U. S. 684) much relied on by the receiver, as modified by Pennsylvania Railroad vs. Towers (245 U. S. 6, 17) or in Denver vs. Denver Union Water Company (246 U. S. 178) and Detroit United Railway vs. Detroit, (248 U. S. —).
>
> We do not find it necessary to discuss whether circumstances may arise where the public service commissioners may be warranted, even under circumstances such as are here disclosed, in establishing rates likely to yield a revenue less than that likely to be derived from those proposed by the receiver, or less than a fair interest on capital honestly and prudently invested. The present decision is confined to the facts disclosed on this record.

A Peculiar Case

Des Moines Railway Commissioner Dismissed for Approving Service Changes

Roy G. Smock, city supervisor of the Des Moines (Iowa) City Railway, was summarily discharged by the City Council on Feb. 26, two days before his resignation was to have taken effect. Mr. Smock's dismissal was by unanimous vote of the Council. It resulted from his having approved the reduction in service proposed by the Des Moines City Railway. Members of the Council felt that Mr. Smock should have withheld action on the cut, leaving it for his successor. His resignation was tendered a month ago.

The new schedule announced by the railway is about a 10 per cent cut in service. It is not as drastic as was forecasted by officials of the company when the application for an increased fare was rejected by Federal Judge Martin J. Wade. The owl car service was not abandoned as at first announced and rush-hour service is not cut. The main reduction is in the non-rush hours with intervals of two or three minutes longer between cars in the morning and afternoon. During the non-rush hours fifty-six cars will be in operation and at the peak load there will be 116.

Mr. Smock in announcing his approval of the service cut issued a statement to the effect that after making a careful study of the earnings of the railway he was satisfied that it could not give the service formerly provided and that he felt he was justified by Judge Wade's rulings in approving the reduction.

Scott Goodrell, who was named as Mr. Smock's successor a month ago, was ordered to report for service immediately after the Council had dismissed Mr. Smock.

The service reduction was scheduled to go into effect on Feb. 27, but a midnight decision on injunction proceedings brought by city attorneys held it up and the case is now on trial before Judge Hubert Utterback of the Polk County District Court. Hearing of evidence on the permanent injunction closed on March 1. Judge Utterback announced that he would render his decision on March 4.

More Time to File Zone Plan

Granting the request of L. D. H. Gilmour, general solicitor of the Public Service Corporation of New Jersey, Newark, N. J., the Board of Public Utility Commissioners on March 4 extended until March 11, the time for the corporation to file its report on a new zoning system, to be used by the Public Service Railway. Under an order of the board the corporation was directed to file the report on March 1, but Mr. Gilmour informed the commission that the report was in the hands of the printer and that it would be impossible to have it completed before March 11.

Transportation News Notes

P.-A.-Y.-E. and Tokens in Springfield.—The Springfield (Ill.) Consolidated Railway is installing Johnson fare boxes on all of its cars and adopting the pay-as-you-enter method of fare collection together with metal tokens.

Increase for Jennings Line.—The Public Service Commission of Missouri has authorized the St. Louis & Jennings Railway, St. Louis, Mo., to increase its fare from 2 to 5 cents for adults and from 1 to 2 cents for children. The commission has ordered the company to sell seven adult tickets for 25 cents, thirty for $1 and 100 tickets for $3. The company operates only 2½ miles of line.

Increased Fare Needed.—At the annual meeting at Findlay, Ohio, on Feb. 26, B. L. Kilgour, President of the Toledo, Bowling Green & Southern Railway, told the board of directors that increased revenue will be necessary in order that the road may render proper service to the public. The company has asked for an increase in rates at Bowling Green, North Baltimore, Maumee and Portage.

Elevated Fare Demurrer Sustained.—Circuit Court Judge Baldwin on Feb. 28 sustained a demurrer filed by the Chicago (Ill.) Elevated Railways to State Attorney Hoyne's amended petition asking for an injunction against the charging of 6-cent fares on the elevated lines. The court said that it is a matter that should be passed upon by the Supreme Court. Mr. Hoyne's assistants said the case would be appealed to the Supreme Court at once.

Motion for Dismissal in Toledo Case.—In the case of the appeal of the city of Toledo, Ohio, against the Toledo Railways & Light Company, the company has filed a motion for dismissal in the United States Circuit Court of Appeals at Cincinnati. The appeal is from an injunction granted by the United States District Court, preventing the city from interfering with the rate of fare charged after the expiration of the company's franchises in Toledo.

Wants Seven Cents in Spokane.—Seven-cent fare on all railway lines in Spokane—those of the Spokane & Inland Empire Railway as well as the Washington Water Power Company—are provided for in tariffs of both companies, made public on Feb. 21. They call for an increase in fare from 5 cents to 7 cents, with a 1-cent charge for transfers. If no objection is offered to the tariff the Public Service Commission may order the increase without calling a hearing.

Fare Changes Wanted by Patrons.—William S. Stearns, attorney for the Town Board of Pomfret, Chatauqua County, has filed with the Public Service Commission for the Second District, a complaint accompanying petitions signed by patrons of the Buffalo & Lake Erie Traction Company between Dunkirk and Fredonia, asking the restoration of certain commutation rates, the issuance of transfers and better service in Dunkirk, Fredonia and the town of Pomfret.

Orders Old Fare Restored.—The Corporation Commission of Oklahoma has issued an order directing the Pittsburgh County Railway, which operates in McAlester and from McAlester to the Oklahoma State Penitentiary, to restore a 5-cent fare from the city to the State Penitentiary. The railway recently arbitrarily increased the fare from the city to the State Prison to 10 cents and the matter was referred to the Corporation Commission by S. W. Morley, warden of the penitentiary, who asked that the 5-cent fare be restored.

Agrees to Trial of One-Man Cars.—Operation of one-man cars was defeated by unanimous vote of the City Council of Norfolk, Va., at its regular meeting recently. Following the vote on the proposition a resolution was adopted instructing the city clerk to notify the United States Housing Corporation of the action taken by the Council and informing the corporation that the Council is prepared to consider any proposition looking to a try out of the cars in Norfolk which will in no way obligate the city or involve the city in any legal complication.

Complains About Round-Trip Fare.—The New York State Railways, Utica Lines, in its answer to the complaint against the 27-cent round-trip fare between Clinton and Utica, filed with the Public Service Commission for the Second District, alleges that continuance of a 25-cent round-trip fare would constitute an unlawful discrimination as between the company's patrons in Utica and New Hartford and its Clinton patrons, and that this discrimination was never intended when the railroad's predecessor was granted a franchise. The commission will at once direct a hearing.

Fare Case in Company's Favor.—Judge Duval West in the United States District Court in San Antonio, Tex., has handed down a decision holding that the franchise ordinance under which the San Antonio Public Service Company operates its cars does not constitute a binding contract in so far as the 5-cent-fare provision is concerned. Application was made by the company to the City Commission in August to charge a 6-cent fare. The appeal was denied in October. In November the company asked for a hearing. This plea was also rejected by the City Commission.

Would Make It Easy for Jitneys.—Senator Henry E. Ackerman of Monmouth County, N. J., has introduced a bill in the New Jersey Legislature providing for the elimination of the bonding feature of the jitney law in municipalities of less than 20,000 people. The Senator says the bill is intended to meet the situation in Long Branch where the local electric railway does not operate in one end of the city and the residents depend entirely upon the jitneys. The bonding companies increased the premium considerably over $300. The bill does not interfere with the franchise tax or the license fee.

Handled Big Crowd Easily.—The two big shows the last part of February—the Auto and the Tractor—materially increased business for the Kansas City (Mo.) Railways. Not only did that company take care of the increased traffic of home people who desired "to come down town and see the show," but it also handled the thousands of visitors satisfactorily. It is estimated that more than 100,000 people came to the city from Missouri and other States to attend the shows. The week's big business showed that the railway is again as able to handle extraordinary demands as ever it was before the recent strike.

Aiding in Civic Betterment.—The Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., is aiding the movement for civic growth of the city of South Bend and has contributed generously to publicity space in South Bend newspapers announcing its co-operation in all matters tending to increase the importance of the city in a business, commercial and civic way. The company shows excellent pictures of its freight and passenger stations, urges travel by interurban railway and the use of the interurban railway for freight shipments. The company is also taking a prominent part in the publicity work designed to foster Interurban Trading Day, held every Thursday.

Open Door Policy in Birmingham.—Under John Sparrow, recently appointed publicity agent of the Birmingham Railway, Light & Power Company, Birmingham, Ala., all inquiries addressed to the company are promptly answered either by letter or through the newspapers. The company almost daily has published news connected with its actual operation. The rule has been adopted of not announcing a betterment in service until the betterment has become effective. Announcements of the company thus have the weight of authority and the public accepts them in good faith. The records of the receiver of the company are, of course, the records of the court and are therefore open to the public. The public, however, cannot examine these records without unnecessary time and trouble. Mr. Sparrow has full access to the records and to all the operations under the receiver. He presents through the newspapers, in part as news and in part by way of advertisements, all the information in regard to the company in which the public is interested.

Personal Mention

J. F. Collins Elected

Vice-President of Michigan United Railways Made President of Central Electric Railway Association

J. F. Collins, vice-president and general manager of the Michigan United Railways, Jackson, Mich., was elected president of the Central Electric Railway Association at the annual meeting held in Cleveland, Ohio, on Feb. 27 and 28.

Mr. Collins entered railway work in 1877 as a horse-car driver for the Citizens' Street Railway, Indianapolis, Ind. He advanced step by step with this company to the position of superintendent. In 1898 Mr. Collins went to Toledo, Ohio, as superintendent of the Toledo Traction Company and later became manager of railways on the same property. He resigned in 1908 to become general manager of the Saginaw-Bay City Railway, Saginaw, Mich., a property which also furnishes electric lighting and gas service.

J. F. COLLINS

In 1910 Mr. Collins resigned from his general managership at Saginaw and returned to Toledo as president of the Toledo & Western Railroad, the Maumee Valley Railways & Light Company, the Toledo, Ottawa Beach & Northern Railway and assistant general manager of the Toledo Railways & Light Company. He resigned these positions in 1912 and went to Jackson, Mich., as vice-president and general manager of the Michigan United Railways and the Michigan Railway, which properties operate more than 400 miles of trolley and third-rail interurban lines in the State of Michigan. Of this mileage more than 200 miles were built under the direction of Mr. Collins since 1912.

Mr. Collins mentions with pride the fact that he has never received one dollar of salary from any other industry than the electric railway.

C. F. Phillips has been appointed freight claim agent of the Toledo & Western Railroad, Toledo, Ohio, to succeed C. C. Cash.

J. C. Ward has been appointed claim agent of the Cleveland, Willoughby & Eastern Railroad, Willoughby, Ohio, to succeed J. H. Shaw.

J. G. Merriman has been elected president of the Asheville & East Tennessee Railroad, Asheville, N. C., to succeed A. S. Guerard.

A. B. Caldwell has been appointed superintendent of the Rochester Electric Division of the Erie Railroad, to succeed J. D. Cummin.

I. C. Martin has been appointed purchasing agent of the Mansfield Public Service & Utility Company, Mansfield, Ohio, to succeed F. E. Ray.

S. C. Stivers, secretary of the Ithaca (N. Y.) Traction Company, has also been appointed treasurer of the company to succeed T. P. Clancy.

Howard Bishing has been appointed roadmaster of the Springfield & Washington Railway, South Charleston, Ohio, to succeed J. H. Lowery.

W. E. Wilson has been appointed electrical engineer of the Cleveland & Eastern Traction Company, Cleveland, Ohio, to succeed F. V. Weldy.

Clarence Wood has been appointed roadmaster of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, to succeed L. J. Rider.

E. R. Wait has been appointed secretary, treasurer and auditor of the Bartlesville (Okla.) Inter-Urban Railway, to succeed L. A. Ramsey.

A. T. Mercier has been appointed superintendent of the Portland, Ore., division of the Southern Pacific Company, to succeed F. L. Burckhalter.

L. Frank Gordon has been appointed claim agent of the Portland, Ore., division of the Southern Pacific Company, to succed A. S. Rosenbaum.

F. E. Wilkins has been appointed auditor of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, to succeed A. E. Dedrick.

Miss P. J. Kelley has been appointed general freight and passenger agent of the Empire State Railroad Corporation, Syracuse, N. Y., to succeed R. E. A. Pitman.

D. M. McLauchlan has been appointed master mechanic of the Portland, Ore., division of the Southern Pacific Company, to succeed C. E. Peck.

William Decker has been appointed master mechanic of the Orange County Traction Company, Newburgh, N. Y., operating 23 miles of line to Newburgh, Orange Lake and Walden, to succeed Edward Schulmyer.

John Harper has been appointed superintendent of transportation of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, to succeed A. C. Flint.

W. H. Goodenough has been appointed master mechanic of the Mansfield Public Service & Utility Company, Mansfield, Ohio, to succeed Riley Perkins.

E. H. Hagensick has resigned as superintendent of electric lines of the Omaha & Council Bluffs Street Railway, Omaha, Neb., to become electrical engineer for the Union Pacific Railroad with headquarters at Omaha. Mr. Hagensick spent seven years in the electrical department of the Union Pacific previous to becoming connected with the electric railway company at Omaha in 1913.

W. O. Jacobi has been superintendent of the electric lines of the Omaha & Council Bluffs Street Railway, Omaha, Neb., taking the place of E. H. Hagensick, who resigned to become electrical engineer for the Union Pacific Railroad. Mr. Jacobi was connected with the Nebraska Power Company in 1905 and 1906, but returned to the Lewis Institute, Chicago, from which he was graduated in 1909. In 1910 and 1911 he was in the employ of the Pullman Company at Pullman, Ill. He entered the electrical department of the railway at Omaha in 1911.

Emil G. Schmidt, president of the Des Moines (Iowa) City Railway and the Interurban Railway, has announced that on his retirement from those organizations he will take active charge as president of the First Trust & Savings Bank, Des Moines. Mr. Schmidt has been president of the bank since its organization three years ago, but has taken no active part in its affairs. Vice-president E. B. Wilson has heretofore been in active charge of the bank. Mr. Schmidt's son, who is now in the service, will also make his home in Des Moines.

Theodore Francis Green, who has been appointed a co-receiver of the Rhode Island Company, is one of the best known and ablest attorneys in Rhode Island. He has been politically prominent for a number of years. He ran for Congress on the Democratic ticket in 1918 and was defeated, while in 1912 his campaign for Governor was also unsuccessful. He has been a federal trustee of the Rhode Island Company for nearly five years, acting as secretary of the body. His other activities were reviewed in the ELECTRIC RAILWAY JOURNAL at the time of his appointment as one of the federal trustees of the railway.

Zenas W. Bliss, former Lieutenant-Governor, who has been appointed a co-receiver of the Rhode Island Company, Providence, R. I., is one of the best known men in Rhode Island. He was born in the town of Johnston on Jan. 10, 1867, and was graduated from the Massachusetts Institute of Technology in 1889. He returned to Providence after his graduation and praticed for a period as an engineer. Later he entered the real estate business. He was a member of the Cranston, R. I., Town Council from 1901 to 1909. He was a member of the House of Representatives of the Rhode Island Legislature from Cranston from 1903 to 1909. He was chosen speaker of the House in 1909 and the following year was elected Lieutenant-Governor, which office he held for two years. In 1916 Mr. Bliss received the honorary degree of A.M. from Brown University. His last public service was as a member of the State commission to investigate the affairs of the Rhode Island Company.

Col. Thornwell Mullally, assistant to the president of the United Railroads, San Francisco, Cal., who has been away for a year on leave of absence, has announced that he will not return to the position that has been held open for him with the traction company. Colonel Mullally organized and took overseas the regiment of California troops popularly known as "The Grizzlies." He is engaged at present in finding employment for his men who are being mustered out of service. In 1915 Colonel Mullally received a special invitation from General Pershing to join the Pershing column in Mexico for an indefinite period, during which he studied military field tactics and procedure at close range as a "military observer." Colonel Mullally was graduated from Yale University and the New York Law School. He devoted himself to law work in New York until 1906, when he went to San Francisco. In his position as assistant to the president of the United Railroads he rendered invaluable public service in connection with the reconstruction and reorganization of the city's transportation facilities following the fire.

John Sparrow, whose appointment as publicity agent for the Birmingham Railway, Light & Power Company, Birmingham, Ala., was noted briefly in this paper for Feb. 22, was born in Florida. He began life as a "cub" in a printing office and is still sticking to the types as head of the Sparrow Advertising Agency at Birmingham. He was a newspaper man for a number of years, holding every position on the staff from reporter to managing editor. About twenty years ago he went into the advertising and publicity business for himself. About a month before the Birmingham Railway, Light & Power Company was placed in the hands of Lee C. Bradley as receiver, Mr. Sparrow was engaged by Mr. Pevear, general manager of the company, to conduct an informative campaign. At that time the company was the victim of much misrepresentation and a consequent misunderstanding on the part of the public. Through Mr. Sparrow the company began to tell the people in a simple, straightforward way the conditions which the managers were endeavoring to overcome. When Mr. Bradley was appointed receiver he approved the open door policy which had been inaugurated by Mr. Pevear and determined to continue it on still broader lines. He accordingly appointed Mr. Sparow to carry on a campaign.

George H. Kelsay, formerly electrical engineer of the Union Traction Company of Indiana, has resigned his position with that company and on March 1 began his new duties as superintendent of power and equipment of the Cleveland, Southwestern & Columbus Railway. His headquarters will be at Elyria, Ohio. Mr. Kelsay was graduated from the engineering school of Purdue University in 1900. After a few weeks spent in the car shops of the Union Traction Company of Indiana he became master mechanic and electrician of the Marion (Ind.) Transit Railway and later was made superintendent. He left this company in 1902 to become master mechanic of the Western Ohio Railway, Lima, meanwhile putting in a few weeks with the Richmond Street & Interurban Railway, Richmond, Ind. During the three years spent with the Western Ohio, Mr. Kelsay had supervision of electrical equipment and power lines for this 80-mile interurban railway, which used a transmission voltage of 33,000. From 1905 until Feb. 28, 1919, he was first superintendent of power and later electrical engineer for the Union Traction Company of Indiana. During this time the company grew from a system operating 200 miles of high-speed line and four city properties, with one power plant and fourteen substations, to one with 400 miles of track and five additional power plants. Under his direction the central power plant was enlarged, the transmission system was expanded, three power plants were eliminated and the number of substations was increased to twenty-eight. He has had charge of all electrical equipment in power plants and substations, transmission lines, telephone systems, track building, 75 miles of automatic signal system, electrolysis surveys, and he designed and constructed and later superintended the operation of thirty small lighting plants in the territory served by the railway.

G. H. KELSAY

Obituary

Stephen Sellon, well-known as a British consulting engineer, died recently. For many years he devoted himself to tramway and light railway work, and was one of the foremost in the inception and promotion of new schemes. He figured prominently as a witness when tramway bills were before Parliament, and as a leading member of the Tramways & Light Railways Association he took a large part in negotiations with government departments on matters affecting the welfare of the industry. Along with the British Thomson-Houston Company he was responsible for the introduction of the first electric tramway on the overhead wire system in England. This began operation in Leeds in the end of 1891. He was afterward engineer for the equipment of many trolley lines belonging to the British Electric Traction Company and other companies.

Sir Rodolphe Forget, banker and former Member of Parliament for Charlevoix, died at Montreal, Que., on Feb. 20. He was 57 years old. Sir Rodolphe at an early age entered the office of Senator L. J. Forget as a clerk. In 1887 he became a partner in the firm of L. J. Forget & Company, continuing until 1907, when he severed his connection and began the banking business on his own account, which has since become one of the largest financial concerns in Canada. Sir Rodolphe was an official in the Quebec Railway Light, Heat & Power Company; Quebec & Saguenay Railway Company; the Toronto Railway; Canadian General Electric Company; St. Lawrence Flour Mills Company. He was the organizer of the Montreal Light, Heat & Power Company; the Quebec Railway Light & Power Company, and the Canada Cement Company.

Philip Henry Wynne, at one time with the Boston Elevated Railway, died on Feb. 11 at his summer home in Old Deerfield, Mass., at the age of fifty-one. He was a native of Elizabeth, N. J. His electrical experience, following a course of study at the Massachusetts Institute of Technology, included terms of employment with the Thomson-Houston Electric Company and later in the engineering department of the Boston Elevated Railway during the construction of the rapid transit system. He was a most valued assistant in tests, calculations and work of scientific precision and bore the brunt of much important electrical investigation under John Lundie, then consulting engineer of the company. Mr. Wynne engaged in the design of scientific instruments for about ten years after leaving the Boston company, being associated with the L. E. Knott Apparatus Company. Lately he gave such time as his health allowed to composing music.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

High Prices Unfavorable To Fixed List

General Electric Doubles List on Wiring Devices to Get Away from Unsatisfactory Condition

Up to the time that the prices of materials began to skyrocket it was very satisfactory to make a fixed list price, and to change discounts as market conditions warranted. Catalogs on this basis did not have to be changed every time the price changed. It was simply necessary to change the discount sheet.

Lately, however, the margin between list and net has become very small, and not infrequently the net selling price is greater than the list price. A good deal of confusion has been created, and some concerns have gone so far as to abolish the practice of quoting on a list basis and now quote on a net basis altogether.

This week an announcement was made by the General Electric Company relative to a new price schedule affecting its entire line of wiring devices, except inclosed fuses and some similar material, effective March 1, whereby all lists are doubled. The statement reads as follows:

> During the active period of the war, when costs advanced very rapidly, the easiest way to accomplish each advance in prices was to reduce discounts. This resulted in a most unsatisfactory method of figuring net prices on many lines, necessitating as it did in many instances selling wiring devices on a list-plus basis. There is no indication that costs will be sufficiently reduced for some time to come to warrant the continuing of this present unsatisfactory method of pricing.
>
> The company decided that the only way immediately to remedy this, without making present catalogs obsolete, was to declare practically all list prices doubled and establish a new schedule of discounts from these doubled lists which gives the same net prices as are now in effect.

Another Manufacturer Adopts Rental System

Power Recorders Under Plan Become Property of Lessee's at End of Sixteen Months

Rental of electric railway equipment is not a new idea to the field although but few manufacturers have utilized this method of distribution of their product. Within the last two or three months, however, two new instances of this means of distribution have been announced, the latest being that of the Arthur Power-Saving Recorder Company, New Haven, Conn.

The rental method of the latest company to adopt this system differs somewhat from the others in that the recorder automatically becomes the property of the renting road after the lease has run a certain definite length of time. In other words, the manufacturer in this instance finances the purchase of his product for the railway.

According to the terms of the lease the railway taking a lease pays rent for sixteen months, at the end of which time the recorder automatically becomes the property of the road. The manufacturer states that this gives him about 6 per cent on the capital advanced.

Of course should railways so desire, recorders can still be purchased outright.

Further Price Drops

Lower Copper Quotations Bring Easier Wire and Bond Prices—Cross Arms Lower

When quotations for the sale of copper began to decrease below the 26-cent base, there were hopes among buyers of electric railway material that further drops would have an effect of lowering the prices of goods into which copper entered to a large extent. The most noticeable replies to this were in the cases of copper wire and rail bonds. The latter have just dropped off a few per cent, raising the present discount from 20 to 25 per cent.

In different sections of the country there have been slightly different bases reported for the same kind of wire. Bare wire is reported on an 18-cent base at Chicago and Boston, and an 18- to 18¾-cent base in New York. Rubber-covered averages close to 23 cents. In Chicago it is quoted on 20- to 23-cent base, in New York on 20- to 25-cent base, in Boston on a 22-cent base and in Atlanta on 23 cents. Weatherproof is given at Chicago as on 18- to 21¾-cent base, at New York as 20 cents, Boston quotes 21 cents and Atlanta is on an 18-cent base.

Few other electric-railway materials have been reported off on price. Wood cross-arms recently dropped 5 per cent on carload lots at the mill, with about two weeks delivery. Cedar poles can be delivered from stock while two to three weeks is necessary on chestnut—a considerable improvement. Tape has fluctuated several times in the San Francisco district, the latest report being a 5-per cent increase after a 10-per cent decrease. There seems to be considerable ordering of friction and rubber tape by electric railways in this western territory. Certain kinds of hardware for use on wooden pole construction have decreased 10 to 15 per cent in the San Francisco district. Deliveries on practically all materials have improved since the end of last year.

Maintenance Material Orders More Frequent

Smaller Companies Are Sailing Very Close on Their Supplies as Deliveries Become Better

At the present time with most war orders closed out manufacturers are able to make virtually immediate deliveries on maintenance equipment. One effect of this has been to cause traction companies to cut down the amounts of their orders for various kinds of equipment but to place these orders more frequently, trusting that they will be able, thereby, to benefit by any drop in price which they feel may be imminent.

This small-lot buying, however, has a counter effect in that higher net prices result. It is not reasonable to expect as satisfactory a price on small orders, though given regularly, as on large quantity orders. Much maintenance material is made on automatic machines where it is possible to procure a large production on each setting. In each case, machinery must be set and the cost of this work borne by the goods manufactured. This cost naturally decreases for each unit as the number of units increases.

LARGER COMPANIES NOT RETRENCHING

Certain large traction systems in the east have not retreated from their former practice of keeping their stocks of maintenance equipment in first-class condition, regardless of the cost of that equipment. The additional cost has been returned in better operation and less time out for repair. Then, after the replacement had been effected and service restored the damaged part has been repaired at leisure where possible.

On smaller traction lines the stocks have been allowed to become so low that necessary repairs or replacements have meant idle equipment until the new part could be procured. This has happened on such replacements as commutator segments on controllers, whereupon there has come a hurry call for a "handful" of new segments.

The idea is similar to the housewife who buys one can of soup each day at maximum unit rate, rather than a case of each of several kinds at a more satisfactory rate by the case, and it is possible that the unit rate per case when prices are higher will be no greater than the unit rate per unit if prices should drop before the cases are all consumed. The chance was taken against a drop in price, and the insurance was the supply ready for any emergency. Buying by case lots tends to strengthen business in any commodity.

No Material Reductions Expected in Lumber Prices

Horace F. Taylor, president of the National Wholesale Lumber Dealers' Association, writing from Buffalo, N. Y., to the Division of Public Works and Construction Developments of the United States Department of Labor, does not hesitate to say material reductions in lumber prices will develop very slowly, if at all. Mr. Taylor says:

> The very clear majority of opinion we derive from representatives of the industry in all parts of the country, is in effect that there will be no further reduction in the cost of lumber for a long period, and that there is no safe ground, therefore, for postponing building in the hope of a price reduction in this material. We look upon the present rather quiet conditions as temporary only and due to industrial readjustment, soon to give place to very sound activity. The cost of making lumber offers no chance of reduction, both on account of materials and supplies, and the cost of labor which it seems not only necessary but desirable to maintain at as nearly an adequate rate as possible in view of the present cost of living. In addition to the ordinary increase in demand that is expected, an unusual call for lumber for export to Europe will soon begin to have its effect on the situation. Logging conditions during the present winter have been unfavorable, particularly in the North, and lumber production will apparently be less than that of normal years for some time to come. There is only one possible conclusion based upon the opinion of those consulted and that is that as far as the lumber market is concerned, the present is an advantageous time to purchase.

Inventories of Surplus Government Material

The office of the Director of Sales, War Department, announces additional inventories of surplus materials furnished by the Construction Division of the Army. Among these are rated the following: Miscellaneous electrical equipment, exclusive of machinery, $200,000; railway equipment, various-weight steel rail, $1,200,000; ties, $400,000.

Rolling Stock

Waterville, Fairfield & Oakland Railway, Waterville, Me., has received two new 43-ft. steel passenger cars.

Citizens Railway, Clarksville, Tenn., would like to purchase one or two new cars this year if conditions appear favorable.

Stockton (Cal.) Electric Railway has received three of its order of five new-type safety cars. The other two are due to arrive at any time.

Nashville Railway and Lighting Company, Nashville, Tenn., has placed in service on the West Nashville line four new closed trail cars. These are center-entrance single-truck cars and were constucted entirely in the company's shops.

Trenton & Mercer County Traction Corporation, Trenton, N. J., recently had a car destroyed by fire while standing in the carhouse in Lalor Street. The car was run to the street, where it was burned. The building was not damaged.

Trade Notes

Frank C. Hedley has joined the selling forces of the W. R. Kerschner Company, Inc., 50 Church Street, New York, N. Y.

Holden & White, Inc., have opened a Detroit office at 2213 Dime Bank Building, which will be in charge of Mr. Hinman, and Mr. Quinton will be located in the main office of the company in Chicago.

William H. Fernholz, Mack Building Milwaukee, Wis., has been appointed the exclusive representative in the Wisconsin territory for the Electrical Engineers' Equipment Company, 710 West Madison Street, Chicago.

Badenhausen Company, boiler and engine manufacturer, announces the opening of a Pittsburgh office at 5030 Jenkins Arcade, in charge of A. D. Neeld, Jr. This office will control the sales in the Ohio, West Virginia and western Pennsylvania territory.

E. Besuden, for the past sixteen years sales manager of the Jewett Car Company, has accepted the position of district manager of the railway department, Eastern territory, for the Chicago Varnish Company. Mr. Besuden will occupy offices at 50 Church Street, New York.

Underfeed Stoker Company of America has moved its general offices from Chicago to the Book Building in Detroit. This will not interfere with the sales work of the Chicago district sales offices in the Harris Trust Bldg., nor any of the other district offices.

G. William Crispell has been appointed production superintendent of the Electric Service Supplies Company, in its plant at Philadelphia, Pa. Mr. Crispell received his early training with the General Electric Company. After several years' experience on installation and maintenance work, he became laboratory assistant to the late Prof. James F. McElroy, consulting engineer with the Consolidated Car Heating Company on both electric and steam railway specialties, and for several years was in charge of the electrical manufacturing of this company. Before assuming his present position Mr. Crispell was assistant superintendent of the Westinghouse Electric Products Company, Mansfield, Ohio.

Gear Standardization Meeting.—A well-attended meeting of the standardization committee of the American Gear Manufacturers Association was held at the Hotel Statler, Buffalo, N. Y., on Feb. 10 and 11. Every committee of the association had representatives in attendance, and a well-defined program was laid out for future activities. All phases of the subject of standardization were discussed. According to the action taken in previous sessions, all committees were urged to seek the co-operation of other organizations interested in the standardization of gears. It is probable that quite an advance toward the standardization of some of the phases will be made at the time of the annual meeting which is to be held in April.

Holland Trolley Supply Company, Cleveland, Ohio, has just opened up a new foundry department and is now ready to take care of its trolley wheel requirements with immediate deliveries of any one of its forty-one different types. In the past the company has been handicapped to some extent in the matter of guaranteeing its mixture, owing to the necessity of having various foundries make up its product, but this trouble is now overcome. No expense has been spared in the equipment purchased, and as the superintendent has had more than forty years' experience in the bronze business, ten years of this being spent manufacturing trolley wheels, the company is looking forward to a large increase in its present volume of business.

C. C. Farmer, until recently assistant Western manager and resident engineer of the Westinghouse Air Brake Company, has been advanced to the position of director of engineering in the same company. Mr. Farmer began his railway career with the Southern Pacific Railway, but in 1891 joined the forces of the Missouri, Kansas & Texas Railway as supervisor of airbrake repairs and later as airbrake inspector of the entire road. After a short service on the Central Railway, he became connected with the Westinghouse Company. John S. Y. Fralich has succeeded Mr. Palmer as resident engineer of the Western district. He has been with the Westinghouse Air Brake Company since June, 1904. Previously he was with the Pennsylvania Railroad.

R. E. S. Geare has been elected president of the Mid-West Manufacturing Company, recently incorporated. Mr. Geare is well known to the construction and power-plant field in Chicago and the Middle West because of his active representation of the T. L. Smith Company, Manistee Iron Works Company, Geare & Company, and others, which work he will still continue. The Mid-West Manufacturing Company has located its factory in Chicago, with general offices in the Old Colony Building. It has acquired the sales and manufacturing rights of the "Continental" chain grate stoker from the Manistee Iron Works, and the "Chaingrip" pipe vise and tools from the Gerolo Manufacturing Company. In addition to this the manufacture of special machines, tools and dies; rebuilding of construction and power plant machinery together with the installation of such machinery will constitute an important part of the new company's activity.

Roller-Smith Company, 233 Broadway, New York City, announces the appointment of Frank R. Ryan to the sales force of its Chicago office at 740 Monadnock Block. Mr. Ryan graduated from the electrical engineering course of Notre Dame University, spent over a year in the testing department of the Commonwealth Edison Company, about the same time in the testing and operating department of the Sanitary District of Chicago, and was subsequently connected with the Krehbiel Company, consulting engineers of Chicago. For the past six months he has been in the Signal Corps. Mr. Ryan takes the position which was held by Charles H. Nicholson before the latter entered the service and subsequently took charge of the company's Detroit office. The Roller-Smith Company also announces the appointment of the P. I. Perkins Company, 141 Milk Street, Boston, Mass., as its agent in Massachusetts, Connecticut and Rhode Island. The P. I. Perkins Company will handle in this territory the Roller-Smith Company's line of instruments, circuit breakers and meters. W. A. Blachford will give his special attention to the company's Roller-Smith activities.

New Advertising Literature

Harry DeSteese, New York: Folder on assembled commutator segments, field coils, armature coils and general repair work.

Rome (N. Y.) Wire Company: Leaflet entitled "Copper History," giving monthly average prices of copper from 1887 to 1918.

Blaw-Knox Company, Pittsburgh, Pa.: A folder, "Build Your Roads with Blawforms'," and a book, "'Blawforms' for Road Construction."

Green Fuel Economizer Company, Beacon, N. Y.: Bulletin No. 151, "A Summary of the Facts Regarding Green's Improved Patented Fuel Economizer."

Lakewood Engineering Company, Cleveland, Ohio: Bulletin No. 25 entitled "Flat-Wheel Haulage Systems," on industrial storage-battery tractors and trucks.

Philadelphia (Pa.) Gear Works: 1919 catalog describing bevel, spiral and generated spur gears, rawhide and micarta pinions, worms and worm gears, racks, lead screws, sprockets and chains.

Ingersoll-Rand Company, Easton, Pa.: Bulletin No. 9120 on Leyner oil furnace No. 3; No. 9010 on the Sergeant ticket canceling box; No. 9123 on "Imperial" tie tamping outfits; No. 9026 on Ingersoll-Rand high-speed piston valve steam engine, class "FP"; No. 9028 on Ingersoll-Rand equipment for sugar factory and refinery service.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. New 1276-page supply catalog complete under one cover. This supersedes and replaces loose-leaf and sectional catalogs that this company has been publishing for several years past. The new catalog has a very complete index of both style numbers and apparatus manufactured, gives a table of "approximate cost multipliers" and contains considerable information of a technical and engineering nature.

Track and Roadway

Pensacola, Fla.—Surveys have been made and plans submitted to the County Commissioners for the construction of a line from Pensacola to Flomaton, Ala., about 40 miles. Herbert A. Smith, Gonzalez, Fla., is interested.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—It is reported that the Chicago, North Shore & Milwaukee Railroad will extend its Libertyville branch to Crystal Lake.

Evansville & New Harmony Traction Company, Evansville, Ind.—Plans are being revived for the construction of this company's proposed line from Evansville to Cynthiana and New Harmony. C. J. Seibert, Evansville, general manager. (Jan. 22, '16.)

Frankfort & Shelbyville Traction Company, Shelbyville, Ky.—Two new bridges, one 150 ft. and the other 90 ft., will be erected by the Frankfort & Shelbyville Traction Company in connection with its proposed line to connect Frankfort & Shelbyville. F. H. Frankland, Waddell & Son, Inc., New York, N. Y., president. (Feb. 15, '19.)

New Orleans Railway & Light Company, New Orleans, La.—About $60,000 will be spent by the New Orleans Railway & Light Company for new frogs and switches.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—Among improvements contemplated by the Trenton & Mercer County Traction Corporation this spring is the construction of an extension of the Market Street division to the new municipal dock along the Delaware River. About 12,000 new ties will also be placed in connection with general repairs to the roadbed on the various divisions.

New York State Railways, Utica, N. Y.—The Public Service Commission for the Second District of New York recently passed an order granting the New York State Railways an extension of time until July 1 to make track improvements in Whitesboro.

Carolina Power & Light Company, Raleigh, N. C.—The construction of an extension from Goldsboro to Mount Olive is being contemplated by the Carolina Power & Light Company.

Toronto & York Radial Railway, Toronto, Ont.—By the terms of an agreement arrived at between representatives of the city of Toronto and the Toronto & York Radial Railway, the city has arranged to purchase from the company for $590,000 the Yonge Street section of the Metropolitan division, lying between its southern terminus near Farnham Avenue and the city limits, together with certain rolling stock and the company's rights and franchise in connection with this section. The program of the city includes the establishment of a terminal at the Union station for the transshipment of freight and the paving and double-tracking of the section acquired immediately the agreement is ratified.

Dallas (Tex.) Railway.—Work has just been completed by the Dallas Railway on the reconstruction of its tracks on Jefferson Street between Wood and Commerce Streets. The company will begin early this month on the reconstruction of its tracks on Main Street from Ervay to Poydrus Streets. Heavier rails will be laid on a concrete foundation. On the completion of this work the company will reconstruct the tracks on Jefferson Avenue from Lancaster to Polk Streets. The work will cost about $350,000.

Eastland, Wichita Falls & Gulf Railroad, Eastland, Tex.—Bids are being asked by the Eastland, Wichita Falls & Gulf Railroad for the construction of a line from Eastland to Mangum, 7 miles. O. B. Colquitt, president, and C. H. Chamberlin, chief engineer.

Newport News & Hampton Railway, Gas & Electric Company, Newport News, Va.—Plans are being made by the Newport News & Hampton Railway, Gas & Electric Company for extensive new construction work this spring.

Power Houses, Shops and Buildings

Birmingham Railway, Light & Power Company, Birmingham, Ala.—Work will be begun within the next few months by the Birmingham Railway, Light & Power Company on the installation of new equipment and improvements to its gas plant at Third Avenue and Thirteenth Street at a cost of about $75,000. A new water gas set will be installed.

Southwestern Gas & Electric Company, Texarkana, Ark.—This company will reconstruct its carhouse and shops recently damaged by fire to the extent of about $75,000.

San Diego & Arizona Railway, San Diego, Cal.—A contract has recently been awarded by the San Diego & Arizona Railway for the erection of a boiler plant at Sixteenth and Main Streets in connection with other improvements, the entire work being estimated to cost $19,527.

Washington Railway & Electric Company, Washington, D. C.—Fire recently destroyed a part of the Eckington carhouse of the Washington Railway & Electric Company at Fourth and T Streets, northeast, together with twelve cars. The loss is estimated at approximately $150,000.

Pittsburgh (Pa.) Railways.—A new station will be built by the Pittsburgh Railways at Castle Shannon. An addition will also be built by the company to its power house at McKees Rocks.

Montreal (Que.) Tramways—Plans have been prepared by the Montreal Tramways for the erection of a substation on Cute Street, to cost $400,000, and also for a new carhouse at Fullum and Mount Royal Streets, to cost $110,000.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, March 15, 1919 *Number* 11

Getting the Electric Railway Industry Back Upon Its Feet

THE American Electric Railway Association held in New York yesterday what in many respect was the most successful mid-year meeting in the series of nine. The circumstances surrounding the electric railway industry are such that topics not vital to the continuation of this essential public industry must be put aside for the time, and this was characteristic of the meeting program. The report of the committee on readjustment showed a determination to get down to fundamentals and, while confessedly preliminary, indicates the lines upon which readjustment must be brought about. On behalf of the industry the committee realizes that some relation between income and cost of service must be recognized by the public and its report furnished a fitting prolog to the discussion on the salient features of service at cost franchises, and on modern regulatory plans and theories. It was an excellent idea, also, to have placed before railway operators the points of view of the investors and the regulators, as was done at the afternoon session. A glance in the mirror now and then is beneficial and under present conditions will not conduce to vanity.

The banquet was a "wonder," in point of attendance and spirit. Our distinguished guests of honor must have received the impression that while the meeting was one of great seriousness the occasion was far from being a funereal one.

If it had not been for the war this meeting would have been the tenth in the series. The plan of holding a winter meeting has therefore been under trial long enough to prove its worth or otherwise. It has been a great success and performs a function complementary to that of the annual convention. This year's meeting was the best of all and, coming after the war, it permitted the thought and feeling pent up for two years to find vent.

A Banker Gives His Views On the Electric Railway Situation

IT IS WELL that the association asked Mr. Sisson yesterday to present the views of the bankers on the present situation. Being so close to their work, electric railway men are exposed to the danger of anyone in that condition of failing sometimes to get the proper perspective of a given situation. Mr. Sisson, however, took the same view of the desperate condition of the utilities without remedial legislation which the executive officers of these companies have been forced to adopt. In addition, he traced the responsibility for the greater part of this trouble to a deplorable indifference on the part of the public and governing authorities, who in their disregard of the rights of the utilities are jeopardizing the credit of many investment institutions, such as savings banks and life insurance companies.

Mr. Sisson also brought out clearly the evil reflex effect of this persecution on those responsible for it. In attacking the utilities unjustly the public is not only injuring the interests of their own community whose prosperity depends upon an efficient and prosperous electric railway system, but they are depreciating the value of the assets of the organizations for popular saving. The municipal authorities who deny fair treatment to the utilities within their jurisdictions discredit their own municipalities in the eyes of bankers and investors, who are quick to discern which cities have a reputation for treating invested capital within their boundaries fairly and which have not. Finally, the state and federal authorities who are ever ready to pile burdens on these public servants but are slow in lending them a helping hand will find that they are encouraging a popular antagonism to private enterprise, and investments of all kinds, and are encouraging the establishment of a state socialism with its extinguishment of all individual incentive and effort.

It is fortunate that these facts should have been stated so clearly, and that they should have been said by one who is in so good a position to read the signs of the times as Mr. Sisson.

Conflicting Dates of Two Important Railway Meetings

IT WAS UNFORTUNATE that the American Institute of Electrical Engineers' meeting in Boston, at which Calvert Townley's paper on "Some Possibilities of the Steam Railroad as Affecting Future Policies" was presented, and the mid-year meeting of the American Electric Railway Association in New York, were scheduled for the same date this week. To be sure, Mr. Townley's paper was assigned to the morning program, permitting attendance at Boston in the morning and New York in the evening, but this was only a partial solution of the difficulty. The occurrence suggests that secretaries of societies might co-operate in avoiding conflicts of meetings when any considerable number of men might desire to attend more than one. A few years ago there was an association of technical association secretaries for this very purpose, but apparently it is not functioning at present. We realize, of course, that circumstances beyond control frequently dictate the times and places of meetings. This was undoubtedly true, at least in part, in the present case, for each association was familiar with the plans of the other. Nevertheless the subject is worthy of attention, particularly in connection with the summer and fall convention plans which will be laid in the near future.

The October Convention Would Be Incomplete Without Exhibits

THERE are many reasons in favor of resuming the exhibit feature at the annual convention of the American Electric Railway Association next October and few reasons against it. For three years there has been no exhibit and consequently no opportunity for a great many electric railway men to study at first hand what the manufacturers have been doing recently in the way of producing improved equipment. Yet, during these three years, in spite of the war, there have been tremendous advances in the manufacture of railway apparatus. Indeed, the extraordinary and arduous conditions which have prevailed in the electric railway field have greatly stimulated the design and manufacture of much of this equipment. For examples, we might cite the one-man car, energy-checking and saving devices and various processes of welding. All of these have become more important than ever before in the electric railway field as the result of the critical condition in which the electric railways have been since 1916.

It may be argued that the electric railway companies are not in affluent circumstances and so are not in a position to extend their purchases greatly. Unfortunately, this is true. But the equipment which would naturally predominate among the exhibits at the fall convention would be designed either to save money or to make money. Some of the devices and apparatus belonging to the former class have already been mentioned. As an example of the latter we might mention collecting and registering apparatus especially designed to take care of the odd and varying fares now so common on railway properties. These, with the equipment and supplies which railways have to purchase to keep their lines in operation will naturally form the basis of any exhibit which may be held next October.

The advantage of an exhibit does not lie entirely in the fact that the railway manager and engineer has an opportunity of seeing in operation a new device or improvement designed for use on his property. He can talk about it at the same time with the manufacturer and other railway men and can ask any questions about it which he desires. The educational value of the exhibits is unquestioned, especially after there have been none for three years, and, indirectly, they increase electric railway traffic by making the service more desirable or by decreasing its cost.

To be sure, an exhibit requires an investment of money, energy, thought and time. Some manufacturers and possibly some railway men may question the wisdom of this expenditure at a time when business conditions are as unsettled as they must be for both at the close of the world cataclysm. This legitimate doubt should receive due weight, but we believe that if a general vote of the members could be taken, the verdict would be: "the ayes have it."

The action of the executive committee on March 13 indicates that unless unforeseen difficulties are encountered in the preparation for the convention the exhibits will be a feature of the fall meeting. The convention committee, soon to be appointed, will be charged with the duty of making provision for them. We bespeak for the committee the hearty co-operation of all manufacturers, to the end that the exhibits this year shall be unprecedentedly successful both individually and collectively.

An Obvious Duty of the New York Legislature

WE WONDER if the people of New York, through their representatives in the State Legislature, will be sufficiently fair minded to correct a defect in the public service commission law which has been found to work an injustice toward the utilities of that State. The incompleteness of this law is called to the attention of the Legislature in the annual report of the First District commission, recently made public. It is a plain plea for justice, and we hope the lawmakers of the Empire State will rise to the occasion and approve the amendment which will put the commission in a position to save scores of essential utilities from financial disaster.

As pointed out in this report, it was undoubtedly the intention of the Legislature to provide in the public service commission law for tribunals not only to take care of the complaints of consumers and patrons, "but, recognizing that the public service corporations have legal and business rights, to afford them also a tribunal which should impartially inquire and if necessary give relief by way of increased rates." Reference is made to the fact that in isolated cases certain cities and villages have waived franchise conditions so that a fair settlement might be made with the utilities. These acts are mentioned, however, as "but temporary and makeshift devices," and it is suggested that the commission, or the municipalities or the corporations should not be left to such expedients.

Ever since the decision of the Court of Appeals in the Rochester case was announced the commission has found its hands tied. Its members recognize the inequity of the situation, and it should not be too much to expect that the present Legislature will take prompt steps to correct the law so that it will be possible to deal equal justice to the utilities and to the consumer.

The Detroit City Government Wants to Run the Railway

THE latest report from Detroit is that the city and the company are approaching a settlement on the question of the purchase of the city lines of the Detroit United Railway. This is certainly a wiser plan than the first suggestion that the city build a competitive system. Municipal ownership and operation of the present Detroit city system is a perilous experiment for the taxpayer in Detroit, but the expenditure of a large sum of money to go into competition with the private company would be insufferably stupid. San Francisco stands as a living example that this is so.

Seattle started a similar program on a small scale, but the city and the railway decided that such a course was suicide. At Seattle it was a case of getting together or hanging separately. The start was made toward getting together, and this was finally effected as in Detroit. The recent decision of the Supreme Court, as reported in our issue of Jan. 18, undoubtedly hastened the latter city in deciding because it declared that the city could not compel the company to give service on the lines on which the franchises had expired except at a rate which would earn a fair return on the investment.

If the decision of the city government to engage in railway operation is ratified by the electorate, as it must be to become legal, Detroit will be the third large city in this country to adopt municipal ownership and operation. There will therefore be an opportunity of judging, after a few years, whether a municipality can operate an electric railway property as successfully, all things considered, as a private corporation. For all, except possibly the taxpayers in the cities conducting the experiment, the trial will certainly be an interesting one.

The Electric Railway Industry Is "Coming Back"

IN EXPRESSING his pleasure at the success of the recent Cleveland meeting of the Central Electric Railway Association, Charles L. Henry characterized the situation in the happy phrase: "The Central Association is 'coming back.'" We agree with Mr. Henry in this conclusion and will go him one better by saying that the industry as a whole is "coming back," or we mistake greatly the signs that are about. The mere statement is not sufficient in itself, however, and it raises in the mind several questions which are well worth consideration at the dawn of the era of reconstruction and readjustment. They are especially apt as yesterday's meeting of the American Association is reviewed. The questions worth pondering at this time are: Why does the industry need to come back? What is it to come back from? What is it to come back to? Each railway man will have his own answers to these questions, colored by his own experience. There are points, however, on which all of the answers will be sure to agree.

The industry needs to come back in order that the communities which it serves may have good transportation of the types which the electric railways are best fitted to give. A unique combination of circumstances has made it physically impossible of late for the average electric railway to give good service and pay all legitimate expenses. War burdens were superimposed upon others almost unbearable and many fine properties have temporarily broken down under the strain.

The industry needs to come back from the depression under which it has been laboring. The past few years have been a nightmare to owners and operators, as they have tried to meet the demands for better service, better wages and higher prices for money and supplies. These things have increased faster than the ability to meet them, that's all. At last it became imperative to ask the public to overlook franchise stipulations, tradition and general affection for the nickel as a fare unit, and reluctantly the public has done so, at least to a partial extent.

The new status of the industry toward which we are now being impelled forcibly by circumstances will be radically different from that of five years ago. In fact, the difference will be startling when, for example, 1925 and 1915 are compared. Prophecies, particularly in print, are dangerous, but some things are plain. Net income will be surer because the public will take more direct financial responsibflity in the business. Service will be better because the needs of the traveling public will be better understood and the general public will be willing to supplement the railway income if necessary to insure first-class service. There will be no speculative profits but capital legitimately invested will be amply secured. The public will have a larger part in the management of properties and there will be far less delay in adjusting income to expenses. Above all, let us hope, the people in 1925 will be as strong boosters of their car service, and with reason, as they were vigorous knockers in 1915.

Public Service Proposes Zone System With Stand-By and Mileage Charges

THE zone system proposed by the Public Service Railway is an important step toward the more general adoption of a logical fare for local transportation. By basing the charge for the service upon its cost, accuracy is substituted for guess and a scientifically determined and flexible fare takes the place of one which any change in conditions is likely to make unfair for either the company or the public—and the companies have learned by sad experience that it takes much longer to raise a fare which is too low than to lower one which is too high.

The lighting and power companies for many years have known that their expense of supplying energy can be separated into two factors: the stand-by charge, or that representing the readiness to serve, and the actual operating expense of generating the kilowatt-hours consumed. Water companies have also adopted this method of charge, in a number of instances. The expense of providing transportation is capable of a similar division, but up to this time no one has attempted to allocate fares on that basis. Where fares are based strictly on the distance travelled, as has been the case in the past on the steam railroads in many states except for the additional few cents required to make an even nickel, we have an effort to cover both items of expense by a charge covering only one of them. Where the other horn of the dilemma has been chosen, as by the electric railway companies in establishing a uniform fare which would answer for all distances within a city, we have an example of the extreme which has been reached in the other direction.

Either of these systems can be made to answer for a time and so long as the surrounding conditions are favorable, but both develop weaknesses as soon as the circumstances become less propitious. The uniform fare regardless of the distance is particularly vulnerable with rising prices of operation, because if the system is at all large the charge for transportation has to be made so high as inevitably to drive away the short-haul traffic.

These considerations have led to the various attempts by electric railways in this country, which have been more or less successful, to combine the two plans under the two-zone systems. This is undoubtedly a move in the right direction, but it still runs the danger of discouraging traffic in either the central or outlying zones. The chief impediment in the past to a more exact system has been the seeming difficulty of collecting and accounting for fares, but this the management of the Public Service Railway believes it has overcome. The plan of entrance checks with pay-leave is a bold solution of the problem on such a large system as that in New Jersey, but a trial of the system is certainly worth making. We hope that the Board of Public Utility Commissioners will grant the application, because, while the plan is avowedly designed primarily for the needs of the Public Service system, its success there will be of great technical value to other properties which are struggling with the fare question.

A Square Deal Is Needed*

All the Railways Want Is That They Be Valued at Cost of Establishment and That They Receive an Inviting Return to Compensate Capital for Risks Assumed and Service Performed

By A. MERRITT TAYLOR
President Philadelphia & West Chester Traction Company, Philadelphia, Pa.

BEFORE the war, in many localities, the public attitude toward public utility companies had become distinctly antagonistic. This antagonism was brought about in part by certain companies which had pursued practices inimical to the public welfare. It enabled designing politicians and public officials to serve their selfish purposes by making reprisals against the electric railway industry. Such practices have now been outlawed, and the public has been safeguarded against their recurrence by effective legislation. Consequently a reconstruction of public sentiment respecting corporate enterprises is now distinctly in order and is actually taking place.

SAFEGUARDING BOTH UTILITIES AND THE PUBLIC

Owners and managers of electric railways must accept this favorable opportunity and co-operate in developing and establishing certain specific, vital, fundamental and just principles which will safeguard and advance the interests of the public and of the public utility companies. The most important of these principles are:

1. Electric railways are entitled to franchises which will assure the owners against loss of capital or income resultant from franchise renewals being denied them, or from unreasonable and confiscatory burdens being forced upon them.
2. Electric railways are entitled to have equitable valuations made of their properties as a basis for financing and rate-making.
3. Electric railways are entitled to charge rates which will adequately compensate the owners for the capital invested, for the risks assumed and for the service performed.

Corporations which have engaged in enterprises unjustifiable from an economic viewpoint, or which through gross over-capitalization are unable to accept and adopt the foregoing principles and to serve the public properly, constitute an abnormal class which the American Electric Railway Association cannot justly sustain.

The legislatures, public service commissions and municipal governments are mainly composed of lawyers and laymen who have had little, if any, experience in the financing, construction and establishment of electric railways as going concerns. Consequently many of them have slight conception of the elements of cost which must be included in arriving at a fair valuation of an established electric railway property as a basis for financing or rate-making; or of what constitutes an equitable and necessary return adequately to compensate the owners for the use of the capital invested, for the risks assumed and the service performed in the public interest; or what franchise provisions are essential to safeguard the public and corporate interests from the broadest viewpoint.

It is, therefore, the duty of railway executives, as operators and as citizens, to lay before these public officials the facts developed during many years of practical experience, with substantiating evidence, which will aid them in arriving at just decisions and in dispensing exact justice to all parties.

FRANCHISES CAN BE STANDARDIZED

A franchise, as it stands to-day, certainly has no other function or virtue than that of an instrument under which private capital performs a public service, and the idea of any inherent value attaching to it has long ago evaporated in the mind of everyone who knows anything about the subject. Blundering attempts to insure good service and to restrict profits have resulted in tying up most electric railways in unfair, inelastic, impracticable and dangerous covenants which have actually prevented uniform good service, encouraged discriminatory charges and brought capital to the brink of disaster.

In the interest of both parties, therefore, electric railway franchises must be revised along reasonable and scientific lines so that they will produce the result for which they exist. They must assure the owners of the right to possess and operate their properties at least until they are fully reimbursed for the value together with an equitable return.

Electric railway properties should not be subjected to special taxes or other burdens in the nature of taxes, such as street paving, to an extent in excess of the levies laid on other lines of capital and industry. All provisions with regard to service and limitations as to rates of fare can be best left to public service commissions for determination when action becomes necessary under unforeseen and varying conditions which are bound to develop.

The electric railway franchise is susceptible of scientific standardization which will assure the public and the corporate enterprise of a "square deal." It is the duty of the association to develop promptly a standard form of franchise which will by its terms conserve the best interests of both parties.

WHAT IS A FAIR VALUATION?

More than twenty years of experience in financing, constructing, reorganizing and operating public utility properties, and years of experience gained from the public viewpoint as Transit Commissioner and Director of the Department of City Transit of Philadelphia, and as Manager of the Division of Passenger Transportation and Housing of the United States Shipping Board, Emergency Fleet Corporation, have led me to conclude that there is slight, if any, real ground for a difference of opinion between corporations officered by practical and honest men and honest and practical public officials as to what constitutes a just formula for the valuation of electric railway properties which have been constructed where the present and prospective population and traffic justify their existence.

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*Abstract of address presented before mid-year meeting of American Electric Railway Association in New York, March 14, 1919.

A just valuation of a legitimate electric railway property must include:

Just compensation for services performed in developing, establishing and financing the project.

The amount of all legitimate costs and expenses incurred in the incorporation of the company and in securing its franchises and rights-of-way, and the cost of maintaining its organization and of engineering during the development period.

The cost of securing the capital required for the development of the enterprise.

The cost of constructing and of equipping its property.

The cost of construction required by the terms of franchises and ordinances, such as street paving, etc.

All operating deficits and depreciation which accrue when these items cannot be met out of income.

All obsolesence charges which cannot be met out of net income without depriving invested capital of its just return.

A just and profitable return on capital invested, which of necessity must accumulate as a capital charge up to the time when such a return can be currently paid out of net income.

On their part, the electric railways must either accept this formula or its equivalent for the valuation of their properties or be open to the charge of unfairness. And the public likewise must be brought to recognize that such companies as agree to accept and abide by such a valuation are standing on an honorable basis which justifies and is entitled to public support.

RATES MUST YIELD INVITING RETURN

The elements of the true value of an electric railway property having been thus defined, the question arises as to what rate of return the owners are entitled to receive.

The development of every electric railway property is accompanied by material risk to the capital invested therein which entitles the owners to special compensation. In rare cases where capital invested in such an enterprise is represented solely by stock, each investor assumes the same and equal risk in proportion to the amount of his subscription, and is entitled to his proportionate share of the profits.

Usually, a large portion of the capital is borrowed on bonds or other obligations yielding a fixed rate of return which is assured by the stockholders who supply and place at risk the remaining capital required. Under these conditions, the capital borrowed assumes little, if any, risk, and practically the entire risk of the enterprise is focused upon the investment of the stockholder, who is entitled to be compensated accordingly.

Those not familiar with the practical side of the problem will of course argue that the investor takes no risk if the company be assured the right to charge such rates of fare as will yield an adequate return on the value of the property. Recent experience has demonstrated the fallacy of this argument, because in the case of many electric railways in this country the travel so declines with increases in fare that an adequate return on the investment cannot be earned at any rate of fare.

The expectation of profits commensurate with the risks assumed is the force which impels courageous pioneers and investors to pool their interests and to engage in constructive public service enterprises. If such a return is to be denied, they will certainly seek other fields which yield adequate profit with ample security.

The investor knows that he can secure a return of from 6 per cent to 8 per cent (varying according to localities) from well-secured first mortgages and upon well seasoned, and in many instances equally safe, standard railroad and industrial stocks which have a wide market and which are readily marketable. He naturally asks why he should invest his money in the development of public service enterprises, the earning capacity of which is yet to be proved but will in any event be limited by a commission to 8 per cent, when he can invest his money and keep it in liquid form without taking any such risks and with the assurance of an equal or greater return at the start, with every prospect in many instances of increasing returns from increasing profits of the business.

Moreover, the man who has the courage, standing and ability which enable him to establish, finance and construct electric railways in anticipation of development and public requirements, and to foster and secure the development of his territory and the resultant earning capacity for his undertaking, is not going to engage in such work unless he is permitted to make a profit (over and above the returns allowed investors) which is adequate to justify his undertaking

Many electric railway executives and operating men who are not familiar with the circumstances which control the investor in selecting his field for investment, or with the factors which regulate the decision of men and organizations engaged in constructive enterprises in selecting the field for their activities, are prone to regard only the immediate necessities of their companies in discussing what is an adequate rate of return on the capital invested. They must learn to view the subject broadly and have the courage to stand up for their rights rather than for their necessities.

The electric railway which goes before a commission and accepts as satisfactory the fixation of a valuation or a rate of fare which will no more than preserve the life of the property and which will deny to the owners a return that they are justly entitled to receive, is a party to the establishment of a destructive precedent and is a traitor to the industry.

This country is approaching an era of prosperity and vast extension of industry. Money will be in great demand, and those who have money to invest already have the opportunity of investing it in well established, substantial and profitable industrial enterprises and other securities which are now offering high rates of return.

There is some room for difference of opinion as to the rate of return which should be allowed on the value of electric railway properties, and in reaching a conclusion it is necessary to consider the rate of return which can be secured on safe securities issued by other industries which are immune from the risks which confront the development and operation of the average railway property.

Unless electric railway properties are enabled to charge rates which will yield an inviting return on their cost and adequately compensate capital for the risk assumed and for the service performed, capital is going to be diverted into other channels which are open for profitable investment; and electric railways will be prevented by the action of public officials from establishing and performing such service as the public interest requires.

I have too much confidence in the common sense of the average American to believe that the electric railway industry is going to be denied a "square deal" after the public understands that what the railways want, and all they want and require, is that the properties shall be valued at what it cost to establish them. All they want is the right to charge a rate of fare which will yield a return reasonably compensatory.

WHAT THE ASSOCIATION SHOULD DO

I, therefore, make the following constructive suggestion:

The immediate duty of the American Electric Railway Association is to assemble and print for publication a complete and clear statement which will conclusively demonstrate to the public mind a constructive and mutually beneficial form of franchise, the truth about valuations, and what constitutes a just return.

This information should be placed in the hands of the governors, members of the legislatures, public service commissioners and municipal authorities in all states. It should be furnished to every newspaper. It should be furnished by each electric railway to every one of its passengers and security holders. Moreover, the officers of each member company should be urged to confer with the editors of all local newspapers in the districts which they serve and secure their aggressive co-operation in bringing about a "square deal" between electric railways and the public.

I fully recognize that this is a big, costly and difficult constructive undertaking which will require the best brains and ability in our organization and the thorough co-operation of member companies, but the solvency and life of the industry must be preserved.

We must convince the people that we are prepared to give and receive a "square deal." Then every honest American will become an ally of our industry and our cause will be won.

Reproduction Cost Is Fair*

No Deduction for Depreciation if Property Is in Normal Per Cent Condition, and None Otherwise Unless Utility Is Relieved of Rehabilitation Up to Normal Per Cent Condition

By H. H. CROWELL
Vice-President Michigan Railway, Grand Rapids, Mich.

THE old order must go. It is evident that new relationships must be established between those who receive electric railway service and those who render it if the various parties are to be satisfied. The parties in interest are the user of the service, the employee in the service, the creditor of the corporation and the owner of the equity. The fundamentals involved are "safe and adequate service" at "just and reasonable rates."

In the formation of new contracts for a continuance of the service, definite agreements should be had in regard to the following points: Fair rate for service; fair return on value of property; maintenance of integrity of capital and recovery of investment upon termination of the contract.

The agreement as to fares, at least in the first instance, will be subject to the right of the State or its duly delegated authority to control public service, but provision must be made for flexibility in order to retain fixed relations under changing conditions.

It has been suggested that an agreement based on service at cost would make for a betterment of conditions and would eliminate opportunity for excess profits to the corporation or excess fares to the public, as well as stabilize the securities of utility corporations and reduce speculation therein to a minimum.

Presuming that the public desires to receive service from a privately owned and operated utility and is willing to pay a fair rate while adequate service is rendered, and that the general plan or agreement under which operations are to be carried on is to be the cost-of-service plan, we must value the property to be used and determine the capital on which a return will be allowed, which capital will from time to time be increased as additions and betterments to property are made. How shall that value be determined, or rather, in the circumstances, what will be fair and equitable to both parties as a base on which to determine the rate of return and the rate of fare that will afford such return?

VALUATION OF OLD PROPERTIES RAISES DIFFERENCES

If one were to establish a new utility for public service, it would be comparatively easy to agree upon the value or amount in dollars upon which the owner was entitled to earn a fair return. When a property is well designed and honestly built, the value is at least equal to the cost, including legitimate outgoes required to bring the enterprise to a point where it is ready to operate, or capitalized estimated net earnings at a given rate of interest, the latter being a matter of judgment and opinion.

Unfortunately we have to consider properties which have been in operation for some time, either profitably or unprofitably, and differences of opinion will arise (as in past rate-fixing proceedings) in regard to what methods of valuation should be used, what should be included, what should be excluded and what really constitutes value.

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*Abstract of discussion of report of committee on readjustment at mid-year meeting of American Electric Railway Association, New York, March 14, 1919.

We are all too familiar with the decisions of courts in favor of present value, and the rulings of many public service commissions, the net result of which is practically to confiscate the difference between reproduction cost new and a value based on the theory that certain physical elements of the plant and property are not new and that a certain portion of their probable useful life is exhausted, irrespective of whether or not capital equivalent in amount has been withdrawn from the enterprise.

HOW TO VALUE A PROPERTY

We are not now concerned with the usual rate-fixing proceeding where the regulating authority may exercise its judgment as to the value or rate base. We are considering an equitable agreement for future service.

It would not be excessively difficult to determine the value of a property for purchase or sale. We would undertake to determine the dependable net earnings, and it would be a simple matter to capitalize such earnings at any satisfactory rate of return. This amount, less any cost necessary to restore the physical property to first class working condition, would represent the commercial value. This value would not remain constant but would rise and fall with changing conditions.

Again, we are not presently concerned with net earnings in determining the value for future service, since the earnings are the resultant of a fixed rate made under different conditions.

DEDICATION ANEW TO PUBLIC SERVICE

Briefly, the State granted a corporation a charter that it might exist and exercise its corporate functions as defined in its charter during its corporate life.

The State, under its police power, has the supreme right to control public service. It has declared transportation to be affected with the public service and, as such, subject to regulation and control.

When the State offered to the utility the right to function in the public service, it implied that the corporation might function with profit since it has the undoubted need and right to the means of livelihood.

The corporation operated in accordance with its ostensible purpose. Its rate of charge was fixed by franchise or regulated by the State or its duly delegated authority; and, because of the binding force of its contract or of the regulation, it has been obliged to continue service under conditions never contemplated when the contract was made.

The period of sacrifice should end. A fair return should be earned from now on. The property is to be dedicated anew to the public service, and the public accepts anew such dedication rather than furnish its own service. Is there not really a new taking of the property? If so, should not its value be determined by considering the capital that now would be required to create the property and establish it upon its present basis?

DEPRECIATION NOT DEDUCTIBLE

The following seems true: No property can be maintained at 100 per cent new condition. Utility properties made up of many elements in various groups, after a period of operation, can be brought to a certain per cent condition, something less than 100, which is the normal per cent condition for that property. The property, in this normal per cent condition, represents 100 per cent investment; and there having been no actual withdrawal of capital, the value upon which a return should be earned is the full investment value, or 100 per cent. That is, unless the per cent condition is lower than the normal per cent condition for the property, the property should be credited with a value equal to the cost of reproduction at the time of the valuation.

For example, assume that it would cost $1,000,000 to reproduce a property, that the normal condition is 85 per cent and that the property is in this condition. Then the rate-making base should be 100 per cent of the reproduction cost of the property, it being demonstrated that 15 per cent of the cost of the property has not been withdrawn or returned to the owners.

If the property is in 75 per cent condition, 100 per cent of the reproduction cost of the property should be the rate-making base unless the owner is to be relieved of the liability to rehabilitate to the extent of the 10 per cent deficiency in condition. The public, however, may well require the owner to deposit a sum which, if expended, will bring the property to its normal per cent condition to insure safe and adequate service.

It seems clear that it would be inequitable to require the corporation to furnish safe and adequate service and maintain the property at normal per cent condition under such rate of charge as would permit the corporation to earn only a fair return upon a value or rate base equal to the per cent condition found.

One must bear in mind that, under the cost-of-service plan, the corporation will be required to furnish adequate service, and it must, therefore, first rehabilitate the property and then maintain it at normal per cent condition. A rate base founded on fractional per cent condition cannot be equitable if, ultimately, 100 per cent replacements are made and the whole cost of making such replacements is deducted from revenues before net earnings are found.

We are not attempting to discuss the various methods for determining value that are put forward in rate fixing proceedings, such as reproduction cost new and original cost, or to discuss unit prices or theories of depreciation. Our main purpose is to call attention to the fact that the property is being dedicated anew to the public service, and that the public elects to be served by a privately owned and operated utility in lieu of providing such a property for its own service.

To summarize, therefore, it is believed that in the circumstances, all the obligations the utility will assume being borne in mind, the proper amount upon which the corporation is entitled to earn a fair return is the sum which equals the cost of reproducing the property—such as it is—with no deduction for depreciation if the property is in its normal per cent condition, and with no deduction for depreciation if the property is in less than normal per cent condition unless the corporation is to be relieved of the liability to rehabilitate up to normal per cent condition. Confiscation of a portion of the principal and the right to earn thereon will follow if value is determined differently and a lower rate base is found thereby.

Every effort on our part should be made to bring out the full worth of the property—and by property we mean something in addition to plant and equipment. In making new contracts, both parties thereto and the supervisory commission, if any, should have a true knowledge of the value of the property in order to insure "safe and adequate service" at "just and reasonable rates."

Rate of Return in Service-at-Cost Franchises*

Commissions and Courts Have Not Established the Basis for Fixing the Rate of Return Necessary to Attract Capital, but Position of Company, Basis of Fair Value and Various Safeguards All Influence the Investor's Demand

By EDWIN GRUHL
Assistant to President, The North American Company, New York, N. Y.

RETURN on investment is the most important indeterminate factor in the service-at-cost franchise. Next to wages, the rental or return on capital is the largest item of cost of electric railway operation. This is because the turnover of the investment is so long postponed that years are necessary before an equivalent in gross earnings is collected. A large packing concern advertises that its returns are 2 per cent on sales and 11 per cent on capital invested, indicating a turnover of 5½ times in one year. Compared with this 2 per cent, the turnover in the electric railway business is so small that from 30 per cent to 40 per cent on revenue represents the cost of money with a modest 8 per cent on capital invested. Moreover, the cost of money for future investment is largely beyond the control of either party to the contract. If the return as fixed becomes too low, eventually growth and expansion stop. If it is fixed too high, all advantage to the public of such a contractual arrangement ceases.

One searches in vain among the economic theories of interest, profit and production cost for the fundamental conditions which a service-at-cost contract must anticipate. There are schools of thought that believe that capital and its return are the all in all, and schools, like the socialists, that say it is nothing of the sort. They range in their background from history to psychology and from sociology to finance. They range in their definitions from "pure interest" or cost of money without risk, to "psychic income," that feeling of satisfaction that persists even when money returns are lacking. The electric railway business has no doubt been productive of large income of the latter variety during the last few years, but it is difficult to convey the fact in reports to stockholders or meet the requirements of the bondholders thereby.

COMMISSIONS AND COURTS HAVE NOT MET THE ISSUE

Nor do we find any fundamentals clearly outlined in decisions of commissions as to rate of return. There are, in rare instances, some discussion on the necessary return or cost of money, some dicta on the risks of the business and some vague references to the equity of encouraging efficient management. Usually no mental processes are revealed, and the findings of fact as to what is a reasonable rate of return are clothed in judicial patois. The reference to these three factors—return, risk and reward—has suggested a qualified acceptance of the analysis of return in competitive business by the classical economists. In fact, in several decisions, notable among them the State Journal Printing Company case of the Wisconsin Railroad Commission in 1910, the argument is quite fully developed. It is not far afield to examine this analysis, as a mere statement of it discloses the practical difficulties in arriving at what is a reasonable return:

In theory: The rate of return on the fair value of the property should conform to that earned in competitive businesses under like conditions. Returns under competition consist of necessary profits and differential or surplus profits. Necessary profits are those which must be earned by the least efficient producer of the same commodity. Should he fail to earn these, he drops by the wayside in the competitive race. Differential or surplus profits are the additional returns earned by the more efficient producers of the same commodity, and they amount to the difference between the cost of production, including necessary profits, and the selling price. Necessary profits, the lowest return which the competitive business must yield if it continues to produce, are defined as being made up of three factors—the cost of money (or interest), indemnity for risks incurred in the business resulting in the possibility of impairment of either interest or principal, and payment for personal skill in the conduct of the business.

In practice: The factors are not capable of any exact determination. The mere cost of money, which is only part of necessary profits, is susceptible of proof. But it is difficult to place a valuation upon the inherent risks to which the business is subjected. It is likewise a mere matter of unsupported opinion what measure should be applied to the wages of superintendence or cost of personal exertion and skill in management defined as similar to the wages of labor. Finally, in the determination of differential profits or the addition to necessary profits to care for the inherent economy of one enterprise over the least efficient enterprise which is still able to navigate, one arrives at a factor that no regulating authority has the courage to announce, as is involves the recognition of commendable efficiency. Accordingly, the rule that a regulated monopoly should receive the returns which would exist if a state of competition were imposed upon it, has been supplanted by the rule that returns are properly limited to the amount necessary to attract capital into the business. Differential profits for efficiency have been disregarded.

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*Discussion of report of committee on readjustment at mid-year meeting of American Electric Railway Association in New York, March 14, 1919.

There is, naturally, little in the decisions of the courts reviewing the determinations of the regulating bodies. They have avoided the question as legislative or administrative and have confined their finding, when called upon to do so, to the question as to whether the rate complained of was confiscatory. A return which is less than that necessary to attract new capital into the business may not be confiscatory.

It has been the history of regulation that during periods of high prices and corresponding low returns of public utility service the efforts of regulation have been most pronounced to keep rates down. During periods of general prosperity and low prices, returns which might have been reduced without involving confiscation, have been permitted without the opposition of regulating authorities. It is a curious coincidence that the judicial review has been asserted and denied under the same economic pressure.

In 1878 with prices high and securities at a very low ebb the principle was announced in the Munn case that rates fixed by the legislature are not subject to judicial review and that for protection against rates fixed by the legislature resort must be made to the polls and not to the courts. During the period 1888-1896, with gradually bettering conditions, the principle was recognized that where rates give some compensation, however small, the courts will not interfere. Beginning with 1896, with the index number of prices at its lowest ebb, there was a series of decisions, notably in the New Memphis Gas Company case, that regulation implies such action as shall be just and reasonable and such as "enables the company to maintain its existence, to preserve the property invested from destruction and to receive on the capital actually invested a remuneration or dividend corresponding in amount to the ruling rate of interest." And in the much quoted case, Symth *vs.* Ames, in 1898, the rule was laid down that "what the company is entitled to ask is a fair return on the value of that which it employs for the public convenience."

Since that date there has been a gradually increasing tendency to concede every presumption in favor of the legislative act. Even at this time, when prices are again high and securities low, three dissenting Justices of the Supreme Court affirm that where franchises expire "the question recurs whether the fixing of any rate by the city could be said to confiscate property on the ground that the return was too low," and suggest that "substantial justice is more likely to result from trusting to the sense of fairness of the community in dealing with such cases than from imposing upon a city a contract which a court shall make for them."

IMPORTANT POINTS IN THE CASE

It is elementary that unless an enterprise earns a necessary return consisting of the cost of money, indemity for risks inherent to the business and a return for management, the business will cease. The fact that the capital cannot be readily removed, and that there are arbitrary restraints such as obligations to continue service, may result for a brief period in such a business being conducted at a loss. Unless, however, the full measure of necessary return is earned, no new capital can be expected to enter the business and any growth of plant such as is vitally necessary in public utility enterprises is stopped.

This is the condition in which electric railways find themselves to-day. Necessary returns are clearly a part of the cost of operation, although the reaction on the business of failure to recognize such costs is not so immediate as in the case of the cost of materials, labor and taxes. Failure to pay the current price for coal and labor, and meet its tax bills promptly, means prompt insolvency. Failure to meet the necessary cost on capital means impaired credit and diverted capital. Because the turnover is large, the amount of starvation to which the patient can submit before it finally dies is greater than in the case of other businesses. If the traction business were in the same position as the packer, with a 2 per cent margin on sales, failure to make returns would very quickly shut off production.

Other questions arise when these principles are applied to a service-at-cost franchise. The nature of the franchise, and the valuation basis upon which the rate of return is applied, will influence the necessary return. Whether a different rate of return is to be specified on capital investment existing at the date of the franchise than on future capital additions; whether the return on the capital investment should be based on the entire investment or represent cost on secured liens and a definite return on the stock equity, and whether the return should be fixed or be placed on a profit-sharing basis are also important questions.

AGENCY PLAN IS BEST

The most important circumstance is the nature of the franchise. Will the electric railway be the lessee, the partner or the agent of the municipality? The trouble with many existing franchises is that they are leases, with the landlord holding the whip hand, with every element of doubt resolved against the tenant, with no chance to vacate, and with the certainty at termination that a good deal of the property will revert like a fixture which is part of the land. With such hazards surrounding the business and such uncertainty as to integrity of investment, capital must demand a high rate of return.

Under the provisions of a partnership, which shares obligations and profits, the rate of return is stabilized and lowered. Yet no partnership which is based on mutual mistrust can endure, and no partnership franchise has as yet been drawn which so explicitly defined the rights and duties of the parties that they may henceforth dwell in mutual security even though constrained to deal at arm's length. "Reasonably adequate" service, "necessary" extensions, "prudent" management, "allowable" expenses, "good" behavior are familiar phrases which are the seeds of dissension and the temptation of a political issue. Nor does the community of interest yield any restraining influence. The fact that Chicago has a $20,000,000 and New York a $100,000,000 stake in the business does not appear to generate any enthusiasm upon the part of municipal officials for very necessary increases in fare in these cities. The city chest or "common good" has no human impulses of self-interest. Partnership arrangements may become, as some of them have, hazards instead of safeguards.

The agency type of franchise appears to have greater advantages. Prior investment is determined and safeguarded; the return on capital additions is fixed at the actual cost of attracting investment; the service, extensions and expenses are determined and approved by the municipality, and the fares are automatically determined to yield the total cost of service. Safeguards of the annual return (such as preference of return on capital over all other expenditures except labor, guarantee of return through the tax power and maintenance of contingent reserves) and safeguards of the investment (such as refund of the actual investment by the municipality or a successor licensee) eliminate hazard, lower the rate of return and cheapen the cost of service. The responsibility is not shared; it is shouldered by the municipality. There are no contingent obligations, no contingent profits. There is little doubt that this latter type of franchise would be overwhelmingly preferred by security holders.

DETERMINING THE COST OF SERVICE

It is to the mutual interest of both the electric railway and the public that any service-at-cost franchise provide the safeguards of that which will cheapen the necessary return and thus cheapen the cost of service. Recognition must be made of the total cost and provision made for currently meeting it. Expenses cannot be camouflaged by creating a system of operating allowances, with its attendant heritage of deficits to be absorbed in the price paid for future service. To use a homely expression of the Supreme Court of Missouri in the Missouri Southern case, "the intake bunghole in the corporate barrel must be opened simultaneously with the outgo spigot."

Adequate provision must be made for maintaining property and keeping equipment modernized through operating expenses. Adequate provision must be made in reserves to insure replacement of property abandoned or outworn. Bond and note discount must be treated as interest cost. That many existing franchise provisions (contrary to all accepted rules of accounting) say that under certain conditions such operating expenses may be absorbed in capital account or that the cost of money may be an accumulated claim to be disposed of on ultimate settlement if not paid on the due date will not reconcile investors to low returns. Provision is, of course, important for the automatic adjustment of rates through the operations of a return reserve and for competent administration by the city of charges imposed upon the service. The advice of the Wisconsin Supreme Court in the "Soo" case in discussing the regulatory law in that State is particularly in point:

> Every unnecessary burden imposed upon the railroad impairs its net receipts and diminishes that margin . . . between the amount sufficient to assure a fair return on the value of its property, plus the amount of its fixed charges and operating expenses, and its gross receipts. In this margin the public and the railroad are interested, . . . to waste this margin is to waste the fund in which the whole public is interested. This should never be done for the benefit of the few, as against the interests of the many.

In a like manner the safeguards of the investment will have an important influence on the necessary rate of return. An actual contract to purchase the property and recoup the investment at the termination of the agreement would mean lower cost of money than a mere option to purchase by public ownership. And the security would be further improved and the necessary return lessened if an option were given the electric railway corporation to sell the property to the city whenever it desired. For it is not merely the preservation of the integrity of the investment during the period of the contract but the ultimate disposition of the property which is of concern to the investor and influences his opinion respecting security and attractiveness of the investment. Lack of such safeguards in the past, under systems of regulation, explain in large part the high rates of return now necessary to attract money into the electric railway business.

The basis of fair value in the service-at-cost franchise also has an important bearing on the rate of return. Investors in estimating their return discount possible appreciation in the capital invested. They are satisfied with relatively low rates of return on certain real estate, for this reason. If the actual investment is definitely determined in the contract, and if a premium is paid upon the taking of the property by the municipality or a successor in excess of such investment, the necessary return is less than where arbitrary determinations of the then present value are to be made in such events. Uncertainties as to the integrity of the investment have a substantial influence on the rate of return, and it may be readily demonstrated that the compensation demanded to insure against this hazard is far in excess of its probable cost. For the tendency of material and labor costs, and the appreciation of realty values would in all probablity, with any fair valuation, yield a more substantial compensation in event of purchase than the actual investment.

SLIDING SCALE OF RETURN QUESTIONABLE

Service-at-cost assumes that the going rate of return shall be paid on future investment. It necessitates a fixing of the equitable returns on investment existing at the date of the franchise. There seems no reason why the return on prior capital should not be fixed as an amount rather than a percentage of the capital value. This would facilitate voluntary reorganization and refunding of existing issues and the development of a financial plan, under the conditions of the contract, which would rehabilitate credit.

What return need be paid on new capital is difficult to forecast. Existing investors cannot bind their successors, and even were the contract to specify the rate of return to be permitted on additional increments of capital, existing stockholders cannot be compelled to subscribe, nor existing bondholders be bound to increase their holdings. A concurrent underwriting might be arranged for a short period of time and for a definite additional amount, but it would scarcely be to the interest of the muncipality to do so.

The safeguards surrounding the investment and return should be such, in the interest of most economical service, that returns necessary in the future will be less than those in the past. On the other hand, the supply of attractive investments with more active participation in foreign markets is certain to increase, and local electric railways must enter into competition for their requirements of new capital. No more practicable plan can be developed for the future than that additional investment be carried at cost. In no other way can future expansion be assured, and the advantages of better credit conditions brought about by the contract and the dealing thereunder, inure to the benefit of the community.

Provisions for the sharing of excess profits and increased dividends with decreased rates have their appeal, but it is questionable whether they will prove satisfactory in the long run. There must, of course, be incentives for betterment and efficiency in any practicable service-at-cost plan, but there is much merit in the claim that these rewards belong to the working organization, the employees and the management, to whom both parties of the contract must look for its successful operation, and not to the investor.

Prospective surplus profits are so readily dissipated by increased requirements for service and increased demands for wages, that their possibility must be seriously discounted. And it will be found that the investor in his deliberate judgment will most certainly prefer a fair return to a combination of meager returns and possible hopes.

PUBLIC SENTIMENT IS INVOLVED

This introduction to the subject would not be complete without reference to the problem of public sentiment. One of the explanations for as low rates as 5 and 6 per cent found in some of the service-at-cost franchises is that they represent a compromise to the public sentiment of what is fair and are not an attempt to measure the cost of money. Unless the safeguards to investment and guarantee of return are sufficient to make such a low return attractive to the future investor, the main purpose of the service-at-cost franchise is defeated.

> THE most important circumstance is the nature of the franchise. Will the electric railway be the lessee, the partner or the agent of the municipality? * * The agency type of franchise appears to have greater advantages. Prior investment is determined and safeguarded; the return on capital additions is fixed at the actual cost of attracting investment; the service, extensions and expenses are determined and approved by the municipality, and the fares are automatically determined to yield the total cost of service. Safeguards of the annual return * * and safeguards of the investment * * eliminate hazard, lower the rate of return and cheapen the cost of service. The responsibility is not shared; it is shouldered by the municipality. There are no contingent obligations, no contingent profits. There is little doubt that this latter type of franchise would be overwhelmingly preferred by security holders.
>
> EDWIN GRUHL

There is no doubt that in the mind of a large portion of the public interest and profits are regarded as an unnecessary rather than unavoidable part of the cost of service. Those who have conducted campaigns of public information appreciate the difficulties involved in correcting fixed ideas as to the nature and necessity of the electric railway's expenditures for interest and dividends. Such elementary facts—as that electric railways must anticipate the growth of cities; that in the interest of cheap service railways must be built with cheap money; that the rental return of capital invested like the wages of labor employed, is part of the cost of service, and that money cannot be legislated into any business except through taxation of the public—require much ingenuity in presentation before any ready acceptance of them is accorded by the public.

Undoubtedly no more favorable time will ever exist for municipalities to enter into franchise contracts which will minimize the cost of money and reduce the cost of service. During a period of prosperity with fares fixed, costs low and returns assured, considerable difficulty would be encountered in persuading existing investors to accede to the proposition which would deprive the investment of its speculative possibilities. The proposition of supply of service at cost twenty years ago would have been received with open opposition. It is only during times of depressed security values, high costs and meager returns that acquiescence can be secured to any plan so radically restricting the possibilities of the investment. Written in 1896 when the pendulum of prices and cost of operation were at the other extreme, Edward E. Higgins in his book on *Street Railway Investments* states:

> The municipal transportation industry in the United States is intrinsically profitable—much more so than abroad. This is due primarily to American peculiarities.
>
> Our national passion for rapid transit forced the introduction of street railways long in advance of their adoption in other countries. "Perpetual" franchises, high fares, freedom from burdensome conditions, all were instantly—almost impatiently—granted in the eagerness for facilities. To-day, these old time franchises are immensely valuable and almost perfectly protect the interests of their owners. This is the first effect of "American energy."
>
> The second is equally characteristic. The average American is careless of small economies. He has no time to "split a nickel;" he despises a penny and, in some parts of the country, will throw it away. He will willingly pay 5 cents to save three minutes in a half-mile ride, and he will doubtless be the same man fifty years hence. Attempts have been made in a few cities to reduce the now almost universal nickel fare. They have rarely succeeded, not always because the reduction could not have been forced, but because no interest could be aroused among the people.
>
> It might appear at first that this argument for the investment value of our street railways is flippant or superficial. It is not. It is fundamental. Americans are free riders, and their insatiable craving for more facilities arouses mingled feelings of gratification and anxiety in the minds of street railway managers.

No one could hope to sell a service-at-cost plan in the face of bullish sentiment of investors such as Mr. Higgins reflects.

Summarizing the discussion, the following conclusions may be stated:

1. Service-at-cost franchises present possibilities of cheaper service to the public through lower returns to capital where the returns are assured and the integrity of investment is safeguarded. Return on the investment is next to labor the largest item of cost of electric railway service, constituting from 30 per cent to 40 per cent of the operating revenues.
2. Neither the writings of economists nor the decisions of commissions and courts establish the basis of fixing or forecasting the rate of return necessary to attract capital. The actual cost of money from time to time must be included in the rate of return provided in service-at-cost franchises if the business is to keep going and growing.
3. The questions as to whether the franchise makes the street railway the tenant, the partner or the agent of the city, what the basis of fair value shall be and what safeguards are needed to insure the prompt payment of return and the certain repayment of the investment have an important bearing on the return demanded by investors. Disregard for these safeguards under present practices of regulation afford a partial explanation of the fact that high returns are at the present time required by new capital in the electric railway business.
4. There must be incentives for betterment and efficiency in any practicable service-at-cost plan, but the question is raised whether these rewards do not belong to the working organization of the electric railway companies rather than to the capital invested therein.
5. Public education is necessary as to the unavoidable nature of returns on investment, the possibility of cheapened service through public co-operation, and the relation of adequate returns on investment to future expansion of the service.
6. Present conditions of high prices and low returns make the present time most favorable for the sale of service-at-cost franchises to investors.

Electric Railways and Investors*

The Public Should Awake to the Deplorable Condition of the Electric Railways—Their Financial Condition Is Desperate and Has Been Aggravated by Large Wage Awards—Municipalities Should Realize that They Cannot Be Prosperous without Efficient and Prosperous Utilities, and Commissions Should Grant Reasonable Increases in Rates

By **FRANCIS H. SISSON**
Vice-President Guaranty Trust Company, New York, N. Y.

BECAUSE our soldiers are daily returning from the fields of their heroic endeavors abroad, let us not deceive ourselves into believing that the struggle which has just dethroned autocracy is ended. We should likewise avoid the fatal mistake of considering our responsibility to "carry on" fully discharged when the armistice was signed.

The battle that our boys have just fought so victoriously across the ocean has gone on since the dawn of time; it will continue so long as human nature remains as it is to-day and has been through all the centuries. The battle may be waged in the name of democracy or in behalf of this or that cause, but always, in the final analysis, it is the struggle of the lesser thought against the greater thought of the time—the fight for progress—whatever form it may assume.

We may evolve a League of Nations which, perhaps, will prevent armed warfare and the wholesale shedding of blood. Certainly all mankind fervently hopes for such a covenant among the nations. But, notwithstanding, we may be sure that the age-old struggle will proceed. It is going on to-day, in fact, the world over. Under the banner of state socialism the foes of peace are now attacking the very foundation of our national and individual freedom. And we shall have ample need for the same spirit which animated our soldiers "over there" in breaking the Hindenburg line of autocracy to annihilate the "Hindenburg" line of the forces of ignorance and dangerous radicalism here.

STATE SOCIALISM DOOMED

State socialism can never attain the millennium it extravagantly promised while the mass of people are uninformed about, or worse, uninterested in, the vital economic problems confronting this nation. And when there shall be such general enlightenment and intelligence as are required for the success of state socialism there will be no need, or place, for such specious theories of government, because their fallacy and peril will be apparent to all. Then the people as a whole will understand that the state cannot deprive the individual of the fruits of his initiative and long thrive, or even survive.

That there is a singular and deplorable lack of appreciation of this fact, however, is plainly evident throughout the land. It is no more pronounced, perhaps, than in the attitude of the people generally toward the public utilities. But, thanks to the costly failure of the government's experiment in controlling the railroads, there may at last come a dawning consciousness among the thinking element of our body politic of the tragic possibilities, as well as fatal limitations, of state socialism.

Let us hope that this awakening will occur before it is too late, in dealing with the problems of the electric railways of the country. And it is with the desire to help disseminate information about some of the fundamental factors of these problems that I shall undertake to discuss electric railways from the point of view of the banker and investor. In this connection, incidentally, it may not be amiss to observe that every progressive banker and investor to-day is well aware that his interests are inevitably and inalienably allied with those of his community as a whole, and that whatever promotes the prosperity and welfare of all the people also profits him. Because the bankers realize this basic principle of their relations to the public, and also because they understand that which the general public does not appear to appreciate, namely, the people's vital financial "stake" in public utilities, they are keenly interested in problems of the electric railways.

THE PUBLIC'S STAKE

The average person, seemingly, thinks that simply because he owns no public utility securities he is not concerned with the financial condition of these corporations. That is a serious mistake, for the ramifications of the fiscal problems of the public utilities affect, directly and indirectly, every phase of the economic life of the communities they serve.

In June, 1918, substantially all the banks of the country, except private banks, owned $385,000,000 of public utility bonds. Insurance companies, also, are large holders of such bonds. In New York State, alone, the public generally owns securities of electric railways to the amount of $1,282,500,000. And more than $6,000,000,000 is invested in the electric railways of the United States. These figures should be sufficient proof of the fact that direct interest in the welfare of public utility companies is not limited to those who are stockholders in these companies.

Surely the war has taught us that, collectively, the public utilities are national in scope and of incalculable importance to national defense, as well as to national welfare and comfort. Yet, the electric railways, representing an investment of $6,000,000,000, are rapidly going on the rocks—largely because of public ignorance of, and indifference to, the true conditions of this great industry. The recent receivership for the Brooklyn

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*Abstract of address presented before mid-year meeting of American Electric Railway Association in New York, March 14, 1919.

Rapid Transit Company dramatically emphasizes the straits into which the electric railways throughout the country have been forced by various circumstances.

Up to the present, the electric railway companies have struggled alone with this desperate situation, but the problem is really a public one because the functions performed by these companies are essentially public. It is time for the public, which has reaped the benefits of the service rendered by the electric railways despite unbearable handicaps, to share in solving their problems. It is high time, indeed, for the public to realize that when it attacks public utilities, such as the electric railways, or denies them fair treatment, it is attacking and injuring its own interests.

The war imposed unprecedentedly heavy burdens on the electric lines, which were already suffering from a cumulative load that was straining their facilities and resources to the utmost. The prices of materials, for instance, have advanced from 25 to 100 per cent in the last few years. The demands made upon the service of the electric roads likewise have greatly increased. Transportation facilities of electric railways are overtaxed everywhere. But, while gross revenues have probably been larger than ever before during the last twelve months, net income has decidedly decreased.

In view of these deplorable conditions is it surprising that electric railway security owners have seen their holdings precipitately and alarmingly depreciate in value? Is it amazing that, with the opportunities offered to the investing public during the last few years to purchase the securities of industrial companies which have shown extraordinary earnings, electric railway securities should find few buyers? Is it to be wondered at that, with the wartime demands upon capital, these securities should have sold at prices which have been so low that the electric railway companies have had the utmost difficulty in obtaining, and, in some cases, have been absolutely unable to arrange, long-term financing? Is it difficult to understand why they have been compelled to pay such high rates for the capital they did get—and which, of course, still further reduced the return on their securities? Is it any wonder that dividends should be passed and that those to be paid this month, totaling $3,062,000, should be $200,000 less than during March of last year?

RESULTS OF WAGE AWARDS

I have mentioned some of the burdens laid upon the electric railways by the war as being instrumental in bringing about the existing financial difficulties of these companies and of the unfavorable position of their securities. There is another factor, however, which has contributed largely to the situation, namely, the awards of the National War Labor Board. In this connection, it may be illuminating to quote the following sentence from a letter recently written by the receiver of a New England electric railway company:

> The receivership is a direct result of the National War Labor Board's award, which placed an additional payroll burden of $125,000 per annum upon the company, notwithstanding our having submitted to the board a full statement of our funds and demonstrating to them that any other increase in wages would create the situation which we now face.

In a hearing between the street car companies of Cleveland and Detroit and their men, the companies pleaded that they should not be required to raise wages because they had no income out of which to pay the increase. They said:

> We are working under a franchise on which we receive only 3 or 4 cents a passenger carried many miles, and, if a substantial increase in wages be granted, bankruptcy and a receivership must follow.

Yet, the general chairman of the board of arbitrators in these cases held that the *financial condition of the companies could not affect the issue at stake.*

Such rulings, however, are only in keeping with the general public's attitude toward the electric railways and which has compelled these companies to operate under two distinct, and, in some respects, diametrically opposed kinds of law—legal and economic. The seriousness of this handicap is apparent when it is realized that probably one-half of the gross operating expenses of a railroad consists of direct labor costs, which are constantly increasing while the abnormally low rates for the service rendered by electric railways were, in many cases, fixed years ago by special laws or by provisions in ordinances or franchises. The rate of fare, in effect, was a part of the consideration for granting franchises. But the franchise method of fixing rates is too rigid to meet present-day conditions. The franchise, while holding down the charges for the service, does not hold down costs; consequently, costs have rapidly been overtaking gross revenues and have reduced to the danger point the margin between the two.

The commission form of regulation was developed largely with a view to remedying the evils of the rigid franchise method, but the commission form of regulation is losing esteem among the thinking people because of the attitude many commissions have assumed toward the public utility corporations, and because of the condition into which the Interstate Commerce Commission allowed the railroads to drift.

The public utilities have long been laying their case before the state public service commissions, but relief has come very slowly. And now, of all times, the men composing the rate-making bodies of the various states must have the courage to adjust rates to existing circumstances and prevent ruin from overtaking many of these corporations. Their responsibility is a very grave one, both to the utility companies and to the public.

THE NEED FOR POLITICAL INTELLIGENCE

There is equal need, also, for a realization by our legislators of their duty toward the public utilities and the holders of the securities of these companies. Business opportunity means nothing, unless we have coupled with it political intelligence which makes it possible of full realization. We look into our own city here, and we discuss the cost of transportation and the economic problems that are involved in public utility problems generally, but what good is the understanding of the economic problems if we have sitting in legislative and administrative halls a degree of political intelligence that absolutely nullifies it, which defies economic law, which refuses to recognize cost of production and cost of service as a basis of price?

We must consider more than the earning power, or franchise terms, or business opportunity, or the trade development that may follow in any given field; we must consider the political angle which, sooner or later, in our form of government determines the value upon which any security rests. We see rising up all over the world this tide of radicalism which has affected every form of business and unless we, as business men, attempt to understand and interpret and guide that radicalism into right channels, it is going to affect the fundamental values in which we all deal.

We cannot expect to take our position in the economic world unless we put into political halls the same kind of intelligence that enters into business organization.

The political angle is having a very important effect upon our business future, and we, as business men, should study that angle and have intelligent opinions about it and be able to vote, through our duly accredited representatives, intelligently, that our business may be protected and conserved.

The adjournment of Congress, leaving the coffers of the railroads empty and the Federal Railroad Administration facing $380,000,000 of back debts, is an instance of the evils of political domination of business. It is one which the public should ponder well in considering the problems of the electric railways, for municipal ownership would plunge these arteries of transportation into petty, local politics—which would be a worse fate, if possible, then the railroads have endured.

If there were to be any one criticism made of the American people as a people it is that though we have organized a democracy here we do not function as a democracy in many important instances, and we allow economic fallacies of all sorts to creep into legislative enactment. We allow economic fallacies to have political importance, which, if we gave them the attention they deserve and if we realized the bearing that they ultimately have on our own pocketbooks, we would be quick to correct in their inception, rather than to fight them in their fruition; and it seems that is the message of this hour, if ever, in the history of the world.

This condition must be remedied. The causes which have permitted and fostered its growth must be removed.

"The difficulty," aptly declared Lloyd George, "is not with interests, it is with prejudices. People talk about vested interests. It is not the vested interests I am afraid of, it is the vested prejudices. We must sweep aside prejudices."

IMMEDIATE REMEDIES NEEDED

But the present critical situation of the electric railway companies cannot wait for a solution of the future; it demands immediate betterment. And there is but one remedy.

Transportation cannot be rendered at less than cost, without the money to make up the deficit coming either from the security holders or the taxpayers, or both. It should be obvious to all that the cost of transportation ought to be borne by the users of transportation, and that some plan should be worked out at once by which such provision is made.

If municipal authorities maintain the position they have held, and unwarranted additions are continuously made to the tax burdens of our communities, the bonds of our municipalities will not be attractive to bankers or investors, and the growth and prosperity of various cities will be seriously threatened. Indeed, as has been pointed out, there is involved in the situation the validity of a huge structure of investment and credit, the undermining of which cannot fail to have far-reaching effects upon general credit and business prosperity, for the credit of our transportation lines cannot be placed in jeopardy and the effects localized or even restricted to these utility companies. Cities cannot be prosperous without efficient utilities, and utilities cannot be efficient without prosperity. Public regulation involves public protection of credit.

There can be no possible justification for imposing such burdens as are being inflicted upon the security holders and taxpayers to-day in a quixotic attempt to give something for nothing, by allowing the users of transportation lines to enjoy the conveniences provided them at less than cost. Fares must be raised to an equitable basis, for they constitute the only source of income for the electric railway companies.

One of the sanest and fairest views on this vital subject which I have ever encountered, and one of special interest to public utility companies in general and to the holders of their securities, is the following opinion rendered by the Superior Court of Pennsylvania:

> A rate that is too low may deprive the members of the corporation of property that cannot be returned, and if too high, the public is unjustly deprived of property. Rates should not be speculative or put in operation for the purpose of determining whether too low or too high. Before that question can be answered, a loss of property might result. The business of rate making should not be an effort to impose on either the public or the corporation; and, while it may be true that some corporations in the past have acted unfairly to the public, that would not justify a confiscatory valuation by the commission or a lowering of rates causing a confiscation. Rate making contemplates fair dealing between the company and the public. When the question of rates to be fixed is before the commission, the value of the whole property and the net return thereon must be considered.
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> The public is entitled to be served at reasonable rates on the value of the property used in the public service. The company is entitled to a rate that will allow it a fair return. To induce investment and the continuance of capital, there must be some gain commensurate with that of any other business. The mere assurance that the investment will not be confiscated will not suffice.

The very recent final decision of the New Jersey Court of Errors and Appeals upholding the legality of the increase in street car fare to 7 cents in the State of New Jersey, is significant and promising. But, more encouraging, as revealing the extension of an enlightened point of view, it has been almost generally admitted by the citizens of New Jersey that the companies needed the extra revenue if the quality and quantity of service was to be maintained.

Approximately 400 cities have raised fares as war emergency measures, but in many cases the increases have been inadequate and, unfortunately, the companies in some of our largest cities, whose financial burdens are proportionately heavier than the smaller lines, have been denied this assistance.

The electric railway security holders do not seek exorbitant increases in fares; quite the contrary. They are fully cognizant of the fact that it is to their interest, as well as to that of the public, to keep rates for service as low as possible, for low fares benefit the companies through stimulating business.

In facing this situation municipal authorities should not forget that they are holding in their hands the credit of their cities, savings banks, life insurance companies and other investment institutions, and a large portion of the invested wealth of the country.

The problem is not merely local or political, but of nation-wide business importance, and, if it is not fairly met, is capable of having a widespread and disastrous effect on business—an effect which every business interest, directly or indirectly, but inevitably, must share.

"Unless some relief is given," declared A. J. Hemphill, chairman of the board of the Guaranty Trust Company, in testifying a short time ago before the Public Service Commission of the Second District of New York, "there will be a cataclysm from which we will not recover for a generation."

Through a Commissioner's Eyes*

Electric Railways Should Get Together in Handling Questions of Municipal Ownership, Procedure in Rate Cases, Valuation and Indeterminate Franchises—Only Known Preventive of Municipal Ownership Is Satisfied Public

By **CHARLES E. ELMQUIST**
President National Association of Railway and Utilities Commissioners

GOVERNMENT control and operation of rail, water and wire lines will probably force the issue of government ownership in the 1920 campaign. This is indicated by the testimony and views of government officials and by the action of organized labor and certain groups of farmers and other interests. If the people decide to continue government control or to purchase the properties, a strong sentiment may be expected to develop for municipal ownership of other public service corporations.

While there is no direct relationship between steam railroads and electric railways, the question of ownership is going to be ultimately determined on principle. Should it be decided to purchase the steam railroad and wire systems, there is no escape from the conclusion that public sentiment will also demand the purchase and operation by the people of street cars and other utilities in a great many places.

In a local sense this sentiment will be augmented by the condition which now confronts the electric railway lines. The increased operating costs have forced many companies to secure higher rates in order to avoid bankruptcy, and the nickel fare has become the exception rather than the rule. But every rate increase takes from the customer something which was given to him by contract or by the order of a commission, and he is likely to feel that he has been deprived of his just rights.

Hence in the near future one may expect an insistent demand for the reduction of fares, tolls and charges. Petitions will be filed with the proper authorities challenging the reasonableness of the higher rates. In all such cases the commissions or courts must be governed by the facts presented, because there is nothing more certain than that the regulation of rates must be controlled by facts rather than by sentiment. Naturally, the operating costs and operating ratios of utilities will decrease, but it is more than likely that adjustments will not be sufficiently rapid to satisfy the public demand for reduced rates.

During this period the pathway of regulating officials will not be strewn with roses. If the facts will not permit a reasonable reduction of rates, an agitation for municipal ownership of these plants may be expected. The people will feel that by possession alone can they secure the rates which in many instances were agreed to as a condition precedent to the occupancy of the streets.

These preliminary observations lead me to the following conclusions:

Municipal Ownership

Immediate attention must be given to the question of municipal ownership. Facts for and against should be compiled and distributed so that the people may have a chance to decide the question upon its merits. The only known preventive is a satisfied public. Efficient service, reasonable rates, courteous treatment of patrons and justice to employees as well as to investors should characterize the conduct of these utilities. No company can successfully defend itself against a hostile public.

National Co-operation

While electric railways are local and perform a service which is largely local, yet their interests are identical in that most of them are confronted with the same kinds of difficulties. It might be profitable for the national organization to continue a study of all questions dealing with improvements and economies in service and to make suitable recommendations to the local companies.

Reforms cannot be made in a month or a year, but if all the managers take hold of the problem in a broad way and endeavor to follow the recommendations of a central body, they will be able to accomplish much to the mutual interests of themselves and the public.

Uniform Rate Procedure

Rate adjustments should be, and as a matter of fact are, largely questions of facts. They involve considerations affecting the revenues and expenses, competition, prospective earnings, investment and value. The controlling principles should be the same everywhere in this country. In the consideration of petitions for reduced rates, the courts and regulating tribunals are entitled to have the questions fairly, honestly and intelligently presented. The same theory of defense should be presented in California and Maine, Illinois and Texas.

A large saving could be made of the time, labor and expense of these utilities, as well as of courts and commissions, if a substantially uniform method could be adopted for the presentation of rate questions. It would seem that such a plan could be successfully worked out by a committee representing the American Electric Railway Association.

Corporations try their cases before courts with great skill and ability, but unfortunately it is a too common practice for them to appear before commissions without proper preparation. Times without number, representatives of the carriers have appeared before the Minnesota commission to favor or oppose a petition, without having agreed upon a course of action, and with no one there prepared to offer an intelligent statement. Each carrier, when called upon, would re-state the opinion of the first speaker. Frequently their cause was just, but it had to be denied because there was no evidence. This practice is not local to Minnesota.

The purpose of a public hearing is to give a fair trial, at which time evidence may be offered by both sides. Hearings would result in a farce if real consideration were not to be given to the evidence in the case. Commissions are busy, and their burdens would be greatly relieved if corporations presented cases in a clear-cut manner. They should give facts instead of opinions, and always bear in mind that public servants are watched and that an order made in a litigated case, which is not supported by the evidence, is arbitrary and illegal and subjects the commission as well as the corporation to serious criticism, and that such proceedings are likely to result in unfriendly legislation.

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*Abstract of address presented at mid-year meeting of American Electric Railway Association, New York, March 14, 1919.

Accounting Uniformity

Considerable progress has been made in an effort to establish a uniform accounting system for utilities. It is not always easy to harmonize the conflicting ideas of the accountants who represent the states and the federal government, and this problem is made even more difficult because the views of utility representatives should also be considered. Uniformity is desirable, and every effort should be made to bring it about.

Of course, there may be local conditions necessitating the compiling of special or additional information. As president of the National Association of Railway and Utilities Commissioners, I shall urge the committee on accounting to give special consideration to this matter, and I earnestly hope that real progress may be made during the year. May we not look for co-operation from a committee appointed by the American Electric Railway Association?

Definite Valuation Plan

Public ownership involves the purchase of the utilities. This is brought about by agreement or condemnation. In view of the prominence which is to be given to the question of municipal ownership, the utilities should not be guilty of "watchful waiting." Preparation should be made for the day when the properties may be taken over. The people should not pay more than the properties are worth, and it is difficult to determine the price in the absence of a physical valuation.

The principles of valuation are not definitely settled. Unfortunately, there are as many different ideas upon this subject as there are lawyers and engineers who make a study of it. Hence it is important that the American Electric Railway Association investigate the problem through a proper committee, authorized to formulate rules and suggestions for the guidance of the companies. A definite plan would be exceedingly helpful to the public as well as the corporations, and it might result in an early judicial determination of the correct principles of valuation for use in purchase, rate-making, taxation and capitalization proceedings. I strongly urge that conservative action be taken by this committee. In the last analysis, nothing is to be gained by claiming everything of present or prospective profit, elements both tangible and intangible, visible and invisible, in the heavens above or the earth beneath.

The steam carriers believed there was advantage in united action. When the government began the valuation, the steam railroads appointed a conference committee, which selected able lawyers, engineers and accountants who were to devote their attention exclusively to this work. This committee brought to the attention of the Interstate Commerce Commission all the law upon the subject, and it compiled a mass of statistical data and expert opinions which greatly aided the commission to arrive at its conclusions in the early valuation cases.

Valuation will play a more important part in rate cases than it has in the past. We seem to have drifted away from the anchorage of contract fares. Rates should be determined by facts rather than by negotiation or complusion. The public suspects that there is over-capitalization in many of the electric plants. This suspicion will not be allayed until the people know what these plants are really worth.

If the securities are excessive, they should be written down to the basis of the real value of the properties used in the public service. In connection with this subject, it will not do to overlook the fact that original cost is an important element to be considered in arriving at value, and that commissions are insisting that this item be shown.

Indeterminate Franchises

The experience during the war will result in a greater assertion of authority by the states over the rates of electric railways than heretofore. The rapid increase in the cost of wages, fuel and supplies brought the public face to face with the fact that public service cannot be efficiently rendered by a company which pays out more money than it takes in.

Fixed rates and flexible costs are inconsistent. Every student realizes that both elements must be variable in order to meet changing conditions, and that the determination of the rate to be charged should be made by a body of expert men. Courts no longer attribute sacredness to a franchise rate. The doctrine that a state may fix a reasonable rate for a local utility unless restricted by constitutional limitations has become the accepted law.

We have entered upon a new era in the regulation of local utilities. At this time emphasis should be given to the importance of transferring to the state authorities the ultimate determination of rates, subject of course to an appeal to the courts. The fairest way to meet necessary changes in conditions and to secure for the public, as well as the corporations, that enlightened consideration to which all are entitled, is for the state to issue indeterminate permits in lieu of existing local franchises.

It is not necessary to discuss the merits of this plan. It has been tried out in several jurisdictions and found to be acceptable. The advantages to the companies, the investors and the public are many; the objections, few. Tested by experience and the judgment of earnest and competent men, it seems to come nearer meeting the requirements than any other plan that has been suggested.

But this presents a legislative question, and laws must be passed to suit the needs of a particular state. The American Electric Railway Association should arrange to have prepared an article fully setting forth all of the advantages and the disadvantages of the indeterminate plan. Then all interested parties could have the benefit of the best arguments on both sides of the question.

The extent of state control depends entirely upon local conditions. I have found that state commissions do not relish the idea of exclusive control of street car companies by the state. Many of them believe that the municipalities should retain their powers over these utilities, subject, however, to an appeal to the state commissions. This is not a denial of the right of home rule. It substitutes a board of experienced men for a court in passing upon disputes between utilities and municipalities.

It Is Time for Valuation Compromise*

New Phase of Valuation Subject Is Going to Lead to Agreements Based on a Give-and-Take Policy and on the Mutual Needs of Railways and the Public

By PHILIP J. KEALY
President Kansas City (Mo.) Railways

THE SUBJECT of valuation has taken up enough space in technical journals during the last ten years for it to be familiar in all of its multifarious details to everyone in any manner associated with the public utility industry. It has received the attention of committees, bankers, lawyers, operators, commissions, engineers, newspapers, civic leagues, reformers and politicians. It has been cussed and discussed in the degree that it was your valuation or the other fellow's.

Volumes have been written upon the subject in its entirety and upon all of its subdivisions and the subdivisions of the subdivisions. It has contributed a new vocabulary to the engineering profession. It has been theorized upon and moralized about. For these reasons I do not care to try your patience by attempting to touch upon any of the technical or theoretical angles of the question.

Theoretically, a properly conducted valuation proceeding should produce a result that would justly represent the present actual worth of an electric railway property within a reasonable degree of variation. The great difficulty lies in the fact that those determining the value frequently attempt to make the result fit the particular purpose of those whom they represent. Upon reviewing the several values determined for any given property by those representing different interests, one is almost led to the conclusion that while "figures do not lie, liars will figure."

A case in point is mentioned in the ELECTRIC RAILWAY JOURNAL of Feb. 8. In the case of a large property the engineers representing the city arrived at a valuation of $24,346,113; those representing the company, $30,712,101; the majority report of a franchise committee, $22,156,951, and the minority report of this same committee, $15,470,630.

PRESSING REASONS FOR VALUATIONS

There is nothing new in the subject of valuation, but there is something new in the reason now existing for an agreed valuation for every electric railway property. It seems to be the consensus of opinion that something must be done, and done quickly, if immediate financial disaster to the holders of securities be prevented. Owing to the kindly ministrations of the National War Labor Board already some of the largest, and at one time financially strongest, companies are in the hands of receivers. Many are operating properties in the interest of the beneficiaries of the War Labor Board and are passing interest payments in order to pay a wage scale which is not possible to the industry as at present organized.

If such conditions are to continue, some plan of operation whereby the traffic pays the cost of operation will have to be devised, because even a receivership will not satisfy the present conditions for long. The plans proposed present two outstanding solutions. The first, which is advocated by perhaps the large majority of operators and which seems the common sense solution of the difficulties, is the service-at-cost theory. In any event this reflects the point of view of those optimists who are not inclined to the idea that crape has already been hung upon the front doors of our offices. The other solution of the situation is presented from the more pessimistic standpoint that the "jig is up" as far as private ownership and operation of electric railway properties go. It holds out as a panacea of all ills the disposal of railways to the municipalities. Either one of these propositions must be bottomed upon the ascertainment of the value of the properties.

COMPROMISE IS NECESSARY

Unfortunately we cannot in all cases have this value determined by strict adherence to the fundamentals which theoretically and justly should form the basis of every valuation proceeding. We are forced into the position of not only having to fight for the right to earn interest on money actually invested, but we have to battle for a recognition of the investment itself. The dollars which we have poured into these magnificent properties throughout the United States, in the minds of many of those with whom we must finally agree, should shrink to 50-cent pieces in valuation proceedings. In the last analysis we should arrive at a compromise so what we lose from our own estimated value may in some measure be made up through stability given our investment and the possible assurance of getting what we have not had for some years, *i.e.*, the certainty of a fair return upon this value. After all, an adequate guaranteed return upon a dollar is better than nothing upon a dollar and a half.

In entering upon one of these pseudo-political valuations either for the purpose of determining the cost of service or of turning a property over to the politicians, statesmen and job-hungry political engineers, we might as well at once get away from any idea that we are going to determine the value of the property entirely by a slide rule or solely on basic valuation principles. What we are going to do is to agree on one of several different valuation results as purporting to establish cost of reproduction new less actual depreciation. Then from this as a starting point we will try to arrive at some reasonable and fair compromise on the various other elements of value which distinguish a going concern from the bare-bone skeleton of an electric railway property.

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*Abstract of discussion on report of committee on readjustment at mid-year meeting of American Electric Railway Association in New York, March 14, 1919.

The entire subject of valuation has been upset in the last few years by present material prices. Thus, in the Minneapolis valuation, it is interesting to note that A. L. Drum, consulting engineer for the Twin City Lines, estimated that the property would cost to reproduce under present prices 70 per cent more than the various values determined by the different engineers. In other words, the questions of actual investment and capitalization have been entirely eliminated if in valuation proceedings we receive enough justice to give us an advantage at all from the present reproduction cost. Not even the most extravagant reformer will assert that any property is over-capitalized to the extent of 70 per cent.

The Interstate Commerce Commission in the progress of its $50,000,000 twenty-year valuation experiment has about come to the conclusion that the steam railroads valued at the present cost of reproduction will show an actual physical value in excess of outstanding securities. I am hopeful that the trend of valuations before courts and commissions will follow this viewpoint; that to a greater extent than ever before the public and the multitude of governing bodies will recognize a fact which has been true of most properties for the last ten years (which is that the outstanding securities represent good hard dollars invested in a public service) and that justice to the investor demands an honest legal rate of interest upon his money invested.

I am no more pessimistic upon the outcome of valuation proceedings than I am upon the electric railway situation in general. I believe that agreements based on a give-and-take basis over the various items that go to make up the complete value of our systems can be reached, which will place the stamp of authoritative approval upon our outstanding securities. I do not believe that the American people as a whole are in accord with the spirit of "pink tea" Bolshevism evidenced by some reformers who fill the magazines with high-sounding phrases and desire the confiscation of our properties on the theory that political might makes economic right.

There are already a number of examples of valuations reached by agreement with municipalities. In these, while the owners did not get all for which they contended, they at least received a fair value, all things considered. Cleveland, Kansas City and Chicago now have for several years been free from worries arising from the question of valuation.

There are now pending a number of valuation proceedings, noticeably Cincinnati, Buffalo, Detroit and Minneapolis, where the value determined will form the basis for the cost of service.

We have entered into a new phase of the entire valuation subject and the final result is not going to be so much that of the slide rule and the adding machine as one of conference and compromise based on the necessity of a public service and a public need.

Maintenance and Depreciation Allowances in Service-at-Cost Franchises*

An Analysis Is Made of the Allowances on Various Bases Predicated on Existing Conditions—A Suggested Classification of Maintenance and Depreciation Allowances Is Then Outlined

By A. L. DRUM
A. L. Drum & Company, Chicago, Ill.

ACTUAL experience during the last ten years with the more recent form of cost-of-service and partnership franchises, as well as more clearly defined rules of accounting, has furnished a clearer insight into the requirements for maintenance, renewal and depreciation allowances.

Prior to ten or fifteen years ago the frequent changes and improvements in the art of transportation had resulted in the custom of meeting from current revenue only the current maintenance, repairs and renewal of the short-lived parts of the physical property, while the renewal or rehabilitation of the major parts of the property was provided for by additions to the capital account. This was a natural development, as the renewal or rehabilitation of the major parts of the property, which ordinarily should have had a long period of service but were replaced prior to the expiration of their useful life, was required on account of: (a) The improvements in the art of transportation which effected improvement in service and economies in operation, (b) the demands of the public to receive the benefit of new and improved transportation methods, and (c) civic improvements, compelling the replacement of property prior to the expiration of its useful life, such as usable track replaced on account of new street paving being installed.

The changes and improvements in the art of transportation in all but a few of the large cities occurred at frequent intervals. The period of use of the horse-car lines was from ten to fifteen years; cable lines five to ten years; the early electrical development period comprising the single-truck car and belt-driven electrical generators eight to ten years; engine-driven direct-connected generating power stations about ten years. The result of this rapid replacement of usable property was that it would have been necessary to charge a rate of fare high enough to have provided net earnings of 20 per cent to 25 per cent upon the capital invested during these development periods in order to provide a fair return on the capital risked at that time and the amortization of this capital within the short period, usually about ten years, during which the property representing it was used for transportation purposes.

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*Abstract of discussion on report of committee on readjustment at mid-year meeting at American Electric Railway Association in New York, March 14, 1919.

During the past fifteen years the street railway art has become fairly standardized with respect to tracks, cars and power supply, but it is now apparent that further changes in the art are taking place, particularly with respect to the passenger car, so that a new period of development is arriving. In this period, it is very probable that due to the inadequacy and inefficiency of the present type of car many of these cars will be replaced for service and economical reasons by light-weight one-man cars and light-weight two-car units. In general it seems probable that the principal parts of the street railway system have arrived at a permanent stage of development unless some very radical unforeseen improvement in the art is developed and consequently it seems desirable to place in effect a uniform and standard system of maintenance and depreciation allowances in existing and future service-at-cost franchises.

ANALYSIS OF EXPENDITURES BY INDIVIDUAL COMPANIES

An analysis of the actual expenditures for maintenance and renewals made by nine of the largest electric railway systems in the United States during the seven to ten-year period just passed shows a wide variation of these expenditures from the standpoint of the various comparative unit costs. For illustration, the total maintenance and renewal expenditures per year by these properties indicate a variation in fairly comparative cities of from $2,600 to $7,400 per mile of single track operated, from $900 to $2,000 per car operated, and from 2.9 cents to 5.6 cents per car-mile operated. These actual expenditures for maintenance and renewals represent the actual outgo for all classes of maintenance and renewals of physical property but do not include any unexpended balance in the so-called maintenance, renewal and depreciation reserves of the companies Consequently, the unit costs are comparative and indicate a wide range of expenditures as between old and worn-out street railway systems and recently rehabilitated and newly constructed systems.

In the case of several of the electric railway systems which have been rehabilitated during the past ten years the average total expenditures, both maintenance and renewals. indicate a yearly requirement of about 13½ per cent of the gross revenue, about 4 cents per car-mile, $3,000 to $5,000 per mile of single track operated and $1,400 to $1,800 per car operated. Certain of these street railway systems made appropriations of from 18 per cent to 21 per cent of the gross revenue for maintenance, renewal and depreciation, and the part of the appropriations remaining unexpended during the eight-year period has amounted to from 20 per cent to 35 per cent of the total amount appropriated. The physical property of these last mentioned street railway systems has been rehabilitated during the past ten years, and the average age of the physical property would not exceed eight years.

General conclusions reached by a study of the actual maintenance and renewal expenditures of the nine large street railway systems of the country indicate that the amount required for current maintenance and renewals is extremely variable and dependent upon the age, previous standard of maintenance and present physical condition of the property, so that it is almost impossible to arrive at a uniform standard of appropriations for current maintenance and renewals of street railway properties. It, therefore, seems necessary that in a service-at-cost franchise the amount of the appropriation for current maintenance and current renewals should be determined by the operating board in control of the property year by year and in effect be the actual amount of expenditures incurred by the property for current maintenance and current renewals during each year.

The allowances to be made to cover renewals of the long lived portions of the property require a separate determination for each electric railway system on account of the great differences in age, types of construction and remaining life of the long lived portions of the physical property of the different street railway systems in the country.

Replacements due to lack of efficiency, inadequacy, improvement in the art, etc., will be encountered in the future by all street railway properties, but are in the nature of a contingent liability for extraordinary replacements, each of which should be judged upon its own merits at the time the problem arises and an additional renewal allowance be determined for each specific item in order to spread the cost of these extraordinary renewals over the period benefited, viz., the estimated remaining life of that specific part of the physical property that has been abandoned. In effect, this method means the deduction from property account and a charge against an abandoned property account of the portion of the amount of the original cost of the abandoned property represented by its remaining life when abandoned and the extinguishing of this item by appropriating from gross revenue annually a sum for extraordinary renewals sufficient to equal during the remaining life of the abandoned property item the amount deducted from the property account.

CLASSIFICATION OF MAINTENANCE AND DEPRECIATION ACCOUNTS

To state briefly the suggestions made herein, it seems advisable to classify maintenance and depreciation allowances as follows:

(A) *Current Maintenance and Renewals*

These expenditures are dependent upon the amount and character of the service and the present physical condition of the property and are widely variable for different properties. Consequently, it seems advisable that the actual expenditures for current maintenance and repairs of the physical property and for the current renewals of short lived parts of the physical property should be provided from the gross revenue of each year as part of the operating expenses.

(B) *Renewal Reserve for Existing and Added Property*

The amount of the appropriations to this renewal reserve for the long lived parts of the physical property is dependent upon the replacement cost, age and expected remaining life of the property and therefore should be made annually in sufficient amount to provide for the replacement, at the end of their useful life, of the various parts of the physical property that are not replaced by the expenditures for current renewals as part of the operating expenses.

The appropriation for the renewal reserve for existing property should be determined by grouping the physical property under a classification of the same or similar types and having reasonably close remaining lives, estimating a replacement value and remaining life in years on the various items of each group, from which the amount of the average annual renewal appropriation for each group may be determined with an allowance for interest accumulations.

The appropriation for renewal reserve for additional property should be determined annually by grouping the added property under a classification of items of the same or similar types and from the actual replacement cost of the property and an estimated life the amount of the average annual renewal appropriation for each group may be determined.

The renewal reserve fund so accumulated should be held for and applied to the replacements and renewals of the portions of the property, the cost of renewals or replacements of which shall not have been charged to current renewals and included in operating expenses. When any portion of the property is retired from service an amount equal to its replacement cost should be provided from the fund and expended on new physical property. In the event of any part of the physical property being withdrawn from service before the expiration of its useful life then only such portion of its replacement cost as is represented by its expired life should be withdrawn from the fund and expended on new physical property.

(C) Abandoned or Superseded Property Reserve

Replacements of property due to lack of efficiency, inadequacy, improvements in the art, etc., represent contingent expenditures for the future benefit of the public or the property and represent definite ascertainable losses of capital that naturally should be provided for from future gross revenue.

Whenever any part of the physical property is retired from service before the expiration of its useful life, there should be deducted from the property account and charged to an abandoned or superseded property account the portion of the amount of the original cost represented by the remaining life of the property when abandoned. The amount of this item should be amortized by setting aside from gross revenue annually an appropriation for abandoned property reserve sufficient to equal with interest during the remaining life of the abandoned property item the amount deducted from the property account. The funds derived from such appropriations may be invested in trust funds or in the securities of the company so that there shall be available as a charge against future revenue or invested in new property an amount to offset the capital outstanding and represented by the abandoned property.

Variables Prevent One General Solution*

Electric Railway Problems Must Be Solved in Light of Local Conditions, with Attention to Merchandising, Zoning, Commutation Rates, Lighter-Car Equipment and Possibly One-Man Cars, with Higher Fares Where Needed

By **WILLIAM D. B. AINEY**
Chairman Pennsylvania Public Service Commission

IT IS self-evident to all that a satisfactory solution of electric railway problems has not yet been obtained. In that connection I suggest that in no single conclusion does the solution lie. But we will without doubt agree upon the following as essential to the well being of electric railways as efficient public servants: (a) The securities must be stabilized. (b) They must bear some fair relationship to the money invested in the properties. (c) The revenues must amply provide for operating expenses, reserves, depreciation and a fair return upon the investment. (d) The service must be adequate to the public needs. (e) The fares must be high enough to meet these requirements and enable companies to render that service and low enough to attract sufficient patronage. (f) The rate structure itself must take into consideration services rendered and received, that the costs thereof may be equitably distributed among the ratepayers.

A general program applicable to all companies or to all localities cannot safely be adopted. Unless it can be assumed—and I am firmly convinced to the contrary—that all companies are similar in regard to corporate and financial histories, physical conditions, topographical and geographical situations and localities, character and number of population to be drawn upon, with their riding habits, there are variables which prevent a conclusion with respect to one company being applicable to another. To illustrate this point—there are in Pennsylvania electric railways which on a 5-cent fare are meeting their increased operating expenses and have suffered no diminution in the dividends upon their capital stock nor defaulted in the payment of bond interest. On the other hand, there are companies which on 6, 7 or 8-cent fares are scarcely able to cope with their operating obligations and fixed charges. Under such circumstances we are forced to predicate our analysis upon particular cases rather than rely upon a composite view of all the companies.

A METHOD OF DIAGNOSIS

While we may not generalize our conclusion, we may with reason adopt a method of diagnosing the difficulties of each particular company under consideration and thus reach some fairly accurate if not a satisfactory conclusion. It will at least support a prognosis. In this program of self analysis, let me suggest the following line of thought:

First: With respect to corporate organization. The simpler it is the more efficient it is bound to be. Corporations, in a sense, follow the law of mechanics. Every useless wheel contributes to lost motion. Every corporate complexity not essential to the maintenance of the working organism spells waste in efficiency or money. Every underlying company which has no operating responsibility and exists solely as a conduit for revenues to its stockholders or bondholders, is an economic loss to the operating road.

Second: I need not dwell upon the subject of the proper relationship between the investment and the capital issues, although it is a matter of grave moment to the corporate life and activity of railway companies and presents a situation which brings travail to the soul of many utility companies. Nevertheless, there never can be a stabilization of securities without a recognition of the requirement that they must rest upon the bed rock of fair value. I admit that serious difficulties frequently stand in the way of a readjustment, but these are difficulties which often bind the financial freedom of the company.

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*Abstract of address presented at midyear meeting of American Electric Railway Association, New York, March 14, 1919.

Third: If a particular company finds itself whole hearted with respect to corporate complexities and financial disparities between its stock and bond issues and the value of its property, it comes to the intimate question of revenues. It goes without saying that every electric railway must receive a gross revenue generously sufficient to maintain its service, care for depreciation and yield an adequate return to its investors. This fact is more easily stated than accomplished. How to secure such an adequate revenue is not a simple question and, I must firmly assert, is not one primarily determinable by public service commissions. The initiative rests with the railway companies, and the accomplishment lies with the company and its patrons.

INCREASE THE CAR RIDERS

Theoretically gross revenues are increased by increasing rates of fare; the alternative method, not now overmuch emphasized, is in increasing the number of car riders.

A careful study will, of course, advise every company of the per mile per passenger costs of transportation service. Ignoring for the moment rush-hour periods but not overlooking their importance, let me inquire whether the railways generally have given sufficient attention to the merchandising side of their business to increase the carriage of passengers. I doubt whether energetic campaigns to that end, during these staggering days of high costs, have with many companies received the attention which other lines of business have evidenced for similar purposes. I am not attempting to state this matter argumentatively, and it is mentioned with full recognition of the increased cost which increased service imposes.

The fundamental difference, as viewed by the public, between electric railway service and steam railroad transportation is that the former is a cheaper type of service. I do not believe that difference can in the public estimation be successfully bridged. Companies may promulgate and commissions approve increased rates, but their value is dependent upon a public willing to pay.

In Pennsylvania the curve of lost riders rises very rapidly as rates are increased from 5 to 6, 7 and 8 cents, and the loss in car riders at the higher rates has to be compensated in part by a shortening of car service and lessened operating expense.

In one of our large cities a 5-cent rate was imposed by the company for an inner zone where there was no anticipated increase in the riding habit, and a 7-cent rate was established as an interzone rate and to apply in an outer area surrounding the inner zone. In this outer territory there were fair prospects of an increase in passengers. The actual experience of the company was a material loss in passengers carried under the 7-cent rate and more than 16 per cent increase under the 5-cent rate.

ZONING IS PROMISING FIELD OF STUDY

The whole rate scheme of many railways needs readjustment. Let me instance cases where electric railways are carrying passengers from 12 to 16 miles for a single fare. Every passenger so carried is a financial burden to the company and to all the other car riders of that company. This leads me to the subject of zoning, particularly with respect to interurban and suburban service. It has at least the advantage of usually retaining the short distance rider, and when based upon a carefully studied plan has arguments of its justice to support it.

Zoning is one of the most promising fields of railway investigation, and while I doubt whether it can be made to follow arbitrarily mathematical formulas or be based upon strictly imposed mileage, and while it has perhaps some serious collection difficulties to be overcome, it nevertheless is a subject worthy of the most careful study.

One Pennsylvania company is trying the experiment of an initial zone rate of 6 cents with 3 cents for each additional zone, all of shortened length. It is attempting to meet local objections by some overlaps and is providing monthly commutation tickets at slightly reduced rates to care for regular riders. I shall watch with interest the results with respect both to the methods of fare collection and to the results in passengers carried.

Have the railways in times past sought to rival the railroads in the high class of equipment used for carriage? Will lighter cars and perhaps in some localities one-man cars meet the public requirements at lessened initial costs and lower operating expenses?

In conclusion I have but this to offer—that the electric railway problem is not to be solved except in the light of local conditions affecting each company, and that to its solution we must bring our attention to merchandising, zoning, commutation rates in special instances, lighter car equipment and possibly one-man cars where they can be operated. Increased rates where apparently required must be imposed with a full recognition of the public's veto power. It is an operative rather than a banker's problem, although we may not minimize the importance of the latter angle of approach.

RIDING PUBLIC MUST RECOGNIZE FACT THAT ALL COSTS HAVE INCREASED ENORMOUSLY

I would be equally unfair to the electric railways, to the public and to myself were I not to say with all frankness that the very great increases in the cost of labor and material have entered as largely into the expense of railway operation as they have in any other line of business activity, with a result which the riding public in the spirit of fair play and exact justice is in duty bound to recognize. This recognition it has apparently given to almost every other item of daily expenditure. That such recognition requires at its hands in many and perhaps in most instances increased fares to preserve electric railways in a condition where they may continue adequate service is apparent.

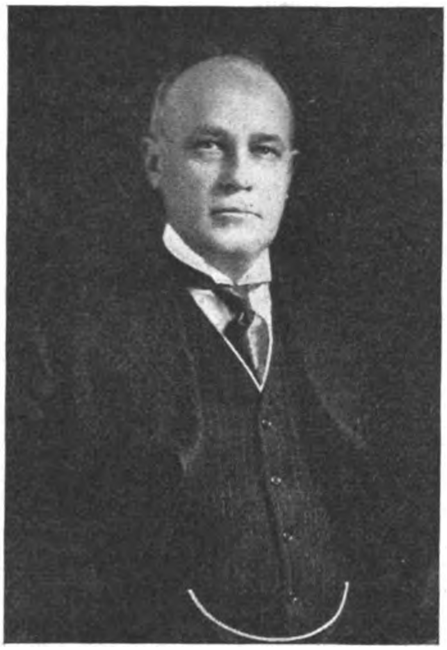
The time has not yet come when we may dispense with electric railway service. No other later certain or better form of local transportation has been devised. Electric railway service is entitled in the public interest to public support, and the public is entitled to adequate service but not at a rate less than it costs the companies to provide it.

I have no hesitation in saying that it shall be my earnest endeavor to preserve the carriers in Pennsylvania on a sound financial basis with sufficient revenue to meet the requirements of good service and to yield a fair return to their investors.

Large Attendance at Mid-Year Meeting

Delegates, Deeply in Earnest, Endeavor to Reach a Solution of Electric Railway Problems—In Morning Listen to Report and Address by Mr. Gadsden—Afternoon Devoted to Papers from Viewpoint of Operator, Banker and Commissioner

THE critical condition in the affairs of the electric railways of the country brought a large attendance to the mid-year meeting in New York of the American Electric Railway Association on Friday, March 14. The programs of the technical sessions were devoted almost entirely to financial questions and were arranged so that views of the status of electric railways from the standpoint of the operators and from those of the bankers and commissions could be obtained. The meetings were held in the Engineering Societies Building, 29 West Thirty-ninth Street. The morning session was convened at 10 o'clock.



J. H. PARDEE

President Pardee occupied the chair and introduced the sessions with a brief address, a considerable part of which was devoted to a description of the facilities of the association for assisting companies needing special information on different topics, and to the work of the committee on national affairs with headquarters in Washington. He mentioned as an example of the first service, evidence on the value of one-man cars which the association was able to supply to a member company in one of the Southern states. By presentation of this evidence to the Legislature, a bill aimed to prevent the operation of such cars was defeated.

At the conclusion of Mr. Pardee's address he suggested that a committe should be appointed to consider any resolutions which might be offered at the meeting. Upon motion the following committee of five was appointed: P. H. Gadsden, chairman, and Messrs. Henry, Kealy, Mortimer and Ely.

REPORT OF THE COMMITTEE ON READJUSTMENT

The first subject on the program was the presentation of the report of the committee on readjustment. It was presented by Mr. Gadsden, chairman.

Mr. Gadsden stated that the position taken by the association in the resolution which created the committee was absolutely justified. Statistics prepared by the association show that one-tenth of the total mileage of the United States is to-day in the hands of receivers. Such increases in revenues as have been secured from higher fares are inadequate, and in many cases they have been granted for such short terms as to be of little if any avail in the settlement of the underlying problems.

The committee believes that the questions submitted to it must properly be divided into two phases: (1) Those dealing with urban electric railways, and (2) those dealing with interurban electric railways. While the conditions of both classes are, in the main, the same, and while the causes of the condition are practically identical, the remedy often differs.

The committee now has under consideration plans which, it believes, will assist in meeting the situation confronting the industry. These will be reported from time to time in detail. In the committee's opinion, there are certain fundamentals which must control the readjustment of the relations between the companies and the communities they serve. Mr. Gadsden presented the following summary of these:

1. The electric railways of the country are breaking down under present conditions of operation. As a result, the public is being deprived of service and is facing certain financial losses through the depreciation of electric railway securities which are held by savings banks, life insurance and trust companies and other similar institutions in which its savings are invested.

2. This condition is primarily due to the economic error of establishing an inflexible fare regardless of the cost of the service rendered or the distance hauled.

3. To correct this difficulty, flexible fares must be established which will be automatically adjusted to the cost of the service demanded by and furnished to the community.

4. A necessary element of the cost of service is such a return on the fund employed as will attract capital to the public service. To provide incentive to enterprise and initiative, there must be an additional reward for economical management.

5. In the interest of the car rider, who must ultimately pay the cost of local transportation, every special impost and tax which cannot be justified upon the ground that it is payment for benefits received should be abolished.

6. To secure satisfactory service and keep fares as low as possible, the public must act on the principle of the "greatest good to the greatest number" and must co-operate with the operating companies in making effective economies by the use of "skip-stops," one-man cars, etc.; and the speeding up of schedules by reduction of vehicular interference.

7. Electric railway transportation is a community problem to be solved by the community and the company acting together and animated by a spirit of civic interest and devotion to the public service and having as its objective the establishment of such regulations as will give the public the greatest efficiency, economy and enterprise in the operation of their transportation utilities.

8. The committee proposes to carry out as rapidly and as effectively as possible the following program:

a. To furnish to members of the association at as early a date as possible, information concerning franchise settlements and agreements along service at cost and other lines.

b. To analyze these various agreements and present for the information of the companies such a summary of their provisions as will provide a guide in the drafting of new ordinances or agreements.

c. To directly assist communities in which the readjustment of franchise relations are under way.

d. To furnish at the instance of the railway company to civic organizations and similar bodies, information as to, and studies of, public utility questions.

In conclusion the committee recommends that the scope of the association's activities be so enlarged as to provide machinery for carrying out these purposes.

After the presentation of the report Mr. Gadsden elaborated the points made by it in an address. He said that the members had been meeting under conditions which had never before confronted the industry. Though the status of the electric railways before the war was discouraging, the war had emphasized the fact that the industry had been predicated on a false economic basis and was now practically in a bankrupt condition. Ten per cent of the properties were in the hands of receivers. During the past year a new phase of the industry had developed and had assumed startling proportions. The public impression up to last year had been that no matter what burdens were placed on any individual property it had to continue service. Whether it was successful or not, it must furnish transportation to the community. The war had brought a realization to the American people that the service must be paid for, and if a community was not able or not willing to pay for this service, the courts would permit a company to junk its property. Thus, in 1918, more than 500 miles of electric railways had been abandoned and the track torn up. The public should realize that if it pushes the railways too far, the people must walk. This aspect should receive more publicity, and the speaker urged the members to take this view back to their respective communities.

Mr. Gadsden then presented two tables, one prepared from statistics obtained from the government giving the status of electric railways in 1912 and 1916, the other made up for ten states from the preliminary reports issued by the census department. The states were Idaho, Wyoming, Vermont, Mississippi, Oregon, Colorado, Arizona, New Hampshire, Connecticut and Rhode Island, thus representing all parts of the country. These tables are presented herewith.

The speaker also presented a table showing the shrinkage in value during the past four years of the securities of seventy-five railway companies whose securities are quoted on various exchanges. They were thus representative of the larger and higher class railways, and showed an aggregate of value of securities in January, 1914, of $495,157,418 and in January, 1918, of $245,680,950, or a shrinkage of $249,476,468. Mr. Gadsden emphasized the fact that these were market quotations and so could not include any watered stock, but were real values. He also explained that these figures did not include the shrinkage in the securities of the Interborough Rapid Transit Company, which alone had amounted to about $126,000,000. He said that the figures were not cited to arouse electric railway managers to the situation, with which they are fully acquainted, but to give them definite data on the subject so that they could prove the facts to the public.

The speaker said that in his investigations he has not found any other industry or any other phase of human activity which had attempted to do business in violation of fundamental economic principles. The rates of other utilities, such as electric light, gas and water, were based on cost. No other business had attempted to do business on a flat rate which had no relation to capital or cost. It was essential to get away from this inflexible rate. An electric railway property is not free from the tyranny of the balance sheet, and the only outcome of the present plan is that the railway investors will lose their money and the public will lose its service.

A popular reply when a company asks for an increase is that the patrons do not mind the increase if the company will give the service. The speaker's answer to that was that in every other industry, as compared with the period before the war, patrons are paying a higher price for an inferior service, and are doing it cheerfully.

ONLY TWO WAYS OUT

In regard to possible ways out of the present situation, Mr. Gadsden said that in the judgment of the committee on readjustment there are only two alternatives: (1) The general acceptance of some sort of service-at-cost plan throughout the country, and (2) in the event of failure of the first plan, the adoption of some kind of municipal or government ownership. The basic reason for each plan is the same, *i.e.*, private capital will not flow into the electric railway business under present conditions, even in spite of the fact that it is essential to community welfare, and capital can only be secured through some sort of support by means of public credit. It is the duty, however, of electric railway operators as representatives of security holders and as citizens to work out a solution of the problem which will keep the railways in private hands and guarantee the efficiency and the initiative of private enterprise.

Mr. Gadsden pointed out that the primary requisite of any service-at-cost plan is a valuation. Unless the electric railway industry is willing to have the value of the properties ascertained, the service-at-cost idea offers no aid. If it is willing to effect agreements on the subject of valuation, relief along the lines of the service-at-cost idea can be secured in many cases. The questions involved are grave ones upon which the association in the near future must take a positive stand. Some interests may not be benefited under service-at-cost franchises, but these are exceptional cases, for the great majority of the companies are not able to make a fair return upon a fair valuation.

SITUATION IN WASHINGTON

Mr. Gadsden also noted the decided change which has taken place in Washington. The claim for federal assistance for electric railways last year was based upon their essentiality in connection with the war program. The problem now before the government is not the winning of the war but the stimulating of buying so as to stabilize the market and restore confidence. The electric railway industry is of such magnitude as to require consideration also in connection with this problem. Involving an investment of nearly $5,000,000,000, these carriers employ from 350,000 to 400,000 operatives and have a potential purchasing power of at least $500,000,000. At the present time the industry is prostrate and out of the market. Hence the government has begun a serious study of the electric railway situation, not out of tender sympathy for security holders, but out of a desire to restore the lost buying power of the companies.

TABLE I—COMPARATIVE CENSUS STATISTICS OF ELECTRIC RAILWAYS FOR TEN STATES*

	1917	1912
Gross revenues	$34,966,172	$31,365.087
Operating expenses	24,154,798	17,750,612
Deductions from gross income	11,355,858	9,312,755
Net income	†544,554	4,301,710
Mileage	2,669.23	2,536.20
Number of companies	72	76

†Deficit.

*States included are: Idaho, Wyoming, Vermont, Mississippi, Oregon, Colorado, Arizona, New Mexico, Connecticut and Rhode Island.

Mr. Gadsden recalled that last year the electric railways had the support of practically all of the departments of the federal government, and he added that encouraging support recently came from the Conference of Governors and Mayors which was held in Washington on March 3-5.

Telegrams from chambers of commerce and leading business and industrial organizations in practically every state and every large city had been sent to President Wilson and were turned over directly by him to the committee on resolutions of this conference. The conference then went on record with a resolution, noted in the ELECTRIC RAILWAY JOURNAL of March 8, 1919, to the effect that the delegates disclaimed "any disposition to trespass on the rights of municipalities" but earnestly recommended "that the federal government continue its helpful offices with the view to averting serious consequences in the financial affairs of public utilities."

Mr. Gadsden said that there was apparently under way a movement to set up a Federal Utilities Commission composed of representatives of the Department of Labor, the Department of Commerce, the Treasury Department, one or two public service commissions and possibly the electric railway industry. There is no warrant in law for such commission to regulate rates, but it hoped that its deliberations and recommendations would be as effective as those of the Industrial Price Commission, which has been appointed with similar powers to take up the question of fixing prices for certain basic industries. The results secured by a Federal Utilities Commission, of course, would depend upon the personnel and the tact and the forcefulness of the members.

CLOSER CO-OPERATION MUST BE GIVEN

In closing, Mr. Gadsden most emphatically directed attention to the vital necessity of closer co-operation on the part of the industry. As a case in point, he mentioned the fact that the companies did not appear to appreciate the great need of co-operating fully with the committee in Washington. For example, the committee received 168 replies to a questionnaire sent out to 1200 companies. It now has in Washington a record of gross receipts for 1918 of only 188 companies, although complete figures should have been on file in Washington by this time. He described forcibly the ignominious position in which the Washington representatives of the industry are placed, when after two years of steadfast work on their part the industry has not yet given to them sufficient information to make possible a statistical summary that covers the whole situation. He added that the committee itself is unwilling to continue its efforts unless it receives better co-operation on the part of the electric railway companies.

TABLE II—STATISTICS OF STREET AND ELECTRIC RAILWAYS

	1912 United States Census	Treasury Department 1916 Returns	Decrease	Per Cent
Number of companies	1,260	1,260	....	......
Number of employees	282,461	....	....	......
Capitalization	$4,708,568,141	....	....	......
Income	579,208,430	$561,991,749	$17,216,681	0.3 of 1
Expenses	497,782,682	491,949,698	....	......
Net income	81,425,748	70,042,051	11,383,697	13

Afternoon Session

At the opening of the afternoon session President Pardee announced that the International Shipbuilding Corporation had invited all delegates interested to witness the launching of the eighteenth ship built at Hog Island, the event to take place at 10 o'clock on Saturday. The invitation was extended through M. C. Brush, formerly president Boston Elevated Railway but now connected with the shipbuilding corporation.

Francis H. Sisson, vice-president Guaranty Trust Company of New York, then presented a paper on "Electric Railways and Investors." This paper is published in abstract elsewhere in this issue.

After the presentation of this paper, Mr. Sisson continued by saying that the only answer which the Legislature gives to this problem is municipal ownership and operation, but this, in the speaker's opinion, would be attended with poorer service, higher taxes and costs and less efficiency. The idea that the government could conduct a business better than private initiative was a fallacy. This is a time when the burden of sound thinking rests on business men. The present problems, he said, are not necessarily new but perhaps they are more acute than before. The only solution is that of a higher personnel in politics.

At the close of Mr. Sisson's remarks, President Pardee extended, on behalf of the association, his hearty thanks to him for his paper. Mr. Pardee then introduced Hon. Charles E. Elmquist, president National Association of Railway and Utilities Commissioners, who presented a paper on railways and regulating commissions. Mr. Elmquist was followed by Hon. W. D. B. Ainey, chairman Public Service Commission of the Commonwealth of Pennsylvania, who presented another paper on the same topic. These papers appear in abstract elsewhere in this issue.

After expressing the appreciation of the association to all those who had presented papers, President Pardee announced that the papers were open for discussion.

DISCUSSION

Charles L. Henry, Indianapolis & Cincinnati Traction Company, was the first speaker. He declared that he was not prepared yet to attend the funeral of the electric railway industry. Nothing, in his opinion, can take the place of electric railway service, and it must continue. The increase in prices of material and labor had begun long before the war but had come gradually. Electric railway men are not responsible for these conditions, but he did consider that they would now be responsible if they did not make any attempt to correct them. In his opinion there was only one solution—absolute service at cost. As a preliminary, he believed it necessary to determine the value of the railway property. The public is interested in the service and has a right to say what the service will be, but when the question of higher fares is raised, the charge is often made that the company wants to pay dividends on "watered stock." That is the reason he advocated a valuation, but he thought the value of the property is much more than its replacement value. As an example he quoted the case of the old national road, which first required the felling of the timber, then draining, then was a corduroy road, then was a plank road, then became a macadam road and finally was a concrete road. It would be improper to say that the cost of that road was simply the cost of laying the concrete.

Walter A. Draper, Cincinnati Traction Company, said that any service-at-cost plan should consider the item of control in addition to that of valuation and the rate of return. It is not enough to decide merely what the public utilities should receive but it is necessary also to decide what is to be given to the public. No public utility corporation can work out its salvation according to any one cut-and-dried plan, but each individual locality must work out its own problems according to the conditions encountered.

Mr. Draper stated that from his experience he had found that the further one can get away from local control the better and easier it is to accomplish beneficial results. If it is possible to secure satisfactory action from state or federal bodies this appears to work out better than from bodies nearer at home. The great object of any service-at-cost plan is to get an adequate return for the service which railways provide and for what they are expected to furnish.

Other Speakers at the Mid-Year Meeting

L. M. GARRISON P. H. GADSDEN B. A. HEGEMAN, JR.

Randall Morgan, United Gas Improvement Company of Philadelphia, said that he came to this meeting to listen rather than to give advice, for it is at meetings such as this that all must obtain their instruction and gather facts to aid in carrying out their work. Railways are public servants and the law provides that they shall give service which is efficient, continuous and of the highest character. It is for this that public regulation was instituted. When these regulating bodies were first established there appeared to be a feeling of irritation on the part of those coming under their control, but such utilities now feel that it is suitable that they should have these regulating bodies in order to insure satisfactory service to the public.

It is now apparent that in order for the public utilities to exist there must be sufficient return to induce those who have money to put it at the disposal of these utilities. Several plans have been discussed during the past few years for providing a suitable return upon the capital invested. Any plan adopted should restore confidence to the investor in order to prove satisfactory. Otherwise the government will have to take over these enterprises or the public will have to go without them. Mr. Morgan said that he believed all members of this association could agree upon some plan provided no attempt was made to force each individual to accept definite instructions as to how it would be carried out. No specific method should be emphasized which would tend to antagonize any of the members. A railway business is not one that can be sold out and moved away from when the owners get tired of it. They must go on with it forever.

Mr. Morgan said that a matter which has concerned him very much, particularly during the past year, has been the necessity for developing some point of contact between the federal point of view and that of the communities. The electric railway business is a serious undertaking. It involves possibly 60 per cent of all the money invested in utilities.

The industry is in great distress and it must get together somehow on a general plan. The private investor is in a position where he no longer trusts anyone connected with the utility business, either operator or regulator. Hence there is the necessity for the doing of something definite.

P. J. Kealy, Kansas City Railways, closed the discussion by saying that as it is necessary to have a little jollity even at a "wake," he would attempt to state some of the more cheerful aspects of the situation. Probably no utility has had more to contend with recently than the Kansas City Railways, with three strikes in sixteen months, the last costing $1,000,000. In the discussion at the meeting there has been passing through the contributions a strain which makes for encouragement. For example, take the attitude toward the rate of fare. The mere fact that a service-at-cost plan is being discussed is hopeful. Again, 400 or more roads in the country have been able to break away from the 5-cent fare. Another example is afforded by the changed attitude of regulating bodies toward the one-man car; where only a few years ago commissions opposed the introduction of this promising improvement they now favor it. Powerhouse economies are increasing too. Who knows but that some power company will develop a super-station, so economical that it will pay railways to take their power.

The owners of securities ought to take more interest in conserving the electric railway business. They are after all the ones most intimately concerned. The manufacturers should help also, as the utility furnishes them an enormous aggregate annual business. It must be remembered that if there is nothing developed to supplant the electric railway it must continue, and this involves the provision of means for supporting it. The attitude of public officials is indicated by a remark made recently by a mayor who said: "These fellows are up against it and must be helped."

Public sympathy also will assist in solving problems, as it did recently in connection with the labor troubles in Kansas City. There is a great deal of support not now used which can and must be enlisted. The situation is not hopeless, it is going to clear. There are manhood, brains and energy enough available to pull the industry up the grade which it is now climbing.

At the close of Mr. Kealy's remarks President Pardee called upon the committee of resolutions for its report.

Mr. Gadsden, in reporting for the committee, presented four resolutions. One extended the thanks of the association for the speakers who had presented papers at the meeting. Another was that the report of the committee on readjustment be approved. A third was to refer the suggestion made by Mr. Taylor in his paper as to dissemination of information on the electric railway situation to the committee on readjustment for its action. The fourth read as follows:

> It is self-evident that the electric railways of the United States are breaking down under conditions of operation which have forced a tenth of the railway mileage of the country into receivership; have depreciated securities of the companies so that there has been a shrinkage of nearly four hundred million dollars in the market value of the securities of one typical group of seventy-six companies; have wiped out the net income of practically all corporations furnishing local transportation; have caused, during the last year, the abandonment of about 500 miles of track and which are everywhere threatening a loss of service essential to the communities, so that there is not to-day a company that is earning a normal interest rate upon the cost of its physical property, to say nothing of the other costs of creating the property.
>
> In this crisis a readjustment of the relations between these companies and the public is essential to the preservation of service. A proper solution implies that the fares charged must be so adjusted as to meet the varying costs of furnishing the service.
>
> Such adjustment when made should be adequate to provide for the growing need of the community served.
>
> The American Electric Railway Association, impressed with the gravity of the present crisis, appeals to all national, state, and civic governmental bodies promptly to accord the relief for the electric railways which the facts so clearly justify, and to afford means of placing the electric railways in position to meet the requirements of their respective communities.

These resolutions were all approved. Mr. Kealy then presented a resolution extending the thanks of the association to Mr. Gadsden for his services in Washington, with the Electric Railway War Board, the committee on national affairs and the committee on readjustment. It was adopted by the association by a rising vote. Mr. Gadsden in replying spoke of the great credit which should be given to his associates on these committees and then said that he greatly appreciated the resolution and that if anything could compensate for his work of the last two years in Washington that did.

In closing the session, President Pardee announced that at the meeting of the executive committee on Thursday it was decided to expand the work of the committee on readjustment. He also said that a decision had been reached to hold a convention next October and that an exhibit might be held in connection with it.

The meeting then adjourned.

Banquet a Brilliant Success

A DINNER and dance at the Waldorf-Astoria Hotel closed the 1919 mid-winter meeting. Nearly 800 members and guests attended. President Pardee acted as toastmaster at the dinner. He referred to the tremendous extent to which the electric railways have grown in a few years until the per capita rides are 155 per annum and the corresponding gross revenue is $600,000,000. Unfortunately the net income has fallen to a negligible quantity, partly because the railway men failed to see the coming storm. The present is a time of "isms" of one kind and another and it is difficult to see in what direction the electric railways are tending. However, a solution for every important problem has been found in the past and the present problem of this industry will be solved. All of the people cannot be wrong all of the time, to paraphase a familiar quotation.

Mr. Pardee introduced Hon. Lindley M. Garrison, former Secretary of War and now receiver for the Brooklyn Rapid Transit Company. Mr. Garrison said that as a newcomer in the railway field he would not venture to discuss traction matters before a railway audience. He then analyzed the plan proposed for a league of nations, urging that the people of this and other nations be given an opportunity to discuss the plan. He expressed the hope that the peace treaty and the league covenant will be kept separate, the latter to be considered with due deliberation after a plan had been made effective to prevent the former Central Empires from again provoking war.

The next speaker was Hon. Francis Burton Harrison, Governor-General of the Phillipines. He paid a tribute to the efficiency of the electric railway system in Manila and explained how the Filipinos are rapidly being prepared for complete self government. They are, he said, loyal Americans. Mr. Harrison defended the league plan at present under consideration, saying that world affairs are now so interwoven that some kind of a world pact is necessary.

The manufacturer members of the association were represented by B. A. Hegeman, Jr., who assured the traction men of co-operation in every possible way, and of the desire of the manufacturers to help in revitalizing the industry. He said, "Your success is our success; your failure, ours." Mr. Hegeman outlined briefly the elements of the present difficulty but said that there is no doubt that much has already been accomplished along the lines of better understanding between the railroads and the public. Those responsible for the operation of the roads must realize the value of taking the public into their confidence, and the people are beginning to believe that the corporations are not quite as black as they have been painted and are showing a much better spirit toward them than formerly, but much remains to be done.

Among other features of the banquet was the unfurling of an electric railway service flag, indicating that there had been 25,893 railway men in the service, of whom ninety-three were known to have died. Mr. Pardee also told of the work done by the association, under the direction of Past-President L. S. Storrs, in preparing for the government a set of 630 maps showing the locations of electric railways, power plants, bridges, etc. This work had been highly commended by the Army officials.

During the dinner there was excellent music and the meeting closed with the general feeling that there is a big work ahead, but that it can be done.

Executive Committee Meeting of March 13

Convention with Exhibits Was Favored—Desire for Completion of Plan for Affiliated Manufacturers' Association Was Expressed

EVERY officer of the American Association was present at the executive committee meeting held on March 13, namely: J. H. Pardee, New York City; Richard McCulloch, St. Louis, Mo.; T. S. Williams, Brooklyn, N. Y.; R. I. Todd, Indianapolis, Ind.; P. J. Kealy, Kansas City, Mo., and E. B. Burritt, New York City. Other members of the executive committee present were F. R. Phillips, Pittsburgh, Pa.; R. E. McDougall, Rochester, N. Y., and Thomas Finigan, Chicago, Ill., representing the engineers, claim agents and manufacturers, respectively. The manufacturers were represented also by W. S. Rugg, Pittsburgh, Pa., and C. C. Peirce, Boston, Mass. Past-presidents in attendance included Charles S. Sergeant, Boston, Mass.; H. H. Vreeland, New York City; W. Caryl Ely, New York City; Charles L. Henry, Indianapolis, Ind., and J. J. Stanley, Cleveland, Ohio. A number of other men prominently identified with the industry were present by invitation.

Secretary Burritt explained plans for interesting non-member companies in the work of the association and co-operation in these was promised by the men present. The feeling was that the benefits of association membership will be better appreciated now than in the past. It was decided to invite newspaper men to the March 14 meeting in order that full publicity might be given to the proceedings.

POLICY ON THE SUBJECT OF CARRYING MAIL TO BE FORMULATED

The carrying of United States mail matter by electric railways was discussed, and it appeared that while this business is comparatively small it is important. The committee on national relations was therefore asked to formulate a general policy on the subject with suggestions. A letter from B. C. Cobb, of Hodenpyl, Hardy & Co., was read outlining a comprehensive plan for publicity. It was referred to the committee on readjustment. The executive committee then, after discussion, approved the holding of a fall convention with exhibits, the president to appoint a committee to arrange all details.

Reports of the committee on readjustment, P. H. Gadsden, chairman, were considered. One prepared for presentation to the association was approved for the purpose, and the other which contained recommendations for enlarged work by the association was referred back for detailed recommendations. The executive committee also approved of co-operation with the Bureau of Standards and with technical and other associations in regard to electrolysis. Mr. Gadsden reported for the committee on national relations (the successor of the war board) showing a substantial cash balance on hand and a record of useful work done. It was decided to continue the Washington office until June 15, the president to make such arrangements for the remainder of the association year, after that date, as he may find desirable.

The executive committee reviewed the status of the manufacturers and it was explained that now that the association has resumed normal activities the report of the sub-committee which is preparing a plan for an affiliated Manufacturers' Association will be ready in time for the convention. This committee was appointed prior to the war period.

SECRETARY-TREASURER'S REPORT TO EXECUTIVE COMMITTEE

Mr. Burritt reported on the resumption of committee work and other activities of the association. He said that the affiliated associations have resumed active work, but in view of present conditions will confine their investigations to subjects having special importance and application at this time. The Accountants' Association in addition to its usual work will co-operate with the Transportation & Traffic Association in a study of methods of fare collection and registration.

In the Engineering Association the following committees have been appointed and subjects have been assigned each: Committees on standards, equipment, power distribution, power generation, way matters, buildings and structures, heavy electric traction, and electrolysis; joint committee to consider safety code of United States Bureau of Standards, joint committee on standardization of method for determining the cost of power, and committee on issuance and distribution of engineering manual. Representatives from member manufacturer companies have been appointed to each of these.

The Engineering Association will also co-operate with the Transportation & Traffic Association in a study of the operation of one-man cars from a transportation standpoint.

The Claims Association has continued its subscription to the Hooper Holmes Information Bureau and the usual work of the association will proceed.

The Transportation & Traffic Association has this year departed from its former practice in the way of committee work and will undertake but four subjects as follows: (1) Collection and registration of fares, giving consideration to the difficulties presented in the collecting and registering of two or more coins for one fare. (2) Code of traffic principles. (3) Proper basis of compensation to city companies by interurban companies for the use of city tracks and terminal facilities, and proper traffic regulations and contract obligations relating thereto. (4) Operation of one-man cars from a transportation standpoint.

Mr. Burritt stated that there are now 521 company members, 844 individual members and 1319 company section members. He presented a revised estimate of receipts and expenditures, showing an estimated surplus to Nov. 1, 1919, of $16,900.

Notes on the Norfolk & Western

SOME interesting facts on existing heavy traction installations were given in a talk on "Railroad Electrification" at the annual meeting of the Engineering Institute of Canada at Ottawa on Feb. 13 by F. H. Shepard, director of heavy traction Westinghouse Electric & Manufacturing Company. In referring to the electric locomotives on the Elkhorn division of the Norfolk & Western Railway, he said that on the lesser grades, trains of 5000 tons are operated, and on the 2 per cent grades trains or 3250 tons, at twice the speed of former steam operation when three large Mallet engines were used per train. With electricity the trains are accelerated to a speed of 14 m.p.h. on a 2 per cent grade in a little more than a minute. The input during acceleration ordinarily equals 12,000 hp., and plans are under way to increase the size of trains so that inputs as high as 18,000 hp. will be reached. On the heaviest grades a second locomotive is used as a pusher.

On account of the length of trains, curvature and the intervening mountains, it was found to be very difficult to communicate to the pushers at the rear even by whistle, so that it was a problem to secure a unison of effort between locomotives at each end necessary to start these large trains. Formerly this was secured by dropping the slack of the train back against the pusher, the bump being taken as a signal for the pusher to open up and help start. With electric operation, this problem has been solved, because at any fixed speed the ammeters on the load engine and those on the pusher are made to read alike, so that each engine takes its share of the load. As the load engine controls the movement of the train, a shift more or less than its share of the load is made, depending on whether speeding up or slowing down is desired. The operator of the pusher is thus advised instantly of such a desire by the indication on his ammeter, so that slowdowns and stops as well are negotiated very smoothly.

During an emergency shortage of electric power on this road, it was found necessary to retire from service four electric locomotives, and sixteen of the heaviest Mallet engines were assigned to the division for emergency service.

More 1917 Census Figures

IN THE CASE of six more states preliminary figures of the forthcoming quinquennial report on electric railways have been given out by Director S. L. Rogers of the Bureau of the Census, Department of Commerce. Like the statistics for eight states published in the ELECTRIC RAILWAY JOURNAL of March 1, 1919, the additional figures all indicate the tendency of operating expenses to increase more rapidly than operating revenues.

The statistics relate to the years ended Dec. 31, 1917, 1912 and 1907, but only those for the decade are reproduced in the accompanying table. The totals include electric light plants operated in connection with electric railways and not separable therefrom, but they do not include mixed steam and electric railways or electric railways under construction.

New Jersey and Georgia showed general gains during the decade, these being divided between both of the five-year periods from 1907 to 1912 and from 1912 to 1917. Tennessee, however, showed substantial gains in the industry for the first five-year period, followed by somewhat smaller increases, and for some items actual decreases, during the second period. The companies in Tennessee did a much larger light and power business in conjunction with their railway operations in 1917 than in prior years.

The figures for Montana show substantial gains for both periods, and those for Florida a general gain for the decade. In the case of Arkansas the gains from 1907 to 1912 were not maintained during the period for 1912 to 1917.

PRELIMINARY 1917 STATISTICS OF CENSUS BUREAU FOR ELECTRIC RAILWAYS OF SIX STATES

	New Jersey		Tennessee		Georgia		Florida		Arkansas		Montana	
	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907	1917	Per Cent Increase Over 1907
Number of companies	39	....	14	....	14	....	8	....	10	....	6	....
Operating	22	....	14	....	13	....	8	....	10	....	6	....
Lessor	17	....	....	....	1	....	....	....	....	....	....	....
Miles of line	902.09	1.9	332.26	67.0	339.73	31.0	151.73	42.0	94.81	49.4	100.86	74.3
Miles of single track	1,354.35	2.6	462.00	55.3	473.31	35.3	183.03	54.8	131.36	50.3	120.92	74.6
Miles of single track in state (a)	....	....	447.36	53.1	449.69	28.0	....	....	121.83	48.2	....	....
Cars	3,364	14.8	840	12.4	777	25.7	333	50.7	262	23.6	184	46.0
Passenger	2,980	16.2	761	11.2	697	27.0	280	48.1	232	14.9	156	44.4
All other	384	5.2	79	25.4	80	15.9	53	65.6	30	200.0	28	....
Electric locomotives	2	....	1	....	1	....	....	....	1	....	....	....
Number of persons employed	7,461	10.7	2,963	31.2	3,669	49.6	1,029	28.6	645	3.2	486	93.6
Salaries and wages	$7,888,127	84.7	$2,238,014	65.7	$2,838,349	107.7	$886,192	72.8	$555,839	42.0	$572,604	77.7
Total horsepower	18,966	*78.9	53,533	36.1	201,243	430.8	33,905	211.3	16,650	58.5	....	....
Steam engines:												
Number	18	....	27	....	28	....	23	....	14	....	....	....
Horsepower	18,966	*78.9	53,483	36.1	57,858	98.7	31,770	266.5	16,650	58.5	....	....
Internal-combustion engines:												
Number	....	....	1	....	1	....	5	....	....	....	....	....
Horsepower	....	....	50	....	3,000	....	735	*10.9	....	....	....	....
Water wheels:												
Number	....	....	....	....	37	....	8	....	....	....	....	....
Horsepower	....	....	....	....	140,385	2321.7	1,400		....	....	....	....
Kilowatt capacity of dynamos	14,550	*78.2	38,205	48.0	129,282	417.3	34,300	187.4	12,457	69.9	....	....
Output of stations, kilowatt-hours	22,895,276	*87.1	90,682,359	42.5	319,184,303	803.5	31,101,546	97.8	33,080,677	102.4	....	....
Current purchased, kilowatt-hours	245,049,086	....	79,354,017	....	45,506,100	....	971,610	....	4,360,889	....	17,927,151	....
Passengers carried	555,286,203	60.9	122,655,470	23.6	114,021,766	58.8	38,625,356	73.9	30,525,360	45.9	25,948,387	84.2
Revenue	432,874,767	60.9	101,824,749	38.1	93,640,506	56.9	32,771,128	73.5	26,283,177	53.3	22,196,885	60.1
Transfer	109,970,183	58.6	17,772,205	*22.2	19,000,810	87.1	5,047,468	62.0	3,406,850	10.7	3,052,359	2001.7
Free	12,441,253	83.7	3,058,516	13.6	1,380,450	*29.8	806,760	283.6	835,333	20.7	699,143	750.7
Revenue car mileage	68,966,244	23.9	21,400,684	34.4	20,907,644	43.2	7,208,883	64.2	5,917,302	36.6	3,591,815	47.7
Railway operations—revenues	$22,204,776	72.6	$5,386,465	43.9	$5,060,481	62.3	$1,683,350	70.5	$1,298,744	56.0	$1,501,383	97.5
Auxiliary operations—revenues	59,305		2,132,199	204.6	5,086,031	239.3	759,604	99.9	658,187	71.6	....	....
Non-operating income	269,212	43.9	36,333	*2.1	338,601	224.8	1,560	....	33,336	*43.9	18,500	*87.0
Income from all sources	$22,533,293	72.2	$7,554,997	68.6	$10,485,113	122.1	$2,444,514	78.2	$1,990,267	56.1	$1,519,883	68.4
Operating expenses	$13,436,048	70.0	$4,594,774	88.8	$5,487,899	114.7	$1,387,107	45.0	$1,079,569	58.0	$1,111,411	101.4
Deductions from income	8,174,260	42.0	2,336,533	64.7	3,953,034	251.4	516,556	177.4	649,580	146.4	215,805	78.6
Net income	$922,985	....	$623,690	*0.7	$1,044,180	0.4	$540,851	136.7	$261,318	*20.5	$192,667	*16.2

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* Decrease of deficit.

(a) Excluding track lying outside of state but owned by companies within state, and including track in state owned by outside companies.

Zone System for New Jersey

After Extensive Study Public Service Railway Asks for Power to Put in Zone Fares on Distance Basis—Five Cents Is Charge for First Mile, One Cent for Each Additional Mile—Transfers Are Also One Cent a Mile with Readiness-to-Serve Charge of One Cent—Collection System Worked Out—Zone Systems in Other Cities Described—Commission Takes Plan Under Advisement

AT A HEARING before the Public Utility Commission of New Jersey on March 11, President Thomas N. McCarter of the Public Service Railway of New Jersey presented the plan of the company for a zone system of fares on its lines in New Jersey. The proposal and the reasons leading up to this recommendation on the part of the company are contained in a printed report of 207 pages, well illustrated with maps and other engravings. Briefly, the report outlines the needs of the company in the way of an adequate fare, and the history of its plea for higher fares before the commission. It then describes the methods followed in conducting an extensive traffic survey on the system and the conclusions reached from this investigation. Finally it recommends a stand-by or ready-to-serve charge of 4 cents and a distance rate of 1 cent a mile, making the fare for the first mile 5 cents, for the second mile 6 cents, etc. In the same way the readiness-to-serve charge for transfers is 1 cent, with a distance rate of 1 cent a mile. The fare is collected on the pay-leave plan, passengers entering by the front and leaving by the back platform. As they enter they receive an identification zone slip or ticket indicating the zone in which they enter the car and this ticket is given up when they leave the car and pay the correct fare.

In presenting the report, Mr. McCarter asked that it become operative on April 1. The commission has taken the report under advisement and will probably announce its decision soon.

REPORT IS WORK OF A COMMITTEE

After the commission on Sept. 25, 1918, had indicated its desire to have the company establish "an equitable zoning system over its entire territory" and had granted an increase in flat fares as an emergency measure, President McCarter appointed a committee to study the subject. The committee consisted of himself, as chairman; L. D. H. Gilmour, general solicitor, R. E. Danforth, vice-president and general manager; H. C. Donecker, assistant general manager, and M. R. Boylan, general auditor. Dr. Thomas Conway, Jr., professor of finance of the University of Pennsylvania, was retained by the company as expert adviser. A sub-committee to take active charge of the work was then appointed with Dr. Conway and Messrs. Donecker and Boylan as members. A large staff of clerks, checkers and other employees was assembled, the total number reaching a maximum of 171.

A complete check of the traffic of the entire property was first taken and the results carefully compiled. The data thus secured furnish a comprehensive picture of the riding habits on the property and are believed by the company to be the most complete body of information in existence concerning traffic conditions on a street railway. These investigations included studies of relative density of population throughout the territory served by the Public Service Railway; the location of factories, theaters, railroad stations and other centers controlling traffic; the co-relation of residential and business districts; the extent and location of new residence construction in the territory served by the Public Service Railway within recent years; the commutation rates on steam railroads competitive with the Public Service lines and the comparative scheduled running time on steam railroads and electric lines. President McCarter and the members of the sub-committee also visited every city in the United States in which the zone method of fare collection had been tried and the conclusions of their trip are given in the report.

A map of the system is shown on page 525. The railway serves practically the entire State with the exception of the local service in Trenton, the seashore resorts and the distinctly rural districts. It embraces 849.036 miles of track and serves 141 municipalities, having a combined population of more than 2,100,000.

The account given in the report of the traffic check conducted by the company last fall is so extensive that a review of it must be postponed until a later issue. Briefly, however, the study led to the following conclusions which the committee believed that the Public Service Railway should adopt as the groundwork of its zone system:

Rates of Fare to Be Established in New Jersey

(From Company's Petition)

"PASSENGERS boarding cars and paying cash fares shall pay a fare based on a rate of 5 cents for the first zone-mile, and 1 cent for each succeeding zone-mile. A passenger riding in one zone, therefore, will pay a 5-cent fare; a ride in two zones will cost 6 cents, while a ride through ten zones will cost 14 cents.

"A stand-by or ready-to-serve charge of 1 cent is to be made for each transfer, representing a fraction of the cost involved to the company of providing the facilities necessary to be ready to serve the transfer rider. In addition, a charge of 1 cent per zone-mile will be made for each and every zone-mile ridden on the transfer car. Transfers will be issued under the same general regulations as now prevail, concerning the period of time in which they must be used, the direction in which transfers will be given as between intersecting lines, etc."

The company says that it is entirely practicable to collect and account for fares of this kind.

First. That the best interests of the people of the State of New Jersey and of the Public Service Railway would be served in considering the property as a unit, and applying the same system of zoning to the entire property.

Second. That the traffic conditions on the lines of the Public Service Railway are such that a system of central city areas with outlying zones was neither advisable, equitable nor practicable; that each rider should be treated as nearly as possible like every other rider, and that rates should be as nearly uniform as possible for all riders taking journeys of the same length. Thus, no artificial advantage or discrimination would be created in favor of or against any locality; all communities being allowed to develop in a normal manner.

Third. That the above results could be accomplished only by the employment of a series of zones each of a standard length rather than by the creation of certain arbitrary zone areas. It was found upon investigation that the difficulties of fare collection were no greater with a system of zones of standard length than they would be under a system such as heretofore has been applied in this country.

Fourth. In consequence, therefore, the Public Service Railway finally decided upon and herewith recommends a zone-mile system as the most equitable, practicable and desirable method of fare collection upon its lines. Such a system involves the creation of zones of 1 mile in length, having fixed limits, applied to every line operated by the Public Service Railway, a passenger being charged just and reasonable rates, varying with the number of zones through which he rides. It is impracticable to have a zone of lesser length than 1 mile because of the collection difficulties which would thereby be created. Zones of greater length than 1 mile are neither necessary from an operating standpoint nor desirable from a public standpoint, because a wider variation of fares between zones would naturally be occasioned and a measure of unnecessary discrimination, therefore, introduced against those persons whose journeys began or ended within a short distance of a zone point.

STUDY OF OTHER METHODS

Before the adoption of these principles, however, or during the months of October and November, after the work of checking the lines of the Public Service Railway, and compiling the results thereof, was well under way, the chairman of the committee on fare zones and the members of the sub-committee visited every city in the United States in which a zone system has been tried. The systems studied were those of the Pittsburgh Railways, the Milwaukee Electric Railway & Light Company, the Bay State Street Railway in Massachusetts, the Shore Line Electric Railway in Connecticut, the Rhode Island Company, the Portland (Me.) Railroad, the Holyoke Street Railway and the Springfield Street Railway of Massachusetts. In addition, visits were made to St. Louis, where the United Railways was studying the matter of a zone system, and to Cleveland, where a study was made of the experience of the Cleveland Railway with the very low fares formerly existing upon the property and the "pay-leave" system of collecting fares. The report summarizes the experience in these cities. While most if not all of these zone systems have been described in this paper, the main features will be repeated here with the conclusions of the committee and data not hitherto published.

MILWAUKEE

In Milwaukee, in 1914, the Wisconsin Railroad Commission authorized a zone plan on the basis of a 5-cent fare for the central city area and a base rate of 2 cents per mile on the suburban lines outside the central district. The limits of the central 5-cent area conform substantially to the then city limits, but the corporate limits were disregarded as a controlling factor. In the suburban area the minimum charge is 5 cents, which minimum permitted a passenger to ride through two suburban zones.

At that time the company sold six tickets for 25 cents, good within the central 5-cent zone, and thirty commutation tickets for 50 cents, each ticket being good only for a ride in one zone in the suburban area. Within recent months, the State Railroad Commission has authorized the discontinuance of the tickets referred to, so that now the company collects only cash fares at the rate of 5 cents for the central zone and 2 cents for each suburban zone. The abolition of the special rate tickets produced a reduction in traffic as shown by the fact that the revenue shows an increase of only 12.91 per cent in different months, instead of the theoretical 17.65 per cent which it should indicate.

In general, the financial results of the zone system were more satisfactory than under the system which it displaced. The method of collecting fares is described in detail in the report.

The Milwaukee Company has recently petitioned for larger revenues by suggesting the addition of one extra fare zone within the present central area and an increase in the outer zone fares. The officials of the company are satisfied that the zone system as thus far applied on their property has been a success. However, the reduction of net revenues brought about by the increased cost of operation demands additional revenues which it is expected would be realized by a plan of restricting the central zone and increasing the fares in the other zones.

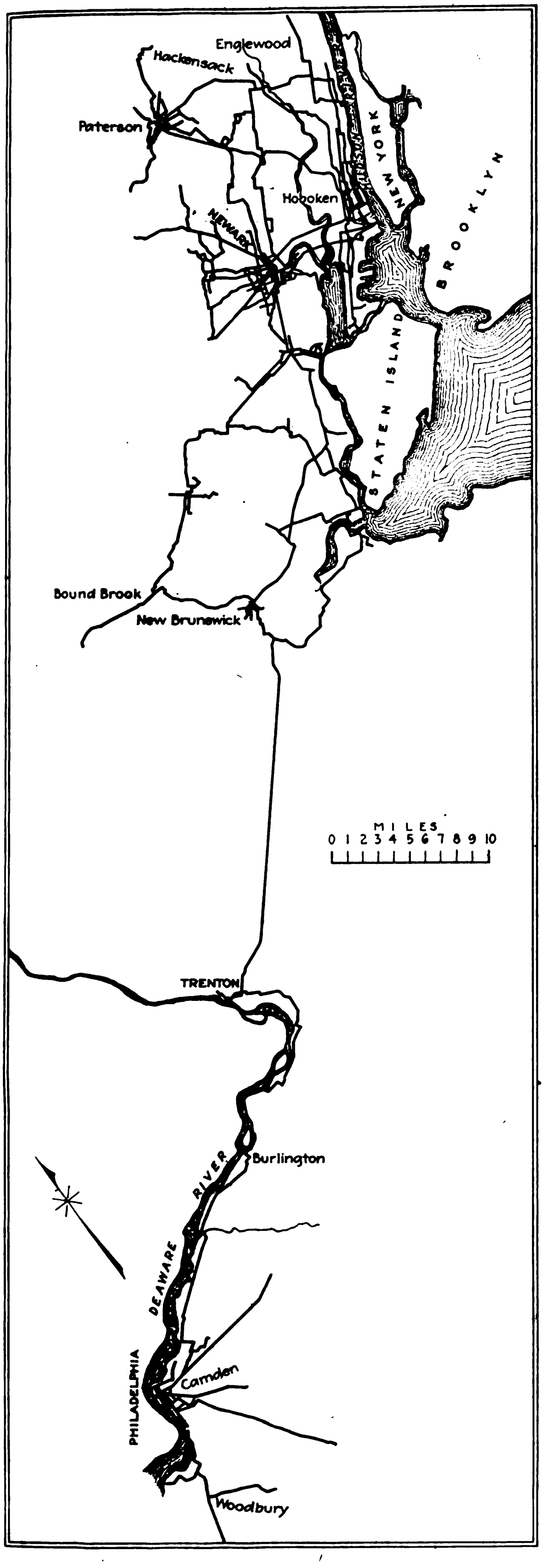
PITTSBURGH

In January, 1918, the Pittsburgh Railways increased its flat fare from 5 cents to 6 cents, but sold two tickets for 11 cents and eleven tickets for 55 cents. During the following very severe winter months the service was badly crippled and a comparison of the results obtaining in these months is, therefore, of little value. In May, 1918, however, when the service had again become normal—the car mileage being about 5 per cent below that of May, 1917—the traffic, as compared with that in May, 1917, was as follows:

	Passengers	Passenger Revenue
May, 1917	26,222,000	$1,139,693
May, 1918	24,392,000	1,165,153
Decrease	1,830,000 or 7%	*$25,459 or 2.23%

* Increase.

As the revenue produced by this system of fares was insufficient to meet the requirements of the company, a system of fare areas was devised and put into effect on June 20, 1918. The plan as instituted and now in force provides, in substance, for a central 5-cent fare area with a radius of approximately 2¼ to 2½ miles, the limits being somewhat irregular, with a 2-cent outer zone. The pay-enter-pay-leave plan of payment is followed. There is practically no riding across the center of the city, all but one or two lines looping in the center instead of being through routed. On the basis of the studies made from "on and off checks" the company estimated that some 63,000,000 passengers a year would pay fares wholly within the 5-cent area, while approximately 200,000,000 people would ride in, to or from the proposed outer area. Of the traffic originating in the outer area the company estimated that there would be a 10 per cent loss because of the higher rate of fare. The actual results showed that the traffic in the 5-cent area had been under-estimated, while the traffic in the 7-cent area had been very largely over-estimated. In



MAP SHOWING THE SYSTEM OF THE PUBLIC SERVICE RAILWAY OF NEW JERSEY

other words, the area system has not produced the revenue which was anticipated.

Transfers are given when requested at the time the passenger pays his cash fare, or in other words, when he gets off the car. Should the passenger leave the car in the central area, outbound, paying a 5-cent fare, and secure a transfer, this transfer is good only within the boundaries of the central area. If the passenger rides on his transfer to a point beyond the limit of the 5-cent area into the outer area he must pay 2 cents additional at the time he leaves the car. Transfers are collected as the passenger leaves the car just as is the case with cash fares. Transfers issued in the central area on a 5-cent fare are distinguished by three punch cuts inserted by the conductor at one end of the transfer ticket in a space in which appears the following: "If no coupon attached the hour punched is the A. M. hour." These three punch marks which are in addition to the regular punch marks appearing on the transfer showing the time, the day of the month and the month notify the conductor on the line to which the transfer is given that the passenger has paid a 5-cent fare, and that if he rides beyond the 5-cent limit into the 7-cent area the second conductor must collect an additional 2 cents. Both cash fares and transfers are dropped in a locked fare box as are the 2 cents collected for each transfer issued on a 5-cent fare. Fares are also rung up on an overhead register.

Observation by the members of the fare zone committee and of the officials of the Pittsburgh Railways showed that a large proportion of the passengers who formerly boarded the cars on inbound trips within a distance of ¼ to ½ mile of the area limit walked to the area limit in order to escape the additional fare. The revenues produced by the plan have not in the opinion of the officials of the company been sufficient to meet the requirements of the property.

BAY STATE SYSTEM

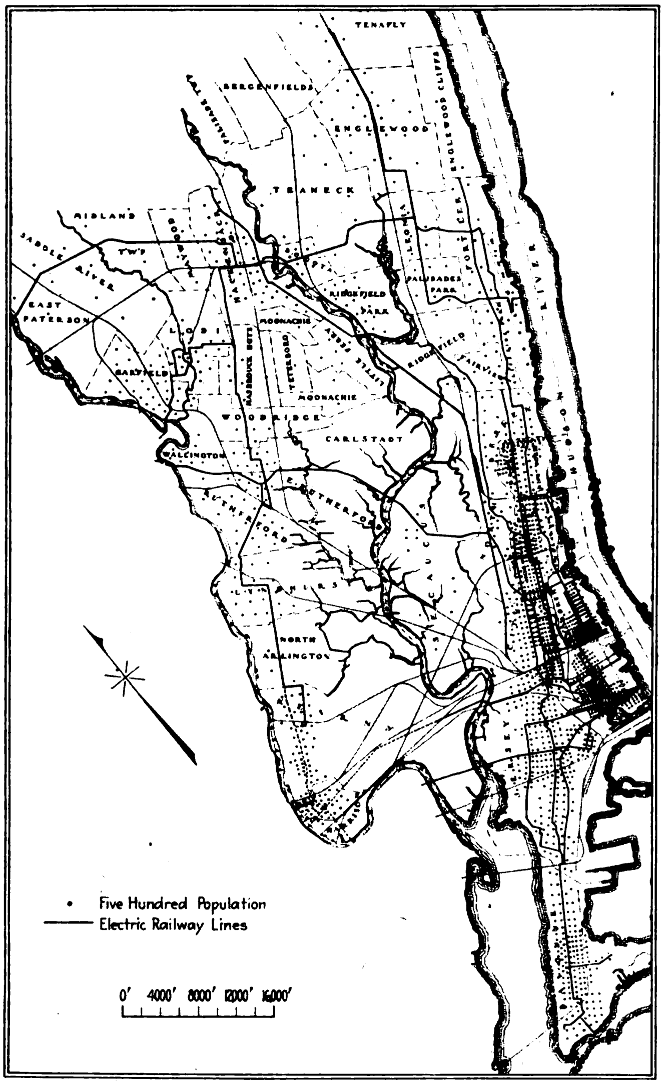
The most extensive application of a zone system, from the standpoint of mileage affected, has been on the property of the Bay State Street Railway, operating 928 miles of track covering a large portion of eastern Massachusetts.

For many years the company operated under a system of 5-cent zones varying in length, but on Aug. 31, 1916, the Massachusetts Commission authorized the company to increase the rates on all of its lines except those operating in the large urban districts by advancing the unit fare from 5 cents to 6 cents per zone. This new plan became effective in October, 1916. In June, 1917, the commission authorized the company to increase the fare to 6 cents over the remainder of the system comprising the populous urban districts. The new rate became effective July 18, 1917.

The increase in revenue secured from these changes was, however, insufficient and on June 11, 1918 the commission authorized in all the cities which the company serves, except three—Gloucester, Woburn and the Hyde Park District of Boston—a new inner zone of greatly restricted area, the radius averaging less than 2 miles. Outside this central zone and, as a rule, within the limits of the former free transfer territory, a second zone was created, its width averaging about one mile. The balance of the territory was divided into zones substantially a mile in length.

The cash fare in the city zones thus created was 6 cents and the rate in the interurban mile zones was in most cases 2 cents. In a relatively small part of the territory the zone charge was 2½ cents and on some of the very sparsely settled interurban lines it was 3 cents. The city zone limits were also the city transfer limits, free transfers being issued upon payment of a 6-cent fare where necessary to enable the passenger to reach his destination traveling in the same general direction.

As an experiment to try to encourage short riding, tickets were sold at the rate of six for 30 cents, good for a ride from any part of the city zone to the traffic center, but not across the center to points beyond. A corresponding ticket was sold at the rate of six for 25 cents, good within the same limits but during the off-peak hours only. Suburban tickets were sold at the rate of seven for 50 cents on which the passenger could travel from any point in the first zone outside of the city zone to the traffic center of the city zone; and a corresponding ticket was sold at the rate of four for 25 cents, good between the same limits during off-peak hours only. Several other classes of tickets were provided under order of the commission.



MAP SHOWING POPULATION DENSITY, ESSEX DIVISION, PUBLIC SERVICE RAILWAY

An extended account is given in the report of the system of fare collection and registration used with these fares from June 24, 1918, to Jan. 7, 1919, and of the modified system used after the latter date. The results, however, secured under these rates were unsatisfactory in that the multiplicity of fares was confusing to both the riders and the company, the fare collection scheme was almost impracticable, and insufficient revenue was obtained. Great difficulty was also experienced in securing an accurate registration of the fares on the part of the conductors.

After several months of control the receiver, who had taken over the property on Dec. 12, 1917, petitioned the commission for permission to institute a minimum fare of 10 cents with a revision of suburban and city zones so as to place the enlarged city areas on a 10-cent basis and 2-mile suburban and interurban zones on a 5-cent basis. The area of the central city zone was enlarged so as to create a zone having a diameter of approximately 5 miles, including practically all of the built-up territory. The outlying lines were rezoned, the plan in substance being the combination of two 1-mile zones into one new zone for which a fare of 5 cents would be charged. The proposed plan was modified by the Massachusetts commission by providing for the sale of 7-cent tickets, sold by conductors on the cars at the rate of five tickets for 35 cents, each good for a ride within the new city area or for one zone in the country. The minimum cash fare in the country territory is 10 cents.

The simplification of collection and the greater check which was secured on dishonest passengers and conductors was an important reason for the modification of the original zone plan. It was found, moreover, that the use of the many classes of tickets provided under the original zone plan gave opportunity for dishonesty on the part of passengers and conductors, and all city zone tickets, except the new tickets for 7 cents, were abolished at the time the plan now in effect was inaugurated. The latest plan of the Bay State Street Railway is but little different from that which has prevailed for many years on street railway properties. A central area with definite limits for a flat fare is provided, in addition to which a series of 5-cent zones of greatly reduced length are created in each of which a 5-cent fare is collected and registered in the time-honored fashioned.

THE RHODE ISLAND COMPANY

The report then contains an account of the zone system which the Rhode Island Company used from May 5, 1918, to Oct. 23, 1918, and which has been described in past issues of the ELECTRIC RAILWAY JOURNAL. The results from a financial point of view the report says, were unsatisfactory, and on Oct. 23 the company reverted to a system of flat 5-cent zones. The former zone limits were revised so the new scheme provided for a central zone with a 2-mile radius, a second zone of approximately 1¼ miles in length, with succeeding zones of approximately 1½ miles each in length. A flat 5-cent fare is charged in each zone. The revision in rates thus accomplished provided 10-cent fares in the built-up area in the city of Providence. There is very little riding in Providence from one side of the city across the business center to points on the opposite side. Only 3 per cent of the traffic crosses the central zone. A 1-cent charge is made for transfers which are good only within the central zone. Fares are collected at zone limits with the Rooke register. With one exception no overlaps exist. The increase in revenue following the introduction of this system, while substantial, was not sufficient to meet the obligatory payments involved in operating expenses and fixed charges, with the result that on Jan. 30, 1919, a receiver was appointed for the company.

PORTLAND RAILROAD

On Aug. 2, 1918, the Cumberland County Power & Light Company, controlling the Portland Railroad, which furnishes electric railway facilities to Portland, Me., and surrounding territory, instituted a zone system of fares.

The plan in substance provided for the creation of a 6-cent central zone with a radius of 3 to 4½ miles, the limits of which practically coincided with the old 5-cent limits. Three lines, within this central zone, for local reasons, carried passengers for 5 cents, but 1 cent was charged for transfers on these cars. Outside the central zone, on most of the suburban lines, the fare was 2 cents per mile-zone. In a few cases the outer zones were 4 or 6-cent zones. During August and September the increase in revenue over the corresponding months of the preceding year was approximately only $1,800, of which $1,400 came from the sale of transfers. This was considerably less than estimated.

On March 2, 1919, with the approval of the commission, the company put an increased fare in effect. This new system subdivides the old 6-cent central area into three 2-cent zones. The old 4-cent and 6-cent outer zones were also divided into 2-cent zones. The new system provides for the use of tickets in the place of cash and curtails the transfer privilege. No tickets are sold for a single ride. The passenger when he boards a car either pays a 10-cent cash fare to the conductor and obtains a 4-cent rebate check, or he purchases from the conductor a ticket good for five rides within the central zone area at a cost of 30 cents, and has one coupon punched which entitles him to ride through not more than three fare zones. The passenger who boards a car without a ticket, pays a cash fare and, riding in more than three zones, pays the conductor for his ride at the cash rate of 3 cents per zone; for each zone fare thus paid in cash the conductor will issue a rebate check good for 1 cent. For example, a passenger who boards a car without a ticket and rides through six zones pays the conductor 18 cents and receives six 1-cent rebate checks. In all cases the passenger is entitled to receive a sufficient amount in rebate checks to reimburse him for the difference between the cash fare rate and the ticket rate. Rebate checks will be redeemed only if presented for redemption not later than the following day at places designated by the company. Conductors are not permitted to redeem rebate checks or tickets.

RESULTS IN OTHER CITIES

The report also describes the zone systems used on the Shore Line Electric Railway and the Springfield and the Holyoke Street Railways. It also describes the system proposed at St. Louis. No attempt will be made to abstract those parts of reports here except to give the accompanying tables relating to Springfield and Holyoke.

FARE STATISTICS OF SPRINGFIELD STREET RAILWAY SINCE FARE INCREASES BECAME EFFECTIVE ON MAY 1 AND SEPT. 16, 1918

Month	Passenger Revenue	Revenue Passengers	Passenger Revenue, Increase or Decrease	Passenger Revenue, Per Cent of Increase or Decrease
May, 1918	$210,045.32	4,238,110	$29,722.04	16.48
June	212,627.41	4,338,295	22,187.12	11.65
July	228,855.10	4,491,873	26,171.87	12.91
August	233,206.17	4,618,352	24,199.29	11.58
*September	235,565.81	4,181,016	3,072.75	1.32
October	185,878.59	3,216,397	‡25,542.73	‡12.08
November	211,910.81	3,654,509	22,106.30	11.65
December	236,326.89	4,022,483	30,170.44	14.63
January, 1919	232,775.83	4,040,772	43,529.85	23.00
*September 1-15	120,693.13	....	‡2,070.31	‡1.69
*September 16-30	114,872.68	....	5,143.06	5.69

‡ Indicates decrease.

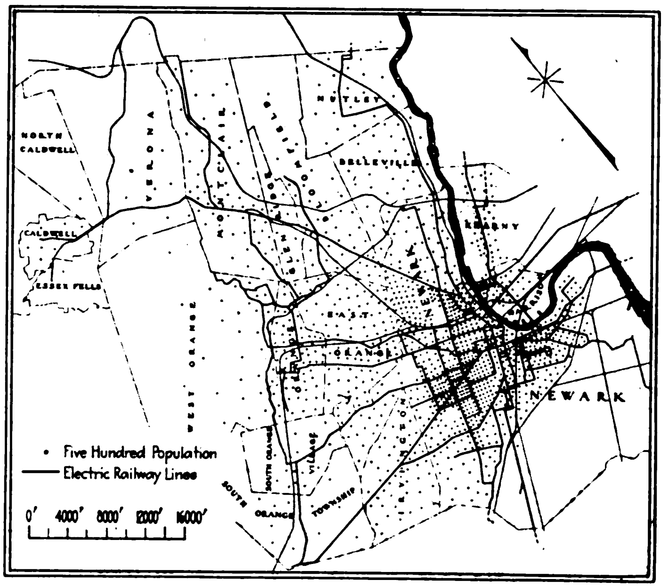
FARE STATISTICS OF HOLYOKE STREET RAILWAY SINCE ZONE SYSTEM BECAME EFFECTIVE

1918	Amount of Increase or Decrease in Revenue	Per Cent of Increase or Decrease in Revenue
February (18 to 28, inclusive)	‡$634.39	‡2.89
March	586.88	1.06
April	191.18	0.36
May	4,062.69	7.28
June	1,680.44	2.67
July	‡2,118.31	‡2.87
August	1,611.01	2.22
September	1,003.50	1.62
October	‡7,111.07[1]	‡12.85
November	‡11,668.14[2]	‡22.50
December	732.33	1.32
1919		
January*	17,588.94	35.21
February (1 to 17, inclusive)	12,275.78	49.24

* New system of fares effective Jan. 1, 1919.
‡ Indicates decrease.
[1] Decrease due to influenza epidemic.
[2] Decrease due to seven days' strike; no cars operated.

CENTRAL ZONE NOT PRACTICAL IN NEW JERSEY

The study of the traffic count conducted by the committee showed that for the conditions existing in many parts of the property a central zone was not practical and that it would bear with especial severity upon factory workers in Newark, Jersey City and some of the other communities served by the company.



MAP SHOWING POPULATION DENSITY, HUDSON AND BERGEN DIVISION, PUBLIC SERVICE RAILWAY

With a central zone, whose radius was determined by the average distance which the company could afford to haul passengers traveling therein for a 5-cent fare, the greater proportion of the manufacturing establishments would lie in the outlying zones. The consequence would be that those journeying from these manufacturing establishments, or other traffic centers situated in the outlying zones, to residential sections just within the limits of the central zone would pay a fare considerably higher than other classes of riders within the same community. The individuals to whom such a system would appeal are those employed at or near the traffic center of the city; or, in other words, those employed or conducting business in office buildings and retail establishments or in such manufacturing enterprises as are situated in proximity to the great traffic centers, which would naturally be taken as the center of the central zone.

Moreover, the conditions on the Public Service Railway are very different from those of many other companies in that in northern New Jersey a very great part of the travel is from people traveling to and from the end of the line, i.e., to or from the ferries to New York, while in Southern New Jersey the same condition prevails as regards Philadelphia. The conventional situation of a thickly populated district of restricted area with a gradually diminishing density of population as one travels from the center of the city, the suburbs finally melting away into rural districts, is not typical of conditions on the Public Service Railway.

DETERMINING THE ZONES

After the zone-mile system was decided upon, much study and thought was given to the most equitable and practicable method in applying to the lines of the company. The first step concerned the question as to the point which should be taken as zero, or the place from which the zoning should begin. There are certain points on the system at which a very large volume of travel originates, and as these represent the beginning and ending of the journeys of a large proportion of the persons traveling in the region surrounding these points, they were selected as zero points. The zoning of each route was then undertaken. An endeavor was made to approximate as nearly as possible a mile in distance for each zone, departing from this limit only in cases whereby a reasonable exception would bring about the location of a zone point at a natural traffic dividing line, such as an intersection with another line, a point of heavy loading due to the existence of traffic-controlling industries, railroad stations and the like, although a general tolerance rule of 500 ft. was adopted, that is, where the exigencies of the case seemed to call for it. It was found by the sub-committee that in applying this rule the property admirably adapted itself to the zone-mile plan.

Wherever possible, transfer intersections were fixed as zone limits, and as stated before, points of heavy loading were similarly adopted. The adoption of the transfer intersection as the zone limit, where possible, is important in that it tends to permit the passenger to take advantage of a full zone at his mileage rate instead of paying for a short distance which might be necessary were the transfer intersection disregarded and the zone limit placed a short distance therefrom. A characteristic exception to the literal observance of the zone-mile is where two lines pass a common point and reach another common point by different routes, as it is obviously impossible, except in cases where very heavy variation obtains, to bring about a condition which would involve two zones on one line and three zones on another line between such points. Another of the principles adopted was that of fixing one zone limit for all the lines operating across the same point, as any other rule would establish varying rates of fares between two points.

DETERMINING THE FARE

The next question was that of determining the proper fare. To do this the estimated operating expenses for 1920 were first segregated into four groups as follows:

(a) Expenses independent of traffic, varying with the track-mile.

(b) Expenses varying with the car-miles run.

(c) Expenses varying with the car-hours run.

(d) Expenses varying with the passengers carried.

Summarizing these figures the committee obtained the following results:

For Passenger Traveling	Stand-by Cost, Cents	Movement Cost, Cents	Total Cost, Cents	Fare Recommended, Cents
1 zone-mile	4.03811	0.99007	5.02818	5
2 zone-miles	4.03811	1.98014	6.01825	6
3 zone-miles	4.03811	2.97021	7.00832	7
4 zone-miles	4.03811	3.96028	7.99839	8
5 zone-miles	4.03811	4.95035	8.98846	9
6 zone-miles	4.03811	5.94042	9.97853	10
7 zone-miles	4.03811	6.93049	10.96860	11
8 zone-miles	4.03811	7.92056	11.95867	12
9 zone-miles	4.03811	8.91063	12.94874	13
10 zone-miles	4.03811	9.90070	13.93881	14

COMMITTEE'S CONCLUSIONS AS TO FARES

The rate of fare, therefore, which was recommended to the commission is as follows:

First. Passengers boarding cars and paying cash fares shall pay a fare based on a rate of 5 cents for the first zone-mile, and 1 cent for each succeeding zone-mile. A passenger riding in one zone, therefore, will pay a 5-cent fare; a ride in two zones will cost 6 cents, while a ride through ten zones will cost 14 cents.

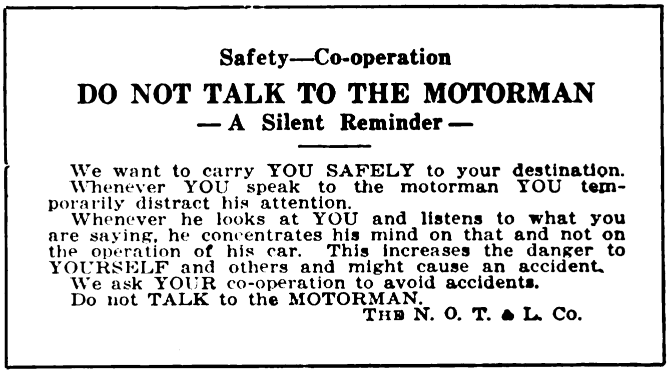
Second. A stand-by or ready-to-serve charge of 1 cent is to be made for each transfer, representing a fracton of the cost involved to the company of providing the facilities necessary to be ready to serve the transfer rider. In addition, a charge of 1 cent per zone-mile will be made for each and every zone-mile ridden on the transfer car. Transfers will be issued under the same general regulations as now prevail, concerning the period of time in which they must be used, the direction in which transfers will be given as between intersecting lines, etc., etc.

REST OF REPORT

A digest of other parts of the report will be made in later issues. These later abstracts will include some particulars of the traffic count conducted by the company and a detailed description of the proposed method of fare collection.

"Don't Talk to the Motorman"

THE Northern Ohio Traction & Light Company has adopted a simple "silent reminder" of this rule. It consists of a card 2½ in. x 5½ in., reproduced below. Motormen are expected to carry a supply of these cards in the upper left-hand coat pocket. Whenever a passenger, policeman, fireman, or other employee attempts to engage the motorman in conversation, the motorman does not reply but hands over his shoulder to the interlocutor one of the silent reminder cards. This is part of the safety campaign which the company is now conducting.



Safety—Co-operation

DO NOT TALK TO THE MOTORMAN

— A Silent Reminder —

We want to carry YOU SAFELY to your destination.

Whenever YOU speak to the motorman YOU temporarily distract his attention.

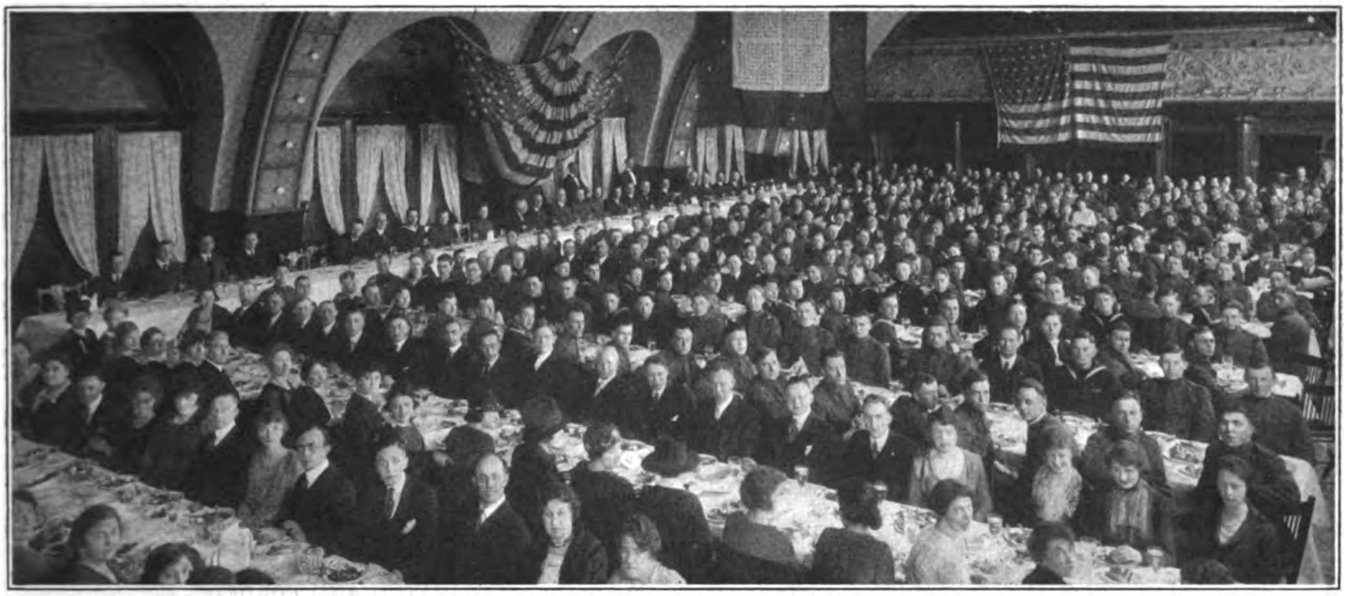
Whenever he looks at YOU and listens to what you are saying, he concentrates his mind on that and not on the operation of his car. This increases the danger to YOURSELF and others and might cause an accident.

We ask YOUR co-operation to avoid accidents.

Do not TALK to the MOTORMAN.

THE N. O. T. & L. Co.

CARD USED IN SAFETY CAMPAIGN



BANQUET IN HONOR OF RETURNED SOLDIERS AND SAILORS OF THE CHICAGO ELEVATED RAILWAYS

Banquet to Service Men

Chicago Elevated Railways Gives Welcome Home Banquet to 230 Returned Soldiers, Sailors and Marines

ON MARCH 4 a reception and banquet in honor of their returned soldiers, sailors and marines was given by the Chicago Elevated Railways in the Auditorium Hotel, Chicago. Complimentary tickets were given to all of the returned men, and any other employees were invited at a nominal charge of $1 per plate. The returned men up to that time numbered 320 and there were between 600 and 700 persons present at the banquet.

Following the dinner President Britton I. Budd paid a tribute to those who had gone and those who had remained to "keep the home fires burning." Among other things he said:

"This meeting being held to-night in honor of our returned soldiers and sailors is something in the nature of a family reunion. We are gratified to know that so many have come back unscathed to rejoin the family circle. A few will not return to us. They gave their lives in the greatest cause the world has ever seen, and although we miss their presence here, we can console ourselves with the thought that the cause for which they made the supreme sacrifice lives and will continue to live. Some who are with us to-night have suffered severe and painful wounds. To them we offer our sympathy, while we rejoice that their lives were spared. Some who wear the uniform among us to-night did not have an opportunity to take an active part in the great battles of the recent war. They, nevertheless, are as much deserving of our thanks as if they had. They were ready and we know that they would have acquitted themselves creditably had the opportunity presented itself. We welcome them all, and I wish to say on behalf of the Chicago Elevated Railroads that every man who left to enter the service of our country will find, when he returns to the company, his old position open to him."

In speaking of what those who remained at home had done to help win the war Mr. Budd referred to the Elevated war record which was as shown in the following table:

Employees in active service....................................656

SUBSCRIPTIONS TO LIBERTY LOANS

	Subscribers	Amount
First	2,470	$175,850
Second	1,994	155,550
Third	4,047	267,950
Fourth	5,486	409,100
		$1,004,450

CONTRIBUTIONS TO WAR ACTIVITIES

February, 1918	
War Community Service Fund	$5,937.97
November, 1918	
United War Work Fund	$10,873.50

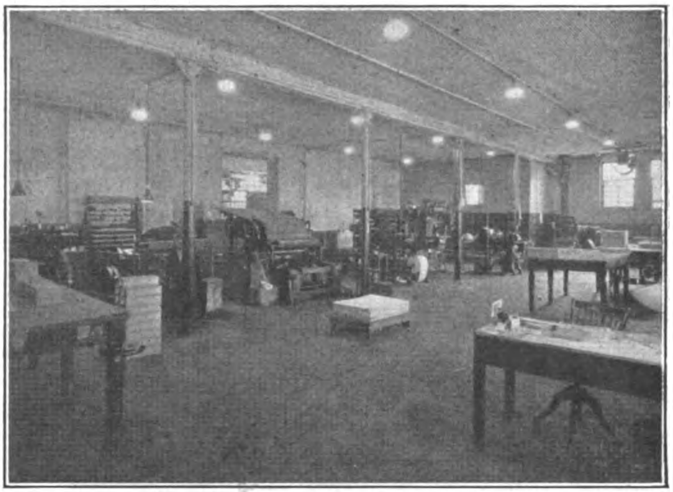
Other speakers were W. S. McClenathan, secretary of Local No. 308; Samuel Insull, chairman of the board of trustees, and some returned soldiers and sailors.

Draft Status of Electric Railway Employees

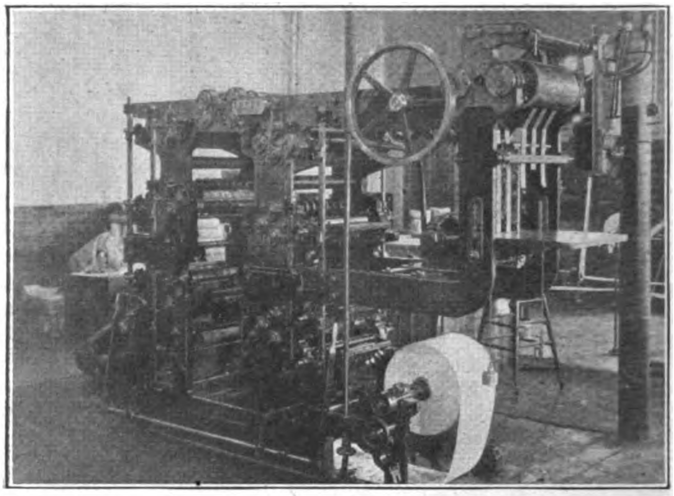
THE second report of Provost Marshal General Crowder to the Secretary of War in regard to the operations of the selective service system up to Dec. 20, 1918, contains in one of the numerous appendices an industrial index which shows how the draft affected electric railway employees. The figures follow:

	Male Employees of All Ages	Ages 21-30 Within Selective Service Law		Deferred Classes Within Selective Service Law			Class I Within Selective Service Law		
		Number	Per Cent	Number	Per Cent of All Ages, 21-30	Per Cent of All Ages	Number	Per Cent of All Ages, 21-30	Per Cent of All Ages
Conductors	65,471	17,777	27	13,376	75	20	4,401	25	7
Motormen	67,855	15,777	23	11,432	72	17	4,345	28	6
Laborers	31,978	28,872	90	4,580	16	14	24,292	84	76
Officials and superintendents	2,798	163	6	118	72	4	45	28	2
Switchmen and flagmen	2,476	399	16	307	77	12	92	23	4
Inspectors	2,640	366	13	281	77	10	85	23	3
Semi-skilled employees	5,965	2,638	44	1,852	70	31	786	30	13

The registration covered by the foregoing figures is only the first, that of June 5, 1917, covering the ages 21-30. The second registration, covering the age 21, on June 5, 1918, and the third registration, covering ages 18-20 and 32-45, on Sept. 8, 1918, are not represented. The figures for the total number of employees were projected from the thirteenth census.



A SECTION OF UNITED RAILWAYS OF ST. LOUIS PRINTING DEPARTMENT, CONTAINING FOUR PRESSES AND A SPECIAL ENVELOPE MAKING AND PRINTING MACHINE



ROTARY PRINTING PRESS WHICH TURNS OUT 240,000 TRANSFERS AN HOUR PRINTED WITH TWO COLORS ON EACH SIDE, NUMBERED, DATED AND FOLDED

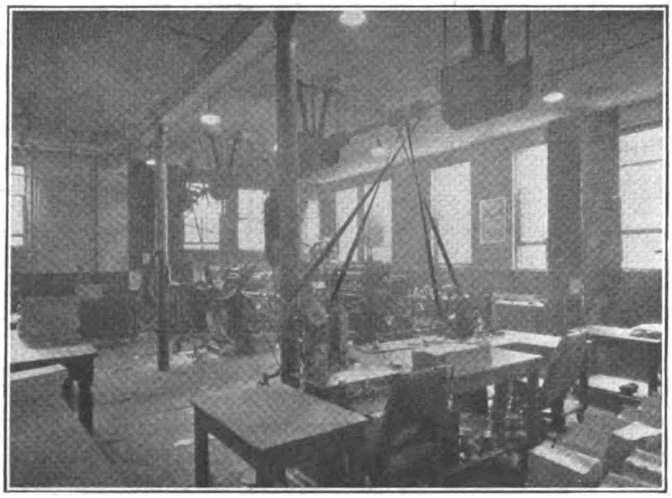
A Complete Printing Department for an Electric Railway

St. Louis Company Installs New Rotary Press to Handle 700,000 Transfers a Day—All Other Company Printing and Binding Also Done in Own Shop

THE United Railways of St. Louis inaugurated its own printing department for transfers in 1904, installing at that time a Harris automatic press giving two colors, and also numbering, dating and perforating the transfers in one operation. As the company gradually increased in size the number of transfers demanded was greatly increased and a second Harris press was installed. Later the double transfer came into use and this necessitated the installation of two folding machines. Instead of the issuing of a transfer on a transfer the whole operation, on this system, is handled by the first conductor, who issues a double transfer folded back to back. Both are punched in one operation. Thus this means no extra work for the first conductor and eliminates the necessity of the second conductor duplicating the operation of the first.

The company operates more than 450 miles of city and suburban lines with about 1600 cars, and the daily demand for transfers amounts to approximately 700,000. The two Harris presses have given a combined output of from 175,000 to 200,000 transfers an hour, but when advertising has been placed on the back of the transfers, as is frequently done, this has necessitated a second run and consequently cut the production in two.

It was deemed advisable to increase the facilities to provide for both present and future needs and a Meisel



SECTION OF PRINTING DEPARTMENT SHOWING HARRIS PRESSES AND NEW JERSEY STITCHING MACHINES

STOCK ROOM OF UNITED RAILWAYS PRINTING DEPARTMENT SHOWING COMPLETE LINE CARRIED rotary press was installed late in October, 1918. This press running at normal capacity turns out 240,000 transfers per hour complete, printed with two colors on each side, numbered consecutively, dated and folded. The old Harris presses required flat sheets 12 in. x 18 in. and printed eighteen transfers to the sheet, while the new Meisel takes a 12-in. roll and makes 20,000 impressions an hour, with twelve transfers per impression. With the Meisel in operation one Harris machine and two folding machines have been shut down. The second Harris will serve as an auxiliary machine and will be kept busy on special work.

From the Meisel press the transfers go to the stitcher and are stitched into packages 100 sheets thick for the single transfers and fifty sheets thick for the double transfers. These packets are then taken to the cutter and cut into books, about thirty books at each operation, and then to the packing room where they are placed in containers each holding enough for one day for a single line. Some thirty lines are included in the system and the transfers for each bear the name of that line in large type. As this necessitates a change of plate for the run on each line the machine has to be frequently shut down for a short interval.

Transfers are printed thirty days in advance of the date upon which they are to be used. If some unforseen occasion arises during that interval and notification of the number of extra transfers needed is received by the printing department in sufficient time an extra emergency run is made. To provide for conditions which cannot be taken care of in this way the company has an emergency transfer on which is printed a calendar for each month and each day of the month with a list of the various lines. These are punched at the outlying stations, fifty sheets at a time, by special punches. The gross consumption of paper for transfers amounts to from twelve to fourteen carloads a year.

In addition to the printing of transfers the company maintains a complete printing department. Here is printed the monthly company publication known as the *Bulletin*, all brief work such as annual reports, petitions to the Public Service Comimssion, etc., all record forms, including more than 1000 different varieties, all car card color display company advertising and dashboard signs, children's and 6-cent tickets. In addition many special filing envelopes and devices are made, leather and cloth book binding is done, including the binding in three-quarters leather of the issues of the ELECTRIC RAILWAY JOURNAL, and various leather novelties such as brief cases are occasionally turned out.

Most of this work is accomplished in a room approximately 100 ft. square in which is located the following equipment: One 10-in. x 15-in. Gordon press, one 12-in. x 18-in. Gordon press, one cylinder press, one Meisel press, two folding machines, one National rotary perforator, two Harris presses, two special New Jersey No. 4 wire stitching machines, one 34-in. Seybold cutter, one S. & T. punching machine, one Rosback power stitching machine, and the usual equipment of a composing room.

In addition to this equipment special mention should be made of a machine which has been especially designed and built to make and print at the same operation 120 No. 6 side seam coin trip envelopes a minute for the use of conductors, half of the quantity being printed in red and the other half in black. The two colors are to differentiate between the direction of the trips, *e.g.*, east from west and north from south.

Many of the machines in this shop have special attachments and improvements developed by J. G. Robertson, superintendent of the printing department.

Twenty-eight persons are employed in the department, five of whom are girls, and three-fourths of the working time is spent on general work other than transfer printing. Before the Meisel press was installed it was a common practice for the department to run twenty-three hours a day, but since that time the work is generally confined to a period of nine hours. This is the only department of the company which is not operated by organized labor.

Welding Engineering Takes on New Dignity

New Association to Be Called the American Welding Society Assumes Concrete Form to Advance the Art of Welding'

THE temporary association formed to organize the American Welding Society has issued a call to all engineering associations, scientific societies, governmental departments, manufacturers and others interested in the development of welding, to join in the formation of this society. The first meeting will be held on Friday, Mar. 28, at 10.30 a.m. in the Engineering Societies Building, New York City.

Now that industry is again becoming normal, it is desirable that the advance in welding, which has resulted from war conditions, should be continued and extended to accomplish more important results. The objects of the new society include the bringing together of persons from all branches of the industry who are interested in any type of welding. This society will create and assist in maintaining what may be termed a "Bureau of Welding," which will afford a means for conducting any investigation which may be considered desirable by any of the engineering societies or manufacturers.

Several classes of membership are contemplated. These include companies that manufacture or sell apparatus or supplies for welding or that employ welding as a process in their output, also individual membership of the employees of these companies, consulting engineers, college professors or members of any engineering society.

As a part of its routine the new society will ascertain what specific investigation or assistance is needed in any branch of the welding industry. If this assistance involves research, a definite program will be arranged and presented to the portion of the industry affected, indicating the benefits to be derived therefrom. The funds which will come from the annual dues are intended primarily to maintain the society, and will obviously be sufficient for any extensive research. It is the intention therefore to finance each research separately. Any investigation desired by the industry will be made if sufficient financial support can be secured to conduct it efficiently.

The benefits of a proper standardization both to the producer and to the consumer are well recognized, but as some of the manufacturers interested in the new society have expressed fears that standardization might be carried too far, from the commercial point of view, it seems desirable to provide uniform methods that will secure in each case co-operation and support of all the organizations whose interest may be affected. Such a method of establishing a standard by this society would not only assure that all interested organizations or groups may participate in the work, but it also requires practically the unanimous consent of the standard before it can be issued. It is intended that the work of the new society in standardization shall conform to the procedure established by the American Engineering Standards Committee, and shall be subject to its approval.

In many localities the application of welding to certain classes of structures is now prohibited by law. When the technical work of the Bureau of Welding has demonstrated that such restrictive measures are no longer necessary, it will be appropriate for the society to take steps to have them modified by supplying authentic information that the law makers will respect. Investigations of the welding committee have thus far shown that one of the most important elements in the success of welding operations lies in the skill of the operator. To secure this uniform method of training is essential, and the society will take an active part in planning how welders should be trained, and how their proficiency may be determined.

AMERICAN ASSOCIATION NEWS

Chicago Section Meets

A MEETING of the Chicago Elevated Railroads company section was held Feb. 19, and about seventy-five members were in attendance. E. A. Brion, comptroller, talked on the various issues of Liberty Bonds; J. H. Mallon, safety engineer, and C. B. Scott of the Bureau of Safety, discussed various problems of the safety question, and P. F. McCall, general storekeeper, explained how the store department handled materials.

Meeting of Felicitation at Manila

AT THE forty-sixth monthly meeting of the "Meralco" section held on Jan. 7, nineteen railway members were elected. Eight were from the accounting department, six from the transportation department and the others from the power plant, claim and medical departments. Retiring President J. M. Bury reviewed the remarkable record of the section with regard to the winning of medals and honorable mention for papers prepared by its members. The new president, C. H. Van Hoven, continued along the same line and closed as follows: "We are going to make this company section a clan, a family group. We want to foster and promote loyalty and closer relations among ourselves. We want to be missionaries in this community that the public may know what we stand for, and that it may know that in our efforts to serve them as they should be served we are also serving ourselves. Meralco has been placed on the electric railway map, and with the aid of every member we are going to keep it there." M. Fariñas and P. Castillo, who had received awards from the American Association, were also presented with checks by the company, and B. H. Blaisdell, chief engineer of power plants, supplemented the medal with a personal check for 100 pesos.

The section itself also awarded the following medals for the best three papers presented during the year: Gold medal to L. C. Bewsey, carhouse foreman, for his paper on "The Human Element as Applied to Electric Railways"; silver medal to M. T. Borja, watch engineer, for his paper on "Economic Production and Transmission of Electric Power," and bronze medal to I. G. Obligacion, chief clerk transportation department, for his paper on "Menace of the Transfer." Cash prizes were also awarded to conductors and motormen for excellence in the performance of their duties, according to the company's custom.

The following amendment to the by-laws was adopted: "There shall be seven standing committees, consisting of program, entertainment, refreshments, papers, discussions, awards and membership committees, appointed by the executive council immediately after the annual election each year and serving for one year. Special committees may be appointed by the president when authorized by motions passed by the executive council or by the section." The entertainment program at this meeting comprised vocal and instrumental music and a volley ball game played between the employees of the accounting and transportation departments.

Slogan for Public Service Section

THE new president of company section No. 2, N. W. Bolen has suggested as a slogan for the year the expression "A Full House." The recently elected secretary, A. H. Nelson, has sent a letter to each member asking him to keep the slogan in mind and to assist in making it a fact.

Western Red Cedar Association Elects New Officers

AT THE fourteenth annual meeting of the Western Red Cedar Association, held at Sandpoint, Idaho, on Feb. 20, R. G. Jones, Lost Creek Cedar Company, was elected president. J. M. Montgomery, Humbird Lumber Company, was chosen as vice-president. Three directors were also elected and committees on advertising, posts, railroads, poles, piling and official inspection were appointed.

The chairman of the 1918 advertising committee stated that $5,664 had been expended during the year for advertising and the members had displayed more interest than heretofore in this matter. Suggestions were made as to how more vigor could be put into the advertising during the coming year, continuing the advertising of Western red cedar poles for one year more. A committee was appointed to confer with members of the Lifetime Post Association with a view to securing the services of a man competent to inspect poles, piling and posts in the woods, on the landings and in the cedar yards of the members of the Cedar Association with the object of improving the quality of the stock.

A recent bulletin of the United States Labor Department is authority for the statement that appropriations made by Congress to pay the federal government proportion of the cost of state road-building projects now total $48,500,000, and that an addition of $200,000,000 probably will be available during the next three years. Then follows a list of approved projects by states, from which it is evident that each state is expected to contribute for the improvement of the highways considerably more than the federal government.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

New Jersey Men Strike

Public Service Railway Men Seek to Enforce Recognition of Amalgamated Association

The employees of the Public Service Railway in Northern New Jersey who are members of the Amalgamated Association went on strike at 4 a.m. on March 12. Service was seriously interrupted, but the company is proceeding with its plans for getting the lines back to normal as soon as possible. Ordinarily the company operates about 1500 cars on the lines affected. Up to noon on the first day more than 300 cars had been placed in service.

MEN DEMAND UNION RECOGNITION

The principal issue involved is recognition of the union. In a final effort to avert the strike, T. N. McCarter, president of the company, on March 11 conferred with certain employees of the company who were local officers of the Amalgamated Association on the railway. By way of concession he offered three things:

> 1. To withdraw and abandon forthwith the welfare and collective bargaining plan recently promulgated by the company, which has not received the approval of the men.
> 2. To submit to the arbitration of the National War Labor Board any question of difference there might be, including the demands of the employees that the company sign a contract recognizing the Amalgamated Union.
> 3. To submit to the arbitration of the Public Utilities Commission any questions of difference there might be, including the demand of the employees that the company sign a contract recognizing the Amalgamated Union.

The representatives of the Amalgamated Union present declined all of these propositions and declared that the strike must go forward unless the company signed a contract with and formally recognized the Amalgamated Union, none of whose general officers reside in New Jersey or have anything to do with the affairs of the Public Service Railway. This Mr. McCarter declined to do.

SUBORDINATE DEMANDS

There are twenty-six sections in the demands presented by the men to the company. In addition to recognition of the union, these demands include a system of arbitration of disputes, no discrimination against the union or its members; the men to agree not to discriminate against employees who refuse to join the union; provisions for discipline of workers breaking rules; day's work for all conductors and motormen to be nine hours consecutively, with pay as at present for ten hours; all runs to be straight runs; runs of six hours and less than eight hours to pay nine hours' pay; runs of eight hours and less than nine hours to pay ten hours' pay; all work in excess of scheduled runs to be considered overtime and to pay time and a half; the company to pay all extra men who answer the roll-call at the rate of $20 per week, $5 more than the men are getting now, men on snow sweepers, sand cars and special work to be paid time and a half.

The company is confident that the public will place the responsibility for the strike where it belongs.

Late on March 13 it was announced that officials of the railway would confer in Washington with the War Labor Board in an effort to arrange a settlement of the strike. The representatives of the men were invited. The War Labor Board requested the men to return to work pending a settlement.

Rotarian Makes His Company Solid

A. W. McLimont, vice-president and general manager of Winnipeg (Man.) Electric Railway, is an enthusiastic Rotarian. When the conference of the Rotary Ninteenth District was held in Winnipeg on Feb. 9, 10 and 11, Mr. McLimont determined to put the Winnipeg Electric Railway organization behind it, and do everything he could to boost rotary and the conference. In this way the company's name was constantly before the public, linked with the rotary idea of service.

A special edition of 20,000 copies of the *Rotary Whizz*, a small publication issued weekly by the Winnipeg Rotary Club, was paid for by Mr. McLimont, and placed in the small box in the street cars, from which the company's own publication is distributed. The only reference to the Winnipeg Electric Railway in the issue of the *Whizz* was in a small panel on the front page.

To draw the attention of the car riders to the fact that the publication was in the box for distribution, a window poster was placed in each car.

Each car also bore a large banner on the fender calling attention to the conference.

Commencing on Feb. 12, immediately after the close of the Rotary Conference was the annual bonspiel of the Manitoba Curlers Association, which lasted two weeks. Further to exemplify the rotary idea of service, Mr. McLimont had window posters printed.

In the special rotary section of the Winnipeg *Free Press*, Mr. McLimont took half a page and published an advertisement.

The part the company took in boosting the rotary idea and the conference was very much appreciated by the Rotary Club of Winnipeg.

Detroit Purchase Arranged

Difficulties Overcome in Tentative Agreement With $31,500,000 as Compromise Price

The purchase of the properties of the Detroit (Mich.) United Railway within the city by the city has been arranged for at a compromise price of $31,500,000. All that remains to make the deal binding are some details which the two contending parties were to endeavor to settle at a meeting on March 12.

AGREEMENT REACHED MARCH 11

The meeting at which the compromise price was agreed upon began at 4 p. m. on March 11 and continued three hours. At the conclusion of the conference Edward T. Fitzgerald, secretary of the Street Railway Commission, gave out the following statement:

> The Board of Street Railway Commissioners and the officials of the Detroit United Railway have conditionally agreed upon a price of $31,500,000. They have not agreed upon important practical details connected therewith. Failure to do so will prevent the submission of the purchase price to the people. The board and the railway officials will meet on March 11, at 10 o'clock for further discussion of the details not yet agreed upon.

The price originally asked by the Detroit United Railway for the properties in question was $33,500,000. The final and unalterable price offered by the city for the same properties was $29,653,936. So that the price agreed upon is a straight compromise of about $2,000,000 by each side.

That a compromise has been effected is also apparent from the language of the letter written on Feb. 22 by the Street Railway Commission to the Detroit United Railway. In this it was said:

> It will be useless apparently for us to discuss with you the question of valuation of the property because you advise us that your company unanimously concludes that the price we offered was wholly inadequate. We are firmly of the opinion that the offer we made is entirely fair and adequate.

BRIEF REVIEW OF NEGOTIATIONS

Things have moved fast in Detroit since James Couzens came into office as Mayor on Jan. 1. A goodly part of his inaugural message was given over to a review of the local railway situation. He promised action at once, looking toward purchase by the city, with a view to having a municipal ownership plan ready to submit to the voters in April. Appointments to the street railway commission, among them that of Edward T. Fitzgerald as secretary, and the retention of M. M. O'Shaughnessy, San Francisco, as special advisor, followed. Detroit then offered the company $29,653,936 for the city lines. This was on Feb. 11. On Feb. 18 the company turned this offer down. It suggested as an alternative a price of $33,500,000 or a lease to the city for a period of fifty years on a rental tentatively fixed at $2,010,000 per annum —6 per cent on a valuation of $33,500,000. This counter leasing proposal the city rejected. The city authorities then announced that they would ask for $10,000,000 to build municipal lines to compete with the privately-owned ones.

Seattle Takes Over Its Railway

Washington State Supreme Court Decision Validates Purchase—Transfer Probable on April 1

When the State Supreme Court at Olympia, Wash., on March 5, handed down a decision sustaining the legality of the $15,000,000 purchase by the city of Seattle of the railway property of the Puget Sound Traction, Light & Power Company, all legal questions involved in the transaction were cleared away. Seven judges of the Supreme Court favored the purchase, while two judges dissented. It is stated by Thomas F. Murphine, superintendent of public utilities, and A. W. Leonard, president of the railway, that the city may be in possession of the lines by April 1.

PREPARED TO TRANSFER PROPERTY

Anticipating a favorable decision in the "friendly" suit, city officials and officials and officers of the company have been preparing for the transfer for weeks, and practically every arrangement has been made, with the exception of minor details, among which is the signing of 15,000 bonds for $1,000 each by the Mayor and city comptroler.

Under the terms of the purchase contract, the company has forty-five days, following the filing in the trial court of the remittitur from the Supreme Court, in which to deliver its property, free and clear of all encumbrances to the city. In event of failure to make the delivery at the expiration of the time set, the company must pay the city $400 a day, until the property is so delivered. At the end of six months, the city may continue to collect $400 a day, or may declare the deal off.

With the transfer of the property, Seattle will acquire 206 miles of track, 540 cars of all kinds, seven carhouses, much valuable real estate, and about $350,000 worth of materials and supplies. The city payroll will be increased by about 2000 workers, of which 1500 are motormen and conductors. With the exception of the legal department, the maintenance of streets and a few other departments, employees of the private company in all branches of the railway work will be taken into the city service in the same line of work they are now performing.

PLANS FOR MUNICIPAL OPERATION

Superintendent of Public Utilities Murphine has made plans for taking over the railway system. It is considered probable that one and possibly both of the present city-owned carhouses will be discontinued, and extensive rerouting of cars will be put into effect to avoid duplications of service that now exist between the company's lines and those operated by the city. Express service will be installed on as many lines as possible, with no stops between the outlying residence sections and the downtown district.

POWER CONTRACT INCLUDED

In the traction deal is a contract which binds the Puget Sound Traction Light & Power Company to sell the city electric current to operate the railway system until such time as the city is prepared to develop its own power, at a price of 1 cent per kilowatt. The current will be delivered to the substations now operated by the Traction Company in connection with railway service.

One of the next steps by the city will be to acquire the lines of the Seattle & Rainier Valley Railway, arrangements for which have been agreed upon, with only details to be taken up.

NEGOTIATIONS STARTED LAST SEPTEMBER

Preliminary negotiations for the purchase of the railway system by the city were started on Sept. 6, 1918, in answer to a demand from the United States Shipping Board Emergency Fleet Corporation for better transportation for the shipyard workers. The offer to pay $15,000,000 in utility bonds was telegraphed to the board of directors of Stone & Webster at Boston, and was accepted one week later. On Sept. 24 the City Council passed the ordinance authorizing the deal. Before the deal was agreed on, the armistice was signed, and the shipyard emergency passed. The transaction was continued as a straight municipal ownership proposition. At the November general election, the deal was submitted to the electors on an advisory ballot, and carried three to one.

FRIENDLY TEST SUIT DISMISSED

The Supreme Court's decision sustained dismissal of an injunction proceeding brought by F. A. Twichell and Charles E. Horton, as a "friendly" measure to remove all legal obstacles. They attacked the proposed purchase bond issue as exceeding the city's charter authority and constitutional limit of municipal indebtedness, also pleading the failure to submit the proposed purchase to an election to validate the indebtedness contracted. The main point in the majority opinion handed down is that a bond issue to be paid in principal and interest entirely out of the revenues of the utility purchased is not a general indebtedness charged against taxation, and therefore not subject to popular ratification by the voters of the city before the fixed limitation can be exceeded.

On the question of pledging revenues, the majority opinion of the Supreme Court reads:

> Appellant contends that because of certain provisions of the ordinances and the statute general indebtedness, transaction may not be consummated without the ratification of the voters. If the completion of the purchase and sale as planned would create a general debt, it would doubtless require the sanction of the voters of the city, otherwise not so.
>
> Our attention is called to certain provisions of the plan or system. Ordinance No. 39025, to the effect that the city, after providing for the special fund, does hereby irrevocably obligate and bind itself to pay into such fund out of the gross revenues of the municipal street railway system sufficient to meet payments of interest and principal of the bonds as they fall due, stating the amounts and maturity of the same, and such fixed amounts out of such gross revenues are hereby pledged to such semi-annual payments of interest and principal, and shall constitute a charge upon such gross revenue superior to all other charges whatsoever, including charges for maintenance and operation; and the obligation of the city in the bonds to pay them with interest, although out of the special fund, even though the balance of gross revenues receipts thereafter remaining may be insufficient to pay the cost of maintaining and operating said system and said additions and betterments thereto.

Judges Chadwick and Mackintosh, who dissented, said in part:

> The legal effect of the majority opinion is that all of the gross revenues are pledged to the payment of the purchase price; that if the one who renders labor or service as a motorman, conductor or about the tracks and barns of the railway system is to be paid he may be paid out of the general revenues; that, instead of taking his pay in a warrant which is a first charge upon the gross revenues as the law contemplates, he may not, if the gross revenues are insufficient to meet the maturing bonds and interest, have his pay out of the earnings of the utility at all but must take his chances with a general fund warrant which may be subject to discount and unless sanctioned by subsequent decree of this court will be doubtful validity.
>
> The ordinances but clumsily conceal the reserve purpose of the Council to maintain and operate the street car system at the expense of the general fund, either by a system of loans from the general fund or by levying a direct tax for that purpose.
>
> If the Council did not intend to charge the general fund it might have said so in words. It might have had due regard for the costs of maintenance and operation as the statute directs by reserving an amount or proportion of the revenue of the utility. or being mindful of a possible charge it should have submitted the measure to the people.
>
> The net results of the ordinances as construed by the court is that the cost of maintenance and operation has not been provided for. By the employment of an indirect method dressed for the occasion in a cloak of words the law is circumvented and the people whose rights of participation and self-determination was so carefully safeguarded have been denied the sovereign right of the franchise.
>
> It was suggested in consultation that the Council could raise the rate charged for fare and thus meet the cost of maintenance and operation out of the revenues of the street car syetem.
>
> Counsel made no such suggestion, as of course they could not, for with the gross revenues of the system pledged irrevocably to the payment of the purchase price the seller or the bondholder, as the case may be, can insist that the gross revenues belong to him whether they are accumulated by a charge of 5, 7, 10 or 50 cents for a single fare.
>
> Believing that the ordinance was drawn with intent to, or whether with intent, it does in legal effect, charge the general fund or leave the way open to levy a direct tax, thus violating the spirit of the law we are constrained to dissent.

State Regulation Stands

Chicago "Home Rule" Element, Lacking Support of Other Cities, Fails in Attack on Commission

Opponents of state regulation in Illinois failed in an effort to kill the state public utilities act in a hearing before the Senate committee on March 4. Accordingly they have decided to direct their efforts toward safeguarding the contractual relations already existing as the result of franchises granted to public utility companies by various municipalities. There is already pending in the Legislature a bill which would prevent the state commission from interfering with rates established by franchise.

Agitation for repeal of the utilities act has been under way for some time in Illinois. This law has been opposed by the "home rule" element in Chicago ever since it became effective, but until recently it had the united support of the other cities in the State. Developments of the past year, such as the granting of higher rates in certain cities, added to the opposition, and there has been considerable activity during the current session of the Legislature.

An interesting situation has developed in Chicago where it was recently announced that the management of the Chicago Surface Lines had dismissed its appeal attacking the jurisdiction of the state commission over service matters. The city of Chicago also was a party to this appeal, and its special counsel has announced that the city will not let up in its fight to do away with state control over service even though the local companies are willing to be governed by the commission.

Right to Organize Upheld

The War Labor Board on March 6 handed down a decision upholding the contention of the employees of the Brooklyn Rapid Transit Company that they have the right to organize and bargain collectively with their employers through chosen representatives. The demand was submitted to the War Labor Board by Paul Millman, representing the motormen, who complained of "insufficient wages, hours, general poor working conditions, discriminations and discharges for joining an organization."

The evidence submitted at the hearing dealt almost entirely with the question of discrimination and the refusal of the company to permit the employees to join the Amalgamated Association and it was to this question that the board directed its attention in the finding. The recommendations follow:

> It appears from the evidence, uncontroverted by the company, that the officials of the Brooklyn Rapid Transit Company and the operating companies owned and operated by it are violating the policy of the National War Labor Board in not permitting their employees to join the Amalgamated Association of Street & Electric Railway Employees of America. Under the principles of the President's proclamation creating the National War Labor Board and under the rules of the board all of the employees of this company and its subsidiary companies should be free to organize and to join such unions as they choose.
>
> If these employees follow a lawful course toward the company, advised or directed by the national or international union, it is their right, and the company should not prevent them from so doing. Discharges for legitimate union activities, interrogation of workers by officials of the companies as to union affiliations, espionage by agents of the company and like actions, the intent of which is to discourage and prevent men from exercising this right of organization, must be deemed an interference with their rights as laid down in the principles of the board.
>
> We recommend, therefore, that the Brooklyn Rapid Transit Company and its subsidiary companies operating electric railway lines in New York City give full and free permission to the employees to organize into labor unions in conformity with the announced principles of this board and as a matter of plain right and justice.

The finding was signed by Basil M. Manly and F. H. Judson, acting as joint chairman and section chairman.

The company has not issued any statement with respect to the decision.

Indeterminate Franchise Proposal

The committee on general legislation of the House of Representatives of Minnesota has before it a bill introduced by C. H. Warner, Aitkin, providing for granting of state franchises to electric railways after the surrender of local franchises. The bill would put electric railways under a state franchise, subject to the rule of the State Railroad & Warehouse Commission.

Under the provisions of the bill electric railways would have the right of appeal from any municipal regulation as to fares and service, first to the state commission and then to the courts. The bill would give municipalties the right to purchase electric railways, but the price fixed would be made subject to review by the state commission.

An electric railway would receive a state franchise by filing, before the expiration of its local franchise, permit or license, a written declaration with the Secretary of State and the clerk of the municipality where the franchise, permit or license was granted, to the effect that it surrenders its local franchise.

United States Employment Service Broadened

The United States Employment Service has further extended the scope of its work by the establishment of two new zone offices of the professional and special section, in Philadelphia and Boston, and it plans to establish other offices of this section in the near future. The new zone offices are in addition to the two main offices at New York and Chicago. They will serve the particular zones in which they are located. The main offices of the professional section are daily receiving the lieutenants, captains, majors and even colonels who led their men to victory, and without exception these men ask for but one thing—opportunity to win new successes in the business world. They are men of proved tenacity, of the quickest intelligence, hundreds of them experienced in executive, professional and technical work.

Employers, representing every line of special endeavor in the industrial world, have been quick to recognize the opportunity to obtain high grade men, and equally quick to forward their requirements to the professional section. Those requiring the services of such men are asked to state definitely the nature of the positions available, to the nearest of the following United States Employment Service, Professional and Special Section offices:

New York office, 16 East Forty-Second Street; Chicago, 62 East Adams Street; Philadelphia, 1518 Walnut Street; Boston, 16 Tremont Street.

Five Cents More For Kansas City Men

The Kansas City (Mo.) Railways on Feb. 26 announced an increase in pay for trainmen of 5 cents an hour, and a discontinuance of the strike bonus, effective March 1.

The new wage scale, together with the present scale, is announced as follows:

Length of service:	New Hr. Wage, Cents	Pres. Hr. Wage, Cents
First six months	35	30
Next six months	36	31
Second year	37	32
Third year	38	33
Fourth year	39	34
Fifth year and over	40	35

One-man car service 2½ cents an hour over scale.

One additional hour a day allowed for training students.

Minimum monthly wage for extra trainmen, $75. It formerly was $60.

Uniforms as part of the wages are abolished and the amount formerly spent for them added to the wage scale.

The company announced that trainmen who did not strike on Dec. 11 would become members of a "Uniform Club" and receive uniforms without charge, based on years in the service. Men who had worked for the company more than a year were given one uniform a year free, and men in the service more than five years were given two uniforms a year. Men who struck on Dec. 11, but returned to the service before Jan. 31, may be added to this club upon approval of the superintendent of transportation, it was announced. Philip J. Kealy, president of the company, is quoted as follows:

> Our purpose in fixing this new scale is to build up a permanent staff of employees. Everyone knew that the bonus was temporary.
>
> These changes in the wage scale are made possible by the fact that practically the entire transportation force is made up of first year men, drawing the minimum hourly rate.
>
> For these reasons this average 5 cents an hour increase is possible, with but a slight increase in the present total transportation payroll.
>
> Under the new schedule the average daily wage for trainmen will be $3.65, as the men work an average of 10.4 hours a day. Everyone knows that the present minimum salary, without the bonus, is not a sufficient wage. Because 50 per cent of our old employees were maximum wage men and 90 per cent of our present employees are minimum wage men we are able to make this increase.
>
> We no longer will furnish uniforms except to members of the Uniform Club. This amounted to about 2 cents an hour in pay. All former service men who want their jobs back now must start in at the minimum wage. Under the new schedule, those who formerly were getting the maximum wage can return at a wage 3 cents an hour less than they formerly were getting.

News Notes

Additional Power for Ohio Commission.—Representative Miller has introduced a bill in the House of Representatives of Ohio which will give the Public Utilities Commission authority to order the abandonment of public utilities in case sufficient cause for doing so is shown.

An Income Tax Reminder.—The Tri-City Railway, Davenport, Ia., included in a recent pay envelope a statement of the income of each individual for the year 1918 with a reminder as to the conditions under which the individual will be required to make a return to the Government.

Would Isolate Motormen.—Representative A. O. Hauge, of Polk County, member of the Legislature of Iowa, has proposed a bill in the House which would compel electric railways operating in that State to provide inclosed compartments for all motormen. The bill required that the compartment must be sound proof.

Progress on City Ownership Bill.—The electric railway ownership bill authorizing cities to purchase the railways has passed the House of Representatives of Kansas and it is expected to pass the Senate. An effort has been made to tack on a rider prohibiting Kansas owning the transportation system unless Missouri does likewise.

Recent Railway Measures in Iowa.—Two measures in which the electric railways of Iowa are interested were introduced recently in the House of Representatives of the Iowa Legislature by representative Epps of Wapello County. One bill would prevent the operation of one-man cars and the other would require power brakes on all cars more than 30 ft. in length.

Wants Norwalk Franchise Renewed.—The Lake Shore Electric Railway, Cleveland, Ohio, has submitted a twenty-five-year franchise to the City Council of Norwalk, Ohio, for consideration. The terms are about the same as those contained in a franchise submitted a year ago. F. W. Coen, general manager of the company, told Council that in the last fourteen or fifteen years the cost of operation has increased from 14½ cents to 35 cents per mile.

Mr. Ford Threatens Competition.—Henry Ford is a big asset as newspaper copy. Accordingly much space has been given lately by the daily press to plans which he and his son are said to have in mind for establishing factories to make a new auto to sell at $250 to $350. Mr. Ford would make of this car "a competitor of the street car, rather than of the Ford." He is reported to have said that the new car would be for the use of people who have no urgent need for a motor car except to go to and from work, or for infrequent pleasure trips.

Recommends Free Right to Organize.—The National War Labor Board has decided in favor of the men in questions involving the workers and the Union Railway and the Third Avenue Railway, New York, N. Y. The board said: "We recommend that the Union Railway give full and free permission to its employees to organize into labor unions, in conformity with the announced principles of this board and of the proclamation of the President, under which the board was created." The complaint of the employees of the Third Avenue Railway was similar to that of the Union Company employees and the findings were identical.

Stimulate Business by Advertising.—At the conference of officials of the government, Governors of the States and Mayors of large cities in Washington on March 3, 4 and 5, a nation wide publicity campaign to stimulate business was proposed by Roger Babson, chief of the bureau of information and education of the Department of Labor. He declared that the same direct interest which encouraged people of the country to save in time of war should actuate them to spend during the period of reconstruction, and that the necessity for immediate resumption of business could best be brought to the attention of the nation through extensive advertising.

Municipal Line Would Put Profits First.—City Engineer O'Shaughnessy of San Francisco, Cal., who has been advising Mayor Couzens of Detroit, Mich., on street railway matters, has returned to San Francisco and is backing up Fred Boeken, superintendent of the San Francisco Municipal Railway, in opposing the Parkside extension of the San Fracisco muncipal lines. Mr. O'Shaughnessy thinks an extension there would represent a loss of $32,000 to $48,000 annually. While this subject was being discussed it was brought out that the auto buses now handling traffic across Golden Gate Park may be continued even though operating at a loss. They provide a necessary service at a loss much less than would be entailed were the same service provided by means of an electric railway.

Must Have Help in Paducah.—A. S. Nichols, manager of the Paducah Traction & Light Company, Paducah, Ky., appeared before the City Commissioners on March 6, and stated that the city would have to take over and operate the railway or grant a more liberal franchise. He said that the organization had been losing money for ten years, and that under the conditions that obtain at present in Paducah it was absolutely impossible to operate the railway so as to return a profit. The company would be glad to sell to the city at a reasonable price for plant and equipment, said Mr. Nichols. In the event that the city was not interested in purchasing, a broader franchise should be granted. This would enable the company to interest outside capital. The Commissioners took the matter under advisement.

Reviews Spokane Franchise Provisions.—In response to a request from the City Council of Spokane, Wash., J. M. Geraghty, the corporation counsel, has reviewed the franchise provisions of the city charter in detail with reference to their application to railway franchises. He finds that no new franchise can be issued earlier than three years prior to the expiration of an existing franchise. Mr. Geraghty finds that all of the Spokane Traction Company's franchises have more than three years to run. This is also true of many of the franchises of the Washington Water Power Company. The city charter gives the right of referendum on all franchises except as otherwise provided by law. The Supreme Court, however, has held that an electric railway franchise is not subject to referendum. According to Mr. Geraghty the two Spokane railway companies cannot consolidate or receive a new franchise from the city without the city charter being amended.

Programs of Meetings

Southwestern Electrical & Gas Association

The fifteenth annual convention of the Southwestern Electrical & Gas Association will be held at Galveston, Tex., on May 12, 13 and 14 at the Hotel Galvey.

Wisconsin Electrical Association

The program of the eleventh annual convention of the Wisconsin Electrical Association to be held at the Hotel Pfister, Milwaukee, Wis., on Mar. 26 and 27 will include the following papers:

"Comments on Overhead Distribution," Frank A. Robbins, Superior Light, Water & Power Company, Superior, Wis.

"High Tension Out-Door Substations and Switching Equipment," Alfred Alfaker, consulting engineer, Chicago.

"Safety Cars," H. L. Andrew, General Electric Company, Schenectady, N. Y.

"Public Utilities Services to Industries," N. J. Whelan, Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis.

"A Review of Policies of Service Extensions as Laid Down by State Commissions," A. J. Goodjen, statistician, Wisconsin Public Service Company, Milwaukee.

The program for the joint meeting with the Wisconsin Gas Association on March 26 is not yet complete, but will include an address by Chester Corey, vice-president of the Harris Trust & Savings Bank, Chicago, Ill., on "Public Utilities Securities," also an address by John S. Allen of the Railroad Commission of Wisconsin.

Financial and Corporate

1918 a Year of Deficits

Pittsburgh and San Francisco Subsidiaries of United Railways Investment Company Suffered Heavy Losses

The latest fiscal year was one of decided loss for the operating electric railway subsidiaries of the United Railways Investment Company. In Pittsburgh, Pa., the net income of $362,446 for 1917 was changed into a deficit of $467,665 for 1918, and in San Francisco, Cal., the net income of $263,479 in 1917 fell to a deficit of $1,677,691 for 1918.

The United Railways Investment Company, it will be recalled, is solely a holding company, having interests in two widely separated fields. Its interests in the Pittsburgh district are represented by holding of stock in the Philadelphia Company, which controls the Pittsburgh Railways and other utilities. Its properties in California are held through ownership of stock in the California Railway & Power Company, which in turn controls the United Railroads of San Francisco and lighting companies.

The consolidated income statement of the Pittsburgh Railways and its allied lines for the latest fiscal year, which closed on March 31, 1918, is presented herewith. The maximum of industrial activity in this district was reached in the spring of 1917. The gradual growth in traffic during the previous year continued until July, 1917, when the largest month's traffic in the history of the company occurred. After this time there was a monthly decrease. The departure of men through enlistment and the draft for service with the government and the attraction of high wages on government work elsewhere for mechanics and laborers resulted in a curtailment of general business that was reflected in reduced traffic.

The high labor costs and the uncertainties regarding necessary materials and supplies caused a gradual increase in operating expenses, the operating ratio, excluding taxes, increasing from 64.1 per cent for 1917 to 73.41 per cent for 1918; and, including taxes, from 67.97 per cent for the previous year to 77.7 per cent for the last year.

The gross earnings of the Pittsburgh Railways proper for the year ended March 31, 1918, were $13,421,934, an increase of but $66,962 over the previous year. The operating expenses were $9,855,009, an increase of $1,307,602. Taxes rose $57,923, and the cost of power increased $490,156 owing primarily to the unprecedented prices of coal.

$540,388 FOR IMPROVEMENTS

There was expended during the year $540,398 for improvements, betterments and extensions on the properties operated by the Pittsburgh Railways. Of this $359,487 was charged to capital account and $180,910 was charged to a deferred account, owing to extraordinary expenditures for improvements, replacements and realignments. There was charged to income account $91,277 as amortization of the deferred account for the same class of work.

The deficit of the combined lines in Pittsburgh for the year ended March 31, 1918, after all charges, was $570,533. This more than equaled the surplus at the beginning of the year, so that on March 31, 1918, there was a deficit of $68,972 to be carried forward.

The income statement of the United Railroads of San Francisco, also published herewith, is for the fiscal years ended June 30, 1917 and 1918. The decline of this company during the last year is evident without extended description, the falling off of $1,196,247 in passenger revenue and the increase of $808,122 in operating expenses casting a terrific burden upon the company. The decrease in net income is said to have been due principally to the lesser receipts occasioned by a strike and the heavy expenditures incidental thereto.

Profit and loss charges for last year totaled $598,050, of which $550,000 was for depreciation. The surplus of $992,091 at the beginning of the year was reduced to a deficit of $1,269,368 on June 30, 1918. During the last year the additions and betterments to propery cost $225,953, while sales and property removed involved $107,196.

CONSOLIDATED INCOME STATEMENT OF PITTSBURGH RAILWAYS FOR YEARS ENDED MARCH 31, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Gross revenue from railway operation	$13,726,741	100.0	$13,648,579	100.0
Operating expenses and taxes:				
Maintenance of way and structures	$1,184,094	8.6	$1,141,119	8.4
Maintenance of equipment	1,288,869	9.4	826,687	6.1
Traffic	41,854	0.3	31,656	0.2
Power	2,083,981	15.2	1,552,410	11.4
Transportation	3,907,432	28.5	3,681,353	26.9
General and miscellaneous	1,589,660	11.5	1,524,523	11.2
Total	$10,095,890	73.5	$8,757,748	64.2
Taxes	581,653	4.2	524,484	3.8
Total	$10,677,543	77.7	$9,282,233	68.0
Income from railway operation	$3,049,198	22.3	$4,366,346	32.0
Income from auxiliary operations	44,866	0.3	74,268	0.5
Total operating income	$3,094,064	22.6	$4,440,614	32.5
Other income	128,989	0.9	172,326	1.3
Gross income	$3,223,053	23.5	$4,612,940	33.8
Rentals and interest	3,690,718	26.9	4,250,494	31.1
Net income	†$467,665	3.4	$362,446	2.7

† Deficit.

INCOME STATEMENT OF UNITED RAILROADS OF SAN FRANCISCO FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Passenger revenue	$6,203,164	99.1	$7,399,411	99.2
Other operating revenue	58,835	0.9	58,730	0.8
Total operating revenues	$6,261,999	100.0	$7,458,141	100.0
Maintenance of way and structures	$286,642	4.6	$418,983	5.6
Maintenance of equipment	346,703	5.5	379,696	5.1
Transportation	3,786,404	60.5	3,292,903	44.1
General	1,178,255	18.8	672,719	9.0
Total operating expenses	*$5,572,423	89.0	$4,764,301	63.8
Taxes	434,400	6.9	487,900	6.6
Total operating expenses and taxes	$6,006,823	95.9	$5,252,201	70.4
Operating income	$255,176	4.1	$2,205,940	29.6
Other income	170,409	2.7	163,121	2.2
Gross income	$425,585	6.8	$2,369,061	31.8
Income charges	511,413	8.2	511,218	6.9
Income before deducting bond interest	†$85,828	1.4	$1,857,843	24.9
Bond interest	1,591,863	25.4	1,594,364	21.4
Net income	†$1,677,691	26.8	$263,479	3.5

* Less $25,581 for transportation for investment.
† Deficit.

Passenger Traffic Decreased

The Carolina Light & Power Company, which supplies electric railway service in Raleigh, N. C., carried 2,362,428 passengers during the calendar year 1918, as compared to 2,411,319 for the preceding year. The electric railway earnings amounted to $108,740, or approximately 10 per cent of the total earnings from operation. The allied Asheville Power & Light Company also showed a decrease in passenger traffic from 5,566,567 in 1917 to 5,519,038 in 1918. The electric railway revenues of this company amounted to $267,906 or 50 per cent of the total.

Bay State to Be Reorganized

Plan Provides for $3,582,633 of New Cash from Stockholders and Scaling Down $20,000,000 of Capitalization to Conform to Public Control Act

The plan of reorganization for the Bay State Street Railway and Massachusetts Electric Companies has been completed. It provides for raising $6,082,633 of cash; places the capitalization of the new company at approximately $52,396,950 and annual interest and dividend requirements at $2,760,000, and provides for cash payments of $3,582,633 by the sale of new securities to stockholders who subscribe.

The plan of reorganization, when put into effect, will permit the acceptance of the special legislative act of 1918 and the formation of the new Eastern Massachusetts Street Railway under public trustees. The trustees, it will be recalled, will have absolute power to fix fares sufficient to pay a return covering all interest requirements, the stated dividends on the preferred stocks and 6 per cent on the common **stock** of the new company. Based upon the Public Service Commission's appraisal of $40,282,340 in its decision of Aug. 31, 1916, plus subsequent additions, the property valuation will be about $46,000,000, on which $2,760,000 is the approximate amount of the permitted initial annual return.

The credit of the State is pledged for the payment of the principal of not exceeding $4,000,000 of serial mortgage bonds of the new company maturing within ten years from the date of issuance. The act requires that $2,500,000 of these bonds be sold immediately so as to produce $2,500,000 cash, of which $2,000,000 must be used for future additions and improvements and $500,000 set aside as a reserve fund: and that $1,000,000 of cash additional must be realized from sale of other securities of the new company and applied to the rehabilitation of the properties or other corporate purposes. This makes a total of $3,500,000 of new cash which must be obtained, as a prerequisite to the formation of the new company under the act.

The proposed capitalization of the new company conforms to the act, so that the permitted return will always be sufficient to pay all fixed charges, and regular dividends. It represents a reduction of more than $20,000,000 from the outstanding debt and capital stocks of the Bay State and Massachusetts Electric companies.

The new company is entitled to earn 1.88 times the fixed charges under the reorganization plan. A further safeguard is that the compulsory cash requirements for fixed charges are made exceedingly small during the first two years of operation. A condensed approximate statement of the capitalization of the new company is given in the table above.

APPROXIMATE CAPITALIZATION OF NEW BAY STATE COMPANY

	Amount	Annual Return
Underlying bonds and undisturbed securities	$8,053,700	$439,64
New refunding mortgage 6 per cent one-ten year serial bonds	2,500,000	150,00
Total securities on which fixed charges must be paid in cash from the beginning	$10,553,700	$589,645
New refunding mortgage bonds with security under the same mortgage as the one ten-year serial 6s, above mentioned, but with the provision that in the event of "available income" being insufficient, interest accruing prior to June 30, 1921, may be postponed to not later than Dec. 31, 1925:		
5 per cent bonds, due 1948	2,871,000	143,550
4½ per cent bonds, due 1948	14,956,000	673,020
6 per cent bonds, due 1927	972,000	58,320
Total securities bearing fixed charges	$29,352,700	$1,464,535
New first preferred stock and sinking-fund stock, 6 per cent cumulative	4,097,000	245,820
New preferred B stock, 6 per cent cumulative	2,998,500	179,910
New adjustment stock, 5 per cent cumulative	8,719,000	435,950
New common stock, 6 per cent (approximate)	7,229,750	433,785
Total capitalization (approximate)	$52,396,950	$2,760,000

The amounts of new securities to be received by subscribing shareholders (per share) are as follows:

	For Each Share of Bay State Preferred Upon Payment of $15	For Each Share of Massachusetts Electric Preferred Upon Payment of $10	For Each Share of Massachusetts Electric Common Upon Payment of $5
New refunding mortgage 5s	$15	$10	...
New first preferred stock, 6 per cent	....	...	$6
New preferred B stock, 6 per cent	100	...	...
New adjustment stock, 5 per cent	12	2	...
New common stock	....	24*	10
Total par value, exclusive of option warrants	$127	$36*	$16
†Option warrants for adjustment stock at par	....	$25	$10

* Estimated.

† The option warrants give the right to purchase new 5 per cent cumulative adjustment stock (par value $100) at $36 per share during the first year, $38 per share during the second year and $40 per share during the third year after reorganization, subject in each case to an interest and dividend adjustment.

Lee, Higginson & Company, Boston, New York and Chicago, have underwritten the purchase of $2,500,000 of serial bonds and $1,000,000 of the cash subscriptions offered to stockholders. There will, however, be no commitment by the underwriters until at least $2,000,000 of the above-mentioned $3,582,633 cash has been subscribed by the present shareholders. If the shareholders subscribe less than $2,000,000, the reorganization plan will fail.

Lee, Higginson & Company are offering temporary negotiable receipts for the refunding mortgage one ten-year serial 6 per cent bonds at 100 and interest. The bonds will be in coupon form for $1,000, registerable as to principal only. They will be callable at 105 on any interest date on sixty days' notice.

Rhode Island Deficit Increases

The annual statement of earnings of the Rhode Island Company, Providence, R. I., just filed with the Public Utilities Commission, shows a net deficit of $777,523 for 1918. This is about $265,000 larger than the deficit for 1917.

The total operating revenue for 1918 was $6,311,285, which is $310,682 or slightly more than 5 per cent more than in 1917. Operating expenses totaled $5,115,551, an increase of approximately $600,000 or 13.2 per cent. The net operating revenue for 1918 was $1,195,734.

Deductions totaled $2,084,591, more than half of which represented rental charges. Taxes showed an increase of 7.78 per cent or $51,000, totaling $604,249. Interest and discounts registered a 9 per cent advance, aggregating $316,501.

A detailed report of operations for December, which was filed with the annual statement, showed an increase of $78,371 or practically 17 per cent over December, 1917. The total passenger earnings for December, 1918, reached $541,590.

The company's policy in discontinuing non-paying lines in order to reduce as far as possible the deficit is reflected in the December statement. This shows a decrease of approximately 150,000 car-miles, the total mileage for the month being 1,194,663 against 1,347,055 in 1917. The receipts per car-mile increased from 34.39 cents in December, 1917, to 45.33 cents in December, 1918.

Want Tax Rate Reduced

Representatives of electric railways in San Francisco, Los Angeles, Oakland and other cities of California have petitioned the State Board of Equalization for a reduction in tax rate on gross earnings. To support the plea, the California Electric Railway Association promised the board to present figures showing a tremendous loss in earnings due to increased cost of labor and materials. It is intended to show that unless a reduction in taxation is granted by the State the railroads will be forced to raise fares. Taxes collected from railroads, including electric railways, amount to $7,982,910 for the present fiscal year. Of this amount the Southern Pacific, Santa Fe, Salt Lake, Northwestern Pacific and Western Pacific pay $5,995,572. This leaves a balance of $1,987,337, which is paid by the non-government railroads and electric railways of the State. The rate of taxation is 5¼ per cent of the gross earnings.

Protective Committees for New York Surface Lines

It was announced on March 8 that because of financial problems confronting the New York (N. Y.) Railways, committees had been appointed to represent the holders of both the real estate and refunding 4 per cent bonds and the adjustment 5 per cent bonds.

Harry Bronner is chairman of the first committee and the other members are William A. Day, Casper W. Morris, Charles A. Peabody, W. H. Remick, Frederick H. Shipman, and Harold Stanley. F. J. Frost is secretary and J. P. Cotton counsel. This committee said that its members already represented directly $4,000,000 of the bonds. Holders of the bonds have been invited to deposit them with the Guaranty Trust Company, New York, N. Y., under a deposit agreement.

The committee of the income bondholders are John Candler Cobb, chairman; Oscar Cooper, Haley Fiske, Frank L. Hall, Duncan A. Holmes, Ernest Stauffren, Jr., and Richard H. Swartwout. B. W. Jones is secretary and Murray, Prentice & Howland are the counsel. Holders of these bonds have been invited to deposit them with the Bankers' Trust Company, New York, N. Y., the Old Colony Trust Company, Boston, and the Commercial Trust Company, Philadelphia. The deposit agreement is being prepared.

Aurora, Elgin & Chicago Protective Committee

A protective committee has been formed to represent holders of Aurora, Elgin & Chicago Railroad first and refunding mortgage 5 per cent bonds, due 1946, and three-year collateral trust notes, due 1921, secured by the first and refunding mortgage bonds.

The committee comprises R. M. Stinson, chairman, of R. M. Stinson & Company, Philadelphia; George H. Stuart, 3d, treasurer, Girard Trust Company; Lewis B. Williams, of Hayden, Miller & Company, Cleveland; W. T. Goodale, Saco & Biddeford Savings Institution, Saco, Me., and A. B. Conant, of A. B. Conant & Company, Boston.

The Girard Trust Company, Philadelphia, Pa., is depositary and the International Trust Company, Boston, and the Citizens' Savings & Trust Company, Cleveland, are subdepositaries. Deposits of securities are to be made before March 31.

On Jan. 1, 1919, default was made in the payment of the interest due on the first and refunding mortgage 5 per cent bonds, $3,079,000 par value of which are outstanding in the hands of the public and $1,626,000 par value of which are deposited as collateral security for the three-year collateral trust notes, of which there are $1,219,000 outstanding. The company has notified holders of these three-year notes that the interest due on same on March 1 will not be paid.

On Dec. 1, 1918, default was made in the payment of the interest due on $1,546,000 par value of Elgin, Aurora & Southern Traction Company first mortgage bonds, which interest must be met before June 1, 1919, or the holders of the Elgin, Aurora & Southern Traction Company bonds will have the right to compel the foreclosure of the mortgage securing same.

Receivers' Powers Defined

Presiding Justice Tanner of the Rhode Island Superior Court has approved the decree defining the powers of the three permanent receivers appointed for the Rhode Island Company, Providence, R. I., on March 4.

Specific reference is made as to the payment of wages, salaries, etc., the receivers being authorized to pay, subject to the order of the court, any such claims as have been incurred within six months past and now unpaid. As the payment of back wages to employees of the company has not yet been settled, this clause it is believed will govern the future disposition of these claims, although this matter was not specifically referred to at the hearing.

As to the surrender or continuance of any of the leases, or contracts now vested in or belonging to the Rhode Island Company, the court reserves the right hereafter to direct the receivers to surrender, reject or adopt any such leases or contracts.

Presiding Justice Tanner read the decree that had been drawn by the attorneys and called attention to the provisions of the ninth paragraph in relation to making various payments, including salaries. He said that such a payment must follow the statutes and that the priority rule therein contained must be observed. The court reminded counsel that although wages accruing during the six months next preceding the adjudication of insolvency to the extent of $100 in any case are regarded as a preferred claim, they are not necessarily a first preferred claim under the statutes.

Upon the entry of the decree by the court, Eugene A. Kingman of Edwards & Angell, asked leave to file an intervening petition in behalf of leased lines requiring the receivers to elect as soon as possible whether they will adopt the leases under which the roads have been operated by the Rhode Island Company.

The court granted permission to file the intervening petition and assigned it for hearing on April 2. The petition also asks that the receivers shall pay all the back rent that accrued under the leases prior to the appointment of the receivers. The petitioners ask specifically:

> That the receivers pay all rentals accruing under said leases prior to the date of appointment of said receivers and in accordance with other terms of said leases and
>
> That the receivers be directed by this honorable court to apply for leave to adopt all of said leases in their entirety and
>
> That failing such election your petitioners be declared entitled to resume and take possession of all the demised premises and property and
>
> That your petitioners may have such other and further relief in the premises as to your honor shall seem meet.

Financial News Notes

Car Trust Certificates in Trenton.—The Board of Public Utility Commissioners has authorized the Trenton & Mercer County Traction Corporation to issue $121,000 of 6 per cent car trust certificates in part payment for twenty one-man safety cars.

If You Have a Claim, File It.—All creditors of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., and all parties having or holding any claim of any kind against the company, or its property or franchises, are ordered to file their itemized and verified claims with the receiver on or before April 10, 1919.

Wants to Extend Its Bonds.—Unable to finance payment at maturity on April 1 of the $2,000,000 of its first mortgage twenty-year gold bonds, the Denver (Col.) Tramway offers to holders to extend the securities for five years. The bonds will be subject to redemption at 102½ on any interest date on thirty days' notice. Interest at 6 per cent a year will be paid.

Abandonment Case Put Over.—An application on behalf of the Huntington (N. Y.) Railroad to discontinue the system came up before Public Service Commissioner Fennell on March 10. As there is a petition before the Supreme Court to dissolve the corporation Commissioner Fennell said that he would await the court's action in the matter. Meanwhile the road will be operated as usual. According to the company, the road was operated at a loss of $55,000 for 1918.

No Action on the Common Dividend.—According to W. W. Lanahan & Company, Baltimore, Md., no action has been taken on the common stock dividend of the Monongahela Valley Traction Company, Fairmont, W. Va., and probably none will be taken until conditions justify such action. Lanahan & Company say that this seems wise under the circumstances, "for traction companies generally have been having an unusually hard time of it during these days of high prices and increased labor costs."

Inactive Company Dissolved.—The East St. Louis & St. Louis Traction Company, which was formed by officials of the East St. Louis & Suburban Railway, East St. Louis, Ill., to operate cars on the free bridge, has returned its charter to the Secretary of State of Illinois and dissolved. The charter allowed the company to operate cars on the free bridge if the consent of the city of St. Louis was obtained. The consent was never sought and inasmuch as St. Louis proposes to operate on the bridge, the East St. Louis & St. Louis Traction Company decided to dissolve.

Junking of Entire Line Threatened.—The entire Spokane & Inland Empire Railway, with the possible exception of the Coeur d'Alene division, may be junked unless the people of Spokane give the company their whole-hearted financial and moral support. Waldo G. Paine, vice-president of the company, said recently that the two city lines of the company might be abandoned if the merger of the lines in Spokane failed. Fred E. Conners, receiver of the company, has added that the whole of the company's property might be torn up in order to prevent further loss to the bondholders.

Alleged Default by Philadelphia Railways.—A suit in equity was filed on March 11 in Common Pleas Court by the Real Estate Title Insurance & Trust Company against the Philadelphia (Pa.) Railways alleging that default has been made in a three months' payment on a $400,000 issue of 5 per cent bonds. The trust company asks the court to sell the property in order to pay the overdue interest. The United States Shipping Board, Emergency Fleet Corporation, is also named as defendant, having operated the line for the transportation of workmen to Hog Island since 1918.

Union Traction Expenses High.—The revenue of the Union Traction Company of Indiana for the year 1918 was $3,198,820 as compared to $3,066,466 for 1917, an increase of $132,354 or 4.32 per cent. The operating expenses for 1918 were $2,236,487 as compared to $2,023,609 for 1917, an increase of $212,877 or 10.32 per cent. The result for 1918 was a deficit of $34,966, without deduction of sinking-fund payments, a decrease of $77,138 from the net income of $42,141 in 1917. After the deduction of sinking-fund charges the deficit was $98,542 as compared with a deficit of $17,649 in 1917, a loss of $80,893.

Winnipeg More Hopeful.—The gross earnings of the Winnipeg (Man.) Electric Railway for the calendar year 1918 at $3,588,723 showed a gain of $249,713 as compared to these of the preceding year. The increased wages and other operating expenses, however, swelled the operating charges so that the net income of $289,784 (excluding depreciation) represented a falling off of $63,845. The year 1918 was one of difficulty on account of the influenza epidemic and a sympathetic strike with the city fire brigade. On the other hand, jitney competition was eliminated. The outlook is said to be much brighter than for a number of years past.

Bills in Equity in B. R. T. Case.—Two bills in equity have been filed in the United States District Court to protect the formal rights of the Central Union Trust Company, New York, N. Y., as trustee under two mortgages of the Brooklyn Rapid Transit Company in pursuance of orders granted a few days ago by Judge Julius M. Mayer. In one instance the issue was of $60,000,000 of long term bonds issued by the New York Municipal Railway Corporation and in the other $29,000,000 of 6 per cent ten-year bonds dated June 1 last issued by the Brooklyn Rapid Transit Company. In each case the terms of the mortgage provided that the establishment of a receivership should be accounted a cause for foreclosure. It is probable, however, that the two bills may be regarded as of a formal character designed chiefly to protect the rights of the trust company.

Beneficial Results Likely to Follow.—Francis T. Homer, president of the American Cities Company, New York, N. Y., in a statement to banking houses, which have distributed securities of the New Orleans Railway Light Company, said: "The appointment of a receiver for the New Orleans Railway & Light Company should ultimately be beneficial to all security holders. The receiver, with the approval of the court, can refuse to perform certain large power contracts which still have some years to run and which by abnormal increases in cost have resulted in a loss to the company. It is expected that with this power and with the fact that the overwhelming majority of this class were willing voluntarily to modify their contracts the receiver will be able to adjust the contracts on a basis of fairness, which will result in an increase of revenue from $140,000 to $200,000 a year. Injunction suits against an increase in fare to 6 cents and an increase in electric and gas rates have been decided by the court of first instance in favor of the railway company."

Further Hearings on Spokane Abandonment.—Further negotiations between the city of Spokane, Wash., and the Washington Water Power Company will be held before the future of railway lines sought to be abandoned by the company is settled. The City Commissioners in conference declined to approve the adjustment whereby the company agreed to operate its cars on North Hamilton Street and South Maple Street, provided it was allowed to discontinue service on Second Avenue. The Commissioners felt that it would not be proper to secure service for one section of the city at the expense of another and that all lines should operate if the city was to give its approval to any settlement. D. L. Huntington, president of the Washington Water Power Company, expressed a desire to meet the wishes of the City Commissioners if it could be done and asked that the matter be allowed to remain open until further investigation. City officials are hopeful that the matter will be settled satisfactorily and that service will be restored on all lines.

More Rhode Island Bondholders Organize.—The Rhode Island Suburban Railway, owner of the main power house and considerable trackage operated under leases by the Rhode Island Company, Providence, for which permanent receivers have been appointed by the Superior Court of Rhode Island, has appointed a protective committee to conserve the interests of the bondholders. Holders of bonds of the company are requested to deposit them with all coupons attached on or before April 15, with the National Exchange Bank, Providence, as depository under a deposit agreement. Michael F. Dooley, president of the National Exchange Bank, is chairman of the committee. The other members are Edward B. Aldrich, trustee of the Estate of Nelson W. Aldrich; Benjamin A. Jackson, president of the Rhode Island Suburban Railway; George L. Shepley, president of the Rhode Island Insurance Company; Frederick S. Peck, treasurer of Asa Peck & Company, Inc.; and Francis E. Bates, secretary pro tem of the National Exchange Bank, all of Providence.

Slight Increase in Interest Fund.—The operating statement of the Cleveland (Ohio) Railway for January shows that $12,158 had been added to the interest fund, bringing it up to about $35,800. From this it will be seen how close this fund, which is the barometer for the rate of fare, came to being wiped out. It was supposed not to go lower than $300,000. No reduction in fare can be made until it reaches $700,000. The company was forced to set aside $123,000 from the January income to take care of the 6 per cent extra income tax on last year's revenue to comply with the new revenue law this year. Had it not been for this, a much larger sum would have been added to the interest fund. As this amount will not have to be set aside hereafter, some hopes are entertained that the interest fund will increase rapidly for the remainder of the year. January traffic showed a decline of 1.40 per cent from that of the same month in 1918, but the passenger earnings were about 40 per cent greater. The average fare for January, 1918, was 3.74 cents and for January, 1919, 5.31 cents.

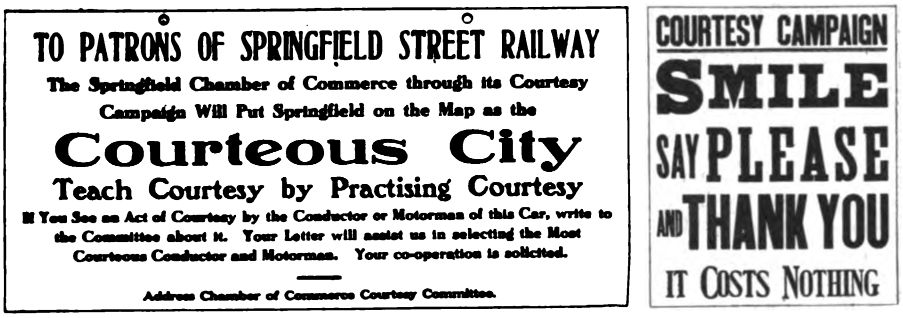
Results in Jersey in January.—The Public Service Railway, Newark, N. J., in its monthly report, comparing January, 1919, and January, 1918, filed with the Board of Public Utility Commissioners as required by that board's order of July 10 last, shows that with the increased fare to 7 cents and a 1-cent charge for initial transfers the total passenger revenue for last January was $1,892,145 and that for January, 1918, was $1,385,095, while the total operating expenses for January, 1919, were $1,425,259 and for January, 1918, they were $942,325. While the increased rate of fare brought an increase to the company in passenger revenue the sum of $507,049, operating expenses increased $484,923. The report shows that the total income deductions were $429,333 for January last and $432,185 for January, 1918, and the net income deductions for last January $65,990 and for January, 1918, $76,873. For January, 1919, the revenue passengers carried were 26,366,858; transfer passengers, 6,266,321; revenue from cash fares, $1,831,689; revenue from transfers at 1 cent each. $60,455.

Traffic and Transportation

Courtesy Campaign

Chamber of Commerce, Springfield, Mass., Wants a "Courtesy City"—Railway in Plan

The convention department of the Chamber of Commerce of Springfield, Mass., has initiated a plan to encourage courtesy in the various groups of men who come in contact with the public, and from whom the visitor will obtain his first impression of Springfield. The campaign embraces the conductors and motormen, policemen, hotel clerks, red caps, newsboys and messenger boys as having unusual opportunities for rendering service to the traveling public. The general public has also been invited to participate in the campaign by the Chamber of Commerce.



TO PATRONS OF SPRINGFIELD STREET RAILWAY

The Springfield Chamber of Commerce through its Courtesy Campaign Will Put Springfield on the Map as the

Courteous City

Teach Courtesy by Practising Courtesy

If You See an Act of Courtesy by the Conductor or Motorman of this Car, write to the Committee about it. Your Letter will assist us in selecting the Most Courteous Conductor and Motorman. Your co-operation is solicited.

Address Chamber of Commerce Courtesy Committee.

COURTESY CAMPAIGN

SMILE

SAY PLEASE

AND THANK YOU

IT COSTS NOTHING

CAR CARD AND DASHER SIGN USED IN COURTESY CAMPAIGN

Arrangements which the convention department submitted, applying especially to the conductors and motormen of the Springfield Street Railway Company, are as follows:

1. A committee shall be appointed, comprised of representatives of employees and officials of the street railway company and members of the Chamber of Commerce. This committee shall determine the conductor and motorman best liked by the public each month, during a period of six months, beginning March 1 and continuing to Sept. 1.
2. Notices shall appear in the trolley cars, announcing this contest and requesting the co-operation of the public by communicating with the committee whenever a conductor or motorman has exhibited any unusual courtesy to passenger or passengers. This committee shall determine at the end of each month, by the correspondence received, which motorman and which conductor have been most polite.
3. The Chamber of Commerce offers as a reward for this service a bonus of $5 and an attractive medal to the contestants selected by the committee.
4. Arrangements shall be made with local newspapers to publish weekly articles concerning the contest, and at the end of each month, feature pictures and story regarding the successful contestants.

To encourage interest in this competition the cards reproduced in the accompanying engravings were prepared. One is a car card; the other is a dasher sign. The Chamber of Commerce also arranged for two talks on courtesy to the motormen and conductors by Dr. Stanley L. Krebs, member of the Institute of Mechanical Art, New York. These talks were given in the morning and in the evening of Feb. 28 at the Assembly Room of the Hooker Street carhouse and attracted large attendance.

The courtesy campaign started on March 1 and will continue for six months. It is receiving much favorable comment in the local press.

New Orleans Suggestions

Speaker Before Louisiana Engineers Points Out Ways of Improving Electric Railway Service

In a paper recently presented before the Louisiana Engineering Society W. T. Hogg discussed means of overcoming the "long, circuitous routes," and "clumsy transfer system" that in his opinion characterize the electric railway system in New Orleans as operated by the New Orleans Railway & Light Company.

General principles upon which any changes for the New Orleans Railway & Light Company should be made were said to be the following:

1. Adoption of a standard spacing of parallel car lines according to (a) comfort and convenience and (b) traffic density (e.g., a spacing of six blocks is deemed acceptable).
2. Prohibition, wherever reasonable, of double-track lines on streets less than 60 ft. wide.
3. Routes as far as possible on boulevards for speed and safety.

Mr. Hogg worked out detailed routes to conform to these principles. For handling the extra cars during peak-load hours he suggested fast express service for long-haul passengers. He said that to secure an annual saving of $500,000 by these means an initial capital expenditure of only $150,000 would be required.

With efficient routing, it was said, the present equipment is sufficient to furnish a seat for every passenger even in rush hours with a reasonable degree of efficiency. As soon as financial conditions permit, however, 100 new cars of fifty-two-seat capacity should be purchased. These should be equipped for multiple-unit operation.

In regard to the question of control, Mr. Hogg said that in view of public distrust and the credit condition, only two courses are possible—foreclosure and the organization of an entirely new company or the purchase and the operation of the present railway property of the New Orleans Railway & Light Company by the city.

Still Feels the Pinch

Flat Five-Cent Fare Established in Washington Last November Not Sufficient

Declaring that since the 5-cent fare became operative on Nov. 1, it has failed to meet its operating expenses, taxes and interest charges by $65,911, the Washington Railway & Electric Company, Washington, D. C., has applied to the Public Utilities Commission for additional financial relief.

SUBMITS THREE METHODS

No specific railway fare is recommended in the petition submitted, the railway proposing three methods by which revenue may be increased and recommending that these methods be considered by the commission. They are:

1. Increase in the initial rate of fare in the District.
2. Establishment of a zone system in the District, with the initial charge in one zone and an additional lesser charge in the second zone.
3. A charge for transfers issued by the company to its own lines and a charge for inter-company transfers issued to and received from the Capital Traction Company, the latter charge for inter-company transfers representing a differential in favor of the company in lieu of the establishment of joint rates between said companies arising out of the issuance of inter-company transfers.

The company says that the increased gross receipts resulting from the increased fares in the District and Maryland have been more than absorbed by operating expenses. In this connection the petition says:

> The net results from railway operation for the month of December, 1918, we estimated would show a decrease in operating income of $33,893, compared with the pre-war period. Since then our actual figures for December show this decrease to be $37,103; and for January, 1919, a decrease in operating income of $41,139, compared with the pre-war period, a loss further increased by additional interest charges of $9,144, making a total of $50,284.

PETITION PRESENTS FIGURES

The petition then sets forth detailed figures for the months of November, December and January under the 5-cent fare showing that, out of its own earnings, it has failed to meet operating expenses, taxes and interest charges by $65,911, in comparison with a surplus above such charges in the pre-war period. "From which it appears that decrease in net income would amount to $550,183 annually," the petition avers. Previous to last November six tickets were sold for a quarter in Washington.

On March 10 the Public Utilities Commission fixed March 21 as the date for the hearing on the application of the company. The Capital Traction Company, which also operates in Washington, has not signified whether it will ask for a similar increase.

Seek Relief in New York State

Hearing Before Joint Legislative Committee on Bill Designed to Permit Commission to Pass on Cases on Their Merits

The joint hearing of the Senate and Assembly judiciary committee of the Legislature of New York on the Carson-Martin bill, took place in the Assembly Chamber at Albany, March 12, starting at 2.30 p.m., and continued to 6.30 p.m. The Carson-Martin bill is designed to amend the Public Service Commission law by extending the jurisdiction of the Public Service Commissions over the rates, fares and charges of electric railways fixed by agreement with local authorities, notwithstanding limitations in their franchises.

OPPOSITION HEARD FIRST

The opposition to the bill was heard first. It was led by Corporation Counsel Burr of New York City. Mr. Burr also represented and spoke on behalf of the Mayors' Conference Committee. He read a long letter, practically a legal opinion which he had sent to Mr. Martin, chairman of the Assembly judiciary committee. In this letter Mr. Burr dealt principally with the Quinby, or so-called Rochester, case against the Public Service Commission, 223 N. Y. 244, placing his own interpretation on the opinion of Justice Crane, saying that the majority of the court had not sustained Judge Crane's deduction.

Mr. Burr contended that the present bill was extremely objectionable, not only in that it sought to deprive the Board of Estimate & Apportionment of New York City or other municipal authority of a voice in deciding whether the fare provisions should be increased, but furthermore in that it delegated to the commission alone the function of passing upon applications to increase fares merely upon the basis of determining whether the private companies are engaged in operating at a loss under the present value of their property.

CITY OFFICERS APPEAR

Former City Comptroller Metz and former Congressman of Greater New York also spoke against the bill, stating that the Chamber of Commerce of Brooklyn was opposed to the giving of the power provided in the bill to the Public Service Commission. He made it plain, however, that the Brooklyn body did not oppose any proposed increase of rates if better service were to be given by the operating companies than was being rendered at the present time. Other civic bodies of the city had also gone on record along this line. Stewart Brown, representing some 10,000 or more real estate owners of Greater New York, also spoke in opposition to the bill, mainly on the ground that the condition of affairs in which the railways now found themselves was largely brought about in the city of New York by the railways themselves through overcapitalization.

Other speakers appeared representing many of the upstate cities, principally those connected with the Mayors' Conference Committee. They alleged overcapitalization and watering of stock, high rentals and excessive salaries.

Those in favor of the bill were led by A. W. Loasby, president of the First Trust & Deposit Company, Syracuse, Ex-Supreme Court Justice and Governor Charles Evans Hughes, representing the Equitable Life Assurance Society, New York Life Insurance Company and the Metropolitan Life Insurance Company, which hold and represent more than $43,000,000 of the securities of the railway companies; Mr. Cobb, Boston, representing more than 5000 stockholders of the local railways in New York City, and A. E. Kalbach, receiver of the Second Avenue Railway, New York City.

Mr. Hughes said that the bill did not increase or reduce rates or fares. It fixed no definite rate nor did it change the basis now established by the statute upon which reasonable rates were to be determined. It was proposed by the pending bill to amend the Public Service Commission's law so as to confer upon the commissions the power in a proper case to fix a rate of fare to be charged by a railroad corporation or a street railroad corporation, "notwithstanding a definite rate, fare or change prescribed by any franchise or contract of the local authorities of any city or other political subdivision of this State," etc.

According to Mr. Hughes the pending bill if enacted into law would confer upon the commissions in clear and definite language the power to change rates in such cases as that in Rochester, so that the rates to be charged should be just and reasonable. He said that until the Court of Appeals decision in the so-called Rochester case it was supposed that the commissions had plenary power over rates and that the power of the commissions affected every electric railway in the State, whether this rate was fixed by general or special statute or by franchise or by contract with a municipality.

The Quinby, or Rochester decision, however, seemed to lay down the rule that, although the Legislature had definitely delegated to the public service commissions the power to change rates of fare and raise or lower them so that they should be just and reasonable, there was no distinct statement of legislative intent to give the commissions power to change rates which had been fixed by agreement with municipalities.

Mr. Hughes contended that the matter of rates was within the control of the State in its exercise of the police power and that agreements with local authorities did not deprive the State of its authority to supervise rates and to determine the just and reasonable rates to be charged. He said that in the Quinby case the power of the Legislature had not been denied and that the clear expression of opinion in the so-called South Glens Falls case established the power of the Legislature beyond any reasonable question.

Mr. Hughes said there was no basis for the contention that the provision of the Constitution as to local consents has in any way ousted the Legislature of its police power or of its normal governmental supervision of charges. The constitutional provision as to consents contained no language permitting such a conclusion. Such an ousting of the Legislature of its appropriate powers of protection could not be implied. Municipal contracts, including franchise agreements, were at all times presumed to be subject to the police power of the State acting through the Legislature or through a duly authorized agency.

Under the Public Service Commission's law, the railroad law and the laws of the State of New York as they now stood, electric railways throughout the State were facing bankruptcy. The magnitude of the disaster which would follow wholesale receivership was apparent only when one considered that the securities issued by these companies were not held by a few persons or corporations, but were held by a large number of persons in small amounts. Mr. Hughes said that the enactment of the pending bill would go a long way toward correcting the enormous shrinkage and loss of credit of the companies and also a long way toward restoring public confidence.

Mr. Kalbach stated that the Second Avenue Railroad had been in the hands of a receiver since 1908. Due to the stress of the present time the company would probably be unable even to pay the interest on the certificates which had been issued by the receiver.

Ex-Judge Nathan L. Miller of the Court of Appeals, of Syracuse, representing financial institutions of the city of Syracuse, appeared in favor of the bill. He reiterated and sustained many of the points made in the argument of Judge Hughes. Mr. Miller said that the Legislature has the power to grant to the commission the relief sought in the bill.

A feature of the hearing was the appearance of representatives of the employees seeking the passage of the bill.

Letters from financial institutions and banks were read, and speakers and representatives in person appeared in favor of the bill from every corner of the State.

A. W. Loasby stated that the principal interest of the bankers centered in the fact that they and individuals in the State hold more than $1,500,000,000 of securities of the electric railways as investments and that under the present conditions the value of these securities was seriously jeopardized owing to the inadequate earnings made by the companies.

In addition to those already mentioned there were present one or more officers of nearly every electric railway in the State.

Wants Local Line Segregated

Bridgeport Committee Recommends Relief for Connecticut Company, Hoping for a Return to the Five-Cent Fare

After months of investigation the traffic commission of Bridgeport, Conn., in its report submitted to the Common Council recommended the return of the 5-cent fare on the lines of the Connecticut Company in Bridgeport with a five-minute service on all lines. The 6-cent fare, under the present service conditions, is characterized as "useless," to meet the company's financial burden. The report has been referred to the miscellaneous committee for consideration. The commission's report embodies a number of important recommendations, including the following:

1. Separation of the local electric railway lines from the Connecticut company to permit a trial period within which the local trolley properties may be operated independent of the Connecticut Company's properties as a whole.
2. Regulation of jitney buses, including provision for the filing of an adequate surety bond to protect passengers in case of accident.
3. Radical changes in the regulation of vehicular and pedestrian traffic, suggesting ordinances similar to those in force in other metropolitan cities.
4. Installation of at least fifty Birney one-man cars with a view to operating suburban and interurban cars within the city limits on the skip-stop system, leaving the local and short haul business to the one-man cars.
5. Appointment of a committee to include the trustees of the Connecticut Company to devise means to finance and carry out the recommendation that the local lines be operated as a separate unit.

In considering the Connecticut Company's properties as a whole the committee calls attention among other things to the following facts:

Although the cost of labor, materials, supplies and equipment has increased in some instances more than 200 per cent, the income of the Connecticut Company has decreased to such a point that expenses are greater than revenue.

The company now carries a passenger from Ash Creek to Devon, about 11 miles, for one fare, 6 cents. The same distance on the steam railroad costs 33 cents.

The point is that the railway is giving its patrons service at less than cost. This, of course, cannot continue indefinitely without a complete and utter collapse of the railway fabric.

Entering into the cost of this service is the requirement made by cities that the railway pay for paving between its rails and 2 ft. on either side.

This has cost the Connecticut Company an average of $310,000 a year on its system since 1913, to which must be added approximately $200,000 of expense incurred in replacing of rails and ties incidental to the new paving, and in many cases this $200,000 expenditure could have been delayed a few years were it not for the requirements of the cities that new pavement be placed.

Summed up, payments to the State and communities amount to more than $1,180,000 a year, or more than 10 per cent of the company's gross income.

These taxes and assessments represent a tax of $2,100 for every car operated by the company, while the jitneys pay an average of less than $21, and operate over paving paid for largely by the trolley riders. In other words, the tax paid by the railway, per car, is 100 times the amount paid by the jitney owner. Everybody knows how they congest the streets, prevent the people from getting aboard railway cars and in general endanger the public, without being responsible for accident to their patrons.

If the electric railways were in the same position that other public utility companies are, they would be required merely to replace pavement in as good condition as they found it when making changes, yet they are required to pay for new pavements to the extent of more than $300,000 a year.

The policy of the State has not permitted such an unfair competition with its water, gas, electric light and telephone companies, and it should regulate the jitneys as to routes and hours of service, and require a surety to guard against loss of life or injury by accident.

Your commission is presenting these facts as they must be taken into account in considering the problem of securing adequate trolley service at a minimum fare.

The committee points out that the Connecticut Company has suitable equipment to cover suburban and interurban service, and with the installation of a liberal number of safety cars, it is the opinion of the commission that if the local system were operated as a unit under the recommendations summarized previously in this article, it would be possible to secure financial relief and the hearty support of the riding public, with a resulting return to the 5-cent fare for a reasonable haul.

The committee recommends in consideration of its general findings that the necessary action be taken to empower the city attorney to appeal to the United States District Court for a modification of the decree under which the trustees of the Connecticut Company operate, to permit a trial period within which the local railway properties may be operated independent of the Connecticut Company's properties as a whole.

Pacific Electric Wants General Increase

Following its action of a few days ago, in which it asked the Railroad Commission to increase its fares in Los Angeles by constricting the 5-cent zone and providing a blanket fare of 8 cents, the Pacific Electric Railway on March 3 filed an application with the commission for authority to make a general increase in its passenger rates. It asks that in all points outside of the city of Los Angeles it be permitted to establish a cash 7-cent fare where the same is now 5 cents; also a coupon book of twenty tickets to be sold for $1, the tickets to be used within ten days and at the rate of not more than two a day, the idea of the book being to maintain the 5-cent fare for the daily rider. This latest proceeding affects fares within the cities of Glendale, Long Beach, Pasadena, Pomona, Redlands, Redondo Beach, Riverside, San Bernardino, San Pedro, Wilmington, Santa Ana, Santa Monica, South Pasadena, Venice and Santa Monica-Ocean Park-Venice-Playa del Rey.

In these communities the Pacific Electric Railway would charge the 7-cent fare and sell the coupon books. The company also asks for authority to have its minimum charge for interurban fares increased from 5 to 7 cents, and that the 10-cent round-trip fare be made 14 cents. The interurban fares will affect Claremont, Colton, Lankershim, Ontario, Fullerton, Glendale and practically all the small towns and cities on the 600 miles of track operated by the Pacific Electric Railway.

The company also wants permission to charge $1.40 for forty-ride school tickets that now sell for $1.

Metal Tokens at Boston

Public Appreciates Them as Far Superior to the Pasteboard Tickets Which They Replace

Metal tokens replaced paper tickets on the entire system of the Boston (Mass.) Elevated Railway beginning Feb. 22. Each token is good for one fare, the present unit being 8 cents. The tokens are slightly larger than a 5-cent piece. They are sold by all conductors, at prepayment stations and in various designated stores in different parts of the metropolitan district.

Wooden Ticket Boxes Replaced

The wooden ticket boxes used on all cars were removed mainly during the night before the metal tokens became valid for transportation, and fare boxes were substituted for them. This was a simple matter as fare boxes were used previously to the paper tickets and practically all cars were already equipped with fare box standards, the fare boxes and registers being stored for use with the metal tokens.

Each token bears on one side the inscription "Good for One Fare" and on the reverse side the signature of H. L. Wilson, treasurer of the company. When the metal tokens were adopted the company issued a regulation rendering all paper tickets invalid for transportation. These paper tickets were redeemed either at the company's offices or were exchanged for metal tokens in the conductors' hands.

Passengers are required to deposit their tokens personally in the fare boxes. It is expected that the use of the tokens and recording fare boxes will decrease losses in revenue accruing from misuse and theft of paper tickets. In case a two-zone fare system goes into effect in April, as planned, the tokens can be used in place of nickels, if desired.

The tokens used at Boston were purchased from the Waterbury Button Company, Waterbury, Conn. The order was for 3,000,000 of the disks. The tokens are of so-called "high brass" and weigh about 10 per cent less than a 5-cent piece, being of the same diameter and thickness. They are now made in a single stamping operation, a pressure of about 16 tons being applied in "minting" each token. No changes were required in the fare boxes. The public appears to appreciate the tokens as far superior in convenience to the pasteboard tickets which they replace. From 600,000 to 700,000 tokens are used daily on the system.

Story of Counterfeits Denied

Erroneous press accounts have recently appeared at Boston and elsewhere to the effect that the company was being flooded with counterfeit tokens, metal slugs, buttons, etc. Inquiry at the office of H. L. Wilson, treasurer of the company, by the representative of the ELECTRIC RAILWAY JOURNAL at Boston, disclosed the fact that only two counterfeit tokens have so far been received, and one of these was taken from a transfer box. Both were wretched imitations of the genuine tokens, one being lead-colored and the other roughly stamped and entirely devoid of the clear-cut characteristics of the tokens themselves.

A few tokens have been used by excited or careless patrons of the local telephone company in place of nickels, possibly a dozen a day. Mr. Wilson said he could not imagine where the story originated that the company was being inundated with spurious coins and tokens. He stated that on the average the company receives only $2.50 to $5.50 in counterfeit money for every $500,000 taken in. The fare boxes are constructed so that the conductors can see what every passenger drops in, and at all the subway entrances electric lights are installed above the boxes so that the collectors can detect a fraud immediately.

Suburban Increase Denied at Ottawa

The Railway Commission of Ontario, has disallowed the proposed new tariff of fares on the Ottawa Electric Railway. The application was filed some months ago. It provided for a zone system with heavily increased rates between the city limits and points outside on the eastern and western extensions of the system.

The application for disallowance was made by the village of Westboro and the township of Nepean, supported by the city of Ottawa. The tariff was suspended by the commission when the application was made to the Railway Commission.

The board found that, after maintaining a 15 per cent dividend and paying interest on its funded debt, the company's returns showed it to be almost $500,000 better off than it was before the war. Under the circumstances the board did not think the company justified in increasing its rates to suburban points.

The recent substantial wage increases were given consideration by the Railway Commission, but against this extra expense there was the additional revenue accruing to the railway from the abolition of the six-for-a-quarter tickets.

The increases sought under the proposed tariff, while not affecting journeys from point to point within the city limits, represented advances of from 100 to 200 per cent in journeys between the city and outside points on the line. The Britannia line, standing alone, the Railway Commission found not remunerative, but said that the line must be considered as a part of the general system.

Paralysis of the port of New York by the strike of harbor workers threatens a coal famine which may restrict, if not stop, operation of subway, elevated and surface car lines unless there is prompt relief.

Transportation News Notes

Safety Cars for Pacific Electric Railway.—Twenty one-man safety cars have been delivered to the Pacific Electric Railway, Los Angeles, Cal. The cars will be used on unimportant runs in Pomona, San Bernardino, Riverside, Pasadena and Santa Monica. None of the cars will be used on the Los Angeles city lines or in the interurban service.

A Bold Bid for Business.—The Chicago, Ottawa & Peoria Railway, Joliet, Ill., effective on April 1, will handle all kinds of express on all of its passenger cars at rates 25 per cent lower than charged by other lines, without pick-up or delivery service. There will be a minimum charge of 20 cents except on empty carriers, on which the charge varies.

Jitneys Must Run Always.—The City Commission of Atlantic City, N. J., has decided that jitney owners must operate their cars during the winter as well as in the summer or their licenses will be revoked. All licensed jitneys must operate the full twelve months of the year for which they are licensed. The City Commission licenses only a limited number of such vehicles.

Liberty but Not License in Kentucky.—The Louisville (Ky.) Police Department in handling Mardi Gras celebrations this season, permitted masqueraders on electric cars on their way to parties, but placed a ban on masqueraders on the down-town streets. In past seasons masked persons have been banned from cars, due to several fights, in which it was difficult to apprehend those guilty.

Railway Considers Service Order Unreasonable.—The Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has petitioned the Public Service Commission of Indiana for relief from an ordinance passed by the Council of South Bend on Feb. 10, requiring the company to operate cars on all of the city tracks every fifteen minutes. The company complains that public convenience does not require such service; that it would be impossible to comply with the ordinance for various reasons, and that the ordinance generally is unreasonable.

No One-Man Cars at Present.—T. J. Minary, president of the Louisville (Ky.) Railway, has branded as premature the reports relative to the company adopting the one-man car system on several lines upon which single-truck cars are operated. He said: "No action whatever has been taken in Louisville, to that end. Of course we are considering various methods of increasing earnings, and meeting the increased wage as authorized by the War Labor Board, but it is too early yet to talk about one-man cars. We don't know yet what the city is going to do."

Would Legislate Against Fares.—An act to abolish the 5-cent fare zones at present in effect on the lines operated by the Rhode Island Company, Providence, R. I., has been introduced in the House of Representatives by Representative John A. Hamilton, Cranston. The act would restore the old zone limits and permit a charge within those limits of more than 5 cents, the Public Utilities Commission being empowered to fix the rate, although a maximum of 8 cents is stated. The act provides further for the issuance of special commutation and excursion tickets on lines which the commission judges requires such action. The measure was referred to the judiciary committee.

Six-Cent Fare Possible in San Francisco.—At a recent meeting of the public utilities committee of the Board of Supervisors of San Francisco, Cal., Fred Boeken, superintendent of the Municipal Railway, replied to demands for extensions which he felt sure would not be self-supporting, by the statement that the policy of making unprofitable extensions, if continued, will force the city to a 6-cent fare or some other means of making up the deficit that would be bound to result. The Parkside district beyond the tunnel was the particular territory under discussion, but unprofitable extensions in other parts of the city would be in the same classification. Mr. Boeken asserted that the city is losing money on the E, H and K lines; just paying expenses on the F and J lines; making a little more than expenses on the D line, while A, B and C lines are profitable.

Interference with Service Cut Prevented.—Judge Martin J. Wade of the Federal Court has issued an order restraining Judge Hubert Utterback of the Polk County district court from in any way interfering with the Des Moines City Railway case. Earlier in the week Judge Utterback had refused to dissolve a temporary restraining order preventing the reduction in service proposed by the Des Moines City Railway as a result of the recent decision in the fare case. City attorneys brought the injunction proceedings to forestall the service cut and the hearing on the permanent injunction had been set for trial by Judge Utterback. Judge Wade's order prevents any further consideration in the district court. Judge Wade ordered a further hearing on the restraining order for March 11 at Ottumwa, Iowa. Officials of the Des Moines City Railway have announced that pending Judge Wade's decision they will make no attempt to cut the service.

Wants Fare Order Set Aside.—The city of Cranston, through its solocitor, Frank H. Wildes, has filed in the Supreme Court of Rhode Island an appeal from the order of the Public Utilities Commission issued on Feb. 26 voluntarily extending for two months the experimental period for the operation of the increased fares on the lines of the Rhode Island Company, as permitted originally on Oct. 23, 1918. The petition states that the residents of Cranston are affected by the order of Feb. 26 in that the changes made in the original order, that is, 2-cent zones to be 5 cents, the additional zone on the Oaklawn line and the dividing of the crosstown line into two zones are to remain in effect until May 1, whereas when the increase was granted originally, the time limit was set at March 1. The petition sets forth many alleged inequalities and unjustified charges and asks the court to review and grant relief wherever the rates under the new order are deemed to be unfair, unjust and discriminatory.

Closed Vestibules and Folding Steps Ordered.—To reduce the number of boarding and alighting accidents in connection with electric railway operation the Public Service Commission for the First District, on motion of Acting Chairman Travis H. Whitney has directed the several electric railways in New York to install closed vestibules and folding steps upon the major part of their rolling stock. The reasons for the direction of the commission were set forth in an opinion by Acting Chairman Whitney which has been approved by the commission. As the result of extensive investigations the commission is convinced that a major portion of the casualties which occur on street railroad lines in New York City are the result of boarding and alighting accidents. Several years ago the Third Avenue Railway System equipped practically all of its closed cars with closed vestibules and folding steps and with a device—which the commission believes should also be generally installed —to prevent vestibules being opened while the car is in motion. As a result of this installation the number of accidents upon this system has been greatly reduced.

Results with Fare Boxes in Washington.—The Capital Traction Company Washington, D. C., has equipped all the cars of its Georgetown division with fare boxes, sixty-five of the boxes being in use at this time. Fare boxes wil be installed in cars of other lines as rapidly as possible. Equipment of all cars on its Columbia division with fare boxes is announced by the Washington Railway & Electric Company. Just what lines will be the first to be equipped with the new boxes has not yet been decided. If the shipment contains a sufficient number to equip all cars of the Georgetown line, that line will be the next to get the devices. If the number is not sufficient to equip al cars on the Georgetown line, some other division with a smaller number of cars will get the boxes. Both companies report that the number of fares turned in from cars equipped with the new fare boxes remains practically as high as during the first week after installation of the boxes. The first fare boxes were installed on cars in Washington on Jan. 26. Both companies advertised the change extensively.

Legal Notes

NEW YORK.—*Duty to Public Must Be Discharged, Even if Property Is Operated at Loss. Corporation on Same Footing As Individual.*

That a railway company cannot operate its railway at a certain rate of fare without loss does not constitute an excuse for failing to discharge its duty to the public, arising on contract voluntarily assumed.

In regard to the modification or abrogation of contract obligations voluntarily assumed, public service corporations stand on the same footing as individuals.

That the employees of a public service corporation demand wages which the corporation regards as excessive does not relieve it from its contract obligations to the public. (Public Service Commission, Second District, *vs.* International Ry., 172 New York Sup., 551.)

NEW YORK.—*Mandamus Should Not Issue Where There Is Impossibility of Performance.*

In a proceeding for mandamus by the Public Service Commission, requiring a street railway company to operate cars within two days, it was error to grant the writ, where the company is thereby required to take striking employees back, which it cannot do because they demand a retroactive scale of wages, payment of which was impossible on account of lack of funds. (Public Service Commission, Second District, *vs.* International Ry., 120 Northeastern Rep., 727.)

NORTH CAROLINA.—*Carrier Responsible for Acts of Strangers Only When They Can Be Anticipated.*

A carrier is liable for injuries to passengers caused by wrongful acts of strangers, if they could be reasonably anticipated, but is not liable for injuries caused by the premature starting of a car due to the pulling of the bell rope by an intoxicated passenger, where the conductor had no knowledge of the intoxication and such third person had been orderly up to that time. (Pride et al. *vs.* Piedmont & Northern Ry., 97 Southeastern Rep., 418.)

DELAWARE — *Public Utilities Commission Has Power to Regulate Fares.*

An order of the board of public utility commissioners, created by legislative act and given supervision over public utilities, fixing rates to be charged by traction companies, was not void as an exercise of delegated legislative power. (Robertson et al vs. Wilmington & Philadelphia Traction Co., 104 Atlantic Rep., 839.)

FEDERAL COURTS—*Public Utilties Commission Has Power to Regulate Fares in Colorado.*

Though a town ordinance, granting, under a law of Colorado, a street railway franchise, allowed certain fares on condition that transfers were given to the line of another company, held, the State, without impairing the obligation of contract, could empower the Public Utilities Commission to regulate the matter of fares. (City of Englewood vs. Denver & South Platte Ry., 39 Supreme Court Rep., 100.)

MASSACHUSETTS—*Maintenance of Bridge Required under Agreement "to Hold City Harmless from Operation."*

The covenant of an electric railway company to save the city harmless from all loss, cost, or damage from construction and operation of extensions of road, held comprehensive enough to include an obligation to save the city harmless from one-quarter of the expense of maintaining bridges on the railroad's locations as extended, apart from any obligation imposed by law before the enactment of the statute. (City of Northampton vs. Northampton, Street Ry., 121 Northeastern Rep., 495.)

NEW YORK—*Rights of Public to Good Service Paramount.*

In proceedings to compel public service companies to comply with an order of Public Service Commissioners to procure and place in operation additional cars, the court should give little heed to nice considerations of equity; the rights of the public being paramount, and the maxims, "He who seeks equity must do equity," and "He who comes into equity must come with clean hands," being pertinent. (Public Service Commission, First District, vs. Brooklyn Heights R.R., 172 New York Sup., 790.)

New Publications

Employment Management

Handbook on Employment Management in the Shipyard. Bulletin II. the Employment Building. United States Shipping Board Emergency Fleet Corporation, Philadelphia, Pa.

Employment departments of electric railways may find suggestions of value to them in this illustrated booklet on employment work in a different field.

Statistics of Railways in the United States for the Year Ended Dec. 31, 1916

Thirtieth Annual Report of Interstate Commerce Commission. Government Printing Office, Washington, D. C. Paper, 20 cents.

This pamphlet gives the latest official statistics of earnings, capitalization and the like for the steam railroads of the country.

Boiler and Furnace Testing

By Rufus T. Strohm, associate editor Power. Engineering Bulletin No. 1 of the Bureau of Conservation, United States Fuel Administration, Washington, D. C. Copies can be obtained free from the administrative engineer of any state or from the Bureau of Conservation.

This little pamphlet is a practical treatise on the subject covered by its title and is intended to enable power plant operators to secure the best possible results from their equipment. It would seem to be the duty of everyone who is responsible for the consumption of power plant coal to secure a copy of this little pamphlet and read it.

Comparison of Workmen's Compensation Laws of the United States Up to Dec. 31, 1917

By Carl Hookstadt. Bulletin No. 240, Bureau of Labor Statistics, Superintendent of Documents, Government Printing Office, Washington, D. C. 106 pages. Paper: 15 cents.

This bulletin summarizes and compares the principal features of the workmen's compensation laws of the several states and territories. It is a revision of a study made in 1916. Since the former report twenty-seven states have amended or supplemented their compensation laws, and five new states have been added, making a total of forty states, territories and possessions.

Books About World Trade, Ships and the Ocean, Foreign Countries, and Foreign Languages

Compiled for the United States Shipping Board by the Free Public Library of Newark, N. J.—Miss. M. L. Prevost, compiler under direction of John Cotton Dana, Librarian.

The new merchant marine of the United States stimulates interest in ships and world trade, as well as other countries, the chief foreign languages used in commerce, methods of conducting world trade, etc. With a view to guiding business men, as well as general readers, the United States Shipping Board has had compact lists of good books compiled by the staff of the Free Public Library, Newark, N. J., an institution with a national reputation for its business reading service.

Fuel Economy in Boiler Room

By A. R. Mauler and Charles H. Bromley. 308 pages. Cloth, $2.50 net. McGraw-Hill Book Company, Inc., 239 West Thirty-ninth Street, New York City.

This is a book for the practical man who wishes to apply in the boiler room the methods which will conduce to efficient operation. It is an extension of the book entitled "Fuel Economy and CO_2 Recorders" by the same authors published in 1914. The new material includes fuels, firing methods, combustion of coal from the practical standpoint, fuel-oil burning, stoker operation, boiler settings, burning low-grade fuels and waste gases, ready means of checking boilers and furnace efficiency, etc. The method of presentation is direct and simple, and the book can be used with profit by the fireman and the water tender on one hand and the manager on the other.

Personal Mention

Lorne C. Webster has been elected president of the Quebec Railway, Light, Heat & Power Company, Quebec, Que., to succeed the late Sir Rudolphe Forget.

L. R. Schenck, formerly treasurer of the Toledo & Indiana Railroad, Toledo, Ohio, has been elected president of the company to succeed D. D. Schenck, deceased.

W. Grissel has been appointed chief engineer of power station of the Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio, to succeed C. H. Erion.

Haven C. Kelly has been appointed superintendent of track and roadway of the Chicago (Ill.) Surface Lines, assuming this new position on Feb. 16. Mr. Kelly entered the service of the Chicago City Railway in 1910, as engineer of construction, filling that position until 1913, when the unification of the various lines was perfected. He was then made a divisional superintendent, occupying that position until the present appointment. Mr. Kelly was born in Parkersburg, W. Va., in 1880. Immediately after leaving school he entered the service of the Baltimore & Ohio Railroad, at Parkersburg, in the engineering department. In 1904 he became connected with the Missouri Pacific Railway at St. Louis as district engineer in charge of construction work, remaining there six years, when he entered the service of the Chicago City Railway as engineer of construction, and has been continuously in their employ since that time.

H. C. KELLY

Charles E. Serviss has been appointed general manager and purchasing agent of the Springfield & Xenia Railway, Springfield, Ohio, to succeed J. F. Egolf.

W. E. Schuppert has been appointed assistant secretary of the American Cities Company, with headquarters at New Orleans, La., to succeed Charles B. Murphy.

W. K. Dunbar, assistant secretary of the American Water Works & Electric Company, New York, N. Y., has also been appointed assistant treasurer of the company.

William F. Brown has been appointed secretary and treasurer of the New York & Long Island Traction Company, Hempstead, L. I., to succeed Frank E. Haff.

H. W. Potter has been appointed treasurer of the Toledo & Indiana Railroad, Toledo, Ohio, to succeed L. R. Schenck, who has been elected president of the company.

F. L. Winters, division superintendent of the New Orleans Railway & Light Company, New Orleans, La., with jurisdiction over the railway lines operating below Canal Street, has resigned.

Nelson R. Troutman has been appointed roadmaster for the Trenton & Mercer County Traction Corporation, Trenton, N. J. He was formerly employed by the United Traction Company, Albany, N. Y.

J. M. Johnson has been appointed superintendent of the Ithaca (N. Y.) Traction Company to succeed Howard Morgan. Mr. Johnson has also been appointed purchasing agent of the company to succeed T. P. Clancy.

Charles Page, president of the Sand Springs Railway, Tulsa, Okla., has also been appointed treasurer of the company to succeed E. M. Monsell. Mr. Page was treasurer of the company previous to the appointment of Mr. Monsell to that position.

William F. Gorenflo has resigned as manager of the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., but he will not sever his connection with the company before June 1 next. Mr. Gorenflo has been manager for the company for several years.

S. S. Crane has been appointed general manager of the Johnstown (Pa.) Traction Company in connection with his position as general manager of the Altoona & Logan Valley Electric Railway, Altoona, Pa. His time will be divided between the two properties.

L. A. Williams has been appointed assistant superintendent of transportation of the Boston Creek-Camp Custer and Battle Creek City divisions of the Michigan Railway, Battle Creek, Mich. Mr. Williams was formerly trainmaster of the Camp Custer division.

James H. Wilkerson, Chicago, Ill., has been appointed a member of the Public Utilities Commission of Illinois to succeed Fred E. Sterling, who resigned to become State Treasurer of

Illinois. Mr. Wilkerson was formerly First Assistant Attorney General of Illinois.

Herman Berg, formerly chief clerk to C. E. Bode, general freight agent for the Illinois Traction System, Springfield, Ill., has accepted a position as chief of the tariff bureau for the Chicago, Indianapolis & Louisville Railroad Company (Monon Route), with headquarters in Chicago.

Harry Darby, foreman of the Poland carhouse of the New Orleans Railway & Light Company, New Orleans, La., has been appointed division superintendent of the company with jurisdiction over the railway lines operating below Canal Street. He succeeds F. L. Winters, resigned.

J. M. Joel, formerly auditor of the Syracuse and Utica lines of the New York State Railways, and since April, 1918, auditor of the Rochester lines also, was made general auditor of the company at the last meeting of the board of directors. Since April, 1918, his headquarters have been at Rochester. Mr. Joel has worked his way up consistently with the local properties during the last twenty-eight years. He filled the posts of general clerk, voucher clerk, bookkeeper, chief clerk and auditor of the Syracuse Consolidated Street Railway and its successor, the Syracuse Rapid Transit Railway. One after another of the auditorships have since been added to his jurisdiction, leading up to the general auditorship of the State Railways. Mr. Joel has taken an active interest in the affairs of the American Electric Railway Accountants' Association, serving for a time on the joint committee of engineering accounting.

J. M. JOEL

J. C. Nelson, vice-president and general manager of the Empire United Railways, Inc., Syracuse, N. Y., has been elected vice-president of the Ithaca (N. Y.) Traction Company, to succeed Charles E. Hotchkiss. Mr. Nelson has also been appointed general manager of the company.

Henry Lee has been appointed master mechanic of the Dayton & Troy Electric Railway, Dayton, Ohio, to succeed M. F. Flatley, who, as noted in the ELECTRIC RAILWAY JOURNAL for July 27, 1918, resigned to become master mechanic of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa.

J. R. Ong has been appointed transportation engineer of the Winnipeg (Man.) Electric Railway, having resigned from a similar position with the Board of Control of the Kansas City (Mo.) Railways. Mr. Ong was formerly connected with the staff of the Wisconsin Railroad Commission.

J. S. Coleman has been appointed general manager of the Asheville & East Tennessee Railroad, Asheville, N. C., to succeed Stanley Howland, who still retains his position as vice-president of the company. Mr. Coleman has also been appointed treasurer of the company to succeed Reginald Howland.

Capt. F. R. Glover, general executive assistant of the British Columbia Electric Railway, Vancouver, B. C., is back again on the company's management staff, after being on military duties more than three years. He returned from Europe a year ago and since then has been superintendent for the Dominion police, with headquarters at Victoria. The duties of this force were recently taken over by the Royal North West Mounted Police. This made it possible for Captain Glover to resume his duties as general executive assistant.

C. Walter Gifford, an employee of the Bay State Street Railway, Boston, Mass., since 1910 and lately working under Transportation Manager Hiram Sparks as efficiency and service man, has been appointed general manager of the Brockton & Plymouth Street Railway, Plymouth, Mass., to succeed J L. Smith, who has been transferred to another position. Mr. Gifford entered the employ of the Bay State Street Railway as conductor in 1910, was made night foreman at the Torrey Street carhouse in 1912, dispatcher in 1914, and day foreman at the carhouse in 1917. Last April he became traveling inspector and in July was appointed to the position from which he has now resigned.

B. C. Edgar on March 1 succeeded F. W. Hoover, vice-president, in active charge of the affairs of the Tennessee Power Company and the Chattanooga Railway & Light Company, Chattanooga, Tenn. Mr. Hoover retains his position as vice-president and remains as a member of the board of directors. Mr. Edgar will retain the position which he has held previously as general superintendent of the Nashville Railway & Light Company. He will divide his time between Nashville and Chattanooga. Mr. Hoover has become vice-president and director of sales of the Lucey Company. Later it is expected that he will become president of the company, to succeed Captain Lucey, who will become chairman of the board. Both the Chattanooga and the Nashville properties are controlled by Clark interests.

Charles S. Banghart has been appointed general manager of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., by The J. G. White Management Corporation, New York, N. Y., the operating managers. He succeeds W. C. Callaghan, who has resigned. Previous to accepting his present position, Mr. Banghart was vice-president and general manager of the Binghamton (N. Y.) Railway, with which he was associated since 1914. Mr. Banghart attended Lehigh University, South Bethlehem, Pa. After leaving school, he was employed respectively on the electrifications of the Allentown & Bethlehem Rapid Transit Company, Allentown, Pa., and the Union Railway, New York City. In 1894 he became superintendent of the Flushing & College Point Lighting, Power & Railway Company, Flushing, N. Y. From 1895 to 1903 Mr. Banghart was associated with the Interstate Railway, Reading, Pa. He was employed by the New York & Queens County Railway, Long Island City, N. Y., from 1903 to 1914, serving six years as general superintendent. In 1914 Mr. Banghart took up his duties as vice-president and general manager of the Binghamton Railway.

C. S. BANGHART

Obituary

E. P. Gerry, superintendent of the railway lines in Elgin, Ill., before their absorption by the Aurora, Elgin & Chicago Railroad, died on March 4 at the age of seventy-five years.

William B. Craig, traffic manager for the Oklahoma Union Railway, Tulsa, Okla., died on Feb. 21 from an attack of apoplexy. Mr. Craig was a well known railroad man of Oklahoma, although his connection with the Oklahoma Union had covered a comparatively short period. All his earlier experience had been with steam lines, but he was regarded as one of the best informed traffic men in the State of Oklahoma.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Construction Field Shows Some Bright Spots

Plans for Extension of Lines and Addition of Rolling Stock and Buildings Make Fair Showing for First Two Months

Recent inquiries among manufacturers and manufacturers' agents have in general failed to bring forth replies of a very optimistic nature in regard to definite orders expected in the near future. Optimism is generally running high that business, when it does return, will surpass pre-war levels, but it is purely a matter of conjecture as to when this will occur. Many inquiries on price and deliveries of electric railway equipment of all kinds have been and are still being received, but producers think these are sent out more for the purpose of feeling out the market than in a serious buying mood.

During the first two months of this year several orders have been given and many plans filed showing the serious intentions of traction companies to do some work on the extension of their tracks and transmission lines, replacement of worn-out materials, in construction of power houses, shops, terminals and other buildings and in the purchase of new or the remodeling of rolling stock. Reports of such activities have come from practically every state and territory of the Union and the items enumerated herein refer only to work in the United States. Canada, however, has ordered and laid plans for a by no means inconsiderable amount of electric railway material.

Below is given a résumé of the construction reports that have appeared in the ELECTRIC RAILWAY JOURNAL during January and February.

Up to March 1, the reports show orders placed for 102 new cars. Reports have been received that about thirty electric railways expect to order more than seventy-one safety cars this year, seventy-seven large type and suburban cars, three passenger and more than ten freight trail cars, and expect to remodel more than fifteen cars besides those already in their shops. One company has authorized $125,000 for rolling stock.

For track extensions certain figures have been given, but much more is contemplated which has been reported merely as extensions and repairs to lines and track, and extensions from one town to another. In addition, eight roads have been reported as expecting to spend more than $1,250,000 in extensions, while six others expect to construct 27 miles of new track and four roads expect to reconstruct 8½ miles. In Texas there are three propositions under consideration for the construction of lines for distances of 185 miles, 180 miles and 65 miles, while in Tennessee there is one considered for 50 miles in length. One traction company expects to replace trolley wire on 36 miles of its line or install steel auxiliary wire under its present trolley wire. Also, 10,000 ties are to be replaced by this company. Another company is reported as expecting to purchase 40,300 ft. of feeder cable in three different sizes. A third company reports it will purchase 2 miles of No. 00 wire and still another company is in the market for 6000 ft. of 250,000 circ.mil cable.

More than $3,600,000 worth of buildings are planned for this year by twelve companies. These include power houses, shops, terminal stations and other buildings. For some of these projects contracts have been let, for others bonds have been authorized by municipalities. Outside of this figure many other plans have been authorized and considered for the same type of buildings, substations, automatic substations, transformers, motor-generator sets, boilers and generators up to 20,000 hp. size.

Taken all in all, the year to date has begun to show signs of some awakening, and it seems reasonable to believe that the energy of manufacturers and manufacturers' agents will turn the plans into orders.

New Heating Combination

A combination has just been made between Holden & White, Inc., of Chicago, and Walter E. Hinman and Osborne E. Quinton, of Detroit, by which they become associated and Holden & White, Inc., will market a complete line of hot-air and hot-water stoves and auxiliary apparatus for electric cars and thermostatic control for electric heaters.

The stoves are being made by the Detroit Stove Works, one of the largest manufacturers of stoves in the world. They will be known as the Jewell electric railway stoves, and will embody several novel features, including the hot-blast principle of the Detroit Stove Works, by which the thermal efficiency of these stoves per unit of fuel is increased. They are arranged to burn almost any fuel, such as hard or soft coal, lump coal, coke or wood. The hot-air stove will have its motor at the bottom of the stove so that it will not be subjected to the heat and thus the maintenance should be low. A number of the new Jewell heating systems have been installed on electric railways and the results are reported as satisfactory. The Jewell hot-water stoves will use the coil principle for heating the circulating water.

Better Tone in Transformer Market

Prices on Large Equipment Expected to Remain Firm for Remainder of Year

Although the demand for transformers is far below normal, a better tone is apparent in the market. Two or three weeks ago buying reached perhaps the lowest point since the armistice began. Price reductions of the order of 10 per cent on larger transformers were quoted about that time, and a logical reaction can be seen in the increased number of inquiries now coming in. Business is still dull in comparison with the outputs and sales of a few months ago, but the outlook cannot be called discouraging, to say the least.

As soon as central station development becomes freer the transformer market will respond quickly to the stimulus. The high cost of financing extensions of plant in respect to both money rates and the abnormal cost of apparatus has held back the growth of systems normally to be counted upon. Some signs of improvement are now noted by the transformer manufacturers. Raw material and labor are plentiful; factory stocks are in excellent shape for exceedingly prompt delivery of sizes ordinarily specified for distribution work, and in the larger units, say from 200 kv.-a. upward, deliveries can be made in about one-fourth the time required last summer on orders carrying anything less than very high priority ratings. Virtually any commercial requirement in large units can now be met in from sixty to ninety days.

The price situation is of interest. The point is emphasized that electrical equipment of the transformer class was advanced only about 60 per cent in price during the war, compared with advances of from 100 to 300 per cent in many other manufactured products. The price of labor appears likely to continue high; much material purchased at high prices is at hand to be worked up before lower cost material will be available, and with the exception of copper very little reduction has taken place in the cost of supplies entering into transformer construction. The high-grade steel and insulation needed show little or no tendency to weaken in cost.

It is well to remember that transformer prices per kilowatt of capacity have long compared very favorably indeed with other equipment built to deliver energy efficiently in bulk. It is to be doubted whether transformer prices will go back to a point 30 or 40 per cent above pre-war levels in any future which can be apprehended now.

Consolidation of English Manufacturers

It is announced that about 90 per cent of the stockholders of Dick, Kerr & Company, Ltd., have accepted the offer made to them by the English Electric Company, Ltd., under which this company will have the predominating control of the Coventry Ordnance Works, Ltd., Dick, Kerr & Company, Ltd., Phoenix Dynamo Manufacturing Company, Ltd., United Electric Car Company, Ltd., and Williams & Robinson, Ltd. The company is registered with a capital of £5,000,000, in £1,500,000 preferred and £3,500,000 ordinary shares. It is the intention to interfere as little as possible with the internal organization of the respective works, but the company will take over the whole of the external business management, and with certain exceptions, such as the civil engineering and contracting department of Dick, Kerr, and certain special parts of the Coventry Works, will conduct all selling and other negotiations with the public.

Rolling Stock

Kansas City, Lawrence & Topeka Railroad, Kansas City, Mo., is reported in the market for material to repair cars.

Jackson Railway & Light Company, Jackson, Tenn., lost its carhouse, seven cars and two trailers by fire. The loss on the building is reported as $5,000.

Pacific Electric Railway, Los Angeles, Calif., has received the twenty safety cars which are reported for use on runs in Pomona, San Bernardino, Riverside, Pasadena and Santa Monica, and not on Los Angeles city lines. The order for these cars was noted in these columns on June 15, 1918.

Track and Roadway

Municipal Railway of San Francisco, San Francisco, Cal.—Plans are being made for the extension of the F route line of the Municipal Railway of San Francisco into the Presidio reservation so that it will end at the proposed new headquarters building and an extension to Fort Scott.

Ocean Shore Railroad, San Francisco, Cal.—It is reported that plans are being made by the Ocean Shore Railroad for building an extension from the present terminal at Tunitas Glen to Pescadero.

City & Suburban Railway, Brunswick, Ga.—It is reported the City & Suburban Railway will extend its line to the Atlantic Refinery Company.

New Orleans, La.—At the convention recently held at Bay St. Louis, Miss., to arrange plans for the construction of a municipally-owned electric interurban railway to connect New Orleans, La., and Mobile, Ala., with all of the Mississippi Coast towns, an executive committee was appointed to work out a plan allotting the cost of construction among the municipalities and to secure estimates from engineering firms. Mayor John J. Kennedy of Biloxi, Miss., was made chairman of the executive committee, with Mayor Frank Suter, Pass Christian, Miss., as secretary. The convention adopted a tentative route for the proposed municipal interurban railway, the line beginning at New Orleans and running via Slidell, Waveland, Bay St. Louis, Pass Christian, Long Beach, Gulfport, Handsboro, Biloxi, Ocean Springs, Pascagoula, Moss Point, Grand Bay and Mobile. [Feb. 1, '19.]

Jackson Light & Traction Company, Jackson, Miss.—Substantial repairs and improvements will be made in the company's property. It is roughly estimated that more than $100,000 will be expended to put the property in shape.

Public Service Railway, Newark, N. J.—Announcement has been made by the Public Service Railway Company that it will spend about $100,000 in the reconstruction of its tracks on Federal Street, between the Pennsylvania terminal and Broadway. The work is now under way. Over 7800 ft. of track is to be relaid, 101-lb. rail being used to replace the 90-lb. rail. The heavy construction is made necessary by the increased traffic.

NEW YORK METAL MARKET PRICES

	Feb. 27	Mar. 13
Copper, ingots, cents per lb	15.25	14.75
Copper wire base, cents per lb	18.75 to 19.00	17.25 to 18.00
Lead, cents per lb	5.25	5.25
Nickel, cents per lb	40	40.00
Spelter, cents per lb	6.65	6.50
Tin, cents per lb	†72.50	†72.50
Aluminum, 98 to 99 per cent., cents per lb	31.50	30.00

† Government price in 25-ton lots or more' f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Feb. 27	Mar. 13
Heavy copper, cents per lb	13.00 to 13.50	12.75 to 13.25
Light copper, cents per lb	11.00 to 11.25	10.75 to 11.00
Heavy brass, cents per lb	7.50 to 7.75	7.25 to 7.50
Zinc, cents per lb	5.25 to 5.50	5.25 to 5.50
Yellow brass, cents per lb	6.00 to 6.50	6.00 to 6.25
Lead, heavy, cents per lb	4.75 to 4.87	4.75 to 4.87
Steel car axles, Chicago, per net ton	$28.00 to $30.00	$28.00 to $30.00
Old carwheels, Chicago, per gross ton	$22.00 to $23.00	$22.00 to $23.00
Steel rails (scrap), Chicago, per gross ton	$15.50 to $16.50	$16.50 to $17.00
Steel rails (relaying), Chicago, gross ton.	$15.50 to $16.50	$15.50 to $16.00
Machine shop turnings, Chicago, net ton	$5.50 to $6.00	$5.50 to $6.00

ELECTRIC RAILWAY MATERIAL PRICES

	Feb. 27	Mar. 13
Rubber-covered wire base, New York, cents per lb	23	21
Weatherproof wire (100 lb. lots), cents per lb., New York	28.75 to 33.75	25.75 to 33.75
Weatherproof wire (100 lb. lots), cents per lb., Chicago	30.75 to 35.75	30.75 to 37.35
T rails (A. S. C. E. standard), per gross ton	$60.00 to $65.00	$60.00 to $65.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton	$57.00 to $60.00	$57.00 to $60.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$55.00 to $60.00	$55.00 to $60.00
T rail, high (Shanghai), cents per lb	3½	3½
Rails, girder (grooved), cents per lb	4½	4½
Wire nails, Pittsburgh, cents per lb	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb	3.90	3.65
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	3	3
Tie plates (brace type), cents per lb	3	3
Tie rods, Pittsburgh base, cents per lb	7	7
Fish plates, cents per lb	3	3
Angle plates, cents per lb	3	3
Angle bars, cents per lb	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb	4.90	4.90
Steel bars, Pittsburgh, cents per lb	2.70	2.70
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.55	4.55
Sheet iron, galvanised (24 gage), Pittsburgh, cents per lb	5.60	5.60
Galvanised barbed wire, Pittsburgh, cents per lb	4.35	4.35
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	77%
Car window glass (single strength, first three brackets, B quality), New York, discount	77%	77%
Car window glass (double strength, all sizes AA quality), New York discount.	79%	79%
Waste, wool (according to grade), cents per lb	13 to 20	13 to 20
Waste cotton (100 lb. bale) cents per lb	11 to 13	11 to 13
Asphalt, hot (150 tons minimum) per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	$43.00	......
Asphalt filler, per ton	$45.00	$30.00
Cement (carload lots), New York, per bbl	$3.20	$3.20
Cement (carload lots), Chicago, per bbl.	$3.34	$3.34
Cement (carload lots), Seattle, per bbl	$3.68	$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.48	$1.53
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.55	$1.60
White lead (100 lb. keg), New York, cents per lb	13	13
Turpentine (bbl. lots), New York, cents per gal	70 to 71	69½

† These prices are f. o. b. works, with boxing charges extra.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Trenton City Commission has asked the Trenton & Mercer County Traction Corporation to lay new track on West State Street, from Willow to Calhoun Streets. The present track has sunk below the surface of the brick pavement.

Brooklyn (N. Y.) Rapid Transit Company.—Announcement has been made by the Brooklyn Rapid Transit Company that the Culver elevated line in Brooklyn will be placed in operation on Mar. 16. For the present the terminus of the line will be at Kings Highway. Within a few weeks it is expected to extend the operation to Avenue U and later to Coney Island, which will be its final terminus.

Columbus Railway, Power & Light Company, Columbus, Ohio.—In connection with street improvements being made by the city, the Columbus Railway, Power & Light Company will construct 6.75 miles of single track.

Oklahoma Union Railway, Tulsa, Okla.—Announcement has been made in Tulsa that the Oklahoma Union Railway has just completed a survey from Keifer to Okmulgee, via Mounds and Beggs and will build the extension to the Okmulgee county metropolis this year. This company also contemplates the construction of a line from Tulsa northward to Nowata, via Collinsville.

Philadelphia, Pa.—Sealed proposals will be received by William S. Twining, Director Department of City Transit, until March 25 for the construction of 68 column foundations of concrete in Front Street from above Arch Street to Callowhill Street, Frankford Elevated Railway, contract No. 500. Plans and specifications may be obtained at the office of the Department, Mershon Building, upon deposit of $10, which will be refunded upon return of the plans.

Power Houses, Shops and Buildings

Kansas City, Lawrence & Topeka Railroad, Kansas City, Mo.—The carhouse of the Kansas City, Lawrence & Topeka Railroad, which was destroyed by fire, will be rebuilt at a cost of $3,000.

Ohio Service Company, Coshocton, Ohio.—The Ohio Service Company is installing an additional 4000-kw. at its plant in New Philadelphia and is contemplating the installation of a new switchboard at its Dennison substation, and also the erection of a parallel circuit of 33,000-volt transmission lines from New Philadelphia to Dennison and from Newcomerstown to Cambridge.

Pacific Power & Light Company, Astoria, Ore.—Plans have been made by the Pacific Power & Light Company for the erection of a new power plant on the grounds adjoining its existing plant at Astoria. The capacity of the proposed plant will be 4500 hp.

American Railways, Philadelphia, Pa.—Arrangements have been completed by the American Railways for the installation of new boiler equipment at Keyport.

Jackson Railway & Light Company, Jackson, Tenn.—The carhouse of the Jackson Railway & Light Company, together with seven cars and two trailers, was recently destroyed by fire. Plans are being made for the reconstruction of the building.

Trade Notes

Standard Underground Cable Company, Pittsburgh, Pa., announces the appointment of Robert T. Lozier as special representative.

Belden Manufacturing Company, Chicago, Ill., manufacturer of wire and cable, it is reported, has increased its capital from $1,000,000 to $1,500,000.

Chicago Pneumatic Tool Company announces the removal on March 1 of its Cleveland district office from room 813 to rooms 406-408 Engineers' Building.

Captain Neale, Civil Engineer-in-Chief's Department, Room 1004, Admiralty, London, S. W. I., desires catalogs from manufacturers of electric railway equipment for purpose of reference.

Smith-Ward Brake Company, Brooklyn, N. Y., reports that B. B. Ringo, who was commissioned as ensign in the engineering corps of the Navy at the outbreak of the war, has returned to his former duties with the company. He is now general manager and assistant treasurer of the company.

Edward A. Miller has been appointed assistant superintendent of the Jersey City plant of the Metal & Thermit Corporation, New York, N. Y. Mr. Miller was one of the pioneers in autogenous welding and cutting, having established the first oxyacetylene shop in New York City early in 1908 under the corporate form of the Acetylene Welding Company. Among his notable jobs in the past have been the removal of the abandoned sheet metal piling encountered under the pneumatic foundations of Dry Dock No. 4 in the Brooklyn Navy Yard in 1910 and 1911 and the demolition of the ruins of the old Equitable Building in New York City in 1912.

J. G. Brill Company, according to press reports, is working its factory about 90 per cent capacity. Most of the direct government contracts for work outside of the company's regular line have been completed. But it is still working on a good many orders for cars for concerns such as the Emergency Fleet Corporation and others indirectly connected with government undertakings. There are some inquiries in the market which suggest interest being taken by street railways in the matter of new equipment, but costs have so far not lowered much. The $8,200,000 business on the books of the Brill company is sufficient to keep it busy for the next six months.

Capt. George Sykes, R. A. F., A. M. I. E. E., who has been in the United States nearly four years, attached to the British War Mission in a commercial capacity, sails for Europe in May. He has joined Messrs. Dutilh-Smith McMillan Company, an international house, as London manager of its engineering and railroad departments. For many years prior to the war Captain Sykes was connected with electrical manufacturers in the sales and engineering departments and with power and traction corporations. He will be glad to hear from firms wishing to introduce electric railway equipment in Europe. His New York address is 50 Broad Street and his London Office is Central Building, Totehill Street, Westminster.

Meachem Gear Corporation, Syracuse, N. Y., with offices at 411 Canal Street, has been incorporated for the purpose of taking over from the New Process Gear Corporation the manufacture of New Process rawhide pinions and for the general manufacture of gears of all kinds. The company is incorporated for $300,000 and has purchased a three-story building which is to be devoted entirely to the manufacture of gears. The Meachems organizing this company are the same who owned and controlled the New Process Gear Corporation and the New Process Rawhide Company for a period of thirty years, and associated with them are George W. Wood, secretary and superintendent, and H. W. Kiddle, assistant superintendent, who had charge of the manufacture of rawhide and the rawhide pinion department of the old company. The plant purchased is now being remodeled and was to begin operations on March 1, at which time it takes over the rawhide pinion business, the hide plant at 811 Free Street, Syracuse, and all of the raw materials and uncompleted orders pertaining to this branch of the business.

New Advertising Literature

Strauss Bascule Bridge Company, Inc., Chicago, Ill.: A 70-page illustraded bulletin of trunnion, bascule and direct-life bridges.

Cokal Stoker Manufacturing Company, 48 West Division Street, Chicago, Ill.: Two folders on "Cokal" hand-operated stokers.

Smith-Sewell Company, 90 West Street, New York City: Bulletin No. 26 on the construction, uses and operation of Francke flexible couplings of the heavy pattern type.

Blaw-Knox Company: Small booklet descriptive of the fabricated steel plate work, transmission towers, steel forms for concrete construction and other products of the company.

Cutter Company, Philadelphia, Pa.: A circular noting the growth of the company's circuit-breaker business in twenty years. Illustrations of two styles of this company's apparatus accompany the circular.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 53 New York, Saturday, March 22, 1919 *Number* 12

Electrification Demands a New Type of Engineer

LAST WEEK the American Institute of Electrical Engineers held an all-day meeting in Boston, and devoted the morning session to steam railroad electrification. In the paper by Calvert Townley and the discussion which followed its presentation, the subject was viewed from an angle different from that usual at electrical engineering meetings. The emphasis was laid upon financial considerations, particularly limitations, and upon the personal element. The technical difficulties of electrification were properly assumed to have been largely overcome, and difference of system to have become negligible. What was particularly interesting was the reference to the parts played in the matter by the steam and electrical engineers, each of whom was acknowledged to lack certain elements. The "steam man" would naturally be bound by certain engineering and operating prejudices, while his electrical brother would by temperament and inclination tend to overoptimism in his vision of an all-electric railroad system for the country. A new type of engineer is needed, therefore; shall we call him an "electrification engineer," or better, a "transportation engineer"? He must be able to perform the very difficult feat of approaching the electrification proposition from two directions at once. Even a few big men of this type can be very useful during the next decade.

Economical Maintenance Has the Floor This Week

IF THIS ISSUE of the ELECTRIC RAILWAY JOURNAL does not help master mechanics, way engineers, power plant men and others in making a dent in maintenance costs it will have failed of its purpose. While the presidents and general managers are struggling with the questions of fares, franchises and publicity the men mentioned above must keep the cars going, and going well. It is a perfect marvel how they have succeeded in doing this under the conditions which have prevailed during the last three or four years. If it had not been for a combination of ability and loyalty on their part the problems of the executives would have been even more difficult to solve than they are. The editors of this paper have had the conviction, and there is reason for it, that under war-time stress new or improved maintenance methods would be developed that would be greatly in advance of those used heretofore. Evidence is accumulating to show that this is the case. Look over this issue of the paper with a view to picking out some of the things that show improvements in maintenance methods. There are many of them. They all help to lessen the burdens of the men higher up.

The writers of the articles in this issue have been asked and urged to hold primarily in mind the thought of keeping down costs. Of course by this we mean long-run costs, not necessarily first costs. The writers are all men who speak from practical experience; there is no theorizing here. On behalf of the industry we express appreciation for the efforts of many busy men to make this the most helpful Maintenance Issue the paper has ever published.

Spirit of Compromise Should Control Valuation Work

THE electric railway industry is breaking down. We are sure, however, that neither the prominence of the speakers at the mid-year meeting of the American Electric Railway Association last week nor the vehemence of their utterances made the above-stated fact more apparent to the delegates than it was before they came to New York. The industry has known for a long time that it was facing a catastrophe. How to avoid this is the real question, and it is this phase of the discussion at the meeting to which the closest possible attention should be given.

A readjustment of the relations between electric railways and the public is inevitable in the majority of cases, and where this is necessary, according to Mr. Gadsden, only two ways are open—the acceptance of the service-at-cost principle or the submission to public ownership. For reasons which have appeared often in these columns, we believe that the service-at-cost principle gives the better promise of success from the point of view of the utility, municipality, commission and investor. Hence we welcome, as a most commendable sign of progress, the determination of the association through the committee on readjustment to analyze the service-at-cost idea in all its theoretical and practical aspects and directly aid companies and communities in the application of this idea.

But, as Mr. Gadsden, Mr. Kealy and others pointed out, the primary requisite of any service-at-cost plan or of public ownership, too, for that matter, is a valuation. This subject has been discussed by a multitude of men during the last few years, and the fundamental principles have been definitely determined. They are clearly stated, for example, by Mr. Taylor. Unfortunately this does not mean that such valuation figures can always be obtained, so that some companies may have to decide whether business expediency may not sometimes dictate the acceptance of a lower valuation than theoretical justice would require.

To Mr. Kealy's mind, the day for a new phase of valuation work—that of compromise—has indeed come, and we believe he is right. This does not mean that electric railways should hasten to sacrifice their property value. It means simply that many details in valuation work, regardless of the mutual acceptance of principles, are matters for bargaining and therefore compromise. It means that a point should without great difficulty be reached where the immediate assurance of protected investment and prompt returns through agreement can well be deemed more beneficial to all concerned than the insecure investment and defaulted returns almost certain to accompany a continuance of the controversy.

The question is a grave one upon which, as Mr. Gadsden pointed out, the association must in the near future take a positive stand. Some interests may not be benefitted under a valuation and a service-at-cost plan, but, as Mr. Taylor stated, corporations which through gross overcapitalization are unable to accept his principles constitute an abnormal class which the association cannot justly sustain. Without a doubt the great majority of electric railways would be helped by valuation compromises leading to service-at-cost franchises.

A Promising Element In Electric Railway Power Distribution

THE automatic substation is not perfect, of course. No reasonable person would expect it to be so after less than four years of commercial development, especially with a world war going on during most of this period. However, on visits made to typical automatics during the past year the writer has yet to hear anyone say that the principle of automatic control is not sound and that such minor imperfections as still exist in the equipment are other than those naturally incidental to such a new and important improvement.

When the automatic plan was first promulgated it was a rather general belief that very little modification in standard apparatus would be needed to provide everything necessary for making substations automatic. It was soon found, however, that there were certain specific service requirements in such substations that made some modification necessary. For example, switches which had ample rupturing capacity for the very occasional opening which occurs in a manually-operated substation were found to need modification when operated many times a day. Relays which were all right in a uniform temperature were found to vary in time of operation when subjected to fluctuating temperature. Such things as these are, however, mere trifles when compared with the wonderful development of the equipment as a whole.

Unfortunately for the automatic substation, practically its whole life has been simultaneous with high prices, scarce labor, discouraging conditions of the industry generally, and war. In spite of all this a great deal has been accomplished, and the record has been placed before the industry in a series of articles in this paper, the latest being in the present issue. Other important articles are in preparation. A review of these at this time will prove very profitable to anyone vitally interested in improving power distribution conditions on his property. The subject also might be well discussed at the coming convention of the American Electric Railway Engineering Association. This association has held practically no meetings since the automatic substation became a factor in power distribution. Many members of the association have now had practical experience with its operation. A frank comparing of notes would therefore be benficial, not only to those who have installed these substations but also to the larger number who hope soon to install them. We suggest therefore that a liberal space on the program be assigned to this topic. There will be no difficulty in getting qualified engineers to handle it.

Talk About What The Public Is Thinking and Feeling

THE replies to our recent questionnaire to public representatives, of which two sections have been printed, indicate, as we have said before, that the present ignorance and distrust on the part of the public can only be removed by publicity and proper service on the part of the railways. Furthermore, in speaking particularly of publicity, the great majority of the commissioners, mayors, leaders of chambers of commerce and others said that there was a need of complete data, frankly given, on the subjects of operating expenses, increaces in costs, investment and rate of return.

This question of what facts to give the public is of fundamental importance. Not all that is published as publicity should really be called by that name. Many electric railway publicity campaigns which have been conducted have been distinguished by one or both of two features—a good-humored or satirical commentary upon the foibles of the traveling public, or an ingenious presentation of matters about which the railway wants the public to think. Such campaigns are all right in their way, but after all they are merely the adjuncts of publicity. They talk about the patrons, rather than to them about the company; or they tell what the railway thinks the patrons should know about utility problems in general rather than what the patrons want to know about their company's problems.

Now do not mistake our argument. The individual patron and the public as a whole have shortcomings and need to be educated, but campaigns should begin at the right end. The real publicity campaign—and consequently the only successful one—is that which concerns itself with matters about which the public is clamoring for information. There is no substitute for a frank, truthful answer to what the public wants to know. Other information is by nature, and should be by position, supplementary.

Hope that Time Will Correct the Situation Probably Illusory

A FAVORITE argument used to deny the need of higher fares on electric railways is that the higher prices during the war were temporary only and now that the armistice has been declared and the soldiers are returning to peaceful occupations, prices will go back rapidly to the level of five years ago. For these reasons, it is claimed, the need for the higher fare is over or will be within a few months and it is not worth while now to go to the trouble of making a change. Some electric railway men may have had the same thought and have believed that if they could keep their properties out of the hands of a receiver until next summer or at latest in the fall, they would reach a time when their troubles would be over.

Those who think the coming of low prices is only the question of a few months can well read the comments quoted by the Public Service Railway from leading authorities on economic matters in the company's petition for a zone system of fares. The authorities mentioned include the Federal Reserve Board, Mr. Vanderlip, the National City Bank and the Mechanics & Metals

Bank of New York. These opinions, while naturally conservative as regards the future trend of prices, are far from supporting the idea that there is to be any early return of the prices of 1914-15. For the most part, these opinions were given early in the year. Since then, Prof. Irving Fisher of Yale has expressed himself even more strongly in support of the view that we are definitely on a new high-price level which presumably is as permanent as anything in the way of prices can be. In fact, Professor Fisher says "Business men should face the facts. To talk reverently of 1913-14 prices is to speak a dead language to-day."

He bases his opinion, which was presented at the conference of governors and mayors at Washington early this month, on the increase of the country's gold supply, the increase in deposit banking throughout the world, the continuation of government loan issues connected with reconstruction throughout the world and other pertinent factors. In reply to the statement sometimes made that prices will have to fall when we begin to feel European competition, Professor Fisher points out that since the war, prices have risen in Europe more than here, and in his opinion they are no more likely to fall there than here and for the same reasons.

We are quoting these facts so as to remove any false impression of the probable future trend in prices. But even those who believe that prices will come down have no valid reason for denying a higher fare to electric railways. If prices do fall and the railway profits become excessively large, the Public Service Commission has absolute right to reduce the fares. Hence the last vestige of any reason for keeping fares on a low level has disappeared.

There's a Broad Field for the Proposed Welding Society

WELDING operations cover a field in which all branches of engineering are interested. At present all the technical papers in this country and abroad are having a good deal to say about welding. One reason for the attention thus being focused on the industry has been the pressure which the welding committee of the Emergency Fleet Corporation has placed on manufacturers of welding equipment to develop their apparatus to supply the urgent needs that were required during the war. Another reason is the popular interest excited by certain welding repairs which were carried out on the disabled German ships in this country. This set all branches of industry to asking why welding had not been applied more extensively to the work in their particular fields.

Previous to the war the development of all types of welding was hindered by the fact that a great amount of work done by welding had proved unsatisfactory. This resulted from lack of proper attention to underlying principles. Industries which have a broad field for the application of welding thus came to consider that special skill is required to produce good welds. It was further assumed that good and bad welds look alike and that there was no efficient method for checking up a completed weld to assure perfection. Another cause for the distrust which has been felt toward welding operations has been the endeavor of some manufacturers of welding apparatus to build up business for their particular lines of welding equipment upon the basis of mistakes or failures of the apparatus of other manufacturers. When users have pointed out that welding has proved unsatisfactory, rival manufacturers have sometimes stated that the poor results were due to the use of improper apparatus and that if their particular equipment had been used the fault would not have occurred. Here is where the new association of welding engineers will come in, for welding investigations conducted by an interested and dependable society will prove of great benefit both to those who use welding in their production and to the manufacturer of welding apparatus and supplies.

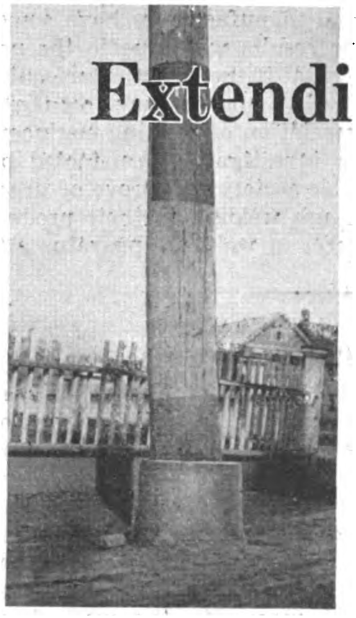
Road Supervisors Draw Attention to Weaknesses in the Service

COMPLAINTS about the quality of electric railway service received by a company from its patrons or published in the newspapers may have a real foundation or they may not. In some cases they undoubtedly come from a person who expects what is equivalent to taxicab service, or better than taxicab service, for a street car fare. All such complaints, when addressed to the company, should be answered, and if definite should be investigated. It is not, however, to the method of handling these complaints as to the lessons from a transportation standpoint which they may teach to which we wish here to draw attention. They often point out real weaknesses in the service which otherwise might escape observation.

In this connection, a recent analysis of the operating statistics of various electric railway companies reveals some strange comparisons, and shows perhaps a way for getting improved service in some cases without the expenditure of additional money. The item to which we have particular reference is that entitled "Cost of Superintendence." We will find, for instance, two properties of practically the same size and with similar local conditions, and one has a much larger expenditure for "superintendence" than the other. A first-hand study of service on the two systems reveals the astonishing fact that the company which paid out the most for "superintendence" makes the poorer showing in handling passengers. Investigation reveals the probable reason in the fact that the company which paid most for superintendence has an unusual number of starters or terminal men but is short of supervisors or inspectors traveling over the lines.

An experienced transportation man, in discussing this point, expressed his belief that the best results are not to be obtained in employing a great number of men to act as starters at the ends of routes. He had found that the platform men are likely to be spoiled by such practice, being trained to depend on others for the observance of scheduled leaving time and in the absence of such supervision the service had a tendency to become irregular. Said this official: "There is such a thing as too much supervision, or rather improper distribution of supervision. These starters as a rule have no disciplinary power and merely act as machines in telling the crews when to start. Trainmen are thus likely to lose initiative, and when starters are not on duty all day long or at all terminals the result is inefficient service. The same money paid for a few more intelligent supervisors, responsible for the regulation of service over a given territory, will always get more beneficial results."

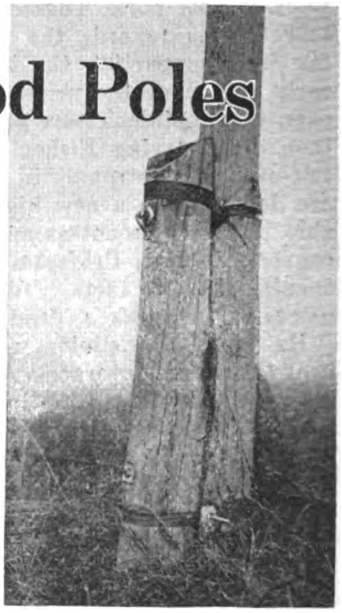
We are inclined to put much faith in this point of criticism, and we offer it as a suggestion to transportation officials who really desire to please their patrons by distributing their facilities to the best advantage.



Extending the Life of Wood Poles

By CHARLES R. HARTE
Construction Engineer, The Connecticut Company,
New Haven, Conn.

Many Methods Are in Use for Prolonging the Life of the Various Woods—The Author Describes These, Discusses Their Relative Advantages and Points Out How Different Preservatives Keep Out and Destroy the Destructive Germs



THE seasoning of wood is a much more complicated process than the mere drying out of the contained water; chemical changes occur in the contents and in the walls of the cells which have a marked effect upon the characteristics of the wood; but the amount of water content in the wood is the simplest and the most universal test of seasoning. This water occurs in three forms: First, what is commonly known as the sap, which fills to a greater or less extent the cavities in the wood fibers, particularly of the sapwood; second, water saturating the walls of the cells themselves; and third, water in the contents of the living cells, which constitutes more than 90 per cent. It is estimated that fresh sapwood of white pine is 50 per cent water, so that in 200 lb. of such sapwood 100 lb. is water and of this latter 60 lb. is sap, 35 lb. is in the cell walls, and 5 lb. is in the cell contents. In the heartwood, however, mineral salts from the sap, and gums, resins and the like produced by the action of the living cells, to a considerable extent take the place of the water. In consequence, the heartwood is not nearly so favorable to the growth of decay as is the sapwood; on the other hand, these deposits seal in such water as remains, and make the thorough seasoning of the heartwood a long-time procedure.

The rates at which the water dries out of several kinds of poles, and for different times of cutting are clearly shown in the accompanying curves, which are taken from Bulletin 84 of the United States Forest Service. These curves cover the usual practice in air seasoning, but in dry air the process goes on for a much longer period than shown, although the loss of water after the first few months is, speaking comparatively, very slow.

If, instead of piling in the air, the poles are first soaked for a few weeks, it is found that seasoning after their removal from the water proceeds at a much faster rate than in the case of the entirely air-dried ones; this is due to the fact that much of the gum and mineral matter is washed out, giving the contained water a more porous material through which to be evaporated.

REDUCTION IN WEIGHT SHOULD BE CONSIDERED

While the chief purpose of seasoning is to cut down as far as possible the food supply of the fungi causing decay, and in case of preservative treatment, to put the wood in condition to absorb the maximum amount of the chemical used, the reduction in weight, and consequent saving in freight charges, is no small matter, ranging, as it does, from about 16 per cent in the case of chestnut to nearly 50 per cent for Western yellow pine. In the experiments described in Forest Service Bulletin 84 the results were as follows:

Species	Length of Treatment Months	Size of Pole		Weight of Pole Pounds		Loss of Weight	
		Top	Length	Green	Seasoned	Pounds	Per Cent
Chestnut	4 to 6	7 in.	30 ft.	1120	940	180	16
Northern white cedar	6 to 12	7 in.	30 ft.	581	440	141	24
Western red cedar	3 to 5	8 in.	40 ft.	902	683	219	24
Southern white cedar	3 to 8	7 in.	30 ft.	768	540	228	30
Western yellow pine	3 to 9	8 in.	40 ft.	1697	862	835	49

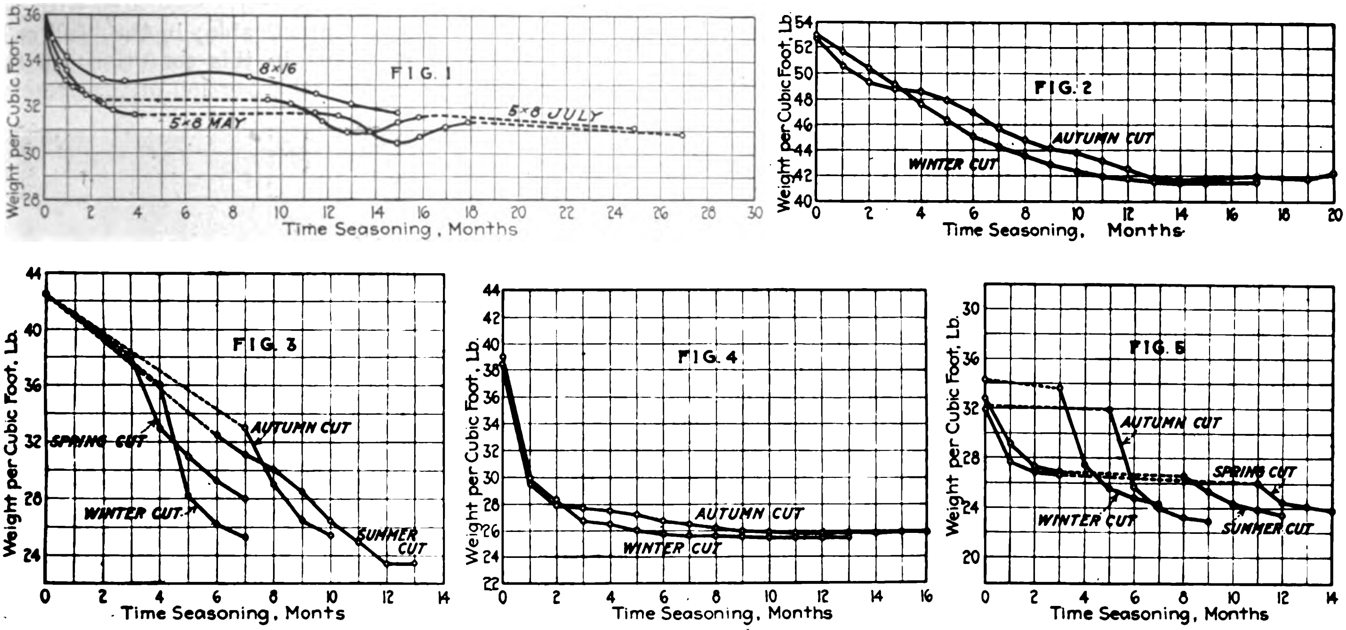
These figures are for commercial air seasoning; a longer treatment under the same conditions of reasonably free circulation of air about the poles will result in still further loss of water, but at a rate which as a rule does not warrant it; kiln drying removes more water in very short time, and if immediately followed by treatment is often desirable, but great care must be taken that the heat is not high enough to affect the strength of the wood, and that the dried pole is at once treated, as otherwise it will absorb moisture from the atmosphere and will go back to the condition of an air-dried pole.

It has been mentioned that for air seasoning the poles should be so piled that the air has a free circulation about them; it is at least as important that they be held clear of the earth and that the supporting skids be of sound timber; and it is hardly less important that all undergrowth be cleared away.

As a result of the removal of the sap itself there is little mechanical disturbance of the wood fibers, but as soon as the water in the cell walls begins to diminish the walls contract and set up stresses which are the chief cause of checking or cracking. The contraction is very slight in the direction of the grain, but across the grain it is considerable. It is about twice as great tangent to the growth rings as it is in the direction of their diameters and as a result the heavy checks are radial, and "ring checks" are apt to be very small or lacking unless the seasoning has been rushed. With most woods the larger part of the sap dries out before the cell wall water is affected, and the deposit in the wood of the solids held dissolved in the sap tends to choke up and to check the drying out of the cell wall water. With normal conditions little trouble is experienced, the contraction being so slow that the wood adjusts itself to the stresses without actual splitting, and even with some speeding up the checks are chiefly at the butt, and being buried below the range of the decays, give little trouble. Such checked poles, however, should be carefully inspected to be sure that the checking is not serious at or close to the ground line.

CIRCUMFERENCE OF POLES REMAINS PRACTICALLY UNCHANGED WITH SEASONING

It is believed by many, particularly if they have poles to sell, that seasoning shrinkage materially reduces the circumference, so that poles well within specification requirements when cut, after seasoning often fail to pass, and the writer, and probably every other overhead man, has had many a doleful tale of such unfair shrinkage. As a matter of fact, however, very extensive measurements made by the Forest Service show that the external circumference is practically unchanged even when there is heavy checking, the shrinkage from green to air-dry condition averaging from three-tenths to one-half of 1 per cent of the circumference at the ground line, and from three-fifths of 1 per cent to nearly 1 per cent at the top, equivalent on the usual sizes of poles to from ⅛ to ¼ in. in both cases, or a little less than one-third of this for the reduction in diameter.



SEASONING OF POLES AND TIMBER, SEVERAL KINDS OF WOOD

Fig. 1—Douglas fir timbers, Eugene, Ore.
Fig. 2—Chestnut poles, Thorndale, Pa.
Fig. 3—Western red cedar poles, Wilmington, Cal.
Fig. 4—Southern white cedar poles, Wilmington, N. C.
Fig. 5—Northern white cedar poles, Escanaba, Mich.

A large proportion of the poles of to-day are innocent of any treatment other than seasoning; indeed, an appreciable number do not even get properly seasoned, but there is a steadily increasing percentage of the poles used which have had more or less extensive treatment with preservative of one kind or another. Some, as the paints, serve chiefly to keep out the germs mechanically, and if improperly applied afford them the best of conditions for growth. Others are more aggressive, and destroy any germs attempting to get a foothold.

The paints are used practically never except as local ordinances compel. A good paint, carefully applied to a smooth, dry pole, gives a coat which while unbroken is excellent armor against decay. Unfortunately—for it is comparatively easily applied—a paint coat is not only easily broken through, but if spread over a partially seasoned pole it seems materially to speed up fermentation of the sealed-in sap and the growth of forms of decay which require little oxygen, and which destroy the strength of the timber with practically no outside indication of the fact until under a load a little heavier than usual the pole fails. The artistic and restful effect of painted wood poles has led many city fathers to demand them; their consistently bad behavior leads wise overhead men to be equally insistent against their use.

Various tars have been used substantially as paints, with but little better success; the coat is more elastic, and therefore less liable to mechanical injury, and it does have a little greater antiseptic effect, but it does not penetrate and decay can and does occur under it almost as badly as in the case of oil paint. The practice of casing with concrete belongs in this general class. Oddly enough, although it might well be considered that in principle this is little different from painting and that internal decay would be promoted with the concrete treatment, the reverse is true, due apparently to absorption of salts from the green concrete, and the subsequent protection against their dissolving out given by the hardened concrete. The cost of the treatment bars it as a rule unless the concrete also serves as a foundation help; when used, the top of the concrete should slope sharply down from the pole, and care should be taken that there is no opening between the wood and the concrete in which rain water could pocket.

Still another treatment of the type surgeons would descrbe as aseptic, or keeping the "bugs" out, rather than the antiseptics, which are active poisons to the little scoundrels, is that of charring, but while this is comparatively simple and cheap it is unfortunately very uncertain in its action, and is very little used. To this uncertainty of result there is added, as further disadvantages, the facts that the charring is very easily carried to a point where the strength of the pole is affected, and the pole after treatment is much more readily lit up in case of a brush or grass fire.

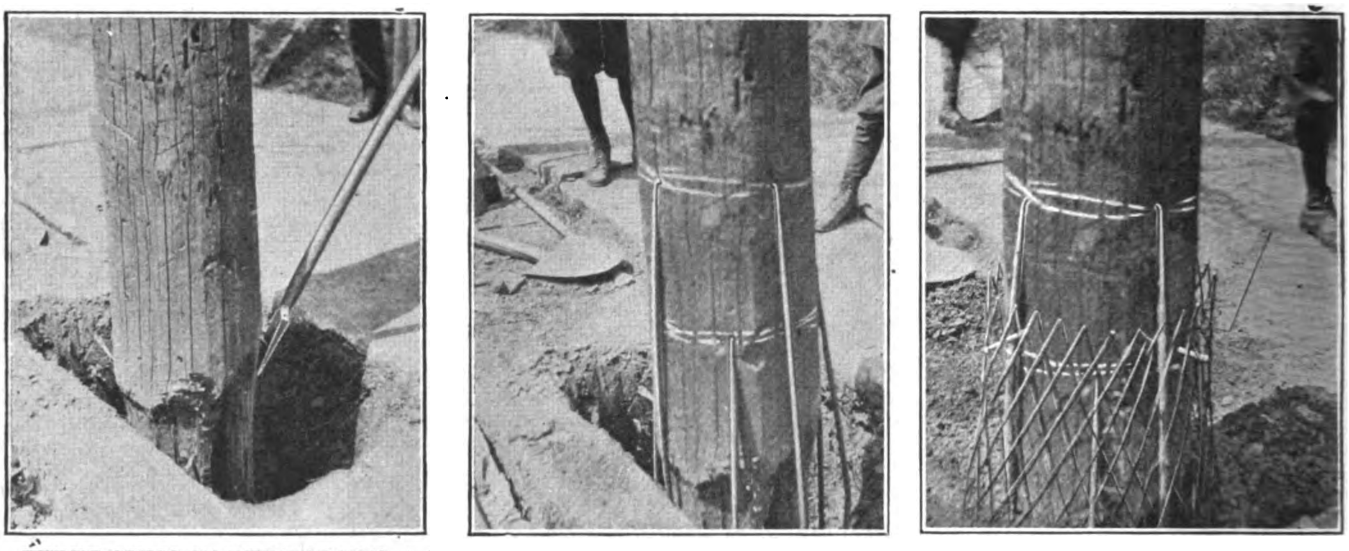
Of the antseptics there are two groups, the mineral salts and the oils. Of the first the chief are chloride of zinc, bichloride of mercury, and sulphate of copper, the last two better known as "corrosive sublimate" and "blue vitriol" respectively. All three would be excellent if it was not for one common and very serious fault. They dissolve readily in water, and unless they are given some additional treatment they soon leach out except in very dry climates. The oils used are chiefly the creosotes and similar compounds.

When any organic matter is distilled, or heated so that it cannot burn, there are given off vapors some of which are permanent gases which do not change, while others condense as liquids and may be broken up into other combinations by suitable redistilling. In fact, the proportions of these different compounds in the first distillation can be greatly altered by varying the temperature and the speed of its increase. Eventually there is left in the still a solid mass of carbon and other solid matter, but just before this there comes over an unsavory syrup which has been given the general name of tar. This is really a most wonderful mixture and furnishes in addition to the other innumerable dyes, medicines, etc., the creosotes and the similar preservatives. Until comparatively recently the bulk of the creosote used resulted from the distillation of bituminous coal, either for illuminating gas or for coke. In the last few years, however, much creosote has been produced from the tar obtained in the manufacture of water gas. It will be remembered that water gas is made first by passing steam through a bed of glowing coal or coke, producing carbon monoxide, the "furnace gas" which every now and then wipes out a careless family, and then passing this gas, which gives almost no light when burned, and petroleum, through a very hot chamber or series of chambers where the oil is "cracked" into various compounds, some of which enrich the water gas while others condense out as it cools, forming a tar. The creosote obtained from this tar lacks the carbolic oils or tar acids of coal tar creosote, but while it was long believed that these tar acids were the important element of creosote, investigations by the Forest Service indicate they are far less important than was supposed.

Commercial creosote, it might well be pointed out, is the product obtained by the distillation of tar, after the first volatile oils have come over, and before "pitch" has been reached in the still. In the case of coal tar it is given off between the temperatures of about 450 deg. and 520 deg. Fahr., and contains carbolic oils or tar acids, napthalene, creosote oil and anthracene oil, the relative proportions varying considerably, depending on the coal, how the tar was produced, and whether or no a market demand for any of the constituents makes it desirable to remove them. Water gas tar creosote, as stated, lacks the more volatile tar acids, while wood tar creosote although also an excellent antiseptic and similarly obtained from wood tar, is chemically very different and the oil similary obtained from petroleum tar, which has been used to some extent in the West, apparently acts mechanically, but by filling the wood structure rather than by coating it, as in the case of the paints.

The preservative treatments may be grouped into two general classes, either of which is applied under one of several systems by one of several methods. In each of the classes the wood is first as nearly saturated with the preservative as may seem practicable; in the "full cell" class of treatment it is left in this condition; in the "empty cell" class a considerable portion of the preservative is withdrawn, on the theory that with good penetration it is only necessary to coat the cavities, and that any additional preservative is practically wasted. A high pressure system is the most effective for actual preservation, but the plant required is expensive; too expensive in fact for any but large users of wood in sections where either climatic conditions or high cost of long-lived timber compel treatment of everything. Under all other conditions it will usually be found that the somewhat less effective other systems are enough cheaper to be really more economical.

High pressure full cell systems require a treating tank long enough to take the longest piece to be treated and of sufficient diameter to insure the required output. The charge is usually piled on one or more little cars which remain in the tank during the treatment and serve to transport the treated material to the storage yard. There is also required a boiler to furnish steam, pumps for handling the preservative and the condensation, tanks for storing the fresh and the used preservative and in a plant of any size, apparatus for purifying the used preservative, and for reclaiming the preservative from the condensation, in addition to the track system and loading and unloading derricks in the yard.

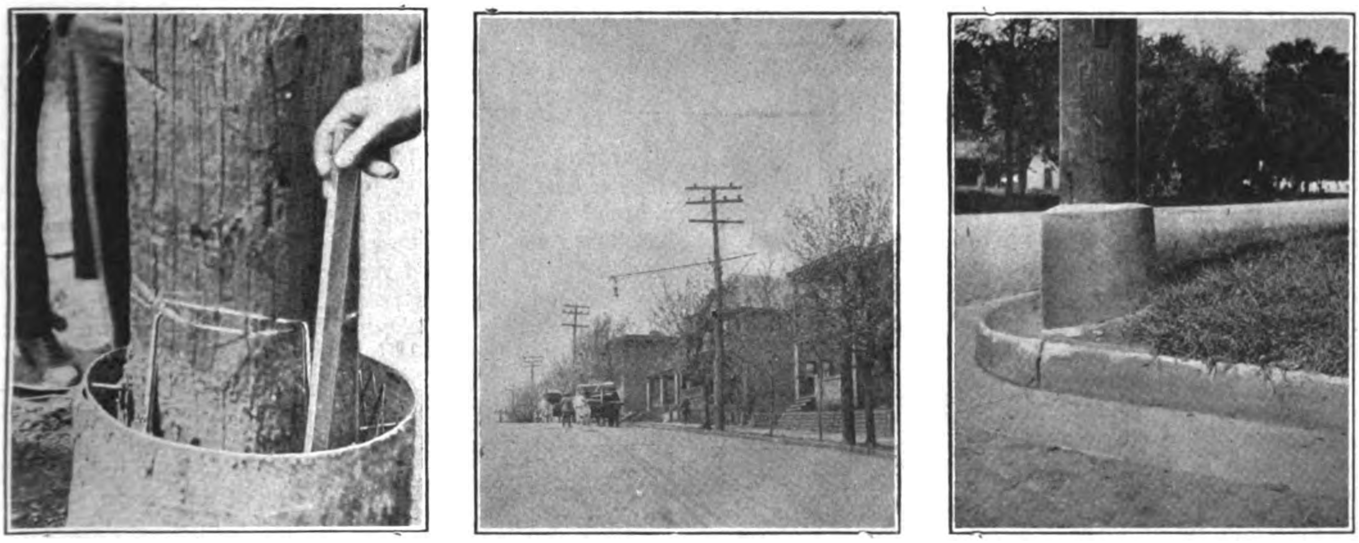

THREE STEPS IN REINFORCING A WOOD POLE WITH CONCRETE—REMOVING DEAD WOOD—IRONS ATTACHED—REINFORCING LATTICE WORK IN PLACE

Substantially the process consists of steaming the timber to be treated for several hours at a pressure of 20 lb. per square inch or even higher. The steam is then condensed and the resulting vacuum increased by the pump which removes the condensation, after which the tank is filled with preservative and enough pressure is put on to secure the desired absorption. The remaining preservative is now run off into the storage tanks, and after draining for a short time the treated wood is withdrawn and the tank is ready for a new charge. Of the methods under this system, the Bethell employs straight creosote oil; the Burnett employs a 2 or 3 per cent solution of zinc chloride; the Wellhouse "Burnettizes" and then gives an injection of glue and tannin, which is insoluble in water and seals the zinc chloride against the leaching effect of water; while the Ruepping, Card and Allardyce methods employ zinc chloride and creosote, the first two mixing them, the Card keeping them thoroughly mixed by mechanical means during the treatment, while the Allardyce first treats with zinc chloride and then follows with the creosote.

In the high pressure empty cell systems the material must be seasoned before treatment. The plant omits the boiler, at least as far as steaming is concerned, but an air pump is required in the Ruepping method, which first puts the material in the tank under an air pressure of about 75 lb. per square inch, then fills the tank with preservative without releasing the pressure; next raises the pressure to about 225 lb., and finally suddenly draws off the preservative. The expansion of the air trapped in the cells blows out all but a film of preservative. In the Lowry method the preservative is run into the tank at the start, pressure is applied to it, and then it is not only withdrawn, but a vacuum is quickly created, and, as in the Ruepping method the trapped air blows out all but a film.

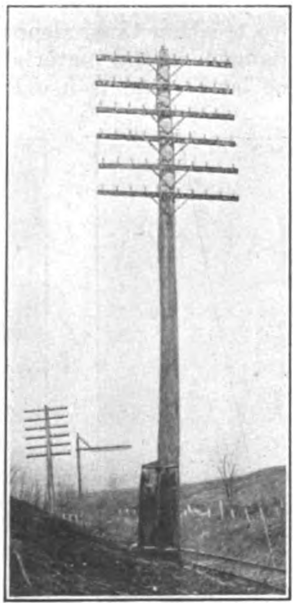
The low-pressure systems employ a full-size treating tank, and in general they differ from the high-pressure systems chiefly in that the pressures used are quite low, thus permitting a marked saving in the cost of the treating tank, and further savings in the cost of the auxiliary apparatus.

The no-pressure or open-tank methods are of two types. In the simplest the well-seasoned material is simply soaked in cold preservative, and while this has proved effective in the bichloride of mercury treatment (Kyanizing) of cut timber, it is little used otherwise. The more common procedure is the "hot and cold" treatment, in which the material is first soaked in hot preservative until it reaches the same temperature (about 200 deg. Fahr.) by which time the consequent expansion of the inclosed air has forced out of the material much of that air and quite a little of the sap still remaining in the case of air seasoning. The charge is then given a bath of cold preservative, and the resulting contraction of the air still in the wood creates a partial vacuum, into which the atmospheric pressure forces the preservative. In the empty cell process the cooling material is taken out of the bath when at a temperature of about 200 deg. Fahr. and allowed to complete the temperature reduction in the air, securing an absorption of the preservative which is on the outside when the material first comes from the bath, so that the finish finds a dry surface. This scheme necessitates one or two treating tanks depending upon whether the bath is changed or the material is shifted. In a large plant the latter plan is usually best; in a smaller plant the former is more economical, while for very small lots it may pay to use but one bath and leave the charge in it until both bath and contents have cooled. For long material, as poles, which require complete treatment the tank will naturally be horizontal, but except for those regions or species of wood in which decay occurs in the upper portion as well as at the ground line of poles, a butt treatment to a point about 18 in. above the ground is usually sufficient and for this a vertical tank is best. In addition to the open tank or tanks there are required means for heating the first charge, pumps for handling the preservative, storage tank or tanks and a derrick for handling the material, and if much work is to be done, storage space and an industrial track system are necessary.


REINFORCING WOOD POLES WITH CONCRETE—AT LEFT, TAMPING THE CONCRETE; AT RIGHT, A FINISHED JOB; IN CENTER, THE REINFORCING OUTFIT ON THE WAY

A method which is increasing in use, and which has the marked advantage that it is applicable to poles already set, although it is the least effective in terms of actual protection, is the brush treatment in which hot preservative is brushed or mopped on the dry pole or other subject. This method requires only the means of heating the preservative, the necessary brushes or mops and some form of support for the poles during treatment and until the coat is absorbed. At best the absorption is less than with any of the other methods, and the penetration is by the lighter tar acids rather than by the heavier and more lasting constituents in the case of creosote treatment. Better results are usually secured when the preservative used is one of the proprietary types, which have compositions designed to give good penetration and which for any one hand vary very little, rather than the commercial creosotes. In general the brush treatment gives a penetration about one-half as great as that obtained by the open-tank method. For the best results the preservative should be at a temperature of about 200 deg. Fahr., the pole should be well seasoned and dry, and two coats should be given; the second only after the first has been absorbed.

The metallic salts used in preservative treatments are definite chemical compounds and any adulterant is readily "spotted" by the chemist if not by the layman, but "creosotes" may vary within wide limits and characteristics, and yet be properly so called. The National Electric Light Association recommends the requirements given below for coal gas tar creosote, water gas tar creosote, and mixed tar creosote respectively as producing the best results. The Western Union Company uses substantially the same specification for coal gas tar creosote, and for comparison the latter company's specification for carbolineum is also given. The treatment used for any particular case will depend largely on local conditions. For yellow pine or other woods which decay readily in the upper portion, and for almost all woods used in the South a heavy treatment is necessary and this practically requires the closed tank method. In general, however, this method is employed for piling and lumber or other forms of wood which must have deep penetration of the preservative. Extensive new work in sections where conditions are not adverse will generally employ open-tank treatment, largely with creosote, either in commercial or in proprietary forms, although the zinc chloride treatment is excellent for dry climates or when properly sealed in; while for a great deal of work, particularly in projects of small size, or for the smaller companies, the brush treatment will be used. Incidentally it is claimed that a mop is much better than a brush for the actual application.



POLE REINFORCED WITH STUB

When it comes to the question of increasing the life of poles already installed, however, the choice of treatments is more limited. If decay has already begun, there will be an affected belt at the ground line, usually about a foot in width, the rot depth depending upon the length of time it has been proceeding. If not checked, it works toward the center of the pole at a much slower rate upward, and at a still slower rate downward (unless the ground line is lowered) until eventually the pole fails. Meantime the soil about the pole has become infected; spores and the hyphae or the plant proper of the fungi are scattered in it, and conditions are favorable for quicker destruction of a new pole unless something is done either to remove or to kill the causes. In addition to the decay, insects which attack decayed wood are usually present, and help the attack on the old pole and its substitute.

Whether the damage is to be repaired or the pole is to be replaced by a new one, the infection danger must be reduced, and by far the safest plan is to remove the earth for a depth of 2 or 3 ft., and an equal distance all around the pole. If then the pole is to be restored the decayed wood must be cut out, for which purpose a broad chisel on a long handle, or a scraper, such as butchers use for their chopping blocks, similarly mounted will be found very convenient. Whatever the tool, the pole must be freed from all dead wood.

If this leaves sufficient solid stock the pole can be given only a preservative treatment. Quite a little work has been done to develop a small cylinder which, being in two parts, would be clamped over the critical section and would then allow a local pressure treatment, but while some promising results have been had, so far as the writer knows there is as yet no device which is really successful, the problem of sealing the ends being the chief difficulty. This leaves the brush treatment practically the only method. With a dry pole, hot preservative and two good coats produce very good results. Unfortunately it is a difficult matter to secure such conditions, and many companies feel that the cost of good work, or the short-lived effect of cheaper work, does not warrant the trouble.

Out of this condition there have developed two ways of avoiding a renewal, while some of the communication

N. E. L. A. AND W. U. SPECIFICATIONS FOR PRESERVATIVES

Preservative Specification	Coal Gas Tar Creosote N. E. L. A.	Water Gas Tar Creosote N. E. L. A.	Mixed Tar Creosote N. E. L. A.	Carbolineum W. U.
Must *not* contain	Raw or partly distilled tar of any kind; other creosote nor petroleum oil	Raw or partly distilled tar of any kind, other creosote nor petroleum oil	Petroleum oil nor its distillates, nor water gas nor oil tars or their distillates which contain more than 10 per cent of paraffine oil.	Any other tar, oil or residue from petroleum or any other source
Specific gravity at 38 deg. cent	Not less than 1.03 Not more than 1.08	Not less than 1.03 Not more than 1.08	Not less than 1.04 Not more than 1.10	Not less than 1.09 Not more than 1.135
Residue soluble in hot benzol, not more than	1 per cent	1 per cent	3 per cent	0.25 per cent
Water, not more than	2 per cent	2 per cent	3 per cent	
	Shall mix with absolute alcohol, volume for volume			Flashpoint not below 140 deg. Burning point not below 170 deg.; ash on ignition not more than 1 per cent
Residue after sulphonation not more than	1 per cent	5 per cent	5 per cent	Fraction between 300 and 360 deg., 0.25 per cent
Tar acids, not more than or between	8 per cent		Not less than 2 per cent, nor Not more than 8 per cent.	Below 300 deg. (not more than 2 per cent)
Distillate up to 205 deg. Cent; not more than	5 per cent	2 per cent	3 per cent	
Distillate up to 235 deg. Cent.; not more than	35 per cent	10 per cent	25 per cent	2½ per cent
Distillate up to 315 deg. Cent.; not more than	80 per cent	60 per cent	80 per cent	At 300 deg., 20 per cent
Coke residue not more than	2 per cent	2 per cent	Above 360 deg., 35 per cent.	Above 360 deg., 35 per cent
Distillate between 205 and 235 deg. when cooled to to 15 deg. Cent	Shall deposit naphthalene			

lines "duck" the issue by resetting the old pole until the lowest crossarm has reached the lowest possible limit. Obviously, however, such treatment can rarely be followed except on private way location.

The simplest proposition is to strengthen the affected pole by setting against it a stub which goes as deep as the pole and extends 5 or 6 ft. above the surface. The two are then tied together top and bottom by lashings, of wire and, if the pole has heavy service, by bolts through both. The old pole should be scraped, the adjacent earth replaced with fresh, and both pole and stub should have preservative treatment. This was for a long time the standard practice of the telegraph and telephone companies, but it, like resetting, is obviously restricted in most cases to private way location.

The Orr plan of reinforcement is a development to permit strengthening poles in highways. In this process the decay is cleared out as for the other treatments; the "necking" is then spanned by rods parallel to the pole, with their sharpened ends, which are at right angles to the main part of the rod, driven into the pole above and below the space decayed out. Outside of these is placed a belt of expanded or similar mesh steel reinforcement. Outside of this a steel split form can be easily placed, and finally the entire space is filled with concrete which is carefully worked to insure that all spaces are filled. The top is then sloped outward, and when the form is removed the pole shows a concrete base 3 or 4 in. thick all around which extends about a foot above the surface. If properly done, the appearance is good; unless the decay had progressed too far the pole is as strong as it was originally, and the concrete acts as a preventive of further decay. Care should be taken that the rods are entirely buried in the concrete, and that the top has enough outward slope to shed water. The pole should be scraped to live wood, and the concrete must be well worked into the spaces, but none of these requirements is hard to meet and the method is being used to a considerable extent, particularly where there are enough poles to be treated to warrant equipping one or more teams for the work. On trolley lines the plan of employing a work car has been tried, but unless traffic is infrequent the car will spend most of its time on sidings, with serious results to the temper of the dispatcher, and a greatly augmented cost of the work.

Maintenance Practice of the San Francisco Municipal Railway

Results of Five Years of Operation of this City Railway System, with Special Reference to the Relation of Construction to Upkeep

By N. A. ECKART
Railway Engineer Bureau of Engineering, San Francisco, Cal.

A STUDY of the engineering design and the construction methods and practices of any railroad property will often reveal reasons for high or low maintenance costs. Unfortunately defects or faults in original design often may not be apparent for several years after operation has commenced, when some weakness develops in the track or equipment resulting in excessive maintenance charges. Sometimes these weaknesses may be remedied in the repair but as often as not the effects will continue to be reflected in the operating expenses until the time of reconstruction. The value of sound engineering design and practice in the original construction cannot be too strongly emphasized in view of the bearing that it has on the cost of maintenance. In each railroad system there are employed certain features of design and construction and methods and practices in construction and repair, which while confessedly not original are perhaps not in general use on other properties. These features have been adopted with the idea of avoiding troubles which have been observed to have developed in other properties where different practices have been the rule. Some details of the practice of the Municipal Railway of San Francisco which have aided in keeping down maintenance costs may be worthy of mention, although no claim for originality with respect to any of them is made.

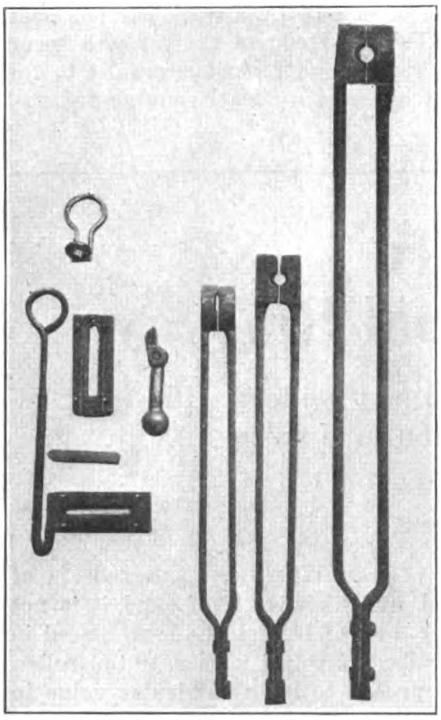
On this system the standard construction specifications require that the subgrade shall be thoroughly flushed with a fire hose and rolled with a roller weighing not less than 10 tons. Where the subgrade is of clay it is not flushed, and likewise if of sand it is not rolled, although after 6 in. of ballast has been placed in the trench the sub-ballast is rolled with a 10-ton roller.

This practice has proved to have particular value in its effect in reducing the cost of maintaining the pavement adjacent to the tracks and likewise in adding to the permanency of the track surface. Where this practice has been followed the pumping of header blocks, which is a common occurrence on many roads, has been eliminated.

SPECIAL WORK STANDARDS WERE DEVELOPED

In 1913, when the city started to work on the lines which were to serve the Panama-Pacific Exposition and later, to form the main part of our system, a very complete set of special-work standards were worked out comprising thirty-five pieces. These in combination permit of making up all layouts for right-angle street intersections, from a grand union to a simple branch-off and right- and left-hand crossovers. Standard specifications for the manufacture of this special work, which is all of solid manganese, were prepared. These established the limits of variation in dimensions of each of these parts, so that each part is interchangeable for a similar part in any layout. This interchangeability of parts proved of great value in the original construction, where time was of the utmost consideration, and it reduces the number of parts which must be carried in stock for replacements and extensions to the system.

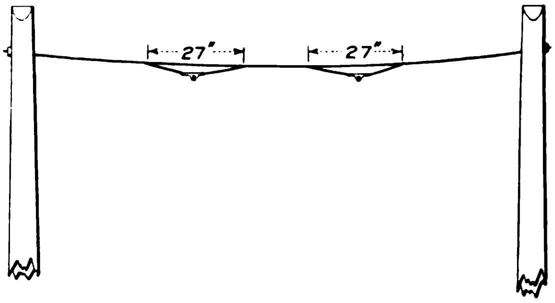
A rather interesting design of special-work layout was one installed at the intersection of Columbus Avenue and Taylor Street, and Columbus Avenue and Mason Street, where the Municipal Railway standard construction intersects a cable-operated line of the United Railroads in a curve, in both cases forming a rather acute angle and a point of intensive wear in an extremely expensive layout. To increase the durability the solid manganese crossing parts were made with insert plates, likewise of manganese steel, so as to permit of renewal in case of excessive wear or breakage at the crossing points. This layout has worn very well and although no renewals have been made up to date there is no question but that when the renewal is necessary it will more than double the life of this complicated and expensive piece of special work. The bonding practice adopted as standard on this system is the use of the electrically welded bond; of the concealed type in the girder rail construction and of the exposed type in the open T-rail construction. These bonds, which have been in service for five years, have not as yet had time to develop any weaknesses, and they show under test the same conductivity as when first installed. Concrete poles were adopted as standard practice at a slightly higher first cost than the steel poles with a particular view to reducing the maintenance charges in connection with the painting of steel poles. In San Francisco the salt air and fog corrode iron and steel very rapidly, particularly in the outlying and beach districts. The use of concrete poles has been found to be satisfactory and there have been no reasons developed which would warrant a change back to the steel pole. The concrete pole has permitted construction of extensions in short periods of time when deliveries of steel poles would have made their use prohibitive, and it is unnecessary to carry in stock any amount of concrete poles as they can be readily cast when required.



DROP FORGING DIES AND SAMPLES OF WORK DONE WITH THEM

STANDARDIZATION OF EQUIPMENT SIMPLIFIES OPERATION

Wherever it has been possible the type of rolling-stock equipment in use has been standardized, with the result that the electric equipment of all passenger cars, with the exception of twenty-eight small cars which were purchased with the Union Street line of the Presidio & Ferries Company, are identical. This feature of standardization in equipment has a double value; first, in that all operators have only to familiarize themselves with the operation of one type, which avoids a great deal of unnecessary abuse; second, in that when repairs have to be made the repairmen have only the one type with which to become familiar, and of course standardization reduces the number of spare parts which must be carried. It is true, of course, that these conditions cannot always be realized, and that conditions on this system are more or less ideal in comparison with conditions which have developed during a long period of time rather than practically within two or three years as in our case.

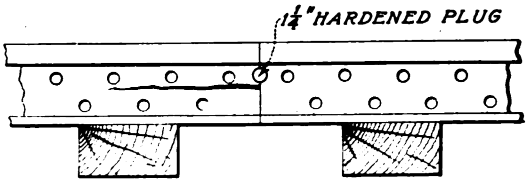


FLEXIBLE SUPPORT FOR TROLLEY WIRE AT "HARD SPOTS"

PRACTICAL KINKS WHICH AID IN MAINTENANCE

Some repair methods or kinks which have been worked out by the master mechanic of this property and which have proved of value are outlined in the following paragraphs.

One of our cars was damaged in a collision with a large auto truck which tore holes in the side plates for a distance of 3 ft. and over a width of 18 in. Repairs on these were made by cutting out the entire damaged section with an oxy-acetylene cutting torch. Into this space a new plate of the same thickness was fitted and welded along the edges and the joint was ground smooth with the aid of a portable grinder. After the car was painted and varnished the patch was not discernible. To have inserted a new plate would have required the removal and replacing of approximately one hundred ⅜-in. rivets, the removal of the butt straps and about 60 sq.ft. of painting.

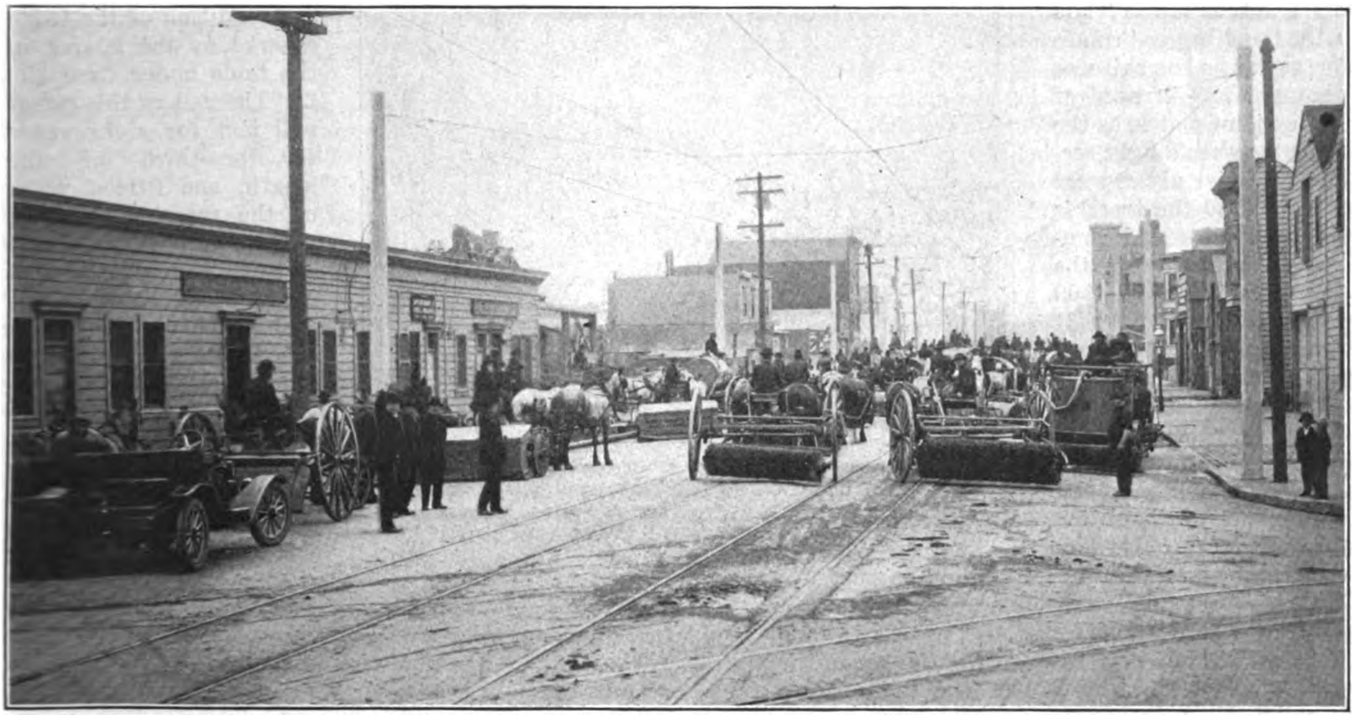


SCHEME FOR REPAIRING A RAIL JOINT INJURED BY SPLITTING OF WEB

During the war when bronze castings were up to 55 cents and 60 cents a pound and deliveries were extremely uncertain, the following method of reclaiming worn axle liners was adopted: These bronze liners were bored out ¼ in. and brought to standard dimensions with a medium babbitt. These reclaimed bearings are babbitted to exact size and require no further finishing. The average mileage obtained with the babbitted liner is approximately 40,000 and they can be rebabbitted many times before the bronze shell breaks.

It has also been found economical to substitute for certain small castings forgings which could be made in one heat. This forging work is done with a 300-lb. Bowdry power hammer by the use of several dies made up in the shop.

Two of the articles thus forged are shown in an accompanying illustration, one in the upper, left-hand corner. The procedure is this: A gate lock is first roughed out in the tong die shown just to the right. The piece thus "roughed" is inserted in the die of which the parts are shown just under the gate lock where the center portion is punched out. The slot thus formed is rounded out to the completed shape and the end is turned on the anvil. The illustration also shows a bell tapper which is forged out by the use of the longer two tong dies shown on the extreme right. In addition to the parts shown this method has been found useful in turning out a special bolt used for carrying the exit gate wheels, leaving the cutting of the thread as the only machine work to be done. We also make a peg for the motorman's stool, which is inserted in a 1-in. pipe and coupled thereto with a standard 1-in. coupling. The threading of the peg is, likewise, the only machine-tool work on this piece.



OVERHEAD CONSTRUCTION, SAN FRANCISCO MUNICIPAL RAILWAY, SHOWING CONCRETE POLE CONSTRUCTION

Where "hard spots" have been found in the trolley wire, caused by the blow of the trolley wheel at the point of support the trouble has been materially decreased by making the suspension from a subspan, which subspan has a great deal less initial tension and mass than the main suspension span. The construction is illustrated in the accompanying sketch.

Switch-group units which have been removed on account of wear have the poles filled in by oxy-acetylene welding. They are then fitted with case-hardened pins and bushings. This method has resulted in prolonging the life of these parts to three times that of the plain untreated pins.

In several instances where a rail has split along the web at the joint, the break has been repaired without cutting back and installing a short length of rail. The rail is drawn up under pressure by means of a heavy clamp applied at the head and base so that the crack is tightly closed. Then a 1¼-in. hole is drilled and reamed in the web or the split so that one-half of the hole is in the adjoining sound rail. Into this reamed hole a 1¼-in hardened steel plug is driven and the joint is replaced. While this method of repair might not at first glance appear mechanically sound, nevertheless it has stood up well under service and no weakness has developed. The economy over replacing the broken rail is very apparent, especially under existing prices.

Suggestions for Safety Councils

At the Seventh Annual Safety Congress, F. M. Rosseland, president Chicago Safety Council, made suggestions regarding the work of local councils. He said that the territory of the local council should be carefully divided into districts with a chairman and committee for each. The work in all districts should be the same, except as local conditions may indicate a definite change, and should be divided in three parts: (1) industrial safety; (2) public safety; (3) home safety. Industrial safety will receive first consideration, of course, and efforts should be directed in five different channels: (1) Safety rallies for workers; (2) instruction classes for safety supervisors; (3) inspirational meetings for foremen and superintendents; (4) monthly safety dinners for executives; (5) the investigation of unusual industrial accidents. The safety rallies should be held at least once every four or five weeks, should be opened at schedule time and, if held in the evening, should close at 9.30 or not later than 9.45. They may be held indoors or out of doors; may consist entirely of moving pictures or include moving pictures as part of a program. These meetings are principally inspirational and are of definite value to the plant safety supervisors.

Some Results of Rail Conservation

Extended Trials Have Shown That by Careful Rehabilitation Old Rails Can Be Aligned and Low Joints Eliminated, Giving the Track a New Lease of Life—The Saving Thus Effected Is Illustrated by Various Examples—Other Track Practices Described

BY W. R. DUNHAM, JR.
Engineer Maintenance of Way, The Connecticut Company

AS EARLY as 1909, the writer believed there were great possibilities in the conservation of old rail. Perhaps it would be a happier term to say the non-renewal of rail, which it had been the custom to relegate to the scrap heap or sell for relayers, substituting a new and heavier section therefor. In that year I had the chance to try out the theory on a construction job, which consisted of relocating an existing single track suburban line on side location and laying a second track. The old rail in the single track was a 58-lb. low T, laid in 1894 and in good condition as far as the rail was concerned but in need of heavier joint plates, as the old plates were a light section. Heavier plates were installed, and the track is still in service and compares favorably with the second track laid in 1909 with 80-lb. low T rail. It was not until 1914, however, that it was possible to try out extensively the theory of rail conservation. In that year I was given actual charge of the maintenance of about 725 miles of track. It may be of interest to state here that in the past five years 4776 tons of old rail has been saved by the methods to be described, and the track is still in good condition. The net saving to the company during this period has been $200,000 in the net cash value of rail. This figure is based on pre-war prices of new and scrap rail and represents the actual cash saving, taking into account the cost of the heavier rail which would have been laid and crediting the scrap value of the old rail.

REHABILITATION CASE NO. 1. THIS TRACK WAS CONDEMNED IN 1908 AND PAVED IN 1915 WITH CONCRETE. THIS PICTURE WAS TAKEN IN 1919. THE APPARENT CRACK IN THE PAVING IS A JOINT

Most of the rail was of plain girder or T section, a greater portion being 7-in. 70-lb. rail that had seen from fifteen to twenty years' service. A large portion was in streets paved with macadam, a pavement which was replaced, under municipal orders, with a so-called permanent pavement. In one case the rail was apparently so far gone in 1908 that a welding company had refused to weld it, its representative declaring that "it isn't worth welding." This particular piece of track was overhauled in 1914 and '15, is still in good condition and will last for a number of years. In 1914 the writer estimated eight years of life for it, but from present appearances this figure is 50 per cent low. A view of this track, taken in 1919, is given in the engraving above. The maintenance charges have been low for the past four years, as can be seen from the figures under "Case No. 1" in the table.

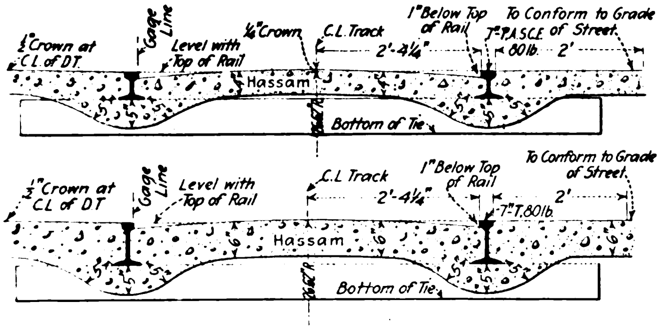
The maintenance consists of building up "cups" as fast as they appear and grinding to a smooth surface. The success of most of the saving in rail was found to vary with the type of pavement used, and after investigation and study a compressed concrete pavement known to the trade as "Hassam" was adopted.

It may be of interest to say that the writer reported as follows to the general manager in 1914 on the condition of the track covered by the figures in the table under Case No. 2: "The rail on this street will last for eight years for one-third of the length, and fifteen years on the remainder, if we use the proper pavement and can purchase a welding and grinding outfit with some of the money saved. I will guarantee the joints from the bottom up, if you will give me the equipment to maintain the joints from the top down." He agreed to the proposition for this job, and in the following years to 1917 inclusive, we saved more than 12 miles of track on one division, as shown by the figures in the table on page 564.

The line in question was a double track main line with five minute headway. As the city had ordered the track paved, it was obligatory for the company to do the work.

The actual work on this division was the same as if new rail was to be laid, but two innovations, as far as the company was concerned, were introduced. Steel shims were used on the ties and Abbott plates were used under the joints. The concrete extended under the base of the rail to a depth of 5 in. in pockets between the ties and then sloped up to 16 in. in depth. The rail was completely embedded for its full height, plus 5 in., and, in effect, was laid on concrete ties 16 in. wide and 5 in. thick, between the wooden ties. The concrete pavement represented one cubic yard for each 5 ft. of single track and cost less per square yard than the pavement on the city's portion, which was 3-in. Topeka on the old macadam highway as a base. The two sections of track, on page 563, show this construction. The way in which the concrete adheres to the rail is clearly illustrated in the accompanying photo-reproduction of a section of a 7-in. 70-lb. T in pavement. This rail had been in service for twenty years and the concrete pavement was put in place during July and August, 1915. The 4-ft. section shown was cut out in March, 1917, for inspection, the rail ends being cut 6 in. outside of the block. The 2-ft. shoulder of the paving is shown at the left-hand side of the picture. This photograph was taken in 1919.

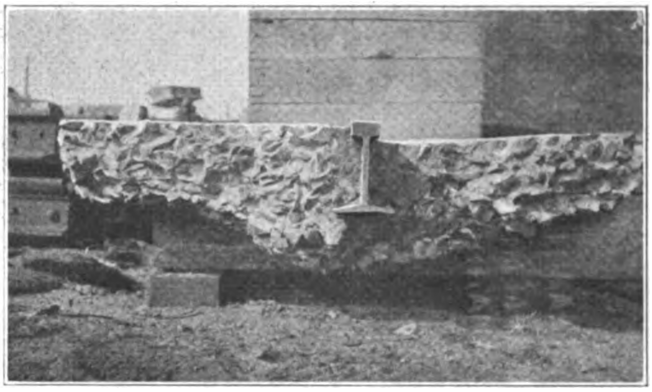
Of course the writer understands that a cash saving in one year may be more than offset the next year by a greater expenditure; in other words, it is not true economy. The results so far obtained, however, show that the work has been a true economy, as may be seen from the statistics in the table under Case No. 3. The track to which these figures relate is shown in two accompanying views, one having been taken before and the other after the track was overhauled.



AT TOP, CROSS SECTION OF TRACK WITH 5-IN. RAIL IN HASSAM PAVEMENT; AT BOTTOM, CROSS SECTION OF TRACK WITH 7-IN. RAIL IN HASSAM PAVEMENT

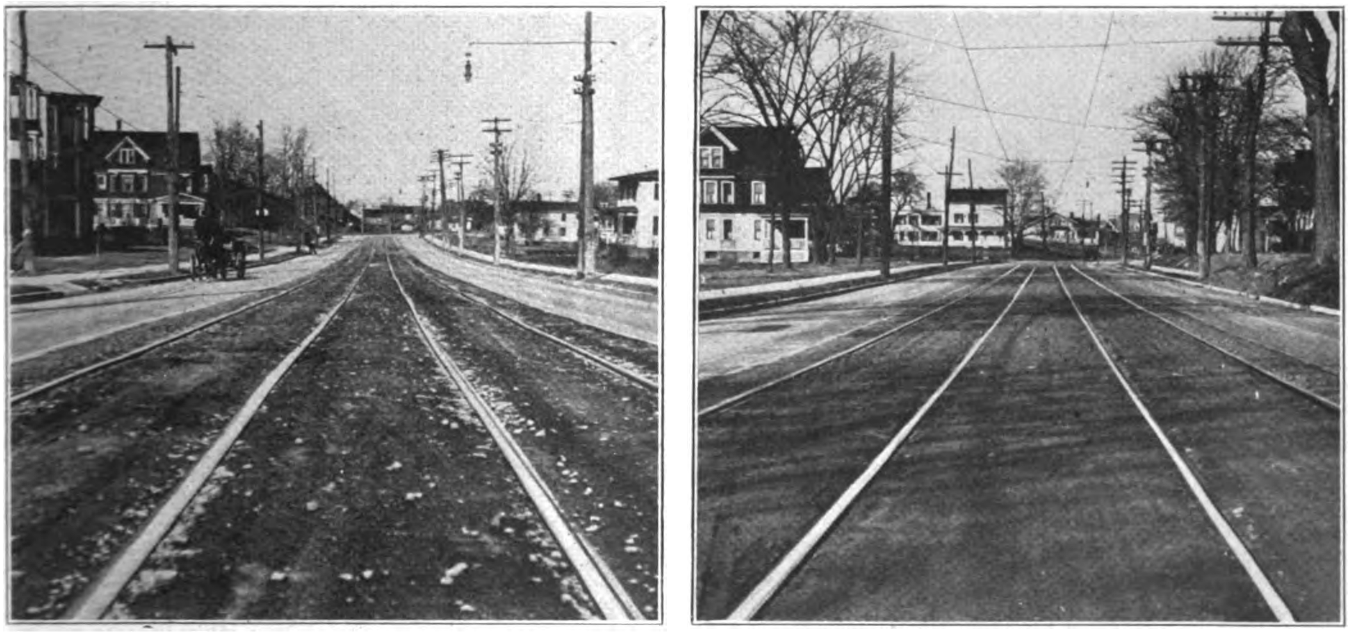
In some cases it is true the saving is so small that it is a question as to the best method to pursue, and in Case No. 4, had the company been able to get new rails, doubtless the old rails would have been scrapped. Personally the writer is glad the rails were left in, however, as while they represent only a small saving they give a tangible base for judgment for work coming in the future.

Generally speaking it has been our experience that the greatest saving is made where the work must be done on the company's initiative, that is, where the track structure is so far gone that apparently the entire structure must be renewed, since this entails a charge for entire paving as well. If the track can be saved by welding the joints and grinding, a great part of the pavement is not disturbed and the cost is thereby reduced, thus decreasing the annual charges and showing a larger saving.

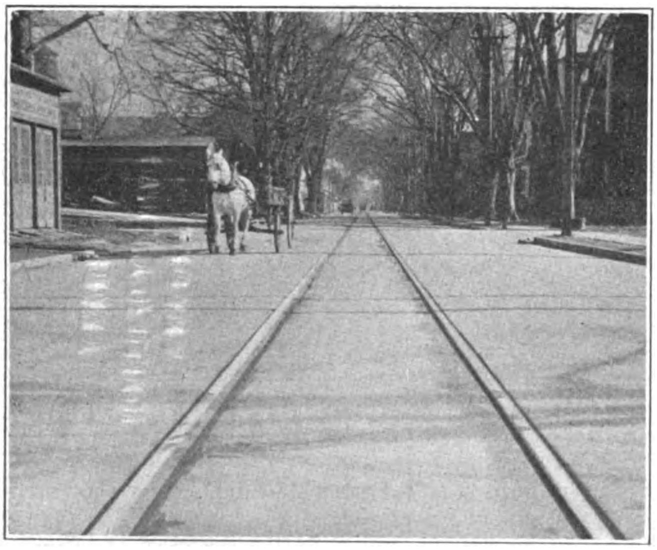


THIS SECTION SHOWS THE ADHESION OF THE CONCRETE TO THE RAIL

The double track line represented in Case 5, on which cars ran on a five-minute headway, was in such condition that the mechanical department could tell by the condition of the cars those which ran over this line. The track was electric welded in 1908, but was so full of "dutchmen" that it looked like a Hun trench. This section was 8000 ft. long. This line had been scheduled for entire renewal every year since 1908, but other work called for by the city cut it out every year. The estimated cost for the entire renewal in 1916 was $80,000. We overhauled it in 1917 and maintained it through 1918 at a total cost of $2900. It was done as a temporary expedient to last until after the war. We estimated it would last three years, but from present appearances it will last five years and perhaps eight years. Views of the track before and after the work was done are published. Basing our maintenance charges for the next three years on the actual maintenance for one year, but increasing 33⅓% each year, we



TRACK COVERED BY CASE NO. 3. THIS RAIL IS 9 IN. IN HEIGHT, LAID IN 1894 AND ELECTRICALLY WELDED IN 1909. THE FIRST VIEW WAS TAKEN BEFORE REHABILITATION IN 1918, THE SECOND AFTER REHABILITATION



REHABILITATED TRACK COVERED CASE NO. 4

shall have saved over $21,000 at the end of three years, as shown by the tabulation below, after allowing for interest on the investment and for depreciation.

Three years charges (new rail)	$25,245.00
Three years maintenance (old rail)	3,540.00
Three years savings (old rail)	$21,705.00
Annual average saving (old rail)	$7,235.00

The writer does not believe that electric welding machines and track grinders will prolong the life of rail to such an extent that the rail mills will go out of business, nor do all types of rail permit of the methods herein outlined, nor are the methods claimed as fitting for all properties. This statement is simply a description of what has been done on one property and may enable others under like conditions to make conservation of rail a success.

RAILS ARE BEING TILTED

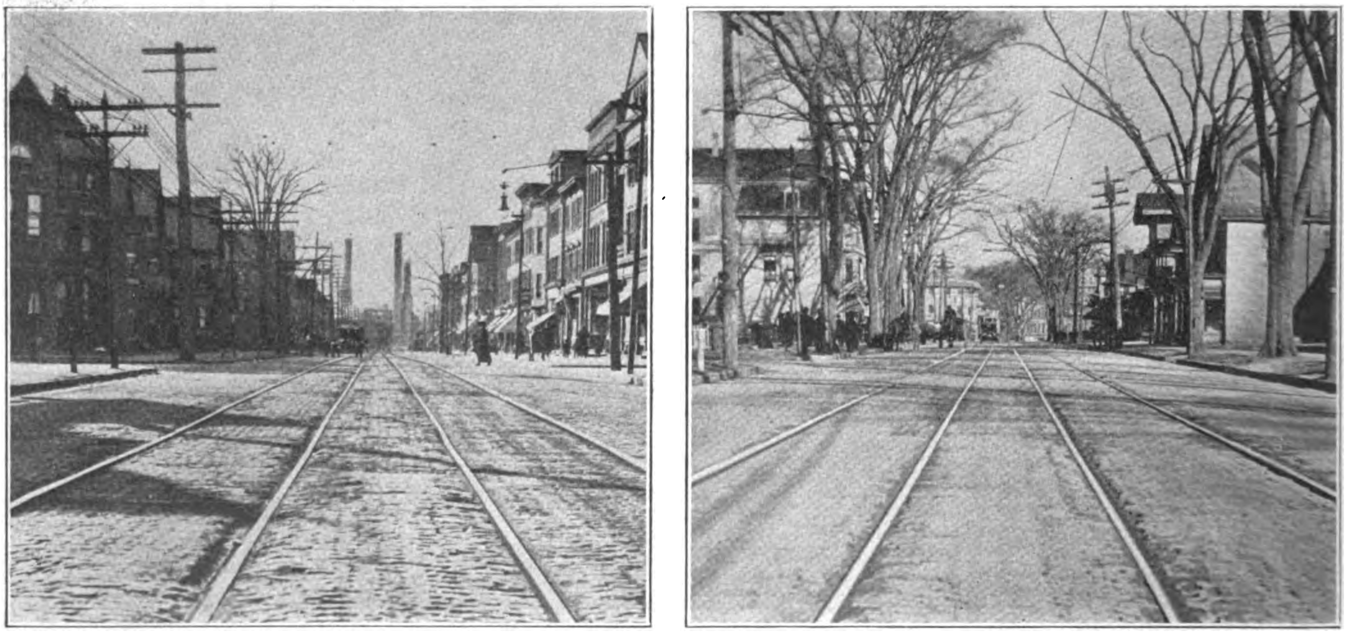
We are also tilting our rails when possible; always on new construction and also when a general tie renewal is made. So far as our knowledge extends, but one other company is doing this in this country, and that is the Cleveland Railway under C. H. Clark. We are getting good results so far and understand that he is also. We believe that by tilting the rail we get less vibration with consequent less pavement maintenance. We also get better rail wear, and where old rail is head worn on the gage line, by tilting, we move the wear toward the back of the rail, and it gradually comes to the center of the head, thus increasing the life. On tram girder rail which is flanging, we can by this method throw the line of contact up from the tram and so overcome the flanging and increase the life of the rail.

On joints which have become loose and are surface bent, we use Abbott plates. The joints then "iron out" and can be kept tight. If they are cupped in addition, we build up with the arc welder and grind smooth.

We also use a vertical rail bender with good success to remove surface bends before placing the Abbott plates, if the rail is to be permanently paved. The theory in all this treatment is to provide as smooth a wearing surface at the joint as at any other part of the rail, and if possible to have the whole rail rigid. By this I do not mean a rigid base only nor a rail partly em-

TABLE SHOWING SAVINGS EFFECTED IN RAIL REHABILITATION

	Case 1	Case 2	Case 3	Case 4	Case 5
Length of track, measured as single track, ft	15,922	64,685	8,480	2,270	8,000
Date of rehabilitation	1915–16	1914–18	1918	1917	1917
Cost of new rail less scrap value of old rail	$19,130.00	$52,920.00	$9,375.00	$2,490.00	$76,500.00
Interest and depreciation on new rail, per annum	$1,722.32	$4,015.44	$1,030.25	$273.90	$8,415.00
Actual maintenance of old rail, per annum	$513.12	$895.92	$815.76	$142.08	$2,900.00
Annual saving from use of old rail	$1,209.20	$3,119.52	$214.49	$131.82	$7,235.00
Interest and depreciation per year per foot of track for new rail	$0.108	$0.062	$0.122	$0.121	$1.051
Annual maintenance per foot of track for old rail	$0.032	$0.017	$0.096	$0.063	$0.146
Annual saving per foot of track for old rail	$0.076	$0.045	$0.026	$0.058	$0.905
Saving to date	$18,617	$52,025	$8,560	$2,348	$5,515.00



THIS SECTION COVERED BY CASE 5, IS SHOWN BEFORE AND AFTER REHABILITATION. THE WORK WAS DONE IN 1917 bedded, but by a rigid rail I mean one entirely embedded in concrete except for the head and gage side. This theory has shown good results after five years practice with rail which had been condemned as too poor to weld, six years before we paved it. It has now been paved five years, or eleven years extra in all, and is apparently good for as long again. During that five years there has been no paving maintenance, and the track maintenance has been cut to $500, or 3 cents per foot of track. On one division alone we have 12 miles of this construction, and the actual maintenance has been $900, or one cent per foot of track.

In addition to prolonging the life of rails, we have, with the use of the electric welders and grinders, saved on one division, in one year, $3534; also, in repairing rail breaks in permanently paved streets, the sum of $2000 was saved, as we repaired 127 broken rails at a cost of $225, which under the old methods would have cost $2286.

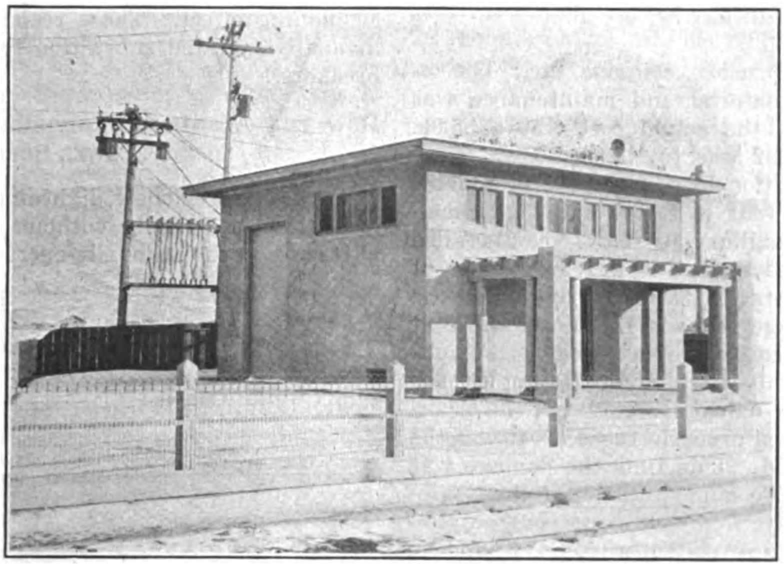
We have on our system three electric welders of the Atlantic type, five welders of the Indianapolis type, eight rotary and seven reciprocating grinders. In addition, we have other labor saving machines, such as steam and electric shovels, which reduce our excavating costs on large jobs 88.6 per cent below the cost by hand and pneumatic tie tampers, which give us better work at 16⅔ per cent less than the cost by hand, and are additionally useful in breaking out old concrete pavement at a reduced cost. We also use the pneumatic tie tampers for cleaning cement grout from salvaged paving brick. Two men with one machine can clean 250 brick per hour, making the cost 35 cents per hundred.

A Year of the Automatic Substation at Butte

Maintenance Cost for First Year Was About $355, More Than 40 Per Cent Less Than Estimate—Company Plans to Extend Automatic Operation

BY E. J. NASH
Electrical Engineer Butte (Mont.) Electric Railway

THE design and construction features of the automatic substation have received considerable space in the ELECTRIC RAILWAY JOURNAL of late, but there has been comparatively little regarding operating records. The first year's operating records of one of these stations may, therefore, be of interest to the readers of the paper, particularly in view of the fact that reliability of service is of primary importance. In the following article are mentioned also a few features wherein the automatic substation of the Butte Electric Railway differs, so far as known, from any thus far described or installed. A few comparisons are given also as to the relative characteristics of automatic and manually-operated stations containing machines of the same type, style and capacity.


AN ATTRACTIVE HOUSING FOR THE AUTOMATIC SUBSTATION AT SOUTH BUTTE, MONT.

The accompanying photographs show the general appearance of the substation inside and out, the equipment being that found in substations of this type generally. By way of explanation of the presence of the chicken wire netting seen on the poles in the exterior view of the substation, it may be said that this is used for resistance between the rail at the station and the negative side of the rotary in order to insure the desired condition that the voltage drop from the rail at the station to the negative bus be the same as the drop from the rails at any other point to the bus. On account of the termination of a contract for power, and also because the company wished to take care of the return current more satisfactorily, it recently became desirable to install a new system of distribution and to use the negative insulated return-feeder system for the mitigation of electrolysis. The location of a substation at the load center of the system was considered, the cost would have been $19,800 more for copper, plus additional annual line loss of $1,700, than if a substation was located at the center of load distribution for the uptown district and another was located in the South Butte residential district where approximately 25,000 people reside. Even under these conditions it would have been more economical to use the copper and suffer the line loss than to install a manually-operated station in South Butte because the company pays each operator $7 per day for an eight-hour shift. As this station would have to run at least sixteen hours a day, making an annual operating charge of $5,110, it is obvious why the automatic substation was the economical solution of the problem regardless of an additional cost of $9,000 for buildings, land and equipment for the rotary.

It was estimated that one day's work per week was sufficient for cleaning and inspecting the apparatus, amounting to $364 annually, as an electrician receives $7 per day. It was estimated that materials would cost $256 per year, including necessary incidental supplies such as oil, waste, brushes, contacts, etc. The total annual charge for material and maintenance was thus estimated at $620; the actual cost was $355.80. Of the latter amount $292 was for labor.

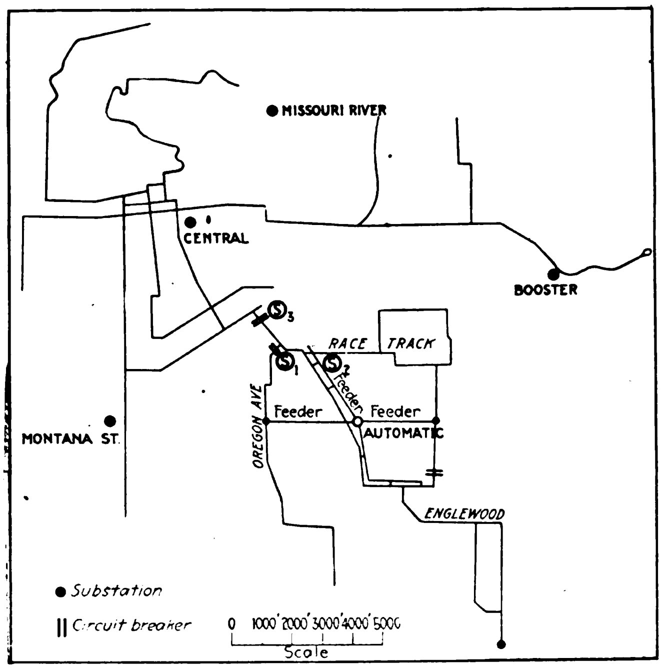


DIAGRAM OF DISTRIBUTION SYSTEM, BUTTE ELECTRIC RAILWAY

The automatic substation has given very reliable service, for during the year it failed but four times. On two occasions the auxiliary to relay No. 27 failed to open. This relay, as described in previous issues of the JOURNAL, keeps the station from starting when the alternating-current voltage is low. In failing the first time the clutch and trip coils were damaged, as the voltage was too low for the oil-switch motor to complete the closing operation. The damage would not have occurred had the circuit been properly fused, as it was the next time the relay failed. This time the damage was simply a blown fuse. The manufacturer of the equipment, the General Electric Company, replaced the auxiliary to relay No. 27 with a relay of a later type and no further trouble has been experienced.

On another occasion the rotary was stopped on a very hot day by the operation of the bearing thermostat. This thermostat had a lower temperature setting than was necessary and the rotary simply remained idle until an electrician arrived. On another occasion, before electrolytic lightning arresters were installed on the direct-current feeders, lightning entered the station. All the damage in this case consisted in a blown fuse and the burning off of the insulation from the wire of the lighting circuit which was tapped to the feeder.

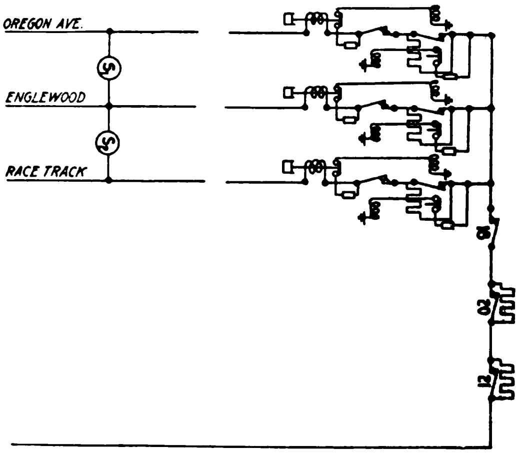
AUTOMATIC IS MORE RELIABLE THAN MANUALLY-OPERATED STATION

It happens that the machines in the railway company's central substation are of the same type, style and capacity as that in the automatic, so that there is an excellent opportunity to compare the operation of these two substations. The rotaries are 500-kw., 60-cycle, 600-volt, six-phase General Electric machines, diametrically connected. The full load rating is 834 amp., and they are designed to carry 50 per cent overload for two hours and 100 per cent overload momentarily. They have flash suppressors, or arc coolers, as shown in one of the accompanying illustrations. These are the devices described by Messrs. Linebaugh and Burnham in their paper on "Protection from Flashing" delivered before the 1918 convention of the A. I. E. E., and abstracted in the issue of this paper for July 6, 1918, page 9.

The two rotaries in the central substation have flashed over, and have flashed to the pedestal. The short-circuit current for the manually-operated substation has been limited to less than 3000 amp. Although on one of the 500,000-circ.mil feeders the nearest trolley tap is more than 10,000 ft. from the substation, a pedestal flash was experienced from this circuit. By way of contrast to this the automatic substation has demonstrated its ability to handle a short-circuit without flashing. Several times when the short-circuit current would have reached a value in excess of 4000 amp., the only indication of trouble was a faint squeak. In one test the trolley wire was short-circuited to the rail within 1000 ft. of the station. In this case a flash started but it was extinguished by the wire arc coolers. This non-flashing feature of the automatic substation is worthy of consideration. It is, of course, due to the use of the flash guards and the load-limiting resistors which have a cushioning effect. These resistors could be used in a manually-operated substation to supplement the circuit breakers.

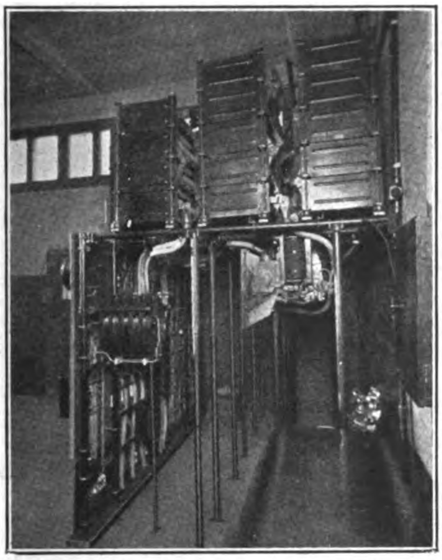
HOW THE AUTOMATIC CONTRIBUTES TO RELIABILITY OF POWER SUPPLY

As stated previously, lightning entered the automatic substation practically without doing any damage. It also entered the manually-operated substation, where it jumped to the low-voltage release of the rotary circuit breaker and blew the instrument fuses. A bearing was burned out in the manually-operated station, also, which would not have occurred with automatic control.



SIMPLIFIED DIAGRAM OF SUBSTATION CONNECTIONS AND FEEDERS

The automatic substation, as will be seen from the accompanying map of the system, is located in South Butte and operates in parallel with the central substation through an automatic sectionalizing switch. The



BACK OF SWITCHBOARD, WITH RESISTORS ABOVE, HEAVY CONTACTORS IN CENTER AND CONTROLLER COVER IN FOREGROUND

automatic feeds three separate trolley sections, utilizing practically but one 500,000 - circ.mil feeder and the double trolley of the same circuits. This is accomplished through the use of two General Electric type SW-4 automatic sectionalizing switches at a point where two lines branch from the main line. The Oregon Avenue and the Race Track lines receive their power from the Englewood or South Butte lines through sectionalizing switches S_1 and S_2.

The contactors in the automatic substation for the Oregon Avenue and Race Track feeders are used to energize these circuits to close the automatic sectionalizing switches in case they open through overload, as the breakers for the Englewood or South Butte feeders would not open to equalize the separate sections. The Oregon Avenue and Race Track feeders will (with a reduction in voltage) carry the loads of these stations in case the power is not on the Englewood section.

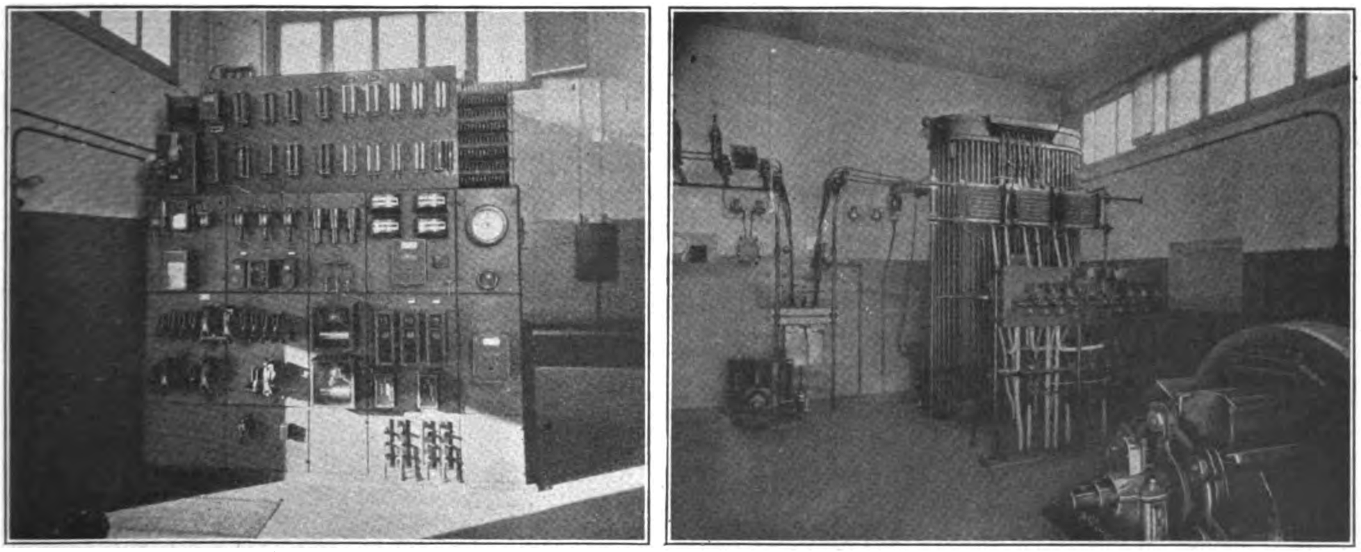
Instead of using a single contactor for the feeders from the automatic substation, which is in parallel with the resistor, use is made of two contactors in each circuit so that in case of a trolley break only the affected section is disconnected from the bus. As will be seen from the accompanying diagram of connections, one contactor shunts the resistor and the other is in series with the line on the line side of the contactor and resistor.

The holding coil of the series contactor is wired from the bus through the contact of a thermostat placed over the resistor of that circuit. When the shunted contactor opens, through the opening of the contact of a series overload time-limit closing relay, current passes through and heats the resistor. If the temperature of this reaches a predetermined value the contacts of the thermostat open, thus opening the holding circuit of the line contactor which disconnects the feeder from the bus. By the use of the connection of the holding coils as shown in the diagram the contactors are closed whether the station is running or not. This is necessary, for at night when the automatic substation is not running, the closed contactors furnish power for Oregon Avenue and Race Track to close the sectionalizing switches in case they open on account of overload.

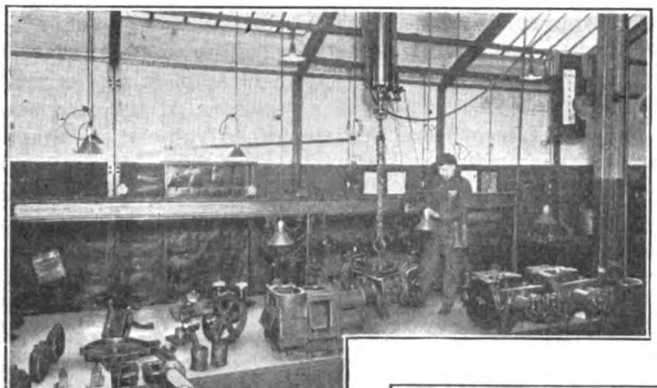
The operation of the South Butte automatic substation has been so satisfactory that plans are now being made to add another substation of the same type to the system and to make the central substation automatic. By the addition of a second substation, copper to the value of $6,000 would be recovered and this station would be available in case one of the other units failed to function. That this would be economical is evident from the fact that the three operators in the central substation are paid $7,665 per year.

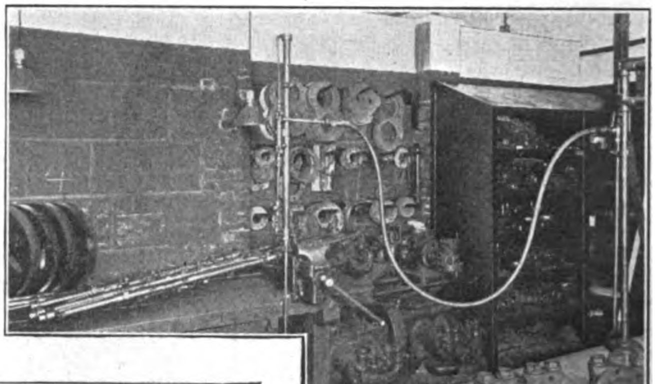
In conclusion, and for purpose of completeness, it should be stated that the population of Butte is given by the 1910 United States Census as 39,165. This figure is misleading as it includes only the inhabitants of the small area within the city limits, covering about 5½ sq. miles. There are a number of towns and residential sections adjoining the city with an aggregate population of about 70,000. Consequently the total population served by the railway is at least 100,000.

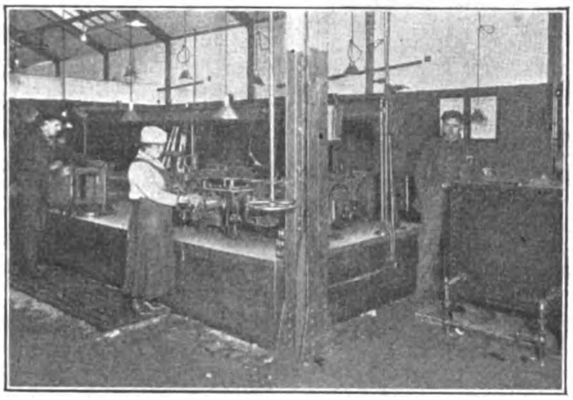
[EDITORS' NOTE. Mr. Nash refers to articles on automatic substations that have appeared in this paper. In this connection the table printed in the issue for Jan. 4, 1919, page 54, is of interest. It, of course, includes the equipment described by him. Helpful articles will be found in the following issues: Jan. 11, 1919, pages 84 and 104; Dec. 14, 1918, pages 1035, 1038 and 1051; Nov. 30, 1918, page 979; Oct. 12, 1918, pages 651 and 665; July 27, 1918, page 157; July 20, 1918, page 118; April 13, 1918, pages 689, 692, 705 and 707; March 16, 1918, reference by Charles R. Harte, in general article on power distribution.]



AT LEFT, MAIN SWITCHBOARD WITH CONTROLLER IN BACKGROUND; AT RIGHT, TRANSFORMERS, ROTARY AND AUXILIARIES



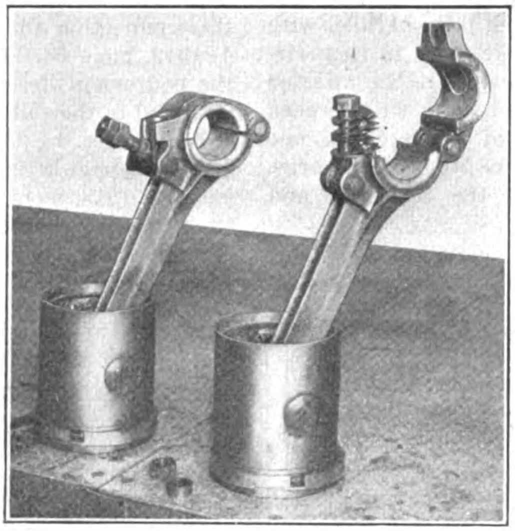




Compressor Overhauling Bench with Working Space on All Sides Gives Easy Access to All Parts and Centralizes Work

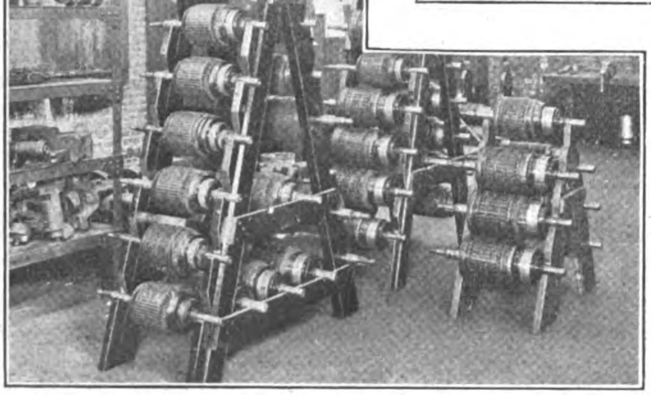
At Left (Top), Lowering a Compressor into Position for Overhauling.
In Center, Dismantling Compressors for Overhauling—Oil Reclaiming Tank Conveniently Located at Right.
At Right, Air Connection for Testing Door Engines—Gasket Rack and Air Brake Equipment Closet in the Background.

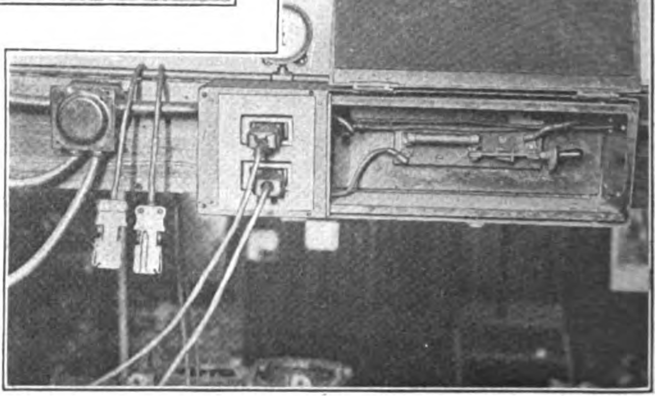
Compressor Overhauling and Testing Bench at One of the Shops of the Brooklyn Rapid Transit Company



Storage Racks and Convenient Testing Equipment Facilitate the Work of Overhauling and Insure Proper Workmanship

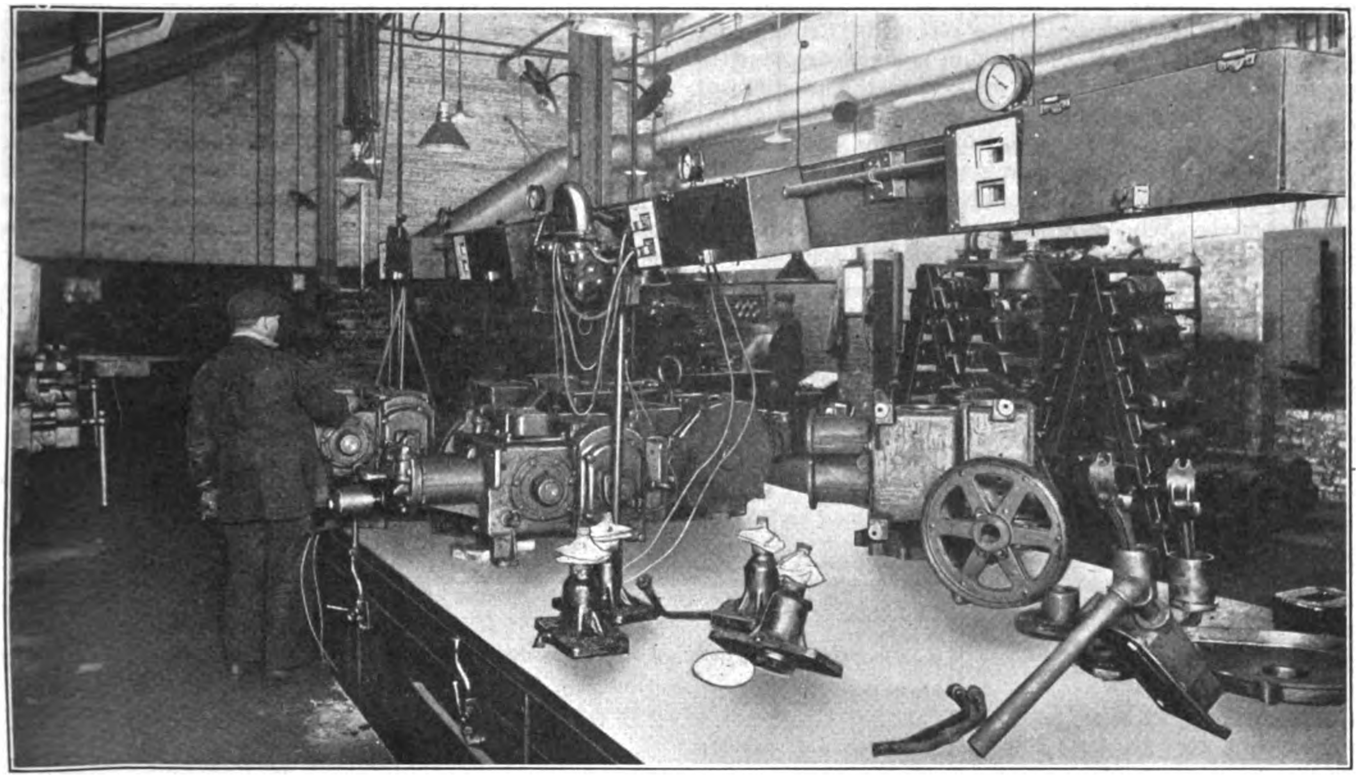
At Left, Racks for Storing Compressor Armature and Air Brake Equipment Parts.
In Center, Connecting Rod Bearings with Shims to Provide Adjustment.
At Right, Switch, Fuse and Contact Receptacle for Testing Compressors.





Up-to-Date Practice in Compressor Maintenance

Methods of Inspection and Overhauling Are Covered and Details Given of a Compressor Overhauling and Testing Bench with Other Labor-Saving Devices



CLEANING COMPRESSORS WITH COMPRESED AIR ON THE OVERHAULING BENCH

THE best air-brake equipment in the world is worthless unless a sufficient supply of compressed air is available. Compressors are the source of air supply and the fountain head of the air-brake system. Their proper maintenance is of the utmost importance in order to avoid accidents, to prevent annoying delays and to insure an efficient service.

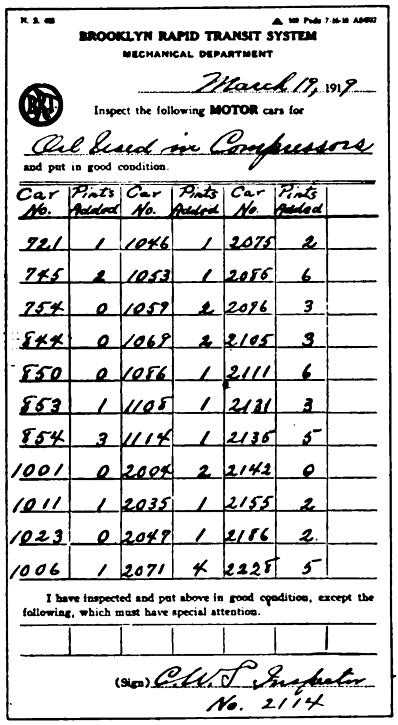
The maintenance work on air compressors is properly divided into two parts. The first includes the regular inspection and light repairs that are necessary to keep wearing parts in proper adjustment. The second comprises general overhauling, which requires the dismantling and cleaning of all parts together with their renewal and reassembling with proper lubrication for the wearing parts. Both classes of work can be most effectively carried out if done on a mileage basis. Where roads have equipment that operates only in limited service, as during the rush-hour or peak-load periods, it is desirable to put a limit on the time that may elapse between inspections, otherwise a greater interval than would be safe might elapse.

The mileage allowed between inspections or overhaulings depends largely on the age and general condition of the equipment and on the service conditions that must be met. Each road can best determine this for itself, as the standard used for one class of equipment may prove entirely unsatisfactory for another.

The work necessary in inspecting electrically-driven compressors is conveniently divided into: (1) Oiling the crank case, bearings, etc., and (2) inspecting and adjusting the operating parts. Most compressors are now provided with elbows and plugs or with oil openings for determining the amount of oil in the various compressor oil chambers, and for convenience in adding necessary oil. These openings are located so that when the oil reaches to the opening there is sufficient for operation. The oil hole for the crank case commonly consists of a street elbow installed about 2 in. above the bottom. The inspector removes the plug from the elbow and inserts his finger to remove anything that might clog the opening. As he removes his finger the oil will "kick back" if the opening is free. Where the opening cannot be cleared with the finger a strand of rope with wire center will be found of value. If the oil follows back to from ¾ in. to ½ in. of the top no additional oil need be supplied, otherwise sufficient oil is added to bring it up to the required height.

A careful record should be kept of the quantity of oil added, together with the car number. The first form shown on page 570 is used by the shop department of the Brooklyn Rapid Transit System for recording the amount of oil used. When the work of oiling is finished the inspector hands this report to the foreman of air brakes who checks it over carefully. Where the report shows that more than 3 pints of oil has been added to a compressor, the reports for the previous inspections of that compressor are checked. If the compressor received no oil or but a small amount on the previous inspection the report is considered satisfactory, but if the previous report shows a large amount of oil used, the car is withheld from service for a detailed inspection to determine the cause of the excessive consumption.

The inspecting and adjusting of the operating parts is usually done by another inspector. This inspection is preceded by a wiping of the compressors with dry waste and the brushholders and insulators with cheesecloth. All brushes are examined and if too short to last until the next inspection are replaced. Brushholder tension is checked and the tension springs are kept in good condition. After this inspection the compressor is operated to see if there is any pounding of the valves or gearing or any sparking at the commutator. If sparking occurs the commutators are cleaned with a pad of cheesecloth. (Commutators should never be sandpapered. Where brushes do not fit the brushholders properly, sand paper may be used to rub them down.) Where brushes do not seat properly on the commutator a piece of sandpaper is placed on the commutator under the brush and this is worked back and forth. (Emery cloth must never be used for this work.) The leads and terminals of the compressor are inspected to eliminate loose connections. Pump valves and strainers are given a more general inspection about once every sixty days.



BROOKLYN RAPID TRANSIT SYSTEM
MECHANICAL DEPARTMENT

March 19, 1919

Inspect the following MOTOR cars for

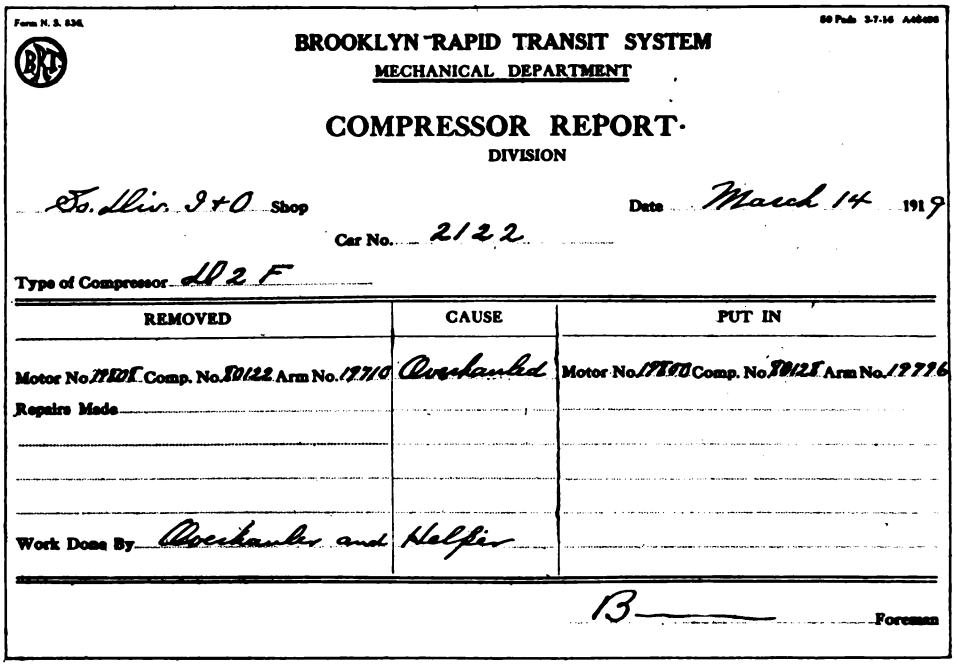
Oil Used in Compressors

and put in good condition.

Car No.	Pints Added	Car No.	Pints Added	Car No.	Pints Added	
721	1	1046	1	2075	2	
745	2	1053	1	2086	6	
754	0	1059	2	2096	3	
844	0	1069	2	2105	3	
850	0	1086	1	2111	6	
853	1	1108	1	2131	3	
854	3	1114	1	2136	5	
1001	0	2004	2	2142	0	
1011	1	2035	1	2155	2	
1023	0	2049	1	2186	2.	
1006	1	2071	4	2228	5	

I have inspected and put above in good condition, except the following, which must have special attention.

(Sign) C.W.T. Inspector
No. 2114



Form N. S. 836

BROOKLYN RAPID TRANSIT SYSTEM
MECHANICAL DEPARTMENT

COMPRESSOR REPORT
DIVISION

So. Div. I+O Shop Date March 14 1919

Car No. 2122

Type of Compressor D2F

REMOVED	CAUSE	PUT IN
Motor No 19101 Comp. No 80122 Arm No. 19710	Overhauled	Motor No 19800 Comp. No 80125 Arm No. 19796
Repairs Made		
Work Done By Overhauler and	Helper	

B—— Foreman

AT LEFT, FORM FOR RECORDING OIL USED. ABOVE, COMPRESSOR REMOVAL AND REINSTALLATION REPORT FORM

SYSTEMATIC OVERHAULING REDUCES COSTS AND PREVENTS ANNOYING DELAYS

The term "overhauling" is used to include the removal of the compressor from the car, the dismantling of all parts, the cleaning and renewing of the parts as necessary, the replacing of all broken or excessively worn parts and their reassembling with proper lubrication. After the compressors are placed in the best possible condition they are given a running test of about six hours duration before reinstallation on cars.

Such an overhauling can be best and most quickly done on an overhauling bench specially constructed for convenience and thoroughness in carrying out the work. The compressor overhauling bench shown in the accompanying illustrations is installed at the Southern Division inspection and overhauling shop of the Brooklyn Rapid Transit System. It consists of a zinc-covered platform 19 ft. long, 7 ft. wide and 25 in. high, with an open space on all sides. Such a bench will accommodate eight compressors, and all the auxiliary piping, electrical connections, storage reservoirs, etc., are arranged with eight units, so that the work of overhauling and testing on one compressor need not interfere with that being done on others.

Sixteen 14-in. x 48-in. reservoirs are installed underneath this overhauling bench. They are connected in series and piped in pairs so that each compressor can be used to charge two reservoirs. The air thus compressed in these tanks is used for various operations in the air-brake room. At the center of each side of the bench is a tap for attaching a hose so that the air may be used for blowing out and cleaning the compressors being overhauled. At one end of the bench a connection is provided so that the air may also be used for testing and adjusting door engines, more than 7000 of which are used on this property. At the other end of the bench there is a connection to the air hoist which is used for handling the compressor while it is being overhauled.

A bench for overhauling other air-brake parts extends along the wall at the side of the compressor bench, and the reservoirs also supply air to this bench. A board extends over the top of the compressor overhauling bench for supporting the various contact boxes, switch and fuse boxes, gages and governor used with the electrical connections to the compressors. This board is 11½ in. wide and is supported by a 1-in.-pipe framework 4 ft. above the top of the bench. The contact boxes have two contact fingers, one for the positive and the other for the negative side of the compressor connections. The boxes are made of asbestos lumber and are fireproof. At one end of the leads used for connecting to the compressors is a plug contact. This consists of a flat piece of hard rubber with copper plates on either side. By shoving this between the contact fingers in the box the electrical connections are made.

At the other end one of the leads is provided with a knuckle joint connector for connecting to the compressor field and the other has a brass ferrule for insertion in the brushholder. These connections can be made very readily. Each individual testing circuit is protected by a 10-amp. fuse and a knife switch. A single governor regulates the cutting in and out of the compressors while being tested but each is provided with a separate air gage.

The bench is lighted with eight drop lights with shades. Extension cords are used where the light is needed closer to the work.

VARIOUS STEPS IN COMPRESSOR OVERHAULING

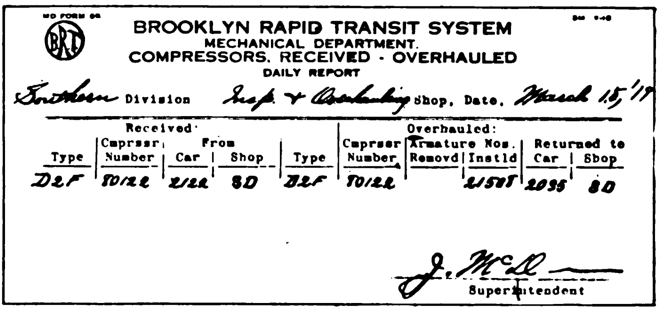
When a compressor is removed from a car, the car number is painted on one of the compressor cylinders for reference and use in making future records. The compressors are handled from the cars to the overhauling room on low shop trucks, and all handling inside the air-brake room is by means of an air hoist which runs on an I-beam the entire length of the room and directly over the air-compressor overhauling bench. All control of the hoist is from the floor. An accompanying illustration shows a compressor being placed in position on the bench for overhauling.

The work of overhauling a compressor can best be carried on by two men. One should be a skilled workman and the other a helper. The helper can place the compressor on the bench and clean off all grit and dirt carefully, which is the first work to be done on the bench. He can then dismantle the various parts by removing the crank and gear case heads, the connecting rods, gear and pinion. The overhauler should take out the crankshaft, the armature, brushholders and both fields. All of these parts are placed alongside the compressor on the bench.

When all parts but the bearings have been removed from the shell, the helper can drain off the oil and empty it into the reclaiming and settling tank. He should then clean the inside of the shell carefully and paint with an insulating paint. The foreman makes a record of the compressor number, the car number from which it is removed, the motor number and the number of the armature. The armature is then removed from the bench and placed in an armature rack. Later it is sent to the electrical repair shop for a thorough overhauling and testing before it is again returned to service.

The work done in the electrical repair shop to compressor armatures received consists first of a thorough cleaning, after which they are given a careful inspection and test to determine just what repairs are necessary. Any grounds or short-circuits in the winding are cleared, open-circuited coils are replaced and in some cases the armature is entirely rewound. It is the practice to slot all commutators of compressor armatures, and when received in the electrical repair shop they are reslotted where necessary. After the repairs are completed and tests show everything in proper condition, the armatures are dipped and baked. This process of dipping and baking complete armatures was described in the ELECTRIC RAILWAY JOURNAL for June 15, 1918, page 1149. On the Brooklyn Rapid Transit System it is the practice to bake the armatures until the reading on a voltmeter connected as below is less than 10 volts. These tests are made without removing the armatures from the oven by connecting one terminal of a voltmeter to the 550-volt shop circuit while the other is connected to the commutator segments, the armature shaft being grounded during the test. Results from these tests show that this voltage reading increases when the baking is first started, due to the expanding of the coils and the evaporation of moisture. After a certain maximum is reached the voltage reading decreases again. In testing armatures during this process it is thus necessary to take a sufficient number of readings to make certain that the voltage drop will decrease with further baking after the specified minimum of 10 volts is reached. After baking, the commutators are given a light cut to remove the insulating compound, and after a final test of the voltage drop between each coil the armature is returned to the maintenance shop for reinstallation.

Upon removing the fields from the compressor they are tapped and sounded to determine if they have become overheated or baked so as to damage the insulation. The fields are then washed off with gasoline and painted with three coats of insulating paint. No special attempt is made to return the same fields that are removed to the compressor. Several spare fields are used for carrying on the work and to prevent delay in finishing the work of overhauling.



BRT

BROOKLYN RAPID TRANSIT SYSTEM
MECHANICAL DEPARTMENT.
COMPRESSORS. RECEIVED - OVERHAULED
DAILY REPORT

Southern Division Insp. & Overhauling Shop, Date, March 15, '19

Received·				Overhauled:					
	Cmprssr	From			Cmprssr	Armature Nos.		Returned to	
Type	Number	Car	Shop	Type	Number	Removd	Instld	Car	Shop
D2F	10122	2122	SD	D2F	10122		21585	2035	SD

J. McD
Superintendent

COMPRESSOR OVERHAULING REPORT FORM

WEARING PARTS SHOULD BE CAREFULLY GAGED

With all parts cleaned the overhauler begins by gaging the bearings. This is done by putting the crank shaft in place and testing for excessive play. The tendency of the bearings is to wear egg shaped from the continual lifting action. If the overhauler finds too much slack he calls this to the attention of the foreman who decides on the renewal of all bearings. With the pistons and rings cleaned the overhauler tries these for wear in the main cylinders. The crank shaft is placed first in one piston and then the other and worked around to determine the amount of slack there is on the connecting rod. When originally installed these connecting rods have about eight shims between the edge of the housing. If there is any play these shims are removed one at a time until the play is properly taken up. The connecting rods run for two or three overhaulings after which it is necessary to rebabbitt them at which time the original number of shims is again used. The gears and pinions are inspected for wear and are renewed as found necessary. The pinions of course wear much faster than the gears.

ELECTRICAL PARTS ARE ASSEMBLED LAST

With all mechanical parts assembled attention is next given the electrical end of the compressor. The fields are first installed and connected up, then the armature is installed. Before installing the armature, however, this is tested with 550 volts through a four-light cluster. This final voltage test saves much trouble and time as it insures the armature as being free from grounds or short circuits. As the armature now put in is not the one removed, the armature bearings may not fit. If such a condition is found new bearings will have to be installed which match up with the armature shaft.

The brushholders removed are taken apart and carefully cleaned. Insulators are inspected for any weakness and renewed where necessary. When the brushholders and brushes are reinstalled the brushholder springs are adjusted. These are usually set with a tension of from 2½ to 3 lb.

With all parts reassembled sufficient lubricant is added to last till the next inspection and the compressor is given a running test of six hours' duration. Any imperfectly fitting gaskets or improperly tightened connections will be weeded out by this test so that when the compressor is again installed on a car there is no danger of something unexpected happening.

Simple and accurate records are necessary for an intelligent following of the work of overhauling. For compressors ordinarily a card record system showing numbers of compressors, motors and armatures that are installed on each car with the dates of overhauling and armature changes should be sufficient. For furnishing this information to the record department some specific forms are necessary for shop use. Accompanying illustrations show two such forms used by the Brooklyn Rapid Transit System. One shown on page 570 is a compressor overhauling report made out by the overhauling foreman to show the changes in compressor equipment for a particular car. The other form shown on page 571 follows the course of a particular compressor in removing, overhauling and reinstalling it.

A Convenient Signal Testing Board

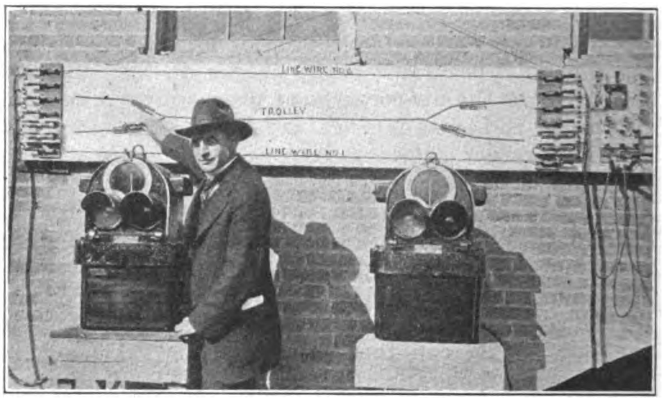
A Portable Device Well Adapted for Instructing a Class of Men and for Testing Signal Equipment

After a block of automatic signals has been overhauled in the shop, the signals should be completely tested as a pair and with normal operating current before being put out on the line again. This involves considerable temporary wiring which must be duplicated each time. To obviate this the Nachod Signal Company of Louisville, Ky., has designed a combined testing and demonstration board which is furnished complete, or if desired the blueprints and specifications will be furnished separately so the board may be made by the railway company. A pair of signals need merely be connected to the fanned-out cables at each end of the board, the power switch closed, and the signals can be actually operated by touching the miniature "contactors" on the trolley plan.

The accompanying illustration shows the board complete, which is self-contained and portable, so that it may be hung on any wall and connected to the 600-volt source of power. The middle part of the test board is occupied by a plan of the trolley wire with its branches at the ends for turn-out or double track. In relative position near the frogs are the trolley contactors, formed of bare wire and adapted to be bridged by the improvised trolley held in the hand, and made of insulated wire bared. To avoid distraction all connections are on the rear of this demonstration section, and the remainder of the board is curtained off. The signals are connected to the cable and placed on stands about in their relative positions, but turned 90 deg. from their normal position so that the indications at both ends of the block may be seen from the front of the testing board.

This portable arrangement is well adapted for use in instructing a class of platform men, since any operating condition may be produced at will and the signal simultaneously observed. Of course this only supplements without displacing instruction in actual operation on the line itself.

At each end of the trolley plan are the switches and fuses as arranged in the junction or fuse box on the line; and the maintainer may duplicate the actual code of line tests here. At the extreme right, besides the fuse and power switch, are some special connections embracing two switches, five lamps and a pair of testing pointers with insulated handles. These enable one signal without its mate to be tested out at reduced current for observation, the several individual circuits being energized by throwing the proper switches. One combination connects the pointers to a "live" bank of five lamps for testing grounds, open circuits, etc. Such a board may thus be used to compare a damaged with a perfect signal, or parts of a signal, to reproduce any questioned signal operation, to locate any difficult signal trouble, to study the circuits and to hold an emergency block in readiness while utilizing it for instruction purposes.



TESTING A PAIR OF SIGNALS BEFORE RETURNING THEM TO SERVICE

Skip-Stop Operation Gives 11 Per Cent Reduction in Power Consumption

The United Railways of St Louis inaugurated the skip stop on Sept. 22, 1918, in accordance with the request of the United States Fuel Administration. The distances between stops in the residence districts were selected to comply with the recommendations of the Fuel Administration although little change was made in the business district. The consumption of energy in kilowatt-hours per car-mile in the months of October, November and December, 1917, was 4.34, 4.32 and 4.38 respectively. With little change in the schedules the figures for the same months of 1918 were 3.74, 3.88 and 3.96, indicating a reduction of about 11 per cent. It is expected that a much greater saving would have been effected by the further rearrangement of schedules which was under consideration at the time the company was compelled to abolish the skip stop on Jan. 25 of this year.

There Is an Intimate Relation Between Bond and Joint Maintenance

Practice on Harrisburg Railways Shows Economy of Keeping Up the Joints in Connection with Testing and Repairing of Bonds

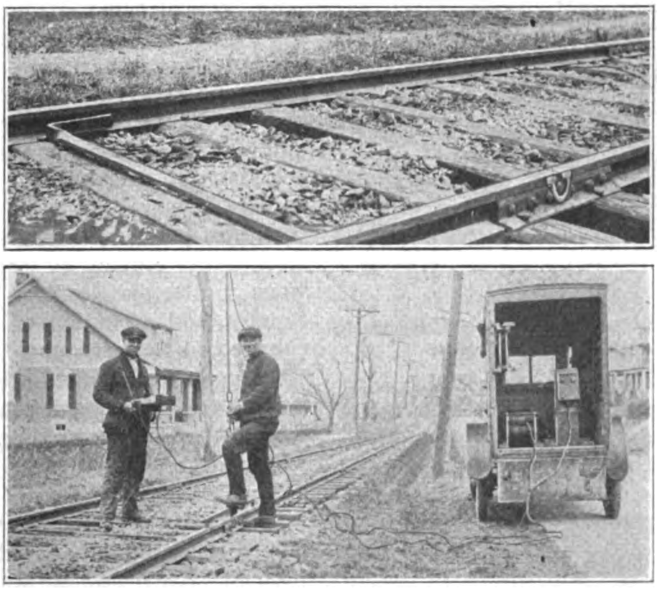
BY G. B. MOIST
Engineer Harrisburg (Pa.) Railways

UNTIL recently the entire system of the Harrisburg Railways, comprising about 73 miles of city and suburban track, and operating about sixty cars, was supplied with power from one central direct-current power plant. On several lines the transmission distance was more than 10 miles, necessitating for satisfactory operation that the track bonding be maintained in the best possible condition.

STEEL BAR USED AS CROSS BOND

The standard type of bonding on this property has consisted of two No. 00 capacity, screw compressed terminal bonds, installed under the plates of each joint. Around special work, 36-in. cable bonds, lengthened by cutting in two and soldering in lengths of annealed trolley wire to give the desired length, were used. In addition at least one bond was installed in every joint.

Cross bonds were used about 600 ft. apart in city districts and 1000 ft. apart in suburban districts. In open track some trouble has been experienced with these cross bonds due to their being cut off and stolen. Where such theft is liable to occur, a bar of iron is laid parallel with the ties, having about 6 in. at each end bent parallel with and close to the webs of the rails, as shown in an accompanying illustration. These ends are drilled and short bonds are installed to connect the bar with the rails. In order to secure uniformly good results in bonding work it was considered necessary that the workmen be made to appreciate the importance of the job. To insure this the work was placed under the direction of the electrical department, and a special group of men possessed of the necessary training was assigned to it. Their responsibility starts with the lining up of the rails and the drilling of the holes with an electric drill. The holes are then polished by drawing a clean rag back and forth through them, an important operation, especially if a drilling lubricant is used. The bond terminals are polished also, and the terminals are inserted in the holes and compressed with as great a pressure as can be secured with the tools available. In purchasing bonds we specify that the terminals shall be machine finished, instead of cast, so that a neat driving fit can be obtained.



ABOVE, STEEL BAR CROSS BOND FOR OPEN TRACK.
BELOW, TESTING CREW WITH COMPLETE OUTFIT, AT WORK ON OUTLYING SECTION OF TRACK

In applying the bond terminals we are particular to see that the screw point is at least $\frac{1}{16}$ in. smaller than the hole in the rail. (See sketch.) Experience indicates that proper compression is sometimes prevented by too great a diameter of screw point.

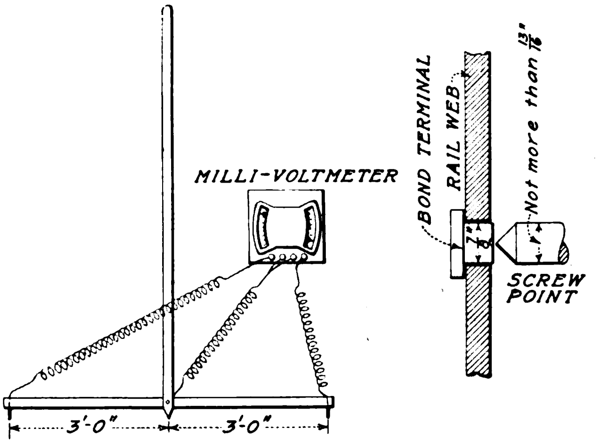
After the bonds have been compressed, the bonding gang applies the plates, a part of the work which we regard as very important. All scale or rust that may be on the contact points of the rails and on the joint plates is first removed with a wire brush. A lubricant is then brushed over the surfaces, and the plates applied and tightened, care being taken that they settle back evenly at the top and bottom. For the past few years we have used heat-treated bolts, thus reducing considerably the troubles from loose bolts and joint plates. We found that many bolts are damaged when first drawn up, as it is easy for a man pulling on the end of a 3-ft. wrench to twist off the end of an ordinary $\frac{7}{8}$-in. bolt. Even when bolts are not actually stretched, they are brought very near to the elastic limit so that the additional stress due to passing cars stretches them and eventually produces loose joints. Heat-treated bolts, with an elastic limit of not less than 75,000 lb. per square inch, are unlikely to be damaged in this way. Our maintenance work is confined almost entirely to track laid on open ballast. In first-class construction, as used in paved streets, we never have broken bonds, and practically no depreciation of the terminal contacts or the strands. As representative of the results obtained in track of this character, the results of a series of tests on twelve joints in track that was constructed in 1908 are given in the table on page 574. The data given are the milli-voltmeter readings taken on 3 ft. of solid rail, as compared with simultaneous readings on 3 ft. of rail including the joint. One set of readings was taken in 1915, and the other set in 1919. There are no corresponding records of the joint conditions at the time of construction. The piece of track containing these joints is not far from the power plant and has been carrying a fairly heavy current continuously for about eleven years.

In track laid in open-ballast construction, where expansion and contraction must be allowed for in the joint, the strands of the bonds frequently break. It often happens that the expansion and contraction of several rail lengths take place in one joint, breaking the bonds in comparatively short time. It has been our practice to test track of this type of construction once or twice each year.

MILLI-VOLTMETER JOINT READINGS ON DATES FOUR YEARS APART

Joint Number	1915 Rail	1915 Joint	1919 Rail	1919 Joint
1	15	13	10	10
2	12	14	10	12
3	12	17	10	10
4	10	14	6	10
5	14	16	7	7
6	10	14	7	8
7	15	15	8	10
8	13	14	9	11
9	10	10	5	7
10	11	11	12	12
11	14	17	9	10
12	10	11	12	13

The testing outfit used consists of a milli-voltmeter having two faces. A frame which carries three contact points spaced 3 ft. apart is placed on the rail, the joint being between the center contact and one of the outside contacts. This arrangement gives the drop in 3 ft. of solid rail on one face of the instrument and a like amount of rail, including the joint, on the other. To insure good contact with the rail pieces of hacksaw blade have been found to be most effective. These are located as shown on the diagram of the test outfit.



OUTFIT FOR BOND TESTING—RELATION OF COMPRESSOR POINT AND BOND TERMINAL DIAMETERS

WHEN IS A JOINT IN NEED OF REPAIR?

Our standard in determining the condition of the bonds in a joint is that the drop, in milli-volts, of 3 ft. of rail including the joint shall not exceed twice the drop of 3 ft. of continuous rail. Any joint exceeding this amount is opened and repaired. Operators on these tests become quite skillful in observing the readings, and are able to detect a defective bond that has even less than 25 per cent of its strands broken.

On some lines, especially toward the outer end of a line, the current flowing in the rails is small and intermittent in character, making slow work of the testing. Obviously the best results are secured when the current is reasonably steady and of a magnitude sufficient to yield reasonably large deflections of the pointers of the milli-voltmeters. This makes it necessary on outlying track to draw some current for measuring purposes specifically. In such cases we use a few standard car resistance grids mounted on a light auto truck for connection to the trolley and track some distance beyond the point where the tests are being made. This outfit draws about 100 amp. of current, which is sufficient for ordinary testing.

The most satisfactory procedure in making tests and repairs is to assemble a force of four or five men equipped with the testing outfit and all tools and materials necessary to make the repairs, taking them to the work on the auto truck. On arrival at the track to be tested, two men start out with the testing outfit and are followed by the others, who repair the joints marked by the testers. A fair day's work will cover the repairs of from fifteen to sixteen joints, distributed over 2 miles or more.

We find that the auto truck is extremely convenient in transporting the extra tools and supplies, and in getting the men to and from the work. The truck is not assigned exclusively to this work, but is used as a general utility truck, and is constantly in demand. Repairs to bonding and joints are made at such times as the men and equipment can be spared from larger construction jobs.

TWO TO THREE PER CENT OF JOINTS NEED REPAIR ANNUALLY

The number of joints tested each season is from 7000 to 8000. Of this number from 2 to 3 per cent require repairs. The repair work covers track equipped with several types of joints, including ordinary channels, Weber and continuous joints. No type seems to be exempt from some necessity for repair. The labor cost per joint repaired is from $1.25 to $1.50. This cost may seem high when compared with those involved in applying the bonds on the outside of the plates by the acetylene or arc-welding methods. We are inclined to believe, however, that we gain a great deal in the fact that our bond maintenance includes the correcting of mechanical defects in the joints, such as loose bolts, worn joints, plates, etc. This is really a part of track repairs, and a portion of the expense could properly be charged to that account.

To replace the bond without correcting the cause of its failure invites a second failure in short time. Removing the plates and replacing worn parts with new where necessary, insures that the joint is left in the best possible condition.

About three years ago we changed the type of bonding in track laid in paved streets. The copper bonded joint was replaced by an arc-welded joint. Standard channel plates, with the addition of a heavy sole plate, were arc-welded to the base of the rail. Tests made at that time showed the joint equal to the rail electrically and without a doubt it is a good joint mechanically. Recent tests show the joints to be in the same condition as when installed. This practice is now standard with us for the given type of construction, but we are not yet convinced that the application of the welding method of applying bonds to open ballasted track is a superior method as to final results. For the reasons outlined above, it is likely that we shall continue to use our present methods of construction in such track for some time to come.

Equipment Inspection on a "Kw.-Hr." Basis

Reasons for the Superiority of Maintenance on an Energy Basis, as Compared with a Time or a Mileage Basis, Are Pointed Out

By WALTER C. BOLT
Investigating Engineer Bay State Street Railway, Boston, Mass.

THE Bay State Street Railway, operating more than 900 miles of line in eastern Massachusetts, recently completed an installation of the Economy railway watt-hour meters.

While the meters were installed primarily for the purpose of saving power, they have been found to be of equal value and importance in other ways, the principal additional value being their use as a basis for determining when car inspections should be made. Until recently cars on the Bay State were inspected on the time basis, but it has been the ambition of the management for some time to replace the time basis of inspection by the mileage basis. In view of the scattered distribution of cars and the interchange of cars among the several divisions of the property, it was found practically impossible to obtain mileage data with a sufficient degree of promptness to enable car inspection to be done on the mileage basis. With the advent of the Economy railway meter a solution of the problem presented itself.

Regarding the use of the meters in connection with power saving it is too early to permit concrete figures to be given as to the extent to which power is being saved, but in general the results are very satisfactory and a good saving is being made. The motormen over the entire system are taking hold of the power-saving campaign in good spirit and are displaying very much interest.

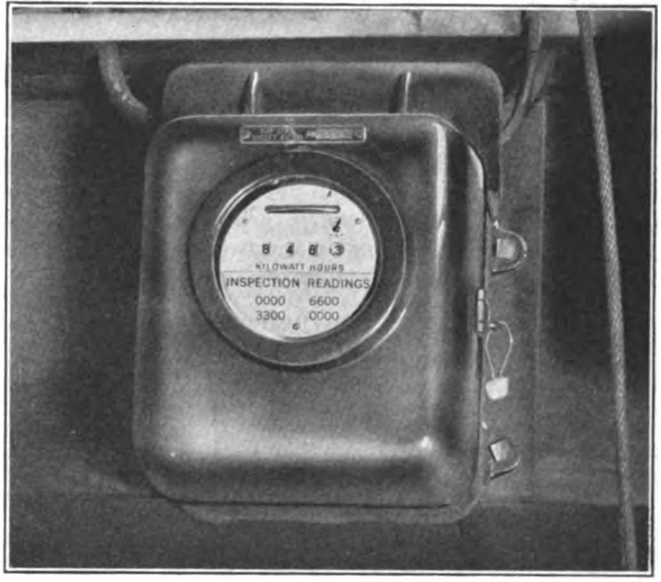
Pending the development by the manufacturers of a device to be used in connection with the meter dial to indicate when a car has used a predetermined number of kilowatt-hours, and thus to show without reference to any other records that the car is due for inspection, the Bay State is using paper auxiliary dials on which are printed the readings at which the car is due for inspection.

This plan of using the "power-saving" meters to show when cars should be inspected was first tried out for two months on one of our divisions, and it proved so satisfactory that our entire system was placed on the kilowatt-hour inspection basis in November, 1918. The following are some of the principal reasons why car and equipment inspection on a kilowatt-hour basis is more proper than inspection on a mileage or time basis:

1. When a car has consumed a predetermined number of kilowatt-hours, the information is made immediately available, and the car can be inspected without delay and without any clerical labor. At best on roads where inspection is based on mileage the necessary data are usually not available until at least 24 hours have elapsed.

2. Elapsed time between inspections is not necessarily a measure of work done, particularly where the car-mileage is not somewhat equally pro-rated as between cars.

3. Most parts of a car require inspection at intervals proportionate to work done. Mileage run between inspection intervals is not necessarily a measure of work done.



CAR METER WITH CARD ON DIAL SHOWING ENERGY CONSUMPTION INSPECTION INTERVAL

4. Kilowatt-hour consumption between inspection intervals is a more nearly correct measure of work done by the essential parts that wear and need inspecting. (a) All electrical equipment depreciates and wears in direct proportion to the power consumed by motors. (b) The wear of truck parts, brakeshoes and wheels is dependent upon speed, stops per mile, condition of track, etc., all of which have an influence upon power consumption.

5. If a motor is working unsatisfactorily for any reason, such as faulty connection, open armature coils, short fields, etc., more power will be consumed and the car will therefore be brought in more frequently for inspection on the kilowatt-hour basis than on the mileage basis.

6. If a car is on an easy-schedule line, having infrequent stops and low grades, it will consume less power than a car operating on a difficult schedule with frequent stops and severe grades. On a mileage or time basis each car would receive an equal number of inspections. On a kilowatt-hour basis less inspection would be given the car operating on the easy schedule and thus a substantial saving in labor would be effected.

7. If two cars of the same type and same motors are running in the same service but with different gear ratios, the car with an improper gear ratio will consume more power and therefore come in for inspection more frequently.

8. If a car has binding or tight brakes, or a tight center bearing, it will consume more power and automatically come in more promptly for inspection and correction of trouble.

9. If a car is handled roughly or improperly by motormen it will consume more power, and therefore

will need inspection more frequently than one which is properly handled. Inspection on a kilowatt-hour basis automatically brings this car in for inspection more promptly.

10. Another factor which tends to make kilowatt-hour inspection more accurate is that power used by cars in switching at carhouses and between carhouses and shops is recorded. The meter is on the job every minute and records even when a car is used only for a very short distance. This miscellaneous mileage is usually totally lost in figuring mileage by cars and is, therefore, not taken into account when cars are inspected on a mileage basis.

It is interesting and gratifying to note that the kilowatt-hour method of inspection is not only more accurate and prompter than the older methods, but it also brings about very substantial economies in decreasing the number of car inspections and yet makes provision for care of cars and equipment in accordance with actual work done. The following is an abstract of the general instructions regarding local inspection of cars:

Extract from General Instructions Regarding Local Inspection of Cars

In carrying out the plan for inspecting cars on an energy basis the following forms have been developed:

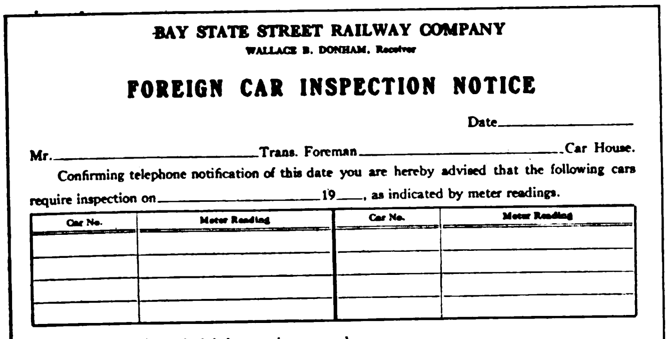
The Economy meter inspection cards will be used by the rolling stock department, carhouse repair men and inspectors to record inspection of individual car parts. A rack will be installed at the carhouses on which these cards will be placed.

The form previously used for entry of nightly meter readings has been modified to provide an additional column headed "Due for Inspection." This form has been filled out by the transportation department representative, who took the register readings and at the same time filled in the meter readings. This form is made up in duplicate, the original being forwarded immediately to the power-saving department, Boston. The duplicate is turned over to the local rolling stock department carhouse foreman. Prior to turning the form over to the carhouse foreman the local transportation department carhouse foreman notes the cars due for inspection on the following day and so arranges his car assignments, traffic permitting, that the cars may be inspected. Upon receipt of the form by the rolling stock department carhouse foreman the Economy meter inspection cards are placed in the rack indicating the date and the number of the cars to be inspected.

The first car inspector removes the cards from the rack and places them in metal containers attached to some part of the car. The several car inspectors then proceed with their inspections and place their initials opposite the names of the parts inspected together with the dates. The last inspector removes the card container and the card from the car and returns the card to some specified place in the rolling stock carhouse foreman's office. The foreman then, in general, goes over the inspection work and signs the card.

Dial sections have been developed and placed on all meters to indicate the energy consumption inspection interval (see halftone illustration). As soon as the energy co sumption as shown by the meter dial approximates any of the readings on this supplementary dial, notation or check mark is placed opposite the car number and the meter reading on the form described above.

Both meter inspection cards and reports of daily meter readings are filed in the local rolling stock carhouse office. On the



BAY STATE STREET RAILWAY COMPANY
WALLACE B. DONHAM, Receiver

FOREIGN CAR INSPECTION NOTICE

Date________

Mr.________Trans. Foreman________Car House.

Confirming telephone notification of this date you are hereby advised that the following cars require inspection on________19____, as indicated by meter readings.

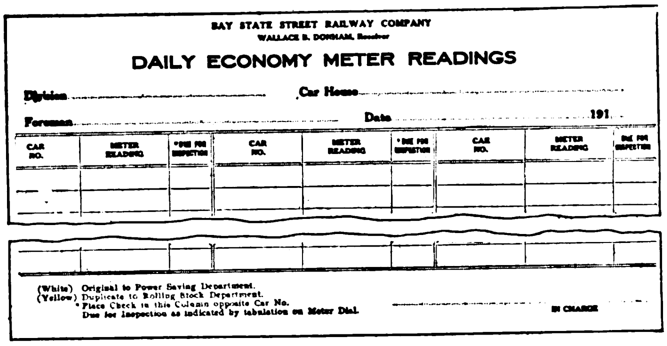
Car No.	Meter Reading	Car No.	Meter Reading

These cars will be scheduled to reach your car house.

Signed________
Foreman.

________Car House.

FORM USED TO NOTIFY TRANSPORTATION DEPARTMENT FOREMAN OF FOREIGN CARS DUE FOR INSPECTION



BAY STATE STREET RAILWAY COMPANY
WALLACE B. DONHAM, Receiver

DAILY ECONOMY METER READINGS

Division________ Car House________

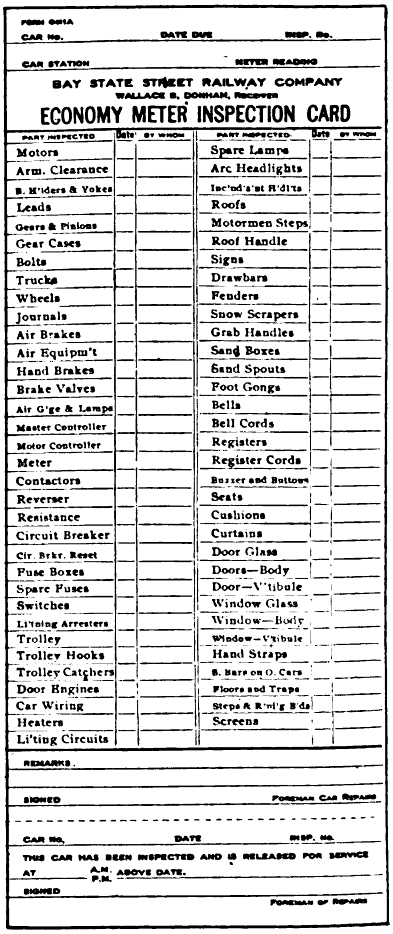
Foreman________ Date________191__

CAR NO.	METER READING	*DUE FOR INSPECTION	CAR NO.	METER READING	*DUE FOR INSPECTION	CAR NO.	METER READING	DUE FOR INSPECTION

(White) Original to Power Saving Department.
(Yellow) Duplicate to Rolling Stock Department.
* Place Check in this Column opposite Car No.
Due for Inspection as indicated by tabulation on Meter Dial.

________ IN CHARGE

FORM (8 IN. x 11 IN.) SHOWING CARS DUE FOR INSPECTION



FORM 601A
CAR No. DATE DUE INSP. No.
CAR STATION METER READING

BAY STATE STREET RAILWAY COMPANY
WALLACE B. DONHAM, RECEIVER

ECONOMY METER INSPECTION CARD

PART INSPECTED	Date	BY WHOM	PART INSPECTED	Date	BY WHOM
Motors			Spare Lamps		
Arm. Clearance			Arc Headlights		
B. H'lders & Yokes			Inc'nd's'nt H'dl'ts		
Leads			Roofs		
Gears & Pinions			Motormen Steps		
Gear Cases			Roof Handle		
Bolts			Signs		
Trucks			Drawbars		
Wheels			Fenders		
Journals			Snow Scrapers		
Air Brakes			Grab Handles		
Air Equipm't			Sand Boxes		
Hand Brakes			Sand Spouts		
Brake Valves			Foot Gongs		
Air G'ge & Lamps			Bells		
Master Controller			Bell Cords		
Motor Controller			Registers		
Meter			Register Cords		
Contactors			Buzzer and Buttons		
Reverser			Seats		
Resistance			Cushions		
Circuit Breaker			Curtains		
Cir. Brkr. Reset			Door Glass		
Fuse Boxes			Doors—Body		
Spare Fuses			Door—V'tibule		
Switches			Window Glass		
Li'tning Arresters			Window—Body		
Trolley			Window—V'tibule		
Trolley Hooks			Hand Straps		
Trolley Catchers			S. Bars on O. Cars		
Door Engines			Floors and Traps		
Car Wiring			Steps & R'n'g B'ds		
Heaters			Screens		
Li'ting Circuits					

REMARKS.

SIGNED FOREMAN CAR REPAIRS

CAR No. DATE INSP. No.

THIS CAR HAS BEEN INSPECTED AND IS RELEASED FOR SERVICE AT A.M. P.M. ABOVE DATE.

SIGNED
FOREMAN OF REPAIRS

INSPECTION RECORD FORM, ON CARDBOARD, 3½ IN. x 8½ IN. IN SIZE

POSTER SHOWING INSPECTION INTERVALS FOR CARS OF SEVERAL WEIGHTS

Car Weight in Pounds	Watt-Hours Per Ton-Miles	Kilowatt-Hours Per 1000 Car-Miles	Kilowatt-Hours Inspection Interval	Car-Miles Per Inspection Interval
18,000	150	1,350	1,250	930
19,999	150	1,500	1,250	835
20,000	150	1,500	2,000	1,330
29,999	150	2,250	2,000	890
30,000	150	2,250	2,500	1,110
39,999	150	3,000	2,500	835
40,000	150	3,000	3,300	1,100
50,000	150	3,750	3,300	880
59,000	150	4.400	3,300	750

The above is the basis in which inspection intervals were determined. We endeavored as nearly as possible to place cars on a 1000-mile basis, but until such time as a special mechanical device is developed, we are limited in choosing inspection intervals to such units as are a multiple of 10,000, the capacity of the meter. It is obvious in this inspection method that a car of any given weight, equipped with old and inefficient type of meters, will come in for inspection more often for a given mileage than will a car of the same weight equipped with modern and up-to-date motors.

Moreover a car that has improper gear ratio for the conditions under which it operates will come in more often for inspection than will a car with proper gear ratio.

inspection card a space is provided for entry of a number of the inspections. For example, the card covering the first inspection of any car on this basis is card No. 1, the next card is No. 2, etc.

Cars marked for inspection are to be reported immediately by telephone, confirmed in writing, to the transportation carhouse foreman of the carhouse from which the car regularly operates. A foreign car should be routed so that it may be taken in at the carhouse from which it regularly operates, for inspection at the earliest possible time.

A special form has been developed for notification regarding foreign car inspection. This is printed in triplicate, the original and duplicate to be forwarded to the transportation department foreman in the car house from which the car regularly operates, the original being retained by the foreman and the duplicate being turned over to the rolling stock department carhouse foreman. The triplicate copy is retained by the man making out the notification.

The above instructions are not to be interpreted in such a manner as to relieve the rolling stock department carhouse foreman of the responsibility for proper inspection of cars when due. Close co-operation between the rolling stock and transportation departments' representatives and the several carhouses is required, and it is hoped that this plan will be successfully inaugurated on the Bay State system.

The above is signed by W. C. Bolt, investigating engineer, and approved by F. D. Ward, superintendent of rolling stock, and R. M. Sparks, transportation manager.

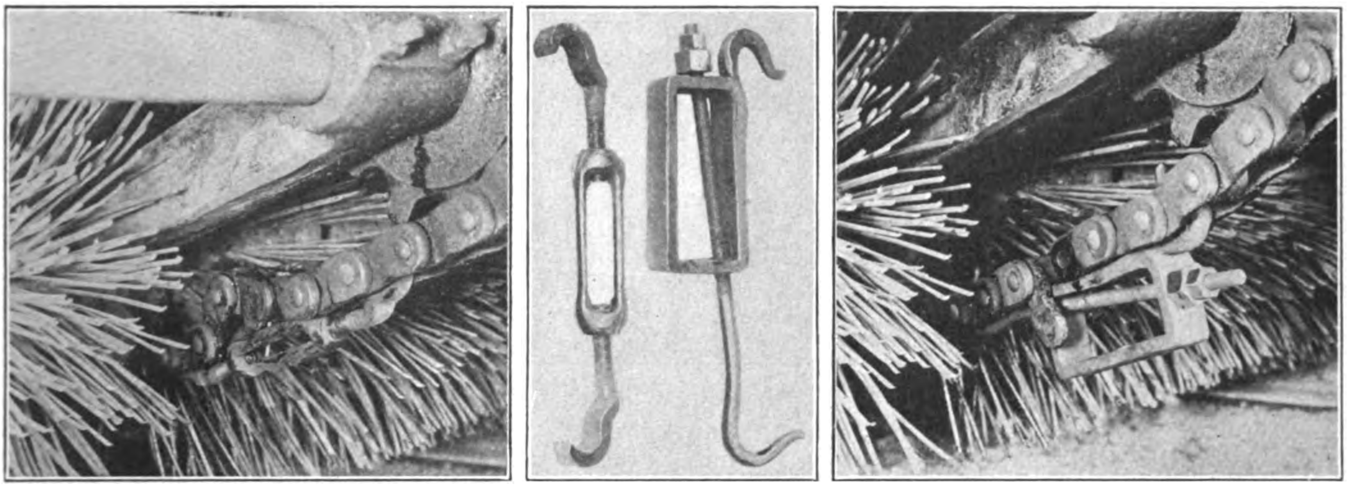
Fare Boxes Help Speed Up Service

The Capital Traction Company and the Washington Railway & Electric Company of Washington, D. C., which have recently equipped several divisions of their lines with fare boxes, report that the number of fares turned in showed a decided increase after the installation, and continues to remain high. The traveling public has now become accustomed to this method of fare collection and this has had a considerable effect in speeding up the car service and obviating delays and long stops. No complaint has been made to either of the two companies in regard to the operation of the fare boxes and the passengers seem well satisfied with the innovation.

"Butterfly" Turnbuckle Provides for Straight Pull

As a Shop Tool It Is of Great Convenience for Producing the Necessary Slack in Sprocket Chains to Renew Broken or Worn Links and Pins

IN REPLACING broken links in the sprocket chains of sweepers and other miscellaneous railway equipment, it is necessary to bring the broken ends of the chain together sometimes under considerable tension. One of the most common methods for doing this is to insert a turnbuckle at the point where the link is to be renewed and by tightening this the ends are brought sufficiently close so that the new links may be applied. The ordinary form of turnbuckle as manufactured is rather inconvenient, as the ends must be provided with hooks which project above the center line of the turnbuckle. The pull on the turnbuckle is then not straight through its center and it is often found very difficult to take up sufficient slack in the chain for inserting the new links. It is also somewhat inconvenient to turn the ordinary type of turnbuckle, as the sides of this project out from the center line so that in turning it interferes with the surface of the chain.



AT LEFT, OLD TYPE OF TURNBUCKLE USED FOR RENEWING LINKS OF SPROCKET CHAIN ON SWEEPER; IN CENTER (A) AT LEFT, OLD TYPE OF TURNBUCKLE; (B) AT RIGHT, BUTTERFLY TYPE OF TURNBUCKLE; AT RIGHT, BUTTERFLY TYPE OF TURNBUCKLE USED FOR REPLACING BROKEN LINKS IN SPROCKET CHAIN OF SWEEPER

A form of "butterfly" turnbuckle has been devised by the Brooklyn Rapid Transit Company, which overcomes this difficulty. The center part of the turnbuckle consists of a rectangular forging with a hook attached at the top. The hook for providing the adjustment and furnishing the tension is at the other end of this center portion, and is inclined at an angle so as to project through both the ends of the center portion of the turnbuckle. The extreme end of this hook is threaded and by the use of nuts the proper tension can be applied. This construction gives a straight pull on the hook which is furnishing the tension and also gives plenty of clearance between the lower part of the chain and the nuts for the use of a wrench to tighten them.

The accompanying illustrations show the method of applying this to a sprocket chain of a sweeper for renewing a broken link. Both the old type and the "butterfly" type of turnbuckles are illustrated.

This "butterfly" type of turnbuckle is also of service for connecting parts of the brake rigging, especially where there is a chain that must be pulled tight.

Winding Coils for Old Armatures

Additional Insulation Is Necessary at Corners and Between Leads Where Clearance with Core Is Small and Large Radius Bends Give Greater Flexibility for Rewinding

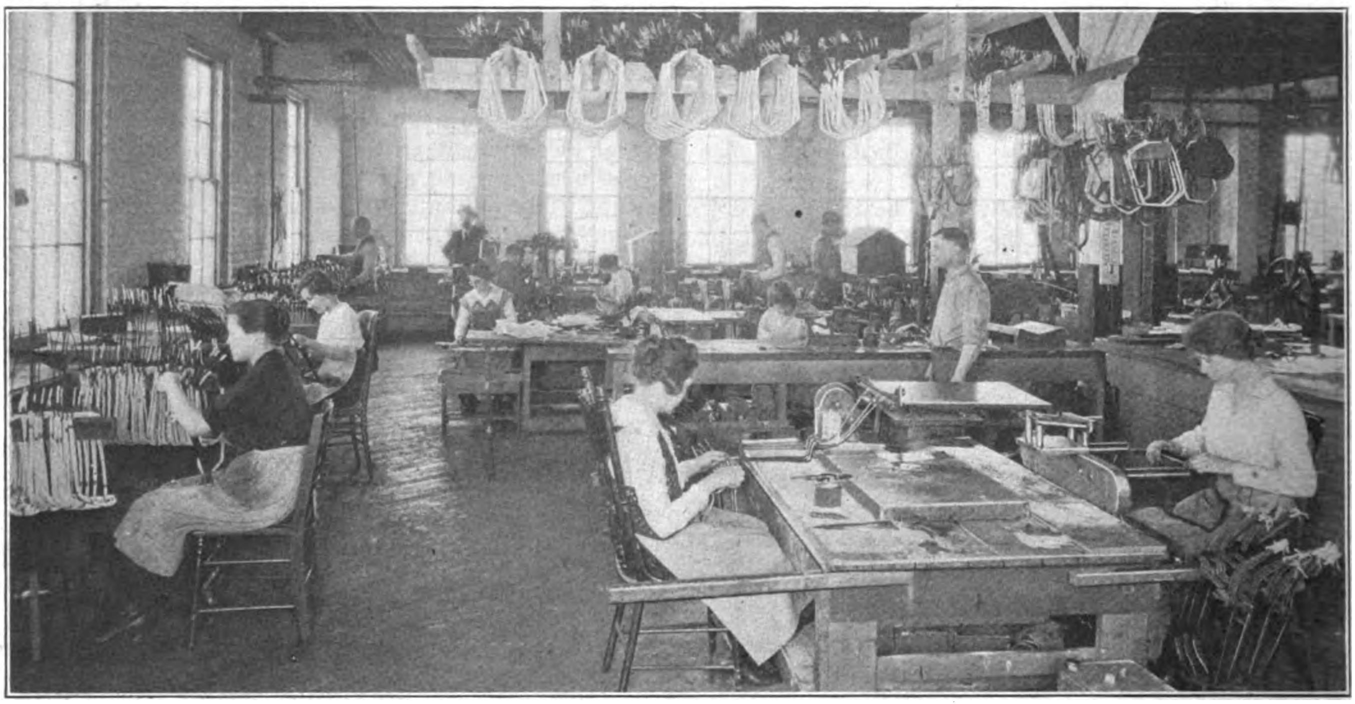


FIG. 1—BUSY SCENE IN A COIL MANUFACTURING DEPARTMENT

GREATER precautions are necessary in winding coils for repairing armatures than when the coils are to be installed in new armature cores. These, cores, especially on the older type armatures, open up with service. This increases the length of the slots and so crowds the coils at the corners and ends. These are the points where short-circuits and grounds most frequently occur as vibration soon causes the cores to cut through the insulation at these points of small clearance. The laminations of the armature core are sometimes bent and sharp projections are formed from rubbing the pole faces; from wire bands loosening and becoming tangled about the armature, and from careless handling. In winding such armatures it is sometimes necessary to pull and distort the coils in order to get them into the slots. Where bends are sharp this pulling is liable to crack the tape and weaken the insulation at that point. These conditions as well as many others which result from operation must be met by a satisfactory armature coil. In the belief that railway operating men would appreciate some pointers regarding armature coils from manufacturers the editors of this paper requested the proprietors of the Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., to permit them to study the practices followed in their armature department. They did so and the present article is the result. The article should prove helpful to master mechanics who make their own coils as well as to those who buy their coils. There is still a great demand for armature coils for what are usually considered as old motors, such as the G.E.-1000 and G.E.-800. Many improvements in the shape of the coils, the method of bringing out the end connections and provision for extra insulation at corners have been made in the later designs of motors that are not possible with the older types. A more substantial type of construction has also been used with most late designs while many of the older coils are frail and easily bent out of shape.

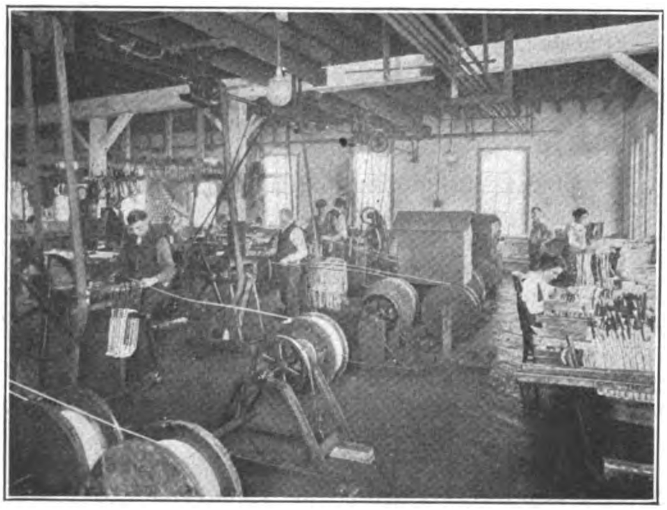
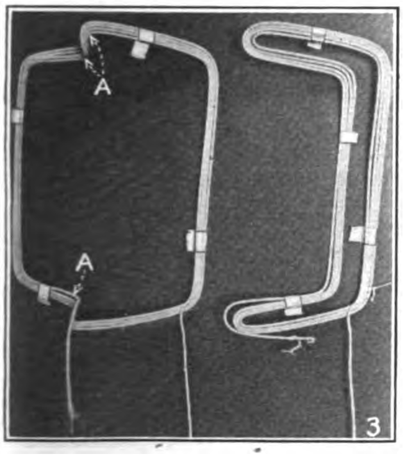
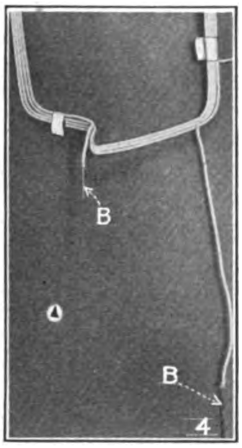


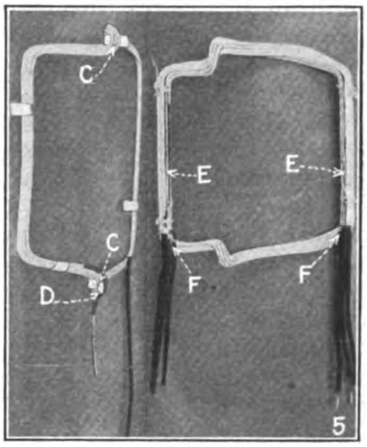
FIG. 2—WINDING COILS AND APPLYING INSULATION

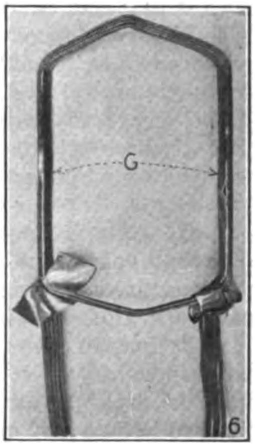
Accompanying illustrations show several types of armature coils in various stages of manufacture in the Columbia works. After the coil is wound it is opened up and care is taken to see that the bends are not too sharp. While short bends make a coil of neat appearance they are difficult to insulate properly and the tape which is applied later to the two bends at the forward and back ends will crack if the armature winder has to spread the coils apart, as he most certainly will in winding. Furthermore, in order to get the coils into shape after spreading, the winder hits the bends with a mallet and when they are sharp the insulation is sure to be damaged. A coil with large radius bends is shown in Fig. 3.

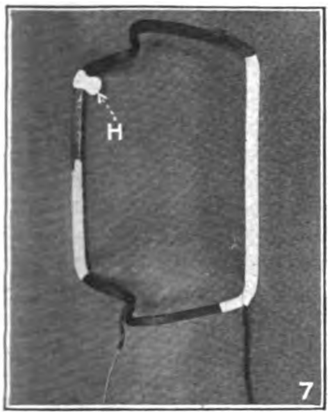
It is necessary to flatten the ends of the leads on some types of coils to provide for connecting to the commutator. This flattening tends to harden the copper at a point where flexibility is most desirable. The next step in the coil manufacture is to tin these ends. It has been found that by quenching the ends in cold water after they have been dipped in the hot solder the copper is softened. This affords an easy means for giving increased flexibility to these ends. Fig 4 shows a GE-100 armature coil with ends of leads flattened and tinned.

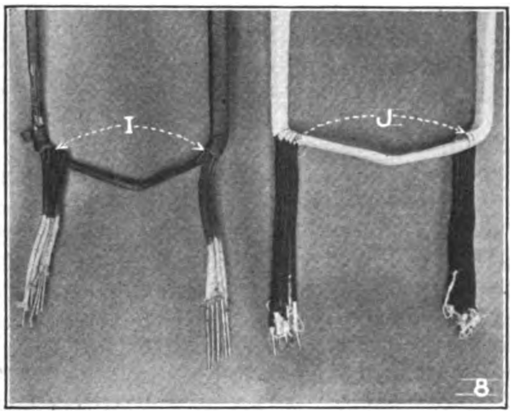


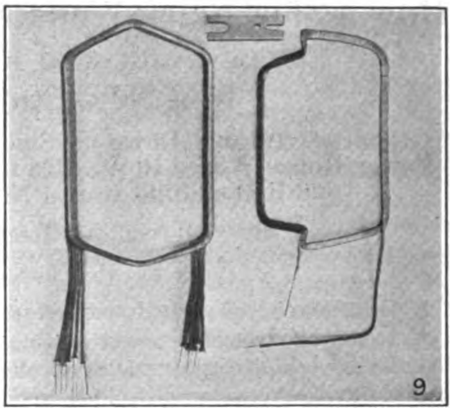












SEVERAL TYPES OF ARMATURE COILS IN DIFFERENT STAGES OF THEIR MANUFACTURE

Fig. 3—GE-1000 Armature Coil Immediately After Winding (Right) and When Opened Up (Left). "A"—Large Radius Bends.
Fig. 4—GE-1000 Armature Coil with Ends of Leads (B) Flattened and Tinned.
Fig. 5—GE-1000 Armature Coil (Left). "C"—Varnished Cambric Around Center Wire. "D"—Tape Where Lead Extends Over Coil. At Right, GE-58 Coils Assembled. "E"—Fish Paper Between Layers. "F"—Sleeving Extending Over Coil.
Fig. 6—Westinghouse 307 Coil with Sleeving Applied. "G"—Sides Double Wrapped with Varnished Cambric.
Fig. 7—GE-1000 Coil. "H"—Varnished Cambric Applied at Corner.
Fig. 8—Westinghouse 307 Coils. "I"—Bad Arrangement, Leads Bunched. "J"—Tape Between Leads.
Fig. 9—Westinghouse 307 and GE-1000 Coils Finished and Gaged Ready for Shipment.

When complete coils consist of two or more single coils they are assembled side by side. Fish paper, 0.010 in. thick, is placed between the coils in assembling. In order to hold these coils tightly together and prevent movement of one coil on another the fish paper is varnished. After assembling the coils are heated either in ovens or hot presses and the individual coils are pressed firmly together, and are kept in this position by the varnish. It is important that the varnish on the fish paper be not allowed to dry out as it then fails to hold the coils together. To avoid the drying out of this varnish it has been found best to varnish the fish paper in small lots which will be used within a few days after they are varnished. Experience at the Columbia works has shown that this varnish holds better if applied with a brush. On sheets which were dipped to provide the coating of varnish it was found that the varnished peeled off very readily, but when the varnish is applied with a brush it enters the pores of the paper and holds firmly. Of course extreme care should be used in drying the sheets to make sure that no dirt or material which would be detrimental to the insulation gets on the varnish while the latter is soft.

Before the coils are taped with the linen tape a wrapping of varnished cambric is applied around the middle coil, at the corners, and as an additional precaution a figure-eight-shaped piece of varnished cambric is applied to the outside of the coil at the corners of the short side as shown in Fig. 7. The sides of the coil are also double-wrapped with varnished cambric. On the short side of the coil the bend comes right at the end of the armature core and vibration soon wears this insulation. In taping the corners the tape is inserted between the leads where they emerge from the coil so as to provide against short-circuits and keep the leads securely in place (see Fig. 8). These leads should also be brought out so that all unnecessary bending in bringing them down to the commutator will be avoided and all sharp cross-overs done away with.

COILS SHOULD BE TESTED UNDER PRESSURE WHILE HOT

In applying the linen tape there will be some creases, wrinkles and rough spots that can only be pressed out in a hot press. The hot steam press will also square up the corners and make the coils tighter. Testing the coils for short-circuits and grounds is best made while they are hot and under pressure in the steam presses. The usual 500 to 600-volt railway circuit should be satisfactory for making these tests. Where hot presses are used these should be constructed and provided with connections so that cold water can be circulated through them for rapid cooling, and the coils should be kept under pressure till cold. If the coils are removed from the presses while hot they will round off in cooling and lose shape.

Small coils are sure to get out of shape during the different operations of their manufacture and an air press is needed to put them in shape again. After the coils are dipped, baked and gaged they are ready for installation in the aramture. Where coils have to be shipped to their destination extreme care must be used in packing, otherwise they will be distorted and injured before they are used.

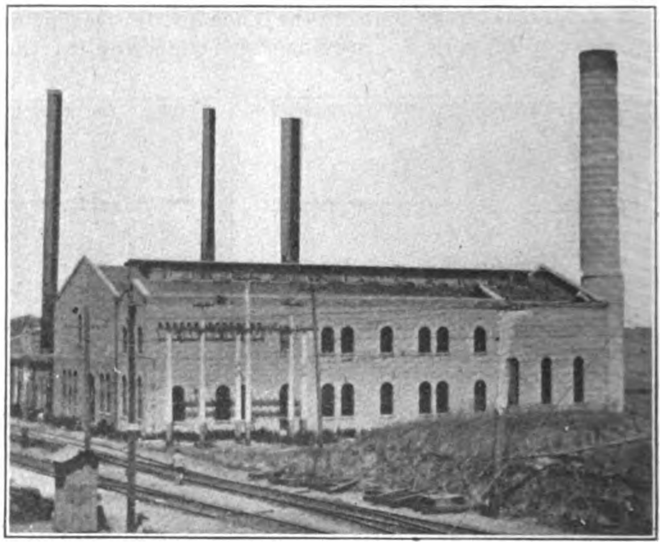
How a Steel Stack Was Removed from Old Power Plant and Reinstalled in a New One

Method of Taking Down a Smokestack from a Power House Where It Was No Longer Required and Reinstalling It at a New Plant

BY CLIFFORD A. ELLIOTT
Cost Engineer Maintenance of Way Department, Pacific Electric Railway

THE removal of a steel smokestack 7 ft. in diameter from the Vineyard power house of the Pacific Electric Railway and its reinstallation at a new power plant located at Torrance was decided upon as an economical measure. The boilers which this stack served at the Vineyard Station were no longer in service, and so the stack was not being used. It rested upon boilers 12 ft. high. Forty feet of the stack extended between the top of the boiler and the roof, while the remaining portion 55 ft. in length projected beyond the top of the roof.

Due to limited building space, the removal of this stack intact was not possible as it could not be lowered through the roof of the power house and be removed through the doors or windows of the building. A contractor was found, however, who was willing to undertake the removal of the stack in two sections. This was the method finally adopted. A large steel beam which extended through the roof as a part of the construction of the Vineyard power house offered a most favorable and substantial support for the installation of a gin pole and its rigging for handling the stack. A gin pole was installed and the hoisting line was run down through an opening in the roof to the boiler room and outside the power house to a donkey engine. The section of the smokestack extending beyond the roof was first released and was lowered by the aid of the gin pole to the roof. It was then moved over the surface of the roof on rollers for a distance of approximately 40 ft. to the building line. The gin pole was then reset, and by its aid the stack was lowered over the side walls of the building to the adjoining power-house grounds, a height of approximately 50 ft. The second section of the stack, 40 ft. long, extending between the top of the boilers and the roof, was then lifted and placed on the roof, from which it was lowered to the ground in the same manner as the upper section had been handled. The total expense of this removal and relocation of the stack will not exceed $600 and will show a substantial saving over the cost of a new stack at the present high market prices. The distance between the two power houses is 20 miles and the stack was transported with auto trucks. The Torrance power house is at present about 35 per cent completed and when finished will serve the new power repair shops of this company. The stack when re-erected, will serve two 250-hp. Sterling boilers, which are also being transferred from the Vineyard power plant to the new power house.



VINEYARD POWER HOUSE BEFORE STACK (THE LARGE STEEL ONE) WAS REMOVED

Cleaning Condenser Tubes

The *Electrical Engineer*, London, mentions a novel method of cleaning condenser tubes by blowing through them water with sand in suspension. Originally an air pistol was used to project the water, but subsequently sand was introduced by means of the circulating water, about 1½ cu.yd. being added to the water daily. After three weeks of this treatment, it is stated, the condition of the condenser was much improved. The size of the condenser is not stated.

Advantages of A.C. Welding

Some of the advantages claimed for the use of alternating current for arc welding are the following:

Simplicity of apparatus: no motor-generator sets, resistance grids, contactors, exciters, etc., are required. Portability of apparatus. Low power consumption. Ease of operation. Constant heat of arc. Deeper penetration. Remote liability of "burning" the weld.

Saving Motor Shells from the Scrap Heap by Welding

The Different Steps in the Thermit Method of Welding Motor Shells as Used by a Large Electric Railway System Are Described and Some Suggestions for Relining Crucibles and Keeping Welding Tools in Proper Repair Are Given

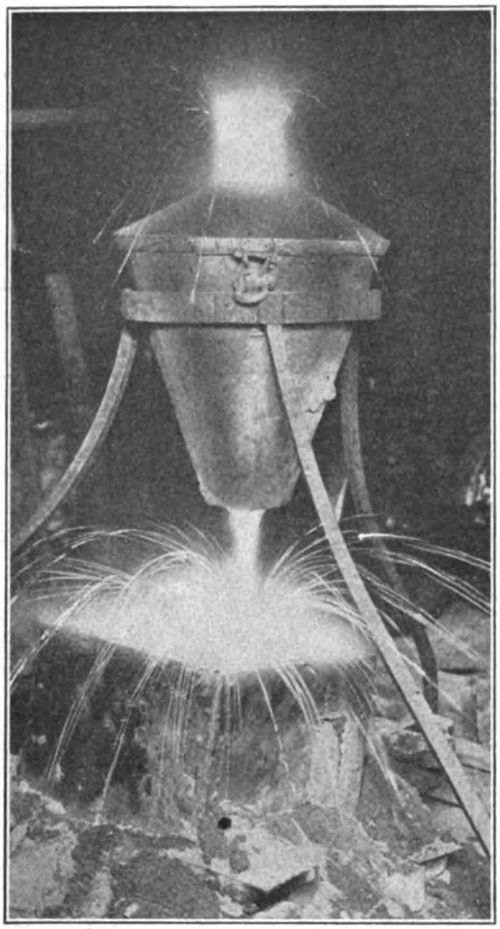


FIG. 1—MAKING A WELD WITH THERMIT

THE amount of welding repair work which electric railways are carrying out has increased rapidly during the past three years. Much of this has been caused by the difficulty experienced in obtaining proper repair parts. Also in many parts deferred maintenance has resulted in breakages and an increased opportunity for welding repair methods. Thus bad track conditions increase the duty on the car equipment, and excessive wear of various equipment parts causes additional stresses from shock and vibration. Crystallization is also caused by vibration, and additional strains then cause breakage. A striking example is furnished by the breakage of motor cases. Most of the breakages occur through the axle bearing bore at the gear end of the motor where one end of the gear case is supported. This throws additional duty on the casting at this point. Wear in the axle bearing, and between the bearing and housing, also allows the motor to be raised and dropped a distance equal to the amount of wear every time the car is started or stopped. This wear is continually increasing and becoming more dangerous. Sharp blows are thus delivered at a vital point in the casting. In late designs of motors the manufacturers have worked out a construction to withstand these blows, but in the older types breakage occurs.

The thermit process has been used extensively in the repair of motor cases, and the purpose of this article is to explain the procedure which has proved most satisfactory in this work.

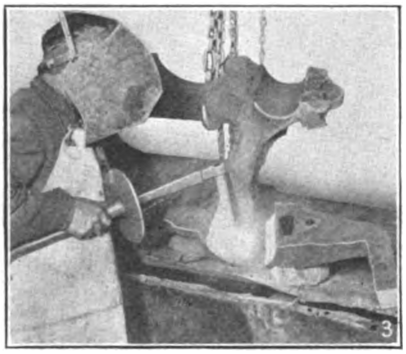
FIRST STEPS IN WELDING MOTOR SHELLS

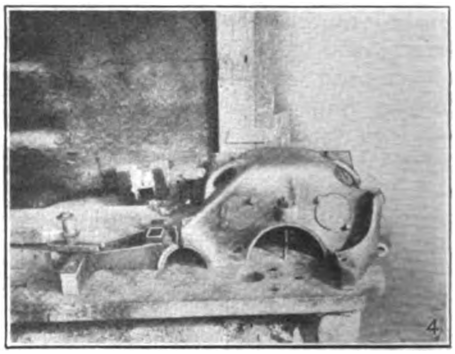
Nearly all motor shells requiring welding have some part entirely broken off. Where cracks exist it is desirable to cut or break the pieces apart, as the contraction of the welded side of the repaired casting will produce shrinkage strains, which might be sufficient to cause fracture during cooling.

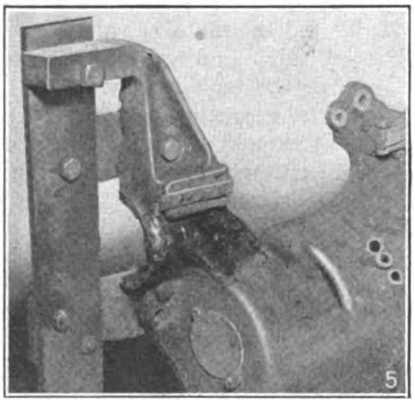
When the parts have been separated the metal along the line of the fracture should be cut out so that approximately 1 in. of space is provided between the parts to receive the thermit. There are two ways of doing this, the better and quicker being to employ a cutting flame of gas or an electric arc. If necessary apparatus for this is not available a series of holes may be drilled along the line of fracture and all metal between the holes removed. In cutting this metal off it is best to cut from the longer piece so as to favor the shorter end. If the break runs diagonally, it is advisable when cutting out, to make the opening as nearly vertical as possible. If the cutting is done with a gas flame there will be a certain amount of oxidization left on the cut surface. This should be chipped off carefully and the metal parts cleaned of all dirt and grease as far back as the mold box will reach. This is essential as otherwise when the mold is rammed up and the heat applied for preheating, grease or other combustible material will burn out and leave a space between the mold and the frame through which the thermit will run out. After the parts have been properly cleaned they should be lined up and clamped to prevent movement, the use of a surface plate being recommended for this purpose. An accompanying illustration shows a motor shell lined up in this manner. Where a surface plate is not available a solid foundation with rails for conveniently fastening the holding-down bolts will prove satisfactory. Where the break is through the axle bore, as shown in the illustration referred to, the welding can best be carried out with the shell laid on its finished surface. With the shell in this position the riser will come on the outside of the shell and can be readily cut off, and so reduce the machining to a minimum. In setting up the parts it is necessary to allow for the contraction of the thermit in cooling by setting the parts away from each other a distance of $\frac{3}{32}$ in. per 1 in. of space greater than that desired in the finished shell.

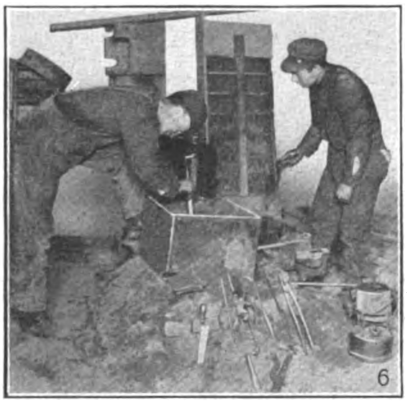
With the frame ready to receive the wax pattern this is next shaped around and between the parts to be welded. Yellow wax is used for this and it should be warmed until it becomes plastic enough to work readily or melted and allowed to cool until it reaches the proper consistency. This is most readily accomplished by pouring the melted wax into a pail of water from which it may be taken with the hand and formed into the space intended to receive the thermit. In applying the wax to a broken gear case lug of a motor frame it should be spread out so as to strengthen the parts when welded as much as possible. The bearing bore, which is usually found to be worn somewhat, should have a wax lining so that the thermit will fill in sufficiently to bring the bore to exact size when rebored.

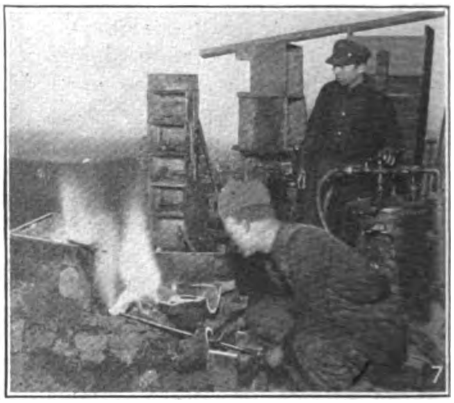
The mold box should then be placed in position and supported so as to remove all weight from the frame. Mold boxes can be readily made up in the railway shops from sheet iron. A box $\frac{3}{16}$ in. thick and 18 in. x 18 in. x 18 in. is a good size for welding motor shells. The bottom edges of this will need to be cut out to fit around the casting. In case the holes thus cut out should be too large they can be closed with pieces of steel in such a manner as to retain the molding sand properly.











PRELIMINARY WORK FOR MAKING MOTOR SHELL WELDS WITH THERMIT

Fig. 2—A Pile of Broken Motor Shells.
Fig. 3—Cutting Out Metal from the Fracture with Electric Arc.
Fig. 4—Broken Motor Shell Lined Up on Surface Plate.
Fig. 5—Wax Mold Applied to Break at Axle Bearing.
Fig. 6—Finishing the Mold and Removing the Riser Pattern.
Fig. 7—Preheating the Casting.

CONSTRUCTING THE MOLD

The facing of the mold, or the part that comes in contact with the thermit, should consist of equal parts of fire clay, crushed fire brick and fire sand. The manufacturers of thermit supply these materials where they cannot be readily obtained in the immediate vicinity of the railway. This mixture should be well riddled, mixed dry and then moistened with just enough water to make it pack well. It can be used for the entire mold where the welds to be made are small, but for welds of the size necessary on motor shells it is more economical to use it only for facing and to use loam or a mixture of one part fire clay to two parts of good sharp sand for backing. The facing should have a thickness of from 1 in. to 1½ in. all around the wax.

In ramming up the mold, 3 in. to 4 in. of molding material should be placed in the box and rammed with a small rammer first around the edges and working toward the center. The molding material should be kept level and rammed hard. There should be a wall of molding material at least 4 in. thick between the wax pattern and the mold box at all points, as the thermit steel is intensely hot and ample molding material should be provided to hold it. The material underneath the casting can usually be rammed up more conveniently if the ramming is done before the mold box is put in position.

A preheating gate, a pouring gate and a riser should be provided in the mold. Wooden patterns should be used for these openings. The pattern for the heating gate should be about 3 in. in diameter at the outside end and tapered to 1½ in. at the inside. The pouring gate pattern should be about 1½ in. at the top and slope to 1 in. at the bottom. The riser may be rectangular and about 2 in. x 3½ in. at the top and tapered ½ in. in its length. The pattern for the preheating opening should be set at the lowest point of the wax pattern and should project outside the mold box. Where the sections to be welded are of the same size this preheating gate should be set in the middle of the lowest part of the wax pattern so that both sides of the casting may be heated equally. When the two sections to be welded are of different sizes the preheating opening should be set more to the side of the heavier section as this will require longer to heat than the lighter section.

The pattern for the pouring gate should be set directly above that for preheating and about 1 in. away from the wax pattern. This should also be set at an angle as indicated in an accompanying illustration.

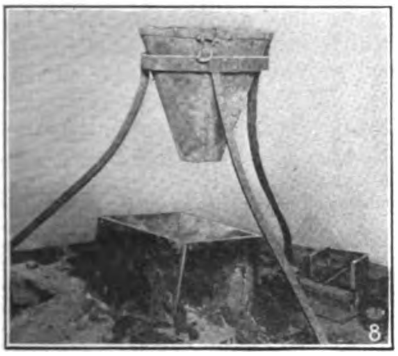
The riser pattern should be placed at the highest point of the wax pattern. If there is more than one high point, a riser should be placed over each. The function of the riser is to hold a supply of steel which will remain liquid for a considerable time, to take care of all shrinkage and to act as a depository for loose sand or other material which will be washed into the riser by the action of the thermit in passing through the mold.

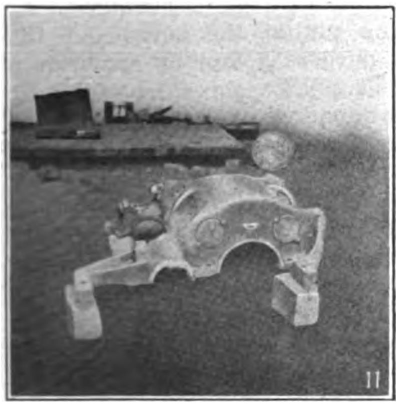
After the mold has been rammed up, the top should be hollowed out to form a basin in which the slag can collect so as not to overrun the box. The mold should be vented by making holes with a No. 8 or No. 10 gage steel wire so that all gases in the liquid metal can escape readily. The patterns for the gate, riser and preheating opening can be readily withdrawn by rapping them slightly. A molder's slick, trowel and lifter are very useful for wiping away any loose sand that might fall into the mold. After the patterns are withdrawn the various openings should be covered and the crucible set up, with the bottom about 3 in. above and directly over the pouring gate.

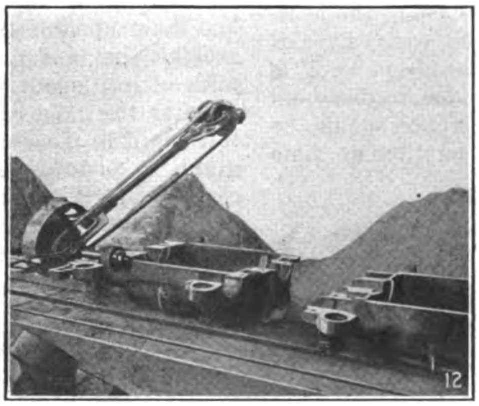
PREHEATING IS ESSENTIAL

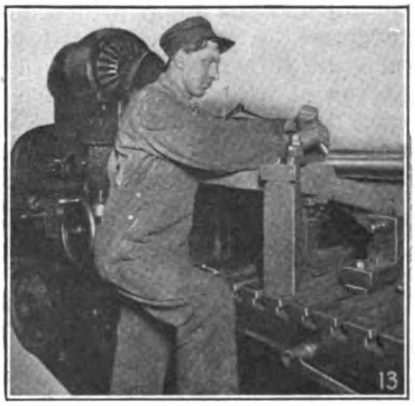
The parts to be welded must be brought up to a good, red, workable heat, and the mold should be dried out thoroughly. The Metal & Thermit Corporation has developed a preheater for this purpose which operates with compressed air and either gasoline or kerosene. Gasoline is recommended for fuel, as it gives a clean, hot flame, with no deposit of carbon. Cleanliness is essential to insure satisfactory results in welding, and even a small deposit of carbon may prevent complete fusion. This type of preheater is fitted with either one or two burners as desired, and the needle valve gives a close regulation of the mixture of air and fuel.

The preheater shown in the illustration on page 585 should be connected with the compressed air supply at *A*, which admits the air to a water separator. The air pressure used should be at least 50 lb. per square inch, but higher pressures can be safely used, as the tank is tested to 250 lb. Valve *B* allows the compression air to flow into the top of the tank and places the gasoline or kerosene contained therein under pressure, driving it up through the pipe *C* into the needle valve *D*, which regulates the amount of fuel to be mixed with the compressed air which flows across the by-pass around the needle valve and through the check valve *F* into the hose and so on to the burner. Fuel and air become mixed together at the needle valve and also through the passage from *D* to the burner *G*. Valves *D* and *E* are used to regulate the torch, controlling the fuel and compressed air respectively.







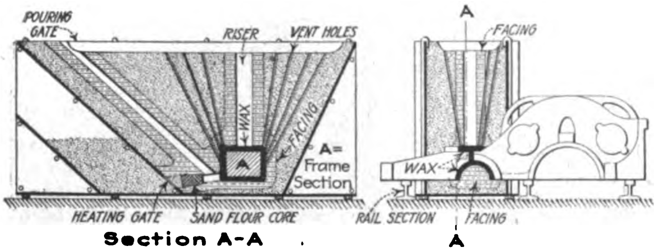


FINISHING OPERATIONS AFTER WELDING REPAIRS HAVE BEEN MADE

Fig. 8—Crucible in Place Ready for Making the Weld.
Fig. 9—Cleaning Off Sand from Casting.
Fig. 10—Trimming Off Gates and Riser with Oxy-acetylene Torch.
Fig. 11—Casting Cleaned, Ready for Machining.
Fig. 12—Grinding Axle Bearing to Remove Rough Metal.
Fig. 13—Boring out the Axle Bearing in a Boring Machine.

In starting the torch is placed in position in front of the preheating gate of the mold, but about 1 in. away. Oily waste, or a flame of some kind at the end of the burner pipe is used to keep the burner lighted until it is satisfactorily regulated. The air valve *B* is opened wide and then the air valve *E* is opened from one-half to one full turn, according to the air pressure used; and the gasoline valve *D* is opened one-half to three-quarters of a turn, the amount depending upon the air pressure. The burner will take a few minutes to start properly, because the mold is cold, tending to liquify the vapor. Gradually, as the preheating gate becomes hot, the flame becomes steady. The burner is lighted more easily if at first a slight excess of fuel is used. Unless the mold is intricate, so that a strong flame would tend to break it, the air flow can be increased after the flame is well started, and then the fuel increased correspondingly. Too much air will tend to extinguish the flame; too much fuel will produce a long, yellow and smoky flame. Shortly after the burner is started the wax will melt and burn out, coming from the riser in the form of a heavy white vapor. This may be ignited at the top of the riser and pouring gates to eliminate the fumes. If the mixture is right there should be no flame at the end of the burner pipe when it is taken away from the mold. If there is a flame the air valve at the top of the gasoline valve should be opened wide.

After the wax has burned out, small sheet-iron plates should be placed over the riser and over the pouring gates to hold the heat in the mold. The plate over the riser should be left in place to cover the opening until after the weld is poured and to prevent any slag which may slop over from the crucible during the reaction from entering the riser openings and spoiling the welds.



DETAILS OF MOLD FOR WELDING MOTOR SHELL WITH THERMIT

At the end of the preheating, the burner is placed in the riser and in the pouring gates for a short time so that any loose sand may be blown out through the heating gates. In stopping the burner, the fuel valves *B* and *D* are turned off completely, but the air valve *E* is left turned on, or perhaps opened wider to blow all vapor out of the burner pipe. The water should be drained out of the water separator from time to time through the test cock at the bottom.

HOW THE CRUCIBLE IS PLUGGED AND CHARGED

While the preheating is in progress the crucible may be plugged and charged with thermit. To do this the opening at the bottom of the crucible is closed by first inserting a thimble wrapped with one thickness of uncreased paper. The tapping pin is then suspended through the thimble, and over this are placed an asbestos washer and metal disk. These are covered with refractory sand.

After the thermit crucible has been plugged, the charge of thermit may be added. It is important to put in a few handfuls first before dumping in the rest of the charge so as not to disturb the plugging material. The thermit charge should be mixed carefully before putting it in the crucible. No ignition powder should be added till the thermit charge is ready to be ignited.

When the preheating has been finished and all preparations made for pouring, the preheating opening should be plugged with a piece of fire brick ground to fit, or with an iron plug. The plug should be backed up with several shovelfuls of molding material between the mold box and a steel plate provided for the purpose. The sand should be packed down hard with a rammer. This will prevent the possibility of the thermit steel running out through the preheating opening. All heating apparatus should be removed a safe distance before the thermit is ignited.

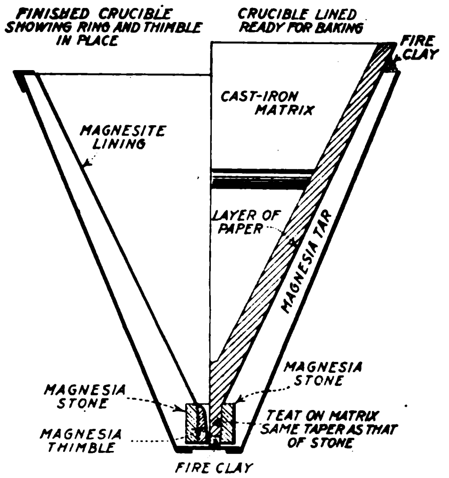
To ignite the thermit, the contents of the ignition powder can are mixed and a half teaspoonful of the powder is placed on top of the thermit in the crucible. Thermit will not ignite from the heat of the preheater, and the reaction cannot be started without ignition powder. This ignition powder can be ignited with a match, or with a red-hot iron. After the reaction has started, it is best to wait at least thirty-five seconds before tapping the crucible. This is accomplished by knocking up the tapping pin at the bottom of the crucible, using for this purpose a tapping spade or a piece of iron about 4 ft. long.

TABLE I. QUANTITY OF THERMIT FOR DIFFERENT SIZE WELDS

Width of Frame, Inches	Depth of Frame, Inches	Width of Thermit Steel Collar, Inches	Thickness of Thermit Steel Collar at Center, Inches	Quantity of Railroad Thermit Required for Weld, Pounds
3	2	4	1	40
3	2½	4	1	40
3	3	4	1	45
3	3½	4	1	50
3	4	4	1	55
4	4	4	1	65
4	4½	4	1	65
4	5	4	1	70
4	5½	5	1¼	75
4	6	5	1¼	75
4½	4½	5	1¼	70
4½	5	5	1¼	75
4½	5½	5	1¼	75
4½	6	5	1¼	80
5	5	5	1¼	75
5	5½	5	1¼	80
5	6	6	1½	85
5	7	6	1½	90
5½	5½	6	1½	85
5½	6	6	1½	90
5½	7	6	1½	110
6	6	6	1½	100
6	6½	6	1½	120
6	7	7	1¾	130
6½	6½	7	1¾	130
6½	7	7	1¾	150
6½	8	7	1¾	160
7	7	7	1¾	155

Space cut out between frame ends should be the same as the thickness of the collar (see fourth column).

After the mold has been poured, it should be allowed to remain in place as long as possible, preferably overnight, so as to anneal the steel in the weld, and in no case should it be disturbed for at least three or four hours after pouring. Where a night shift is worked, it is found very convenient to do the pouring in the afternoon shortly before quitting time of the day force, then the mold can be broken up by the night gang before they leave in the morning and all parts can be properly cleaned up.


FINISHED CRUCIBLE SHOWING RING AND THIMBLE IN PLACE
CRUCIBLE LINED READY FOR BAKING
FIRE CLAY
CAST-IRON MATRIX
MAGNESITE LINING
LAYER OF PAPER
MAGNESIA TAR
MAGNESIA STONE
MAGNESIA STONE
TEAT ON MATRIX SAME TAPER AS THAT OF STONE
MAGNESIA THIMBLE
FIRE CLAY

CONSTRUCTION OF CRUCIBLE FOR THERMIT WELDING

Table I gives the amount of thermit required for different size welds. It is usually advisable, however, to calculate the amount of thermit necessary from the wax used. Care should be taken to have the entire space filled with wax, which later is to be filled with thermit steel, so that not only the collar, but the space between the frame ends are filled with wax. By weigh-

TABLE II—CAPACITY OF THE DIFFERENT SIZES OF CRUCIBLES

Size of Crucible	Capacity in Pounds of Railroad Thermit	Outside Diameter at Top, Inches	Height, Inches	Size of Magnesia Stone for Relining	Size of Magnesia Thimble o Pe Used	Size of Plugging Material to Pe Used	Weight of Magnesia Tar Required for Relining, Pounds	Gross Shipping Weight, Pounds
No. 1	6	8½	8½	No. 1	No. 1	No. 2	8	40
No. 2	8	10	10	No. 1	No. 1	No. 2	20½	60
No. 3	15	12½	13½	No. 2	No. 2	No. 2	42	110
No. 4	25	14½	15	No. 2	No. 2	No. 2	61½	125
No. 5	35	16½	15	No. 2	No. 2	No. 2	87	150
No. 6	70	20	21	No. 2	No. 2	No. 2	141	250
No. 7	140	25½	25	Nos. 1—2	No. 2	No. 2	216	450
No. 8	210	28	28	Nos. 1—2	No. 2	No. 2	258	525
No. 9	280	30½	29½	Nos. 1—3	No. 3	No. 3	327	650
No. 10	400	34	34	Nos. 1—3	No. 3	No. 3	408	775

ing the wax before and after the completion of this operation, the difference will be the quantity of wax used. For every pound of wax one bag of railroad thermit, which holds 25 lb., is allowed. This rule provides ample thermit steel, not only for the weld proper, but also for the pouring gate and riser. Where the welds to be made are small, it is necessary that extreme care be used in weighing the wax, otherwise a small error will make a considerable difference in the amount of thermit to be used.

AN AVERAGE MOTOR SHELL WELD COSTS $30

In checking over the material used by one railway company in making a number of welds to broken gear case lugs on motor shells, it was found that an average weld takes about 2 lb. of wax or approximately 50 lb. of railroad thermit. Table II gives the different sizes of crucibles necessary for different quantities of thermit. It will be seen from this table that a No. 6 crucible has a capacity of 70 lb. of railroad thermit and is the size most suitable for most welds of motor cases. One man and a helper can make one weld a day. This includes cutting out the material for the thermit, cleaning the casting, setting up the mold and making the weld. The time taken for grinding and machining will be in addition to this. The total cost of making a weld to a gear case lug will average about $10 for labor and about $20 for material, making a total of $30.

In comparing the time taken for making similar welds by the electric welding method, it was found that to weld a gear case lug electrically required about twelve hours as compared with eight hours for thermit. The cooling of the thermit welds takes from three to four hours additional, and there is more machining to be done where thermit is used, so the total time taken is about the same for the two processes. Railways which have had experience with both classes of welding state that the principal advantage of thermit over the electrical process is, that it does not take such a skilled operator to carry out the process, so that when a weld is completed they feel that there is less danger of the work proving unsatisfactory.

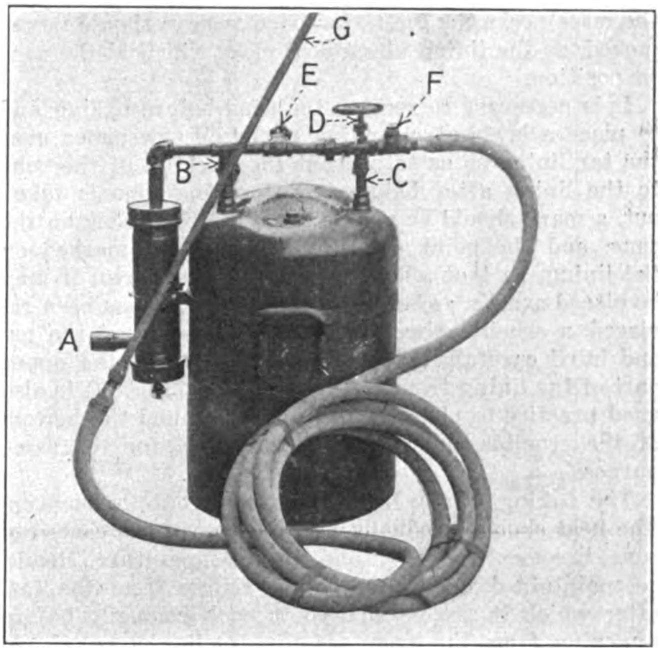
CRUCIBLE LINING IS AN IMPORTANT FACTOR

The crucible and the thimble through which the metal runs after the reaction are two of the important factors in the thermit process. The high temperature together with the ebullition of the molten metal during the reaction, necessitates a lining which is not only mechanically strong, but of a very highly refractory substance. It has been found that magnesite-lined crucibles are the only ones which satisfy these conditions. This material is furnished in the form of magnesia tar. The tar acts as a binder for the magnesite and is burned out in the process of baking the lining.

In the usual operation required for welding motor shells, a crucible lining will stand about twelve reactions before it becomes so thin as to endanger the metal casing. Ordinarily the point at which it is necessary to have the crucible relined can be determined by watching for heating of the outside sheet iron. If a dull red spot should appear during the reaction, the crucible should not be used again until it is relined.

Crucibles should be handled very carefully as the lining is liable to crack and fall out under rough treatment. It is also always important that they be stored in a dry place, as the lining, being porous, will absorb moisture, and produce a violent thermit reaction.

A certain amount of slag will be found adhering to the inside of crucibles after they have been used. It is not necessary to clean out this slag, as it is a very refractory material itself and can do nothing but help preserve the crucible if left on. At the bottom, however, in the vicinity of the stone and thimble, the slag must be removed so as to clear the opening of the thimble or permit the old thimble to be knocked out and a new one inserted. Very often it is possible to increase the life of crucibles by patching the linings with magnesia tar. This is particularly the case where they wear away in spots, or at the bottom. In the latter case, care should be taken to patch the lining at the bottom with magnesia tar so as to cover the stone. This magnesia tar should be thoroughly baked before the crucible is used. In some cases fire clay has been used for patching crucibles. This method is not recommended, however, and it will be found that if magnesia tar is used instead, it will stand up much better under the heat of the thermit reaction.



SINGLE BURNER PREHEATING EQUIPMENT

PREPARATION OF MATERIALS AND LINING OF CRUCIBLES

To line the sheet-iron shell of the crucible, the magnesia tar should be heated until it becomes plastic. A few handfuls should then be placed in the bottom of the crucible shell and a magnesia stone, as shown in an accompanying illustration, should be inserted in this material and centered over the hole. More magnesia tar should then be rammed around the stone to hold it firmly in place. The cast-iron crucible cone should then be placed in position with the small projecting teat at the lower end set in the hole in the magnesia stone. The upper part can then be centered inside the shell by means of wedges inserted at equal distances along the circumference. The magnesia tar can then be rammed into the space between the cone and the shell a little at a time and tamped hard, for upon the density or hardness of the lining depends the life of the crucible. Special iron tools should be made up for this tamping and should have flat ends. Good hard blows should be struck with a hammer on the upper end of the tool when ramming, or what is better still, a pneumatic bench rammer can be used for this purpose. The material should be added a little at a time, as the better and more uniform the tamping the longer the crucible will last. As the mass nears the top the wooden wedges should be removed, as the lining already in place will hold the cone in position.

It is necessary to remove the cone before baking and to place a layer of wrapping paper or newspaper over the tar lining so as to prevent the sticking of the cone to the lining after baking. Before the cone is taken out, a mark should be made with a piece of chalk on the cone, and the point opposite it should be marked on the lining, so that when the cone is withdrawn it may be placed exactly as before. After the cone has been replaced, a crucible ring should be placed around the top and luted carefully with fire clay to protect the upper part of the lining from the heat while baking. It is also good practice to place damp fire clay around the bottom of the crucible and inside of the stone for the same purpose.

The baking of the lining is carried out in an oven. The heat should gradually be raised until the cast iron cone becomes red hot, and this temperature should be maintained until fumes stop rising from the tar, after which it can be allowed to cool gradually before removing from the oven. If the crucible is baked too long, the lining will appear crumbly and the life of the crucible will be very much shortened. Baking for too short a time will leave some of the tar in the lining and cause a violent thermit reaction. When cool, the luting may be removed and the cone taken out, when the crucible is ready for use.

WORN THIMBLES SHOULD BE REPLACED WITH NEW ONES

The portion that has to withstand the most severe strain of all is the part at the bottom of the crucible, or the walls of the hole through which the metal is tapped. It has to stand the wash and pressure of the moving liquid metal and slag under great heat. The magnesia stone, which is centered in the bottom of the crucible and around which the material for lining is packed, has a tapered hole in the center. The thimbles are of the same taper as the holes in the magnesia stone and are set into the latter as shown in the illustration on page 584, which gives the various details in the construction and lining of a crucible. When the thimble requires replacing either due to enlargement of the hole or to the thimble becoming split or cracked, it can be knocked out and replaced with a new one, so that the full life of the crucible may be utilized. The thimbles should be wrapped with one layer of uncreased paper before being placed in position.

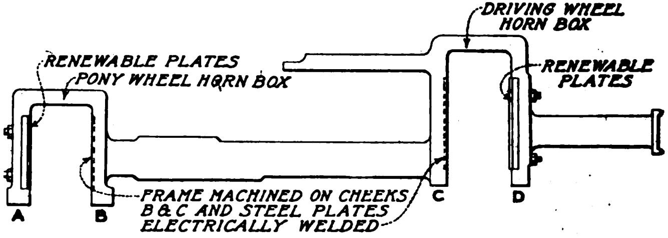
The Restoration of Truck Frames by Electric Welding

By J. M. Calder (A.M.I.E.E.)
Chief Assistant Engineer Reading (Eng.) Corporation Tramways

AN AMERICAN critic recently observed that upon the conclusion of hostilities most of the rolling stock of street railways which had been in use for any lengthy period would be consigned to the scrap heap.

When an opportunity presents itself to this individual to witness some of the excellent repair work now being executed on rolling stock by the application of electric welding he may have reason to withdraw his somewhat bold statement.

The introduction of this method of restoring worn parts and so saving expensive renewals commends itself to the attention of engineers associated with the upkeep of all tramway material. To cover the whole repair ground work would be a somewhat comprehensive task, consequently the writer has chosen to deal with that part of the truck upon which much depends as regards the stability of the tramcar—notably, the side frame. As this class of work is so general in character, the side frame of a Brill maximum-traction truck, which has just been under overhaul and repair, will be the subject of our consideration.



SIDE FRAME OF BRILL MAXIMUM TRACTION TRUCK

Prior to the stripping of the trucks for overhaul it was found that no satisfactory setting of the brakes could be effected because of the excessive clearance due to severe wear on the cheeks of the horn boxes of the side frames, and also on the cheeks of the journal boxes. Measurements of the journal boxes taken showed that the vertical sides which ride under the horn boxes were not parallel, consequently these were machined so as to make them parallel. This point is worthy of note, chiefly because the measurement of the horn boxes which are under repair are inter-dependent on the size of the respective journal boxes belonging to them. The journal boxes now being trued up, we turn our attention to the side frames. Measurements taken showed that the side wear varied from $\frac{1}{4}$ in. to $\frac{3}{8}$ in., chiefly on the cheeks marked "B" and "C" (see sketch). Temporary centers were placed on the horn boxes and vertical parallel lines were scribed on the face around the horn box, showing the depth of recess which would accommodate the steel plate about to be inserted, and so form a new working face. The frame was then "set up" in a shaping machine and the cheek machined to the line marked thereon.

When this was done the steel plate, suitably dimensioned, was carefully fitted to the recess. On the opposite cheek of this horn box is fitted a renewable cheek plate secured to the side frame by means of two bolts. To renew this plate (see "A" and "D" on sketch) it was necessary only to replace the same by a new one, in order to make good this side or cheek of the horn box. Upon bolting up the latter plate, the other one, which is now ready to be welded on, was temporarily inserted in position, and held there by means of a steel rod of about $\frac{3}{8}$ in. diameter, and about $\frac{1}{16}$ in. longer than the actual gap of the horn box. This rod was used to fasten the loose plate in position, and so keep it in place ready for the electric welding operation. The simplicity of the latter operation needs no lengthy explanation. The supply voltage was about 50 to 100 volts and a current of about 120 amp. was taken. The electrode used for welding was composed of Swedish iron positive in polarity while the truck frame was connected to the negative side of the supply circuit. After the welding was finished the surplus metal around the newly-welded plate and frame was cleaned off. The horn box of the side frame had every appearance of being a sound job, likely to endure for many years to come the hard service wear which would probably be imposed.

Were it not possible to apply electric welding to the repair work of these frames the job would certainly be much more difficult and expensive. A glance at the sketch will reveal to any engineer the trouble likely to be experienced in setting up special drilling gear, if bolted instead of welded plates were to be fitted to the sides. The ordinary drilling tackle could not possibly be applied owing to the peculiar design of the frames. Furthermore, the depth of the metal to be drilled and other incidental work, such as specially fitted bolts, recesses to be machined, etc., all contribute to increased costs, which electric welding is likely to relieve.

Machine for Testing Jacks Under Pressure

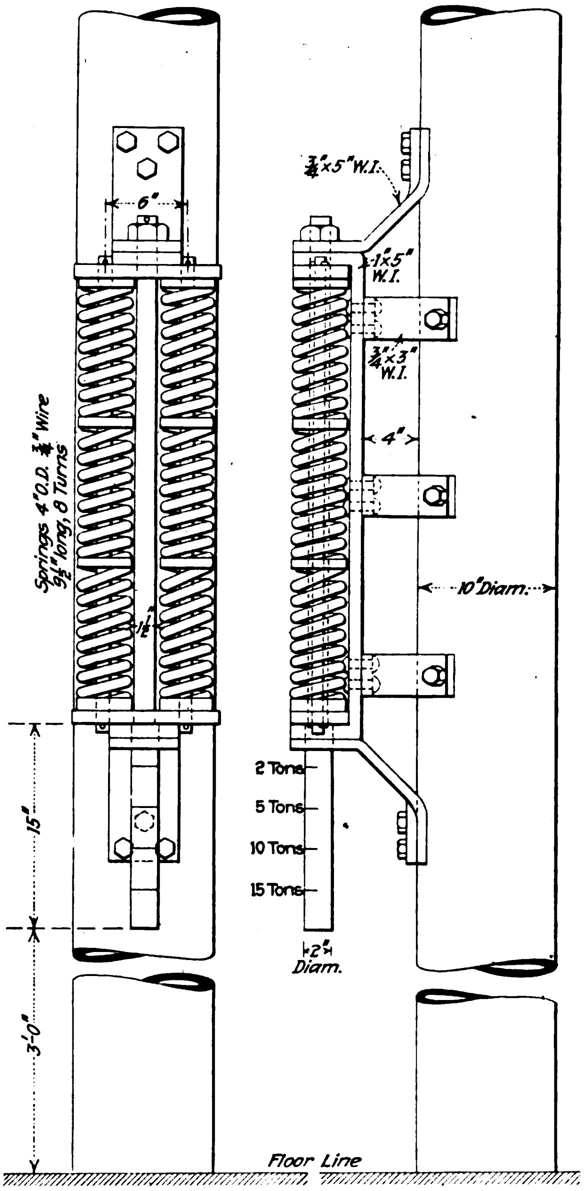
BY E. R. PIKE

Assistant to Superintendent, Fifty-second Street Surface Repair Shop, Brooklyn Rapid Transit Company

THE device shown in the accompanying illustration was built for testing jacks after they had been repaired in the Fifty-Second Street surface repair shop of the Brooklyn Rapid Transit Company. It has proved very efficient and in addition to being very simple and inexpensive to build, there have been absolutely no maintenance charges of any kind for its upkeep since its installation a number of years ago.

The device consists of a forging or yoke long enough to permit the three coil springs, which were old springs removed from Brill 22E truck side bearings, to go in between when placed end to end. It will be seen from the accompanying illustration that there are six springs or two batteries of three springs each used in this construction. By this arrangement the necessary spring resistance was obtained without the necessity for placing all six springs end to end. This latter construction would have required a yoke twice the length of the one now in use. A piece of 2-in. round steel passes up between the two sets of springs. The upper portion of this rod is turned down to 1½ in. diameter and this forms a shoulder on which the plate rests that supports the springs at the bottom. Two pieces of 1¼ in. round cold-rolled steel pass up through the center of the springs and through the collar on which the springs set, so as to keep them in central position. The yoke is riveted to three brackets which are in turn fastened to an iron column with a thrust forging at both top and bottom to relieve the shearing strain on the tap bolts used for fastening these brackets to the post. As no castings are used in making this device the labor and material cost are greatly decreased.

Before the device was placed in position and fastened to the column, it was taken to a hydraulic wheel press and calibrated. Indicating marks were put on the lower part of the push rod to correspond to the reading of the gage on the hydraulic press. Calibration marks of 2, 5, 10 and 15 tons will be seen in the accompanying illustration.



CONVENIENT MACHINE FOR TESTING CAR JACKS

To test a jack, it is placed on the floor directly under the center of the push rod and then raised by working the jack handle. Either hydraulic or the automatic lowering types of trip jacks may be tested. The jack under test is raised until the push rod of the testing machine has been pushed up and the springs compressed to correspond to the capacity of the jack being tested.

With the above method of testing it is evident that the jack is subjected to practically the same strain as it would be were it being used in actual service and all possibility of failure is thereby eliminated. The method of supporting and installing such a testing machine can be varied to suit the condition where it is installed. It may be fastened either to the wall or to any other sufficiently strong part of the shop which will stand the strain. Any coil springs may also be used which are on hand and have sufficient capacity.

Maintenance of Door Operators

The Writer Outlines the Methods Used for Operating and Controlling the Movement of Doors, Gives the Provisions Desirable for Emergency Operation and Describes the General Methods Used in the Inspection and Overhauling of Door Operators

BY GEORGE E. OAKLEY
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PNEUMATIC engines for the operation of doors of surface, elevated and subway cars are now considered as a necessary component of the car equipment. This is true of all new subway, elevated, center-entrance and one-man surface cars, and is rapidly approaching this condition in the case of the end entrance type of car, although I noticed in a recent issue of one of the trade papers that certain air-brake engineers class this part of the car equipment as "parasites." Pneumatic door operators are used for operating sliding doors, with and without folding steps, and folding doors with folding steps.

There are various methods used for controlling the operation of the doors, briefly described as follows: The door operator is provided with a main valve which in one position connects the closing cylinder of the operator with the air supply and the opening cylinder to exhaust, and in the other position of the valve the opening cylinder is connected with the air supply and the closing cylinder to exhaust. In some cases this valve also cuts off the air supply at the end of the piston travel and connects both cylinders to exhaust. This valve is of the rotary, slide, or pin-valve type and is mechanically, electrically or electro-pneumatically operated. When the main valve is mechanically controlled there is a system of levers connecting the valve with an operating staff located at the conductor's station to which is fitted a small immovable operating handle. In the case of electrically operated valves, the main valve is operated direct by solenoids which are energized by means of push buttons or switches so located as to be convenient for the conductor. The electro-pneumatic control is obtained by the use of an auxiliary set of electric valves, operated from push buttons. These valves are of the pin-valve type, and when the coil of one of the valves is energized by pushing one of the buttons, say the opening button, the valve is opened and this produces an unbalanced condition of air pressure between the two sides of a small piston, and the resulting movement of this small piston is communicated to the main valve, thus throwing the valve to the opening position. By pressing the closing button the other auxiliary valve is energized, which throws the main valve to the closing position. These methods of control are all satisfactory, the one to be used depending upon the conditions of service, operation and class of car.

In the case of sliding doors the general practice is to provide an operator for each door, but in some cases the door operator is located above the doors and one operator works two doors. For folding doors, one operator controls two two-leaf doors and the folding step and is located above the doors or underneath the car.

TWO TYPES OF DOOR OPERATORS USED

There are two general types of door operators in use —the direct drive and the geared type. In the direct drive type the movement of the piston is communicated direct to the door through levers or a connecting link. In the geared type, the movement of the piston is communicated to the door through a rack and pinion in the operator and an arm pinned to the pinion shaft.

The latter type drive is coming into more general use, as it can be installed to better advantage in cars of the cross-seat type. Also in geared type operators for sliding doors provision is made for automatically cutting off the air supply to the cylinders when the stroke of the piston is completed, so that there is no air pressure in the cylinders except while the door is in motion. This reduces to a minimum the consumption of air and prolongs considerably the life of the piston leathers. Although there is no air pressure in the cylinder to hold the door in the closed position, it is impossible to open the door by pushing against it, nor will it work open due to the vibration of the moving car, as the driving arm of the door operator travels down to a locked position when closing the door, and the only way to open the door is by means of an emergency handle keyed to the door operator shaft.

As a number of surface and subway cars have all the doors equipped with this type of door operator it is necessary to provide means whereby one door on each side of the car, in the case of surface cars, and one door on each side and the two body end doors, in the case of subway cars, may readily be opened from the outside in case the car is laid up in the yard with all doors closed. Where the doors are controlled by means of push buttons, provision is made for opening the doors from outside the car by providing special push buttons so constructed and located as not to be readily operated by passengers from the station platforms or the street. It is also desirable to provide some means for opening these doors by hand from the outside of the car in case certain switches inside the car should be open, thus cutting off the current supply to the push buttons or should there be no air on the car. Thus in addition to having the external push buttons a mechanical device is provided by means of which the driving arm of the door operator can be raised to a height sufficient to allow the door to be pushed open by hand.

PROVISION FOR EMERGENCY OPERATION OF DOORS IS ESSENTIAL

It is always possible to open the doors from inside the car in case the current supply or air, or both, should fail, but in some instances public service commissions have requested that provision be made in connection with the door equipment of surface cars for easily and quickly accomplishing this by the conductor or the passengers in case of accident and resultant excitement. Hence in some installations when the direct drive door operator is used there is a disconnecting device for each door, so arranged that by pulling a handle located in a convenient place the door is disconnected from the door operator and is then easily pushed open by hand. Another method of accomplishing the same result, and which is probably more satisfactory as it is less complicated and requires very little maintenance, is to arrange the emergency opening device so that the pulling of the emergency handle will throw the door valve to the opening position. Then if there is any air on the car the door will immediately open; if there is no air, the door can easily be pushed open by hand. When the cars are equipped with the geared-type machine which cuts off the air at the end of the stroke, the emergency opening device is so arranged that by pulling the emergency handle the driving arm of the door operator is raised up high enough to allow the doors to be pushed open by hand.

Two other special features in connection with door operator installations are the collapsible shoe as applied by the Interborough Rapid Transit Company to the front edge of the doors of subway cars and the collapsible driving arm of door operators used by the New York Municipal Railway and the Long Island Railroad. With the collapsible shoe equipment, in case the door when closing strikes a passenger the movement of the door is reversed and the door then travels in the opening direction until the obstructing pressure on the shoe is removed, when the movement of the door is again automatically reversed and the door goes on to the closed position. With the collapsible driving arm, which is for the purpose of guarding against passengers getting caught and held by the door when it closes, it is possible to push the door open about 4 in. from the fully closed position, which is sufficient to allow a person to free his arm or foot if caught by the closing door. When the pressure against the door is released, the compression springs of the collapsible driving arm return the door to the fully closed position.

EASY ACCESS TO ALL PARTS REDUCES MAINTENANCE COSTS

In taking up the question of maintenance of pneumatic door operators it might be well to first consider the question of installation at the time the cars are built, as the nature of the installation will to a large extent affect the service obtained and the maintenance required. The railroad engineers, car builders and manufacturers should work together with the object in view of obtaining an installation which will provide for maximum ease of access to all parts of the apparatus, consistent, of course, with the essential features of the particular car design. If the equipment is so installed that it is difficult or unhandy for the shopmen to inspect or work on the apparatus, it simply means that the equipment is going to be slighted and not given the proper attention; or, in case the shopmen and foremen are conscientious and do their work properly irrespective of time and trouble required, it means that the cost of maintenance will be excessive—two results which are absolutely unnecessary. It is not to be inferred from these remarks that pneumatic door operators require an unnecessary amount of attention, but any part of the car equipment having moving parts requires more or less attention and should be inspected regularly, and the door operators are really an important part of the equipment. Not only should the question of accessibility be considered when making the original layout, but also ample clearance should be allowed for the doors and any moving external part of the operators. It is quite essential that these points be kept in mind when details of the installation are being worked up, in order that the best results be obtained from the pneumatic door operators.

The basis of inspection and overhauling should be the same as for the control and air-brake equipment, whether this be time or mileage. The mileage basis, when the mileage is accurately kept, is undoubtedly the more equitable, but in any case there is no reason for a separate basis of inspection for the pneumatic door operators.

ATTENTION NECESSARY ON INSPECTION

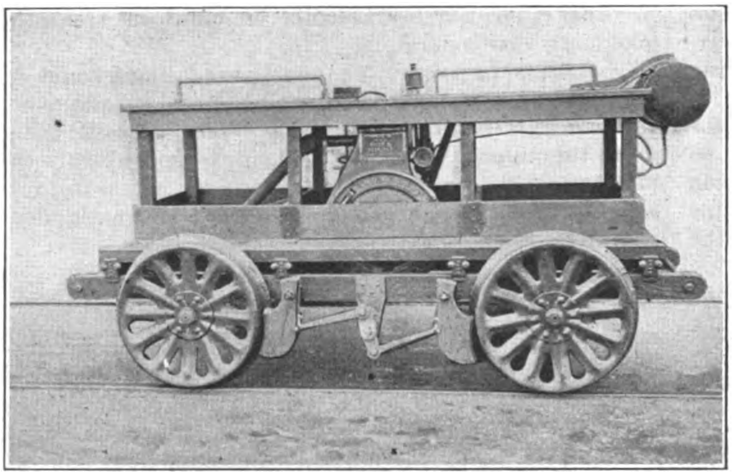
In inspecting this part of the car equipment, the doors should first be operated to see whether or not they operate properly and at the required speed. If the operation of the doors is all right, the door slides, driving arm, levers or connecting links and door hangers should then be examined to see that there are no loose screws, pins or bolts, and that there are no excessively worn parts; the door slides and door sheaves should be given a little oil if necessary, and the valves should be inspected to see that they are not leaking. In the case of some of the older type equipments with a rotary valve not attached to the engine body, these valves should be oiled on inspection. I will not attempt to state what to do in case the doors do not operate properly, as the shopmen soon learn where to look for the trouble from the manner in which the doors behave. It is quite essential that the doors, door hangers and tracks be maintained in good condition, and that the doors work freely, as any trouble here will seriously affect the operation of the door equipment. Where collapsible shoes or disconnecting devices are used, they should be tried out and their various parts carefully inspected.

The older types of door operators should be overhauled once a year, while the later types, the construction of which permits of the piston leathers and other moving parts being kept in better condition due to improved lubrication facilities, can easily be placed on the same overhauling basis as for the car.

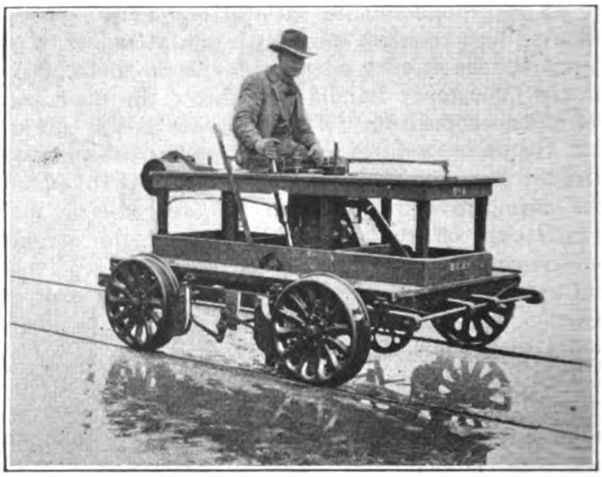
OPERATORS SHOULD BE REMOVED FROM CAR FOR OVERHAULING

The door operators should be removed from the car, taken to the overhauling bench and completely taken apart and the various parts thoroughly cleaned. The piston leathers should be removed and new leathers (a supply of which should be kept in oil of the same kind as used in the door operator) installed. The leathers which are removed should be examined and those found to be in good condition saved, as these leathers can be used to replace leathers which might become defective between overhauling dates. The various parts of the operator should be carefully examined and those parts replaced, the condition of which would indicate that they might cause defective door operation before the next overhauling date. The valve parts and ports should be thoroughly cleaned and valves ground in or renewed where found necessary. The overhauling bench should be equipped with air connections so that the door operators after being assembled may be tested out in order to make certain before putting the operators back in the car that they work properly and that there are no leaks.

While the door operators are being overhauled on the bench, the doors, hangers, levers, etc., should be gone over and put in good condition; the air pipes blown out and the air strainers removed and cleaned.



MOTOR SIDE OF CAR SHOWING SECTION REMOVABLE FOR CRANKING PURPOSES



CONTROL SIDE OF CAR SHOWING BRAKE LEVER ON OUTSIDE AND CLUTCH LEVER INSIDE

Interurban Motor Section Cars

Detroit United Railway Is Equipping Interurban Divisions with Section Cars—Built to Obtain Low-Speed Feature for Safety

THERE is little need to emphasize the value of motor section cars for an interurban road of any considerable mileage. The energy of the men that is saved for their more necessary work and that for which they are primarily employed will more than pay for the cars in a short period. Instead of reaching the job fagged out and ready for a rest they arrive full of "pep" after an exhilarating ride in the morning air. In addition, due to the labor shortage of the last few years, it has been almost impossible to get section men to pump the old style hand car. And then there is another point which generally carries considerable weight, and that is the matter of time consumed in getting to the job. The Detroit United Railway, which operates some 584 miles of interurban lines, claims that the case of an electric line differs from that of a steam line and that speed is not the only point to consider.

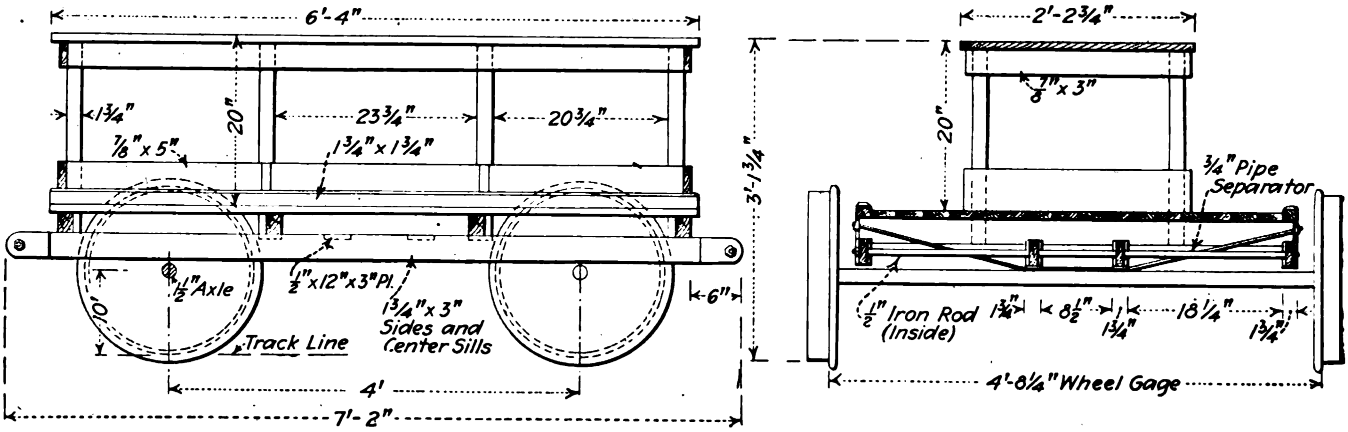
John Kerwin, superintendent of tracks, places more value on the safety of his men than he does on a little time saved, and he does not believe that they should travel over the road in a section car at 30 m.p.h. It is his opinion that even on steam roads at the present time safety is sacrificed for speed much more than is necessary. Consequently, much investigating and experimenting have been done, and failing to find a car that entirely filled the requirements laid down the Detroit United Railway is building its own motor section cars.

The general design of the car bodies is as shown in the accompanying drawings, the wooden members being oak throughout. The wheels are standard 20-in. steel wheels and are purchased from an outside source. The motor used on this car is a New Way, one-cylinder, 4-horsepower, 4-cycle engine with clutch control and one-way one-speed operation. The engine is air cooled, equipped with Holly carburetor and Bosch magneto, and the flywheel travels at a speed of 800 r.p.m.

The car is chain driven from a sprocket on the rear axle with a gear reduction of four to one, there being sixty teeth on the axle sprocket and fifteen teeth on the motor sprocket. The motor sprocket is made in the track department shops and is keyed onto the axle. The resultant speed ranges from 5 to 12 m.p.h.

The motor weighs about 250 lb., and the car complete weighs 450 to 500 lb. This makes it possible for two men to handle the car with comparative ease and four men can lift it bodily. There is a total seating capacity for eight men. The car is braked on all four wheels by means of a hand lever the brakes being wood blocks lined with strips of leather belting.

At the present time there are five cars which have been in operation for several months, and more will be built from time to time as necessary. The cars make 20 miles to the gallon of gasoline, giving an estimated total operating cost of approximately 1¼ cents per mile. The total cost of the machine is about $250, of which $125 is for the motor.



END AND SIDE ELEVATIONS OF MOTOR SECTION CARS BUILT AT DETROIT

Conditions Govern the Choice of Rail Bonds

Several Common Types of Rail Bonds Are Discussed and Their Adaptation to Conditions Is Pointed Out

By G. H. McKELWAY
Engineer of Distribution, Brooklyn Rapid Transit System

THE first bonds used to connect track rails were of iron wire and were riveted into the web of the rail. These very much resembled the bonds now used for the track circuits controlling signals, except that the material differed. When it was found that greater conductance than that afforded by iron wire was desirable, a change was made to copper and the cross-section of the conductor was increased until solid bonds of No. 0000 capacity are now common. There is very little danger of a heavy solid bond being broken by the movement and vibration of the rails, as is the case when strands or ribbons are used for the conductors. On account of the stiffness of solid bonds, however, they act as levers which tend to loosen the bond terminals as the rails move. Therefore, while the conductor itself is not so liable to be damaged as when made in another form, the bond as a whole is less efficient because of its weakness at the terminals.

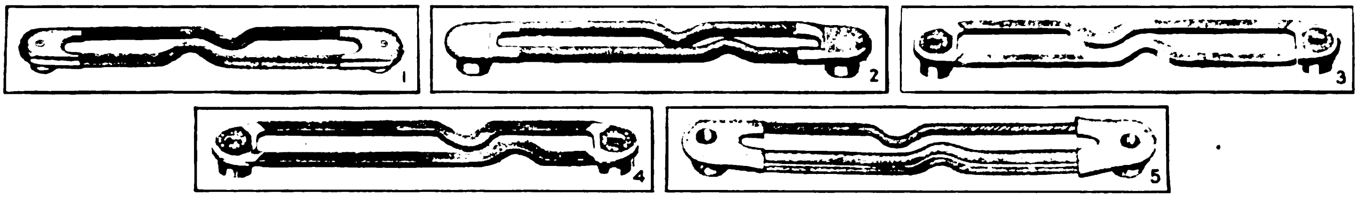


FIG. 1—TYPE F-3-T BOND; FIG. 2—TYPE C. S.,—04 CROWN BOND; FIG. 3—TYPE U. P.,—01 UNITED STATES BOND; FIG. 4—TYPE U. P.,—04 UNITED STATES BOND; FIG. 5—CROWN TRIPLEX RAIL BOND

In order to avoid this lever-like action a more flexible conductor was needed and stranded wire was naturally made use of. This is much more satisfactory and does away entirely with the twisting action on the terminals. At the same time, if the bond is properly designed and made and if the individual strands are of sufficient length and of proper cross-section there is but little chance of their becoming broken. It is no fault of the stranded bond that it is not used universally. In some forms, it costs more than other bonds similar in length and conductivity but the principal drawback to its use is due to the poor design of the joint plates with which so many rails are equipped. This trouble does not appear when the bonds are used outside of the plates but it becomes serious when space must be found for the bonds between the plates and the rails.

The most common size of bond is No. 0000. A stranded bond of that size requires a space at least $\frac{17}{32}$ in. square to pass through, and in order to avoid pinching still more room is really needed. There are few joints made with such a large clearance so that the most obvious step is to make a bond with two conductors connecting its terminals. If both of the conductors are of the same size then for a No. 0000 bond the size of each of the conductors will be No. 0 and the opening needed by each one can be reduced to $\frac{3}{8}$ in. x $\frac{3}{8}$ in. With many joints even this requirement is too great and two openings of that size cannot be found, although often below the line of the track bolts there will be a somewhat larger opening, with a smaller one above the bolts. When this condition occurs it can be met by the use of "unbalanced" branches in the conductor, that is, one of the branches will be of smaller cross-section than the other, although the total cross-section of both of the branches will equal the section desired for the bond. Often the openings are rectangular rather than square and the distance above and below the bolt holes are greater than that between the web of the rail and the joint plate. In such a case the round stranded wire is not suitable and a rectangular form must be found that will pass through the rectangular holes. Then, instead of making up the conductors from round wires, they are formed from flat ribbons of copper, these ribbons being approximately $\frac{1}{32}$ in. thick and generally about $\frac{3}{16}$ in. wide. Sometimes ribbons are of nearly double that width and on other occasions they are hardly half as wide. The number of ribbons in the branches varies with the size of the bond and these are usually from one and a half to two times as many on the lower branch as in the upper.

There is still another type of bond conductor used under the plates where the clearances are limited. This is a stranded two-branch bond but, instead of leaving the conductor round, it is squeezed into the shape shown in one of the illustrations and it then takes up no more room than a ribbon bond. The most recent developmen is known as the "triplex" bond and consists of three branches, a fairly large conductor passing above the line of bolt holes and one large and one small wire running through the opening beneath the bolts. This last-named bond has not been on the market long enough to have had a thorough try-out, but it requires less room than a stranded bond with only two branches and should have a longer life than the stranded type which has been squeezed out of its round shape.

With the comparatively short bonds used under the plates there would not be sufficient flexibility if the strands or ribbons ran practically straight from one terminal to the other, and so they are looped or "crimped" or "tucked," as it is variously called, as near the center of the bond as circumstances will allow. These loops add greatly to the life of the bonds, especially when placed in the center, and the resistance to the effects of vibration lessens very materially as the tuck approaches the end of the conductor. Where only one bond is used to a joint the crimp can be placed at the center, between the two end bolts of the rails, but when two bonds are used they have to be placed as shown in the illustration, with the terminal of one bond, as well as the track bolt, passing between the two branches of the conductor. This makes center tucking impossible and forces the loop to be made close to one of the bond terminals. With bonds having thin ribbons or strands of wire a well-made crimp will increase the life of the bond by almost 100 per cent.

When two bonds are used at a single joint and on opposite sides of the web of the rail it is the general custom to drill the hole for one terminal of each bond between the first and second bolt holes from the end of the rail, and the other holes between the second and third bolt holes from the end of the other rail. The diameters of the single strands of wire bonds vary from 0.04 in. to 0.08 in. The smaller size is much preferable, as experience has shown that they have almost twice the life of those with strands of twice that diameter.

It might be thought that the protected bond that would be considered as best for all round work would be either of the ribbon type or of the type with formed strands, and the ordinary round bond would be last in favor, as the two former can be used in all places that the latter can and in some places where it cannot be used. This, however, is not the fact and the round wire bond is to be preferred for all places where it can be used because it will be found to have a longer life than either of the other two types. Some persons claim that the ribbon bond is even stronger than the wire type for withstanding the effects of movement in a vertical direction, and though they admit that against horizontal vibration the ribbons are not as strong as the wire strands, yet they claim that there is so very little horizontal movement to the rails that the weakness does not show up in practice. The writer has found in actual practice, that the wires last much better than the ribbons and there are places where the use of comparatively short concealed bonds is necessary as ribbon bonds would last but a very short time.

New Colloidal Fuel Developed

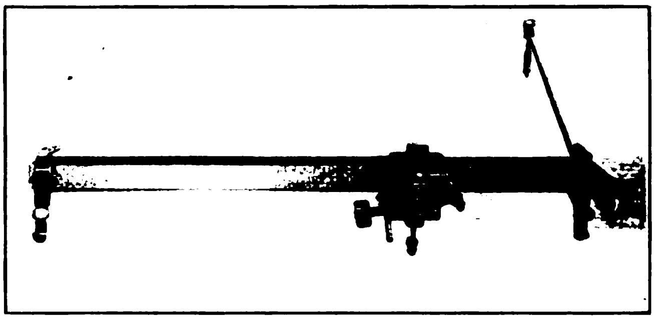
UNDER the auspices of the Submarine Defense Association, which consists of shipping and allied interests, a committee of engineers has been at work for some time developing a fuel which would consist essentially of a mixture of fuel oil and powdered coal. The primary purpose in developing the new fuel was to reduce the consumption of fuel oil.

The association now authorizes the statement that it is possible to suspend permanently in oil 30 per cent to 40 per cent of coal pulverized so that about 95 per cent passes through a 200-mesh screen, the suspension being assisted by a special fixateur. It is now possible to combine in a stable liquid fuel about 45 per cent oil, 20 per cent tar and 35 per cent pulverized coal, thereby replacing more than one-half the oil, securing equal or greater heat values per barrel and saving considerable cost.

As an example of this fuel, the statement is made that "industrial colloidal grade No. 10," devised to use up some poor coal holding 25½ per cent ash, is composed of 61½ per cent of pressure-still oil, wax tailings, petroleum pitch and fixateur, running 18,505 B.t.u. per pound, and 38½ per cent of anthracite rice running 10,900 B.t.u. This grade contains 162,500 B.t.u. per gallon and has 10.2 per cent of ash. The fixated oil itself has 151,750 B.t.u. per gallon. In fuel value, therefore, the colloidal fuel is worth 7½ per cent more per gallon than the oil from which it is made.

Scribing Rail Surfaces to Show Wear

THE instrument shown in the accompanying illustration was developed by the Metal & Thermit Corporation for making records of rail joint wear. To obtain a chart of the running surface of a rail the instrument is placed firmly in position on the part of the running surface of the rail to be scribed, with the supporting foot extending out in the back. A hardened roller running on the surface of the rail head imparts motion to a pencil point as the rider moves from one end of the instrument to the other. This transfers very accurately a pencil record onto a strip of paper clamped into the stationary part of the machine. The leverages of the rider are so arranged that a pencil point placed on one side will make an exact duplication of the unevenness of the rail head, whereas if placed on the other side the ordinates of this uneveness will be multiplied by three, thus enabling a more accurate examination of the defects. The scribed records can be carefully marked and filed away for future reference and by comparing them with similar records taken subsequently the rail wear is indicated. The instrument is referred to as a "rail surface indicator" and records made from it year after year and superimposed will quickly indicate any defects which eventually would result in joint trouble or corrugations.

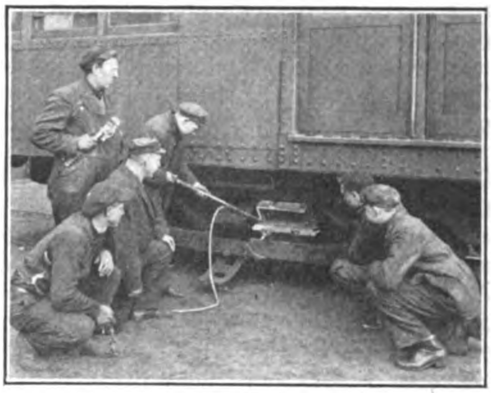


RAIL SURFACE INDICATOR FOR RECORDING WEAR OF RAILS

Joint defects such as mentioned above in the case of thermit welds are found to be due in every case to very minor initial defects in the grinding of the rail joint originally, these minor defects being aggravated by the constant hammering of the wheels. An original record of the joint, therefore, made by this machine enables the engineers of the company carefully to watch the joints in the order of their installation and correct any such minor defects in the grinding which may have escaped the operator's notice.

The American Zinc Institute, in its campaign to increase the uses of zinc, is advocating spelter for rail bonding purposes. It is reported that a very important electric railway has recently purchased a large quantity of this metal for the purpose. The institute points out that zinc is a comparatively plentiful and cheap metal, and in many directions is satisfactorily taking the place of more expensive materials.

Some Mysterious Car Ailments



Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD

A Peculiar Case of Controller Trouble

THE freight business of a large electric railway property required the use of an additional electric locomotive. This was built in the shops of the company and the equipment used was of an old type made up of spare pieces which the railway already had on hand. To avoid the necessity of purchasing a new four-motor controller two old K-13 controllers were installed and placed back to back. A large rack with the necessary gearing to provide for operating the controllers in unison was mounted on the tops.

After completion a test run was attempted but in shutting off the controller it blew up. The motors were tested and the wiring was checked for wrong connections but all were found correct. Another attempt to run was made, but with more disastrous results as this time the entire cab of the locomotive was badly burned. This led to a further investigation. It had been noticed that in shutting off the controller the arc from the contacts held on instead of being cut off sharply as was to be expected. Further tests showed that the controllers had no blow-out effect due to the magnetism from the coils being opposed so as to neutralize the blow-out effect. The leads to one of the blowout coils were then reversed and no further trouble was experienced.

Train Stalls on Crossover and Ties Up Line

AN ELEVATED TRAIN equipped with multiple-unit battery-type control started to pull out of a yard preparatory to going into service. The head car had just reached the main line while the others were taking the crossover, when the train stalled. This was just at the height of the rush hour, and several other trains were in the yard ready to go into service, while others, heavily loaded with passengers, were tied up on the main line due to the position of the stalled train. The train dispatcher "started hopping around" at a lively rate and called to all employees in sight to try and get the train off the line. A rapid inspection showed all equipment in apparently good working order. An inspector boarded the rear car and found that the equipment would operate all right from the master controller on this car. The train was again pulled back into the yard by operating from the rear end so as to clear the line, and a thorough inspection was given all parts of the equipment.

The trouble was eventually located as an open circuit in the battery "plus" train-line wire between the master controller and the switch group. On opening up the junction box immediately underneath the master controller a loose connection was found. Evidently when last repairs had been made in this junction box, the nuts on the battery plus binding post had not been tightened down securely. These had loosened somewhat and the loose connection resulted.

A Train That Operated Satisfactorily Outbound But Was Very Sluggish on the Return Trip

ON AN IMPORTANT railway system using multiple-unit battery-type control, with train-line jumpers between cars, the motorman of one of the trains reported it as operating O. K. while west bound but as being very slow on the east-bound trip. As the east-bound part of the trip occurred during the rush hour when passenger traffic was very heavy, this resulted in a considerable delay. On arrival of the train at the terminal the electrician, after a very rapid examination, finally located the trouble as a defective jumper between two of the cars. The train was composed of six cars and the defective jumper was between the last two cars on the west-bound trip, but was between the first two cars on the east-bound trip. A further inspection of the defective jumper showed that the multiple wire was open. This caused all cars back of the defective jumper to operate in series only so that on the west-bound trip five of the cars were operating in multiple and one in series, while on the east-bound trip one car was operating in multiple and the other cars in series. This explained the difference in operation in the two directions.

Troubles of this nature have been one of the greatest sources of annoyance to railways using train operation since the introduction of multiple-unit-type control. Such troubles are caused principally by the breaking of the small wires at the terminals in the jumper heads, or in the body of the jumpers where they are subjected to the greatest bending action. Various means have been tried to detect the broken wires, such as connecting all the wires of the jumper in series through a bank of lamps or by subjecting each wire in the jumper to abnormal current, so that in case a wire is partly broken, the high current passing through this would burn it apart. At the same time that these tests are conducted, the jumper is usually twisted and bent so that the tests may be made as severe as possible. Tests of this nature are usually made monthly and they necessitate considerable handling of the jumpers. The labor involved in collecting these jumpers for test is very expensive.

One road has instituted a method of testing and inspecting each jumper every time the train containing that jumper is in the shop for inspection. The test consists of operating the control equipment on each car of the train, from the master controller on the end car. At the same time an inspector checks each car to make certain that the controller equipment of that car is operating satisfactorily, and at the same time additional inspectors move the cable of each jumper up and down so that by this action a broken connection will be detected by the dropping off of the controllers back of the open circuit. Since the institution of this method of testing, a large number of defective jumpers have been located, and much trouble and inconvenience has been avoided.

A Multiple-Unit Control Equipment That Would Not Notch Up

A VERY serious detention occurred on an elevated line using train operation, with cars equipped with automatic battery-type control. The motorman of the train reported that the control would take one or two notches and then immediately drop off, so that he could scarcely get the train over the line. The cars were taken out of service and inspected for open circuits and dirt on the control contacts, but nothing to account for the erratic operation was found. On taking voltage readings of the batteries, it was discovered that all were weak and one set was badly grounded. As all the batteries in the train were connected in parallel, the grounding of this set had caused the other batteries in the train to attempt to charge it, so that their voltage had also been reduced. This grounding had occurred through the wood battery boxes, due to corroding of the terminals, and to acid-soaked boxes. To prevent a recurrence of the trouble, batteries were removed as rapidly as possible, and the boxes were soaked in concentrated soda solution for twenty-four hours, after which they were painted with an acid-proof paint. Porcelain insulators were also installed underneath the boxes and between them. This gave a better circulation of air, as well as providing an efficient insulation.

A Car That Would Not Leave the Terminal

AFTER changing ends at a terminal, the motorman of a certain car equipped with multiple-unit control found that he could not start it. An electrician was called, and on opening up the switch group and reverser he found the latter thrown for operation in the reverse direction and it would not operate from the master controller on the front end of the car. He at first thought that a poor contact in this master controller might be the cause of the trouble, but all contact fingers were found to be working properly. The electrician then went to the other master controller to see if the equipment would operate from that end and found that the contact drum of this master controller had not returned entirely to the "off" position, so that contact was still being made for the reverser circuit. The reason for the failure of the drum to return properly was found to be a broken return spring. To assist in preventing spring breakages the manufacturer changed the shape somewhat so as to do away with a sharp bend and greater care was given to selecting spring material.

Solving a Hot Axle Bearing Mystery

THE number of hot axle bearings on a large railway system became excessive, expensive and annoying. There were two motors per car of 200 hp. each, and these were mounted on one truck. At first it was thought that improper or insufficient lubrication was the cause of the trouble. The heating of the bearings charred the waste and destroyed all evidence as to the quantity of oil in the bearings at the time the overheating started. On comparison of the records showing the time that the cars had received oil, and the quantities used, it appeared that a sufficient quantity had been added to take care of the service requirements. As no leaks were found in the housings it was evident that the oil could not all have been used up in the short time that the cars were in service between the time that the bearings were inspected and the time that the hot bearings occurred.

In addition to this investigation of lubrication, the bearings were also carefully gaged for clearance, and a microscopic inspection was made of the bearing surface. These tests showed that a pitting action, electrolytic in its nature, had taken place in the bearings, which was evidently caused by the return current from the motor finding an easy path through the bearings to ground. Milli-voltmeter tests were made, which proved that the current passing through the bearings was of a quantity sufficient to heat the babbitt lining and partially melt it. To overcome this trouble a ground lead was installed between the motor frame and the truck bolster to give a low resistance circuit for the current. Since this installation the company has been free from troubles of this nature.

The success derived from the above investigation prompted the officials of the road to conduct similar experimental work in connection with armature bearings. A brush collector was installed on one end of the armature shaft to relieve it from carrying current which might be caused by leakage or grounds. This particular armature has now been in service for about three years without trouble.

There has always been a sort of controversy between the shop men responsible for the maintenance of armatures, and foremen of the electrical repair departments as to the fundamental cause of armatures damaged by rubbing the pole faces. Where hot armature bearings occur and the motors are continued in service for a sufficient length of time, the clearance for the armature is decreased and rubbing occurs. The electrical repair foreman thus draws the conclusion that the damage to the armature results from hot bearings. On the other hand, the repairman usually produces evidence showing that oil in sufficient quantity and at sufficiently frequent intervals has been added to take care of normal conditions, and these men maintain that the grounding or short-circuiting of armature coils was the original cause of the trouble, and that the hot bearings resulted from this, rather than being the cause of the trouble. The test and investigation above referred to were conducted to settle this controversy.

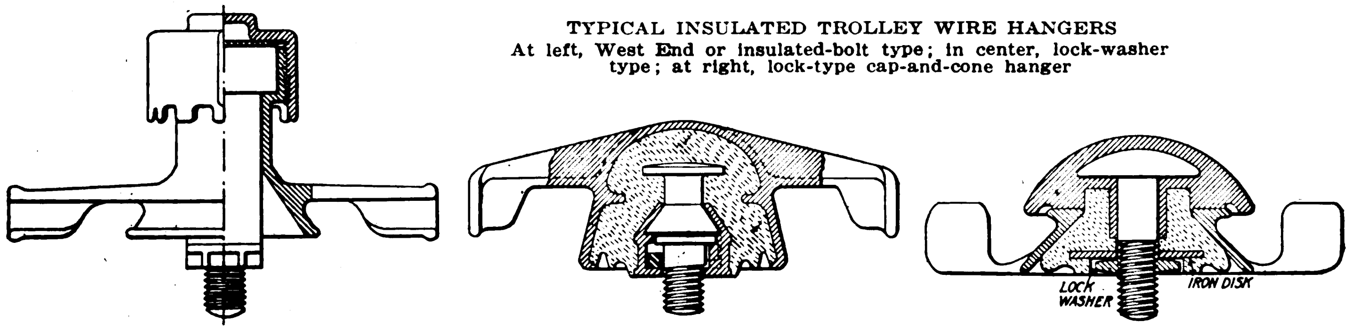
What Makes a Good Trolley Hanger?

The Author Considers the Practical Features Which Experience Shows to Be Necessary in a Durable Insulator

By G. H. Bolus
Designing Engineer The Ohio Brass Company, Mansfield, Ohio

THERE are three general types of insulated trolley hangers in use in the United States for supporting direct-suspended trolley wire. They are the "round top," so called because the top of the hanger is of dome or round shape, the "West End" or insulated-bolt type, and the "cap-and-cone" type. Of the three the West End was the first in use and it still continues to be very popular, although the round-top type may be considered as gaining in popularity as indicated by the sales records of one of the largest manufacturers.

The West End, or insulated-bolt type, is illustrated in an accompanying drawing. It has the advantage that the insulated portion can be renewed without scrapping the malleable body and cap. In some localities where insulation goes to pieces quickly, due to atmospheric conditions, this factor results in preference being given to this type of hanger. For new construction the round-top hanger, in which the insulation is molded into a malleable-iron body and is not renewable, is the more generally used.



TYPICAL INSULATED TROLLEY WIRE HANGERS
At left, West End or insulated-bolt type; in center, lock-washer type; at right, lock-type cap-and-cone hanger

The West End hanger has the further advantage that as the bolt is rotatably mounted in the hanger body it can be screwed tightly in the boss of the trolley ear, thus preventing the stripping of threads both on the stud of the hanger and in the ear boss due to vibration. It is not so well adapted for curve work although it has been used to some extent in this manner. Its chief drawback for curve construction is the very heavy bending moment which is imposed upon the bolt at the point where it emerges from the body of the hanger.

While the insulation in the round-top hanger is not renewable this type of hanger will prove much better on a curve than the West End type. Until a comparatively recent date the principal objection to the round-top hanger was that it could not be lined up with the direction of the trolley and still provide a tight joint between the ear boss and the hanger seat. To overcome this defect several types of hangers have been evolved. The lock-washer type, shown in a second illustration, has met with great success.

The cap-and-cone type hanger is made in the standard and lock-stud types. This type of hanger admits of ready standardization, and the American Electric Railway Association has set standards for dimensions and contour which all manufacturers of overhead with one or two exceptions have adopted. The principal objection to this hanger is the exposure of the insulation to the elements, but many large properties use it with entire satisfaction. Where trouble is experienced with this type hanger backing out of the ear-boss threads, a hanger of the lock type should be used. This is made with a metal bearing and positive lock washer which locks the parts together against accidental disengagement. A third illustration shows the lock-type cap-and-cone hanger.

MECHANICAL AND DIELECTRIC STRENGTHS OF INSULATORS

Electrically all makes of hangers will test about the same. The writer has found that the round-top type will usually flash over from stud to shell at about 13,000 to 14,000 volts effective, and that the mechanical strength is about 4½ to 5 tons vertical load, at which load the stud is pulled from the body of the hanger. The West End type of hangers, except where bakelite insulation is used, will test about the same mechanically and about 9,000 to 10,000 volts effective electrically.

There are several characteristics which an insulation for trolley hangers should possess, namely, heat resistance, non-absorption of moisture, dielectric strength and mechanical strength. By various combinations of gums and fibers the manufacturer can produce stocks running high in one or two of these characteristics, but the aim should be to produce a balanced stock. In other words, a stock should not possess extremely high dielectric strength at the expense of mechanical strength or *vice versa.* The writer has in mind one molded stock which will show an extremely high dielectric strength when dry, but when the hangers have been soaked twenty-four hours in water and wiped dry, and are then tested, the stock is practically valueless.

Most trolley construction for 650 volts direct current employs series insulation; in other words, the hangers are in series with some form of span insulator. This is a step in the right direction because where no secondary insulation is used an arc may hold over from stud to shell, burning up the insulator and tying up traffic.

RUST-PROOFING OF STUD IS ESSENTIAL

Overhead trolley hanger bodies are invariably of malleable iron, and some form of rust proofing is employed, ranging from electro galvanizing which is now practically obsolete, to hot dip galvanizing and sherardizing. The writer believes the sherardizing to be the most popular, as this process does not harden the malleable iron as does the hot-dip galvanizing process for instance.

Rust proofing of the stud, or of that portion which is molded in the insulation, should absolutely be insisted

upon because if plain iron studs are used, with the possible exception of Armco iron, oxide of iron is formed. This has a wedging action on the composition insulation and soon causes a separation of the stock from the stud, allowing the entrance of moisture and inviting early failure of the hanger electrically.

The question of petticoats versus a single groove in the insulator is a much discussed one and it is the writer's experience that either type will give satisfaction. The petticoats are added to lengthen the leakage path and in some cases to increase the resistance to side strain, but as there is a large factor of safety possessed by any of the trolley hangers on the market it is questionable whether any form of petticoating is necessary. An argument advanced for the single groove is that it is more easily cleaned than the multi-grooved construction.

Some manufacturers turn the span wire lugs on the arms upward while others turn them downward. With the upturned span lugs the strength of the design lies in the strength of the lugs, while with the down-turned construction the strength lies in the arm and its stiffened rib. The writer's preference is for the latter construction. He has personally installed both types on tight span wire and can see no difference in the ease with which one type is installed as against the other type of construction.

EXTRA-HEAVY STUD IS UNNECESSARY

All hangers in commercial use today are either ⅝-in.-11 or ¾-in.-10 U. S. standard threading. On some properties where ¾-in. studs are used it is believed that this size is absolutely necessary for strength. The writer believes that ⅝-in. studs will answer all requirements regardless of the type of construction or severity of the service.

There is now a movement under way, fostered by the government, to eliminate ¾-in. studs and ears entirely. This is done as a conservation measure and it is the writer's understanding that several of the largest manufacturers will not list ¾-in. material in their 1919 catalogs.

The practice of painting the bodies of insulated hangers with black asphaltum or other heavy black paint, applied after the hangers are installed, is a very good one. The paint protects the galvanizing of the hanger and, if well daubed about the span wire where it passes under the hanger lugs, will serve to protect the wire at this point where most span wires rust out from weather conditions.

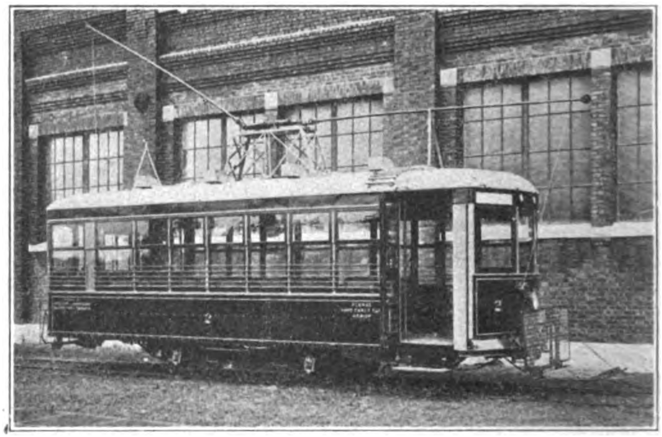
The professional and special section of the United States Employment Service, formerly located at 29 South LaSalle Street, Chicago, has moved to 63 East Adams Street. This section was formerly known as the Division of Engineering but has enlarged its service to include all kinds of professional and technical men and women. Now that the war is over its activities will be directed toward reconstruction and peace needs. No charge will be made for its services. Registration blanks can be secured from the Employment Service, and applicants from Illinois, Indiana, Iowa and surrounding territory should register with the Chicago office of the section.

Light-Weight Air Fender for One-Man Car

By F. P. Maize
Master Mechanic Portland Railway, Light & Power Company, Portland, Ore.

All cars provided with air brakes except those with M. C. B. drawheads, running in Portland, must be equipped with an automatic air fender which can be dropped by the motorman, or by a projecting trip in front of the fender which will automatically drop the fender and apply the brakes. As the present fender used by the Portland Railway, Light & Power Company is too heavy for the Birney cars, this company designed a fender eliminating all castings, bolts and threaded pipe, by using instead electric welded pipe and forgings. By so doing the weight of the fender was reduced 50 lb.

The fender as shown in the accompanying picture is composed mostly of pipe. The frame of the apron is made of ½-in. pipe in one piece, bent cold in a form and electrically welded at the joint. Four pieces of ¼-in. pipe are welded on the top for holding the screen and bracing the apron. Clips of ¼-in. round iron are welded on the top for the projecting trip to work through. This eliminates all holes through the frame and makes it stronger and stiffer than the original fender. The joint in the back is made of two pieces of boiler plate electrically welded together. The uprights are made of light boiler tubing, one fastened to the body and the other to the apron. A chain running from the crossbar to an air cylinder under the car pulls the fender to the tracks.



SAFETY CAR WITH LIGHT-WEIGHT AIR FENDER

The valve for operating the fender is a three-port slide valve operated by a piston. One port connects to the emergency line, one to the air cylinder and one to atmosphere. Main reservoir pressure is thus provided in the main body of the valve and the piston is held closed by a spiral spring. There is a $\frac{1}{16}$-in. hole in the piston, so that the air pressure can equalize on both sides. On the back of the piston there is a small needle valve, which when opened will reduce the pressure on the back of the piston so that the reservoir pressure will immediately force the piston over, thus connecting the emergency line with the exhaust and main reservoir pressure with the fender cylinder. When the needle valve is closed, the air pressure will build up througt the $\frac{1}{16}$-in. opening and the spring will shove the valve closed, connecting the fender cylinder with the atmosphere and closing the emergency line.

All pipe connections are made to a bracket, so that it is only necessary to loosen two bolts to remove the fender valve. As all parts are electrically welded, the fender, although much lighter, is stronger and more easily repaired than the older type.

Timber Preservation Will Aid In Lowering Maintenance Costs

By R. C. Cram

Assistant Engineer Department of Way and Structures, Brooklyn Rapid Transit System

THERE can no longer be any doubt as to the fact that timber preservation should be considered as one of the most available means of reducing maintenance costs of ties, bridge timbers, poles and crossarms. Electric railways use vast quantities of timber in these forms, and it is a well-known fact that renewals of tie timber alone represent the largest single item of cost in open track maintenance, if the general item of maintenance labor be excepted. With the rapid rise in costs of both timber and labor, it has become almost imperative that all available steps be taken to secure the greatest possible life from the timber.

The most important step in this direction, and the one which produces the greatest results, is that of giving the timber some preservative treatment. But the cost of treatment has also risen, and the most effective method in general, of preserving timber, which is creosoting, has become almost prohibitive because of the high cost due to greatly decreased supply caused by war conditions. This will continue for some time.

There are various methods of treatment, broadly grouped under pressure and non-pressure processes. Of the pressure treatments the best known and most generally used is the "full-cell" pressure treatment with creosote (Bethell process). Second in importance is the Burnett process of pressure treatment, using zinc-chloride. Various modifications of these two pressure processes have been employed, of which those still in considerable use are the Wellhouse or zinc-tannin process; the Card, or zinc-creosote process, and the several modifications of the "saving" or "empty cell" process. The last named includes the Lowry and Rueping processes.

Under the non-pressure method of treatment are the brush, spray, dip and open-tank processes. Each having its own modifications incidental to use and preservative employed. Industrially speaking, the open-tank process merits the most attention, since with variations of temperature and duration of the hot and cold baths almost any kind of preservative treatment desired, may be given with an absorption sufficient for most purposes.

There are various chemicals or preservatives employed in all of the foregoing general processes and creosote and various coal-tar derivatives represent by far the larger group. Under war conditions zinc chloride has come to be used quite extensively. The use of bichloride of mercury (Kyanizing) has been restricted to practically one section of the country for treating spruce lumber. Unfortunately the war has prevented much progress in the use of sodium fluoride solutions which have proved very efficient abroad for a period covering the last two decades. The use of these salts is likely to increase, since tests so far made in this country bear out the promising results obtained abroad in that they are considerably more effective than zinc chloride. Crude oils have been tried as preservatives by the steam roads with very poor results and, at least, one electric railway has definitely proved that such treatments are a failure.

There appears to be some doubt as to the advisability of using zinc chloride on electric railways for tie treatments, because certain tests and statements have indicated that it has a destructive action upon spikes, tie plates and rail bases in tracks carrying electric currents. Signal systems have also been affected to some extent, but in nearly all cases we believe such troubles have been traced to the use of freshly treated ties, and it is reasonable to assume that if a proper seasoning period after treatment were allowed this trouble should be greatly minimized if not entirely eliminated. It is rather unfortunate that these doubts have arisen, since the zinc chloride treatment is comparatively cheap and increases the life of ties from two to three times that of untreated timber. There is little information as to similar action with the so-called double process using zinc chloride and creosote, but it may be assumed that the double process is to be preferred since the use of the creosote oil tends to hold the zinc chloride within the timber, thereby reducing the hygroscopic character of the treated timber. It is possible also that sodium fluoride, which is less hygroscopic, in combination with creosote oil may give a tie treatment with nearly equal preservative qualities as compared with a fuel-cell creosoted tie and at a much lower cost.

The large companies which purchase treated timber in the open market and the few whose requirements are sufficient to warrant the installation of pressure-treating equipments must be considered separately from the majority of companies which purchase timber locally and in comparatively small quantities. For this large class of electric railways, thorough open-tank treatment with any one of a number of desirable preservatives is available. The open-tank method is comparatively low in cost and its use in the past has been principally confined to treating poles, posts and bridge timbers, although quite a number of electric railways have open-tank plants for treating ties.

An extended tie life as well as the increased life of all timber is very desirable and can be obtained by this method without the installation of an expensive plant, at a cost which should be well under any of the pressure methods referred to. It will be well worth while for electric railway managements to investigate the subject thoroughly. Since most electric roads are being forced to use ties made from so-called inferior woods which require treatment if full life is to be obtained and which are usually delivered along their lines, the open tank method can be made available at almost all chief delivery points, thus minimizing handling and transportation charges to far-away treating plants. One of the principal reasons for the comparatively low cost of open tank treatments lies in the reduction or absence of these two items of expense.

How the Public Service Railway Established and Will Collect Its Zone Fare

The Company Proposes to Put a Ticket-Issuing Machine on the Front Platform by Which Each Passenger Will Receive a Check Indicating the Zone in Which He Boards the Car—Then He Pays the Appropriate Fare as He Leaves by the Rear Platform

IN THE ABSTRACT of the proposed zone system of the Public Service Railway published last week the statement was made that the company considers its stand-by and readiness-to-serve cost as 4 cents per passenger and its movement expense as 1 cent a mile. These figures are backed up by detailed figures of the past and anticipated cost of operation.

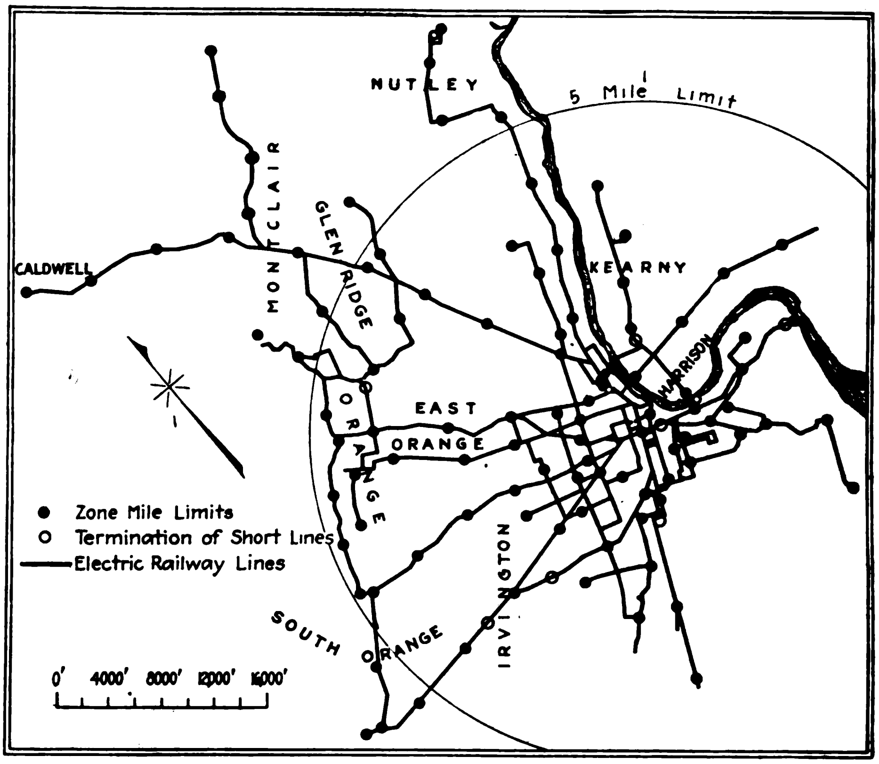
ELEMENTS IN COST OF SERVICE

In discussing this question the company points out that the cost of service properly embraces all of the elements of expense required to enable the company properly to perform its natural functions, and these include:

(a) The furnishing of good service to the public;

(b) The maintenance of its property in proper repair and a reasonable allowance for depreciation; and

(c) The securing of a return sufficient to attract capital to the enterprise.



MAP OF ESSEX DIVISION OF PUBLIC SERVICE RAILWAY, SHOWING PROPOSED ZONE-MILE LIMITS

The provision of good service to the public is, of course, the first and primary function of an electric railway and, therefore, the most important of the three factors summarized above as controlling the amount of revenues necessary to meet the cost of service. However, important as the first factor is, the company cannot accomplish this essential purpose unless the other two requirements are also met in a thoroughly satisfactory measure, for in the final analysis the furnishing of good service implies that the company must keep its facilities in a well-maintained condition, and that it must also, by reason of a stable net earning power, be kept in a position at all times to meet reasonable demands involving the investment of new capital.

Entirely aside from the capital requirements to meet increasing traffic demands, there is another very serious factor affecting investment which is not appreciated by the general public. An electric railway company has a peculiarly intimate relation to the development of the territory in which it operates, and because of this it must constantly meet requirements for the investment of new capital if it is to keep pace with the continuous and healthy growth of the communities which it serves. This is particularly true in the case of the Public Service Railway, located in that portion of the State of New Jersey where the industrial development has made marvelous strides in the last few years. This industrial expansion will undoubtedly continue in the future as the great possibilities of this territory are more fully realized, and it is essential that the electric railway should be in a position to meet the demands which have accompanied and which must continue to attend such large developments.

In this widespread civic and industrial growth there must, necessarily, be constantly involved highway and street improvements, which, in locations where electric railway tracks are laid, usually necessitate participation by the railway company. Sometimes these improvements are undertaken by the cities in advance of the expiration of the full life of the track involved and the company is thus required to assume, in addition to such new capital as may be necessary, the replacement of its original investment long before the material has rendered its full and complete usefulness. To the extent, therefore, to which the renewal of such facilities is anticipated, the company is required to shoulder the loss of the value of the unused life and absorb the sum into its operating expenses.

Still another unusual demand which is frequently met is the matter of the relocation of tracks which must be undertaken by the railway company if civic or county improvements are to be carried out as planned

TABLE I—OPERATING EXPENSES—CENTS PER CAR-MILE, PUBLIC SERVICE RAILWAY

	Actual, 1914	Actual, 1915	Actual, 1916	Actual, 1917	Actual, 1918	*Actual 3 Mos. Ending Jan. 31, 1919	Estimate Year Ending June 30, 1920
Way and structures...	2.169	1.959	1.686	2.239	2.477	2.918	2.742
Equipment..........	1.707	1.650	1.770	2.047	2.989	3.840	3.603
Depreciation.........	0.924	1.191	1.344	0.316	0.626	1.438	2.000
Power..............	2.897	2.657	2.753	4.005	4.102	4.179	4.159
Operation of cars.....	7.678	7.477	7.947	8.372	11.042	13.059	12.960
Traffic..............	0.005	0.002	0.010	0.002	0.006	.....	0.004
General and miscellaneous...........	0.912	0.911	0.981	0.944	1.167	1.266	1.223
Undistributed........	1.638	1.414	1.569	1.674	2.148	2.430	2.283
Taxes..............	2.308	2.350	2.314	2.771	2.952	2.960	4.473
Total............	20.238	19.611	20.374	22.370	27.509	32.090	33.447

*Operating expenses and taxes actual; depreciation shown on basis of $800,000. per year.

TABLE II—SCALE OF WAGES FOR TRAINMEN, IN CENTS PER HOUR, PUBLIC SERVICE RAILWAY

First year—	In Effect 1-1-12	In Effect 1-1-14	In Effect 7-1-16	In Effect 10-1-17	In Effect 6-1-18	In Effect 6-6-18	Labor Board Award In Effect 6-7-18
First six months......	23	23	25	28	30	30	1st 3 Mos., 41
Second six months...	23	24	25	28	30	35	Next 9 mos., 43
Second year..........	24	25	27	29	31	35	45
Third year............	25	26	28	30	32	35	45
Fourth year..........	25	26	28	30	32	35	45
Fifth year............	25	27	29	31	33	35	45
Sixth year............	25	27	29	31	33	40	45
Seventh year..........	25	28	30	32	34	40	45
Eighth year..........	25	28	30	32	34	40	45
Ninth year............	25	29	31	33	35	40	45
Tenth year...........	25	29	31	33	35	40	45
After ten years........	25	30	32	34	36	40	45

by the authorities. This may mean the transfer of the tracks from the side to the center of the roadway or there may be involved in the contemplated improvement a substantial change in grade, or both. In either case, of course, heavy expense which is chargeable against operating cost must be assumed and substantial capital investment is made necessary to cover paving costs and other incidental new work.

That the expense entailed in such work as is referred to above is far from a negligible quantity is evidenced by the fact that over a period of years it has been necessary for the Public Service Railway to reconstruct with the same rail on an average 17 miles of track per annum, such work being undertaken in advance of the time when the track would have required replacement because of actual wear. At the average cost prevailing in 1918, the amount of money expended in the reconstruction of 17 miles of track would be approximately $516,000, which burden the company has assumed annually in this one class of expenditures.

From 1913 to 1917 inclusive, the capital expenditures of the company for track, cars, buildings, etc., amounted to $2,173,888.66 per annum as against an average increase in revenue for the same period of $735,154.13, the ratio of added capital to increased revenue being, therefore, $2.96 for each $1 of added receipts. If the zone-mile system suggested by the company becomes effective, there will be required, in addition to the above normal investment, a capital investment for new registering machines, fare indicators, ticket-issuing devices for the new system of collection, and zone limit signs, as well as moneys for changes in car construction, which involve alterations in the entrance and exit doors and in platform arrangements. The total cash investment which it is estimated will be required to meet the above is approximately $655,000.

OPERATING EXPENSES

The company also presented tables of operating expenses, the figures for the last five years on a car-mile basis and the wages paid since Jan. 1, 1912, being shown in Tables I and II. Table III shows the weighted average price of materials purchased in 1918 and prices paid in 1919. In this connection the company points out that in the conduct of the equipment and other departments it is necessary to contract for materials, such as wheels, gears, pinions, rails, etc., well in advance of the time when the articles will be actually used, in order to insure a sufficient and permanent stock and to obtain also the advantage of purchasing in large quantities. Fortunately for this company, many contracts of this character were made in earlier years and covered the war period, and, to that extent, the costs of operation in 1918 were reduced. These contracts have now expired, and the company is forced to pay the higher rates now prevailing. Inasmuch as contracts and orders must anticipate the use of the articles needed for a considerable period, it is obvious that if reductions do occur, immediate advantage cannot be taken of the changes. In other words, the use of the lower-priced goods, if any recession of prices is experienced, would be deferred until the stock purchased at the higher rates has been exhausted. Because of this, there is no justification for anticipating for the immediate future material reductions below the costs which maintained in 1918 and which often involved a lower price under contracts than can now be secured.

The views of a number of expert economists are then published indicating that no early decline in commodity prices is to be expected. Among those quoted were the Federal Reserve Bank and prominent bankers and banks in New York.

From these facts, the company deduces the proper fare to be 5 cents for the first zone and 1 cent for each additional mile zone, as described in the portion of the report abstracted in the last issue of this paper.

COLLECTION PROBLEM UNDER ZONE-MILE SYSTEM

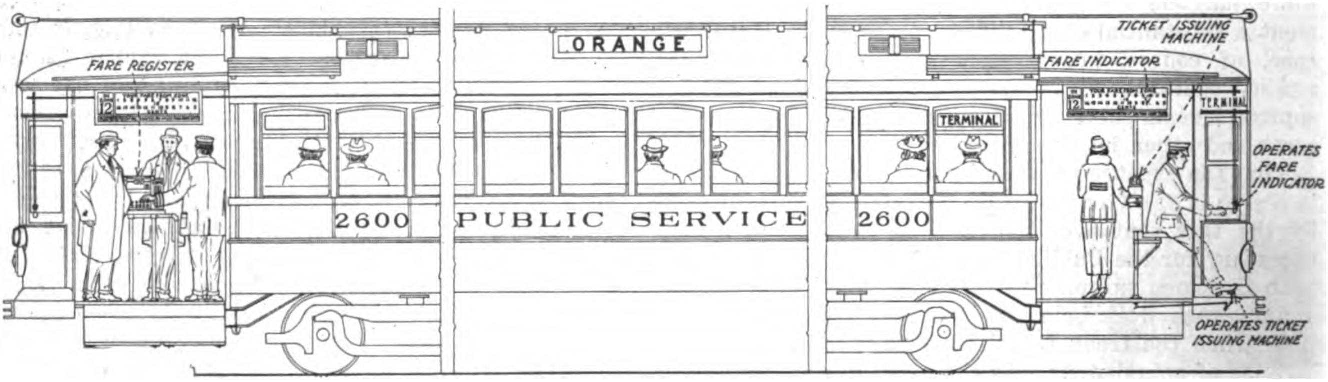
The great obstacle to the successful operation of a zone system has been the difficulty of collecting and accounting for fares. Several methods have hereto-

TABLE III—COMPARISON OF UNIT COSTS OF MATERIAL 1918 AND 1919

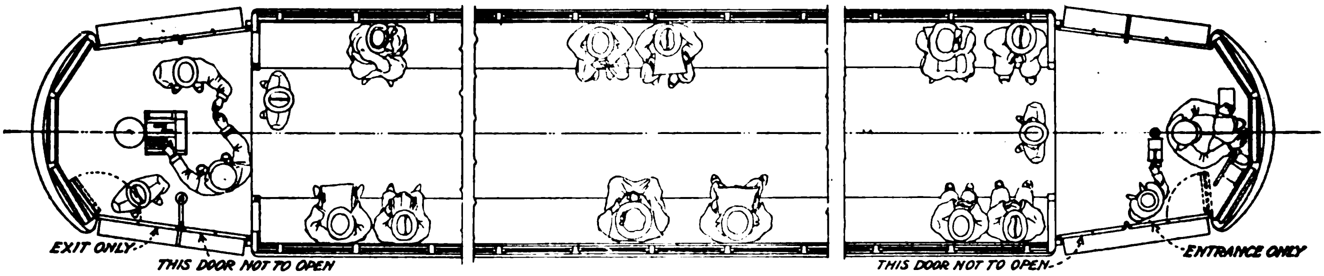
Item	Unit	1918 Weighted Average Price	Prices Prevailing February, 1919
Babbitt metal.........................	lb.	$0.8327	$0.636
Brakeshoes..........................	Net ton	53.66	69.43
Gears GE-67 (69 tooth).............	Each	50.00	50.00
Glass, 30-in. x 30-in...............	Box	8.31	11.87
Ash lumber, 3-in....................	1000 ft.	180.00	160.00
Body color paint....................	Pound	.265	.28
Pinions, W. H. 101 (16 tooth)........	Each	7.92	7.87
Seat rattan..........................	Square foot	.38	.38
Soft steel, ¾ in. x 3 in.............	100 lb.	4.125	3.97
Black insulating tape................	Pound	.3365	.35
Trolley rope.........................	Pound	.608	.76
Trolley wheels.......................	Each	1.05	1.05
Cotton waste.........................	Pound	.13425	.13375
Wool waste...........................	Pound	.2043	.215
Copper wire No. 000—61 strand.......	1000 ft.	143.24	100.00
Magnet wire—DCC, No. 9..............	Pound	.3458	235
Cast-iron wheels—star special 33 in....	100 lb.	1.63	1.63
Steel car wheels—standard............	Each	35.00	38.25
Tee rail—section 80/251..............	Gross ton	70.00	59.30
Girder rail—section 101/486..........	Gross ton	69.60	76.70
Trilby rail—section 116/434..........	Gross ton	71.10	76.70
Treated ties—yellow pine.............	Each	1.73	1.89
Tie rods..............................	Each	.775	.70
Wood paving block....................	Square yard	2.26	2.48
Granite block (Newark specification)...	1000	115.00	112.00
Spikes 9/16 in. x 5½ in..............	100 lb.	4.85	4.30
Copper bonds, 36 in..................	100	123.42	112.20
Feeder 500,000 circ.mil. W. P.........	Pound	.262	.205
Trolley poles—30-ft. steel...........	Pound	.055	057
No. 00 trolley wire...................	Pound	.2682	18
Charcoal..............................	Net ton	35.00	30.00
Coal, chestnut (for car heating).......	Ton	5.90	8.10
Salt...................................	Sack	.87	1.40
Wrapping paper, 36-in.................	Pound	.1105	09
Copy sheets...........................	1000	1.60	1.70
Car records...........................	1000	2.239	2.70

Weighted average increase 1918 over 1917—82.30 per cent
Weighted average decrease 1919 from 1918—2.25 per cent

fore been applied in such work, the report points out. In all cases city fares are collected in the ordinary manner, registration being effected with a fare box, with or without the use of an overhead register, or some other of the many fare collection devices, now generally employed. The fares on suburban lines, in some cases, are collected in the time-honored method, the conductor going through the car and collecting the fare at each zone limit. Where outlying zones of 1 or 2 miles are used and the schedule is rapid the conductor spends practically his entire time in successive trips through the car collecting fares. The practice is annoying to passengers, keeps the conductor off the rear platform the greater part of the time and therefore increases the likelihood of boarding and alighting accidents. Where different units of fare are collected, as for example, 5 cents for a central area and 2 cents per zone in the suburban areas, the methods of registration have involved either the use of two registers, one on which 5-cent fares are registered and the other 2-cent fares; or the use of a 5-cent register for city fares and a duplex ticket for suburban fares. In practice, serious operating difficulties have developed from the use of two registers, dishonest conductors finding it possible to defraud the company by registering 5-cent fares on the 2-cent register or by failing to register all of the 2-cent zone fares collected. This is especially true where, in order to save annoyance to passengers, the entire suburban fare is collected at one time. If a passenger pays 24 cents entitling two companions and himself each to ride through four suburban zones the registration cf the fare would require twelve registrations on the 2-cent register. A dishonest conductor will not always register the full number of zone fares.



ELEVATION



PLAN

SIDE ELEVATION AND PLAN SHOWING PROPOSED METHOD OF COLLECTING ZONE FARES

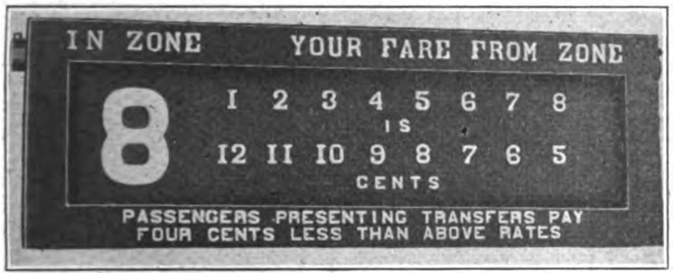
No company has succeeded in using the duplex ticket to register city fares where the travel is heavy and stops are frequent with a considerable number of persons boarding and alighting at certain points. The registration of fares through the use of duplex tickets is a slow process and has been confined to suburban and interurban lines on which the stops are comparatively infrequent.

The committee on fare zones early reached the conclusion that the successful application of a zone system in thickly built-up city areas was predicated upon the development of a speedier and safer method of fare collection than had heretofore been applied. The successful system of fare collection must be one in which the opportunity for the conductor to overcharge the passenger is reduced to a minimum and in which no loophole is left by which the passenger can defraud the company out of all or part of his fare. It must be a system under which the opportunity for the conductor to misappropriate the fare is also reduced to a minimum.

Careful study was given to the applicability of the European system of collecting fares. The report points out, however, that operating conditions in European cities are quite dissimilar to those which prevail on American urban electric railway properties, such as the Public Service Railway. The European car is small, compared with the cars required to handle the traffic in the large cities of this country. Every electric railway operator who has heretofore considered the zone system has obviously concluded that European collection methods were not applicable to the conditions existing in American cities and the committee on fare zones after deliberate consideration came to the same conclusion.

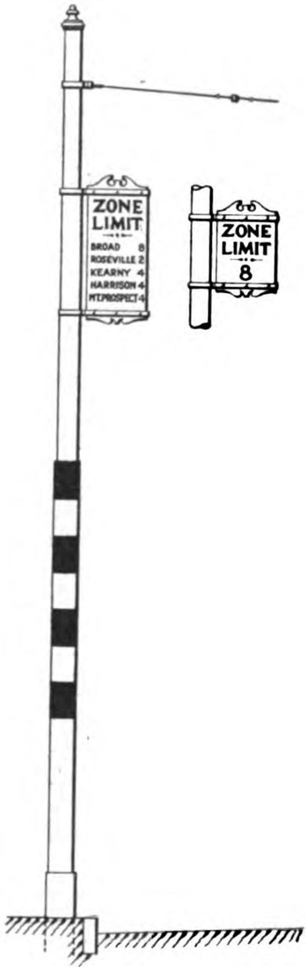
FARE COLLECTION THE KEY

It was early recognized that the success of the entire investigation depended upon the solution of the fare collection problem, and a very large amount of time and study has been devoted to this matter. Unfortunately, no method was at hand which it was felt would meet the requirements, and the problem before the committee on fare zones was therefore one of working out a method that would prove satisfactory under operating conditions prevailing on this property. The foundation of a successful system of fare collection obviously rested upon devising or adapting instrumentalities of collection and registration which would insure accuracy and honesty on the part of the conductor and protect him against the imputation of dishonesty. The underlying principle of successful registration of zone fares is involved in visible registration of the fare; showing not only that the fare had been collected but the amount paid as well. The plan sometimes heretofore followed of using two or more overhead registers, on one of which the nickel, for example, would be registered while pennies were registered on another, were discarded as cumbersome and impracticable, being wasteful of the time of both passenger and conductor and presenting too great possibilities of dishonesty. The conclusion was reached that the principle of the practicable register for zone fares was embodied in the modern cash register, whose distinguishing characteristic is the ability to register sums of varying amounts by pressing different keys, the amount registered being shown plainly by an indicator visible alike to the passenger paying the fare, the conductor or indeed anyone in the car. The universal application of the cash register to retail business is a matter of every-day comment. A large percentage of the stores selling merchandise of various kinds have found it advantageous to install cash registers because of the accounting advantages afforded by the machines and more especially because of the effect which such devices have exerted in checking dishonesty or forgetfulness to register sales on the part of clerks. There is no reason why the same safeguards cannot be applied with equal success on the street car as in the retail store. The ordinary individual instinctively looks at the cash register indicator to see the amount which the clerk has rung up. He becomes a volunteer inspector, as it were, for the proprietor, and he is not willing to pay a sum greater than the amount which the clerk has registered on the cash register.


IN ZONE
YOUR FARE FROM ZONE
8
1 2 3 4 5 6 7 8
IS
12 11 10 9 8 7 6 5
CENTS
PASSENGERS PRESENTING TRANSFERS PAY
FOUR CENTS LESS THAN ABOVE RATES

ONE OF THE FARE INDICATORS AT EACH END OF THE CAR

But the cash register in the form in which it has heretofore been manufactured was not suitable for the purpose of fare collections under a zone system. In the first place, the standard keyboard of the cash register and the mechanism which controls is so constructed as to ring up amounts in the following multiples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 90. Larger machines are built on the same principle; the essential difference being that it is possible to register dollars in addition to the amounts indicated above. It was considered inadvisable to introduce a machine in which any considerable number of fares would have to be registered by pressing two keys. Under the standard keyboard this would be necessary with any fare over ten cents excepting even amounts—20 cents, 30 cents, 40 cents, 50 cents, etc. On long lines such as exist upon the Public Service Railway and on which heavy traffic is carried, a considerable number of fares greater than 10 cents must be registered. In addition, certain protective features later described were considered essential, which were not found in any model of a cash register heretofore placed upon the market. As the manufacturers of these registers were busy with war work, the zone committee on its own account undertook the work of adapting a National cash register of current model to meet the requirements as they were conceived.

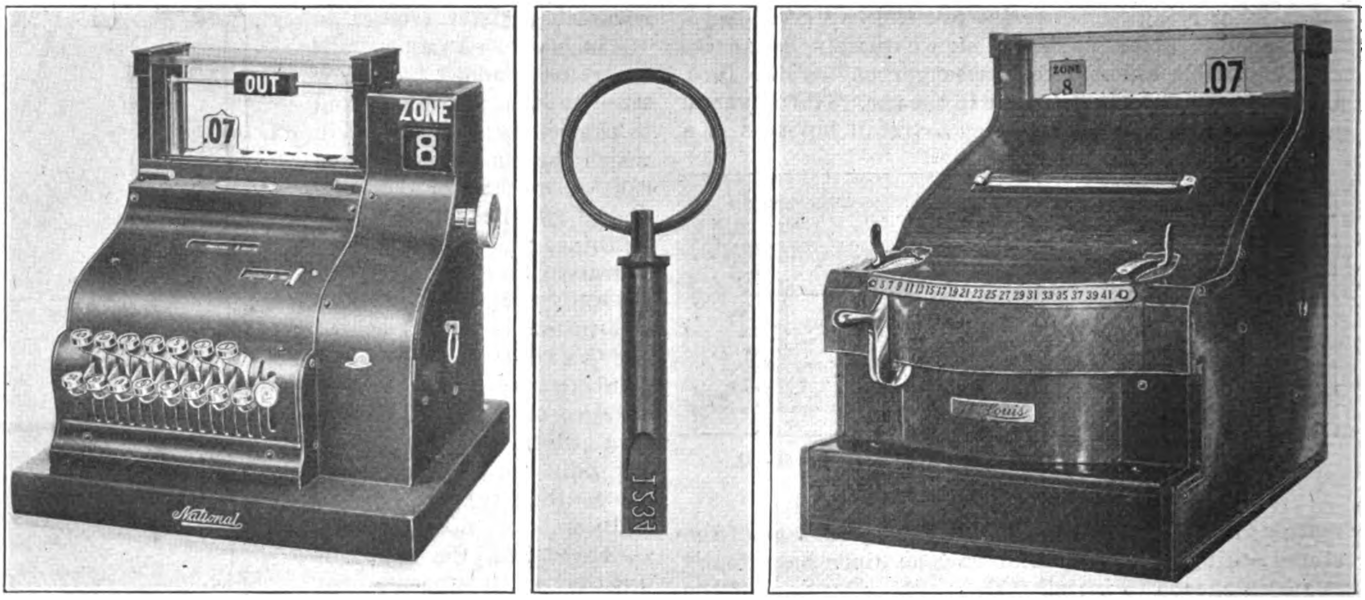


PROPOSED METHOD OF INDICATING ZONE LIMIT

DEVELOPING A REGISTER

The keyboard was changed so as to register from 1 to 16 inclusive. A zone indicator was added to show both to the passenger and to the conductor the zone in which the machine was then set. A mechanism was attached which locked the machine and prevented its operation except when a key bearing a serial number was inserted in the machine and held therein, and the printing mechanism was so changed as to record on the detail strip (or paper tape) not only the amount rung up on the register, but, in addition, for each amount so registered, the zone indication as it appeared at the time the registration was made, and the number on the key inserted in the register to unlock it. This key number would correspond with the number of the conductor then operating the register. Of course, the adding mechanism had to be materially changed so as to add correctly the new amounts represented by the changed keyboard. A key was also added by which employees' free tickets, transfers and other paper tickets might be registered. When a free ticket is registered a symbol is printed on the detail strip. Where a passenger presents a transfer and pays his zone-mile rate for the journey taken on the transfer, the detail strip shows both the symbol and the amount of money, indicating that the transaction represents a ride on a transfer. A change was also made concerning the totalizers on the register. Three totals are carried; one shows the total number of registrations made, whether cash or ticket; the second shows the number of tickets registered including not only free tickets but transfers; the third shows the total of the cash registration. From the opening and closing numbers of each totalizer the conductor is enabled to make up his day card, which furnishes the basis of his settlement with the receiver in the carhouse.

After the armistice was declared, the National Cash Register Company and the St. Louis Cash Register Company developed model registers for the purposes described. They are illustrated herewith, the St. Louis register being of the first model constructed. These registers can be operated only when the conductor's key has been inserted in the machine and while it remains there. The zone in which the car is operating is conspicuously shown.



TWO TYPES OF FARE REGISTERS DEVELOPED FOR USE WITH FARE SYSTEM PROPOSED, ALSO CONDUCTOR'S KEY FOR LOCKING AND UNLOCKING REGISTER

A MACHINE FOR ISSUING ZONE CHECKS

Another mechanical problem which presented itself for solution involved the perfection of a device for issuing identification checks or tickets, indicating the zone in which the passenger boarded the car. Under the conditions such as prevail in rush-hour traffic it was deemed essential that the issuing of such checks should be accomplished through a mechanical device rather than to require the conductor or motorman to hand them to passengers boarding the car. Attention was naturally directed to the ticket issuing device, now almost universally used in moving picture establishments, familiar to almost everyone in the United States. These machines, it will be remembered, are manipulated by a series of push buttons, each of which regulates the issue of a certain number of tickets. If the button bearing the figure 1, for example, is touched, the machine (which is motor-driven) almost instantaneously throws one ticket through an aperture in the brass plate with which it is covered. If the figure 2 is touched, two tickets emerge. The familiarity of the public with such a method of issue—that is to say, with the issue of tickets in the manner in which these machines present them—was considered to be a feature which should be incorporated in the ticket issuing device. The machines used by moving picture establishments, however, did not contain the other features which were essential. The distinguishing characteristic of these machines is the issue of varying numbers of tickets, all of which were alike. It is true, of course, that some of the machines issue tickets of various denominations, but such machines are merely a combination of the essential features of two or more of the simpler models. The ticket-issuing machine for a zone-mile system, it was decided, should be built so as to accomplish the following results:

1. Issue only one ticket at a time; the ticket being presented to the passenger somewhat after the fashion of the ticket-issuing device described.

2. That while the tickets themselves would be numbered serially and therefore a check would be had on the number issued, the device should register consecutively the number of tickets issued, so that it would be possible to check off the opening and closing number of tickets issued, just as is now customarily done by conductors in taking off the opening and closing number of the totalizer on fare registers.

3. That but one form of ticket should be used. A machine which would contain a roll of tickets for each zone through which the car passed would be unwieldy in size, difficult to operate and confusing to the passenger. If only one form of ticket, however, is to be used, it is obviously necessary to equip the machine with some sort of printing device so that the machine would print in a conspicuous manner, in a space provided on the ticket, the zone number in which the machine was set at the time the ticket was issued.

4. The machine should be equipped with some sort of telltale, or device which would indicate in a prominent manner to both the trainman and the passenger the zone in which it was then set, the number of the zone corresponding with the number printed by the machine on the ticket as it was issued to the passenger.

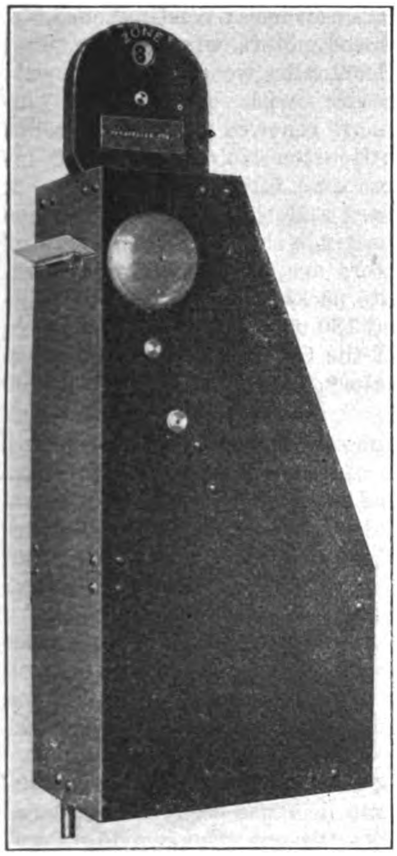
5. The ticket issuing device should be inexpensive, rugged in construction and as nearly "foolproof" as possible.

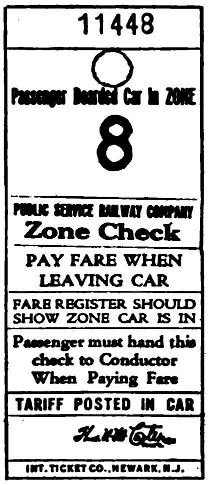
Such a machine has been perfected, and a view is shown, with a picture of the form of ticket issued.

DESCRIPTION OF SYSTEM OF FARE COLLECTION

The system which the company proposes to use in the collection of fares after the machines described are received is the pay-leave and it will be conducted as follows:

All passengers board the car at the front door and leave the car by the rear door. Thus a positive movement of passengers through the car will be established and an even distribution of passengers within the car assured. The ticket-issuing machine, already described, designed to give each passenger an identification slip or ticket, indicating the zone in which the passenger boarded the car, will be located on the front platform and will be operated by the motorman. The fare register will be situated on the rear platform and will be operated by the conductor. At least two fare indicators will be installed in each car; one on each platform, connected by a rod running through the car which will synchronize the two indicators. In other words, when one indicator is changed a corresponding change will be effected on the other. The general appearance of the car as thus equipped is shown in the sketch on page 600.




11448

Passenger Boarded Car in ZONE

8

PUBLIC SERVICE RAILWAY COMPANY
Zone Check

PAY FARE WHEN LEAVING CAR

FARE REGISTER SHOULD SHOW ZONE CAR IS IN

Passenger must hand this check to Conductor When Paying Fare

TARIFF POSTED IN CAR

INT. TICKET CO., NEWARK, N.J.

AT TOP, ZONE TICKET; AT LEFT, TICKET ISSUING MACHINE

The motorman will be charged with the duty of advancing the fare indicator as the car proceeds from zone to zone, and of advancing the ticket-issuing indicator so as to insure the issuing of identification checks bearing the proper zone number. These operations can be done without any trouble, ratchets being provided so that with a simple movement of levers both can be advanced. Pasengers boarding a car will be quick to call the motorman's attention to the fact that he has failed to advance the zone indicator on the ticket-issuing machine if the zone limit has been crossed, for a check or slip bearing the number of the preceding zone increases the passenger's fare. The ticket-issuing machine will be operated by a treadle, thereby reducing to a minimum the amount of work required of the motorman. As there will be no necessity for issuing checks or identification slips except when the car is stopped to allow passengers to board, the motorman's attention will not be diverted from the operation of his car. It is believed that the necessity of issuing identification slips to each passenger boarding the car will tend to reduce accidents arising from premature starting of cars.

In order that both the public and trainmen may know where the zone limits are situated and the number of each zone, the limits of each zone will be marked by appropriate signs attached to poles, the base of the pole being striped to make it stand out conspicuously. The system of marking the zone limits is illustrated in the cut appearing on page 601. The illustration shows two types of marking. The marker on the left of the illustration, attached to a full length pole, is the type which will be used to mark zone limits on trackage used by two or more car lines. The number of the zones on each line appears opposite the name of the line on the zone limit sign. The second type of marker, appearing on the right of the illustration, attached to but a portion of a pole, is the type which will be used to mark zone limits on stretches of track used by only one car line. The number appearing under the words "zone limit" indicates the number of the zone into which the car is about to pass. The company believes that it will require but a few days for patrons to familiarize themselves with the zone numbers in which their homes and places of business are situated. If a journey is taken over an unfamiliar line the zone-limit signs will serve to familiarize passengers with the zone numbers in which their points of origin and destination are located. It is the intention to post conspicuously in the cars on each route the limits and numbers of the several zones so as thoroughly to acquaint passengers with the new arrangement, and to promote public understanding of the system.

The zone identification tickets, an illustration of which appears on this page, are printed in sheets or strips, each ticket being serially numbered. The sheets of tickets are folded and inserted in the bottom of the ticket-issuing machine. Prior to the time that the ticket passes through the machine and is issued by it, the space at the top of the ticket on which appears the large numeral 8 is blank. When the motorman manipulates the machine by pushing the treadle the ticket is fed through a simple printing mechanism which prints in the blank space above referred to a large numeral corresponding to the zone in which the passenger boarded the car; cuts the ticket from the sheet; registers the operation on the totalizer which constitutes a part of the machine, and issues the ticket to the passenger.

When the passenger approaches his destination he goes to the rear of the car and presents his identification check to the conductor. Both the passenger and the conductor have before them a fare indicator, one of which it will be remembered, is located on each platform, the two being connected by a rod passing through the car. The purpose of the fare indicator is to enable both passenger and conductor to ascertain quickly the fare which the passenger should pay. The appearance of the fare indicator is shown in the illustration on page 601.

The large numeral 8 appearing at the left of the indicator shows the zone in which the car is operating. If the passenger about to pay his fare had boarded the car in zone 6 and was alighting in zone 8, he could quickly ascertain the fare by looking for the figure 6 in the first line of figures shown on the indicator and the amount below this figure.

This amount is paid to the conductor who registers it on the cash register. At the same time he collects the passenger's identification check. As all transactions are recorded, an audit is easy. The company will retain its prepayment areas at ferry terminals, with only a slight change in its method of collecting fares.

Conductors will be required to make up trip envelopes at the end of each half trip, inserting therein the passenger identification checks issued and collected during that trip, together with the employees' tickets and transfers which were collected. These envelopes will be sealed and placed in a container, so constructed that they cannot be removed by the conductor. Thus, any holding out of envelopes from one trip to another will be detected because the envelopes will not be found in the container in the order in which the trips were made.

Conductors will be required to note on the face of the trip envelope the direction of the trip, inbound or outbound, the scheduled leaving time, the number of tickets and transfers collected, the number of cash fares registered, and the run number, trip number and conductor's name and badge number. Any attempt on the part of the conductors to mix identification checks collected on different trips will be immediately detected because the serial numbers on identification checks issued on a particular trip will run in consecutive order. Missing numbers should represent the checks issued to passengers who lost them or purposely withheld them from the conductor. In such cases, conductors will be instructed to assume that the passenger has boarded at the end of the line. The total number of identification checks turned in by a conductor on the several trips made by him must agree with the difference between the closing and opening number on the totalizer of the ticket-issuing machine.

The company admits that some slowing down of schedules may occur until the public has become thoroughly familiar with the new system, and the results of the first few days will therefore not be a fair criterion of the possibilities of the new system. But it believes that after the public has become familiar with the system, the location of the zone points and the numbers assigned to the zones between which they customarily travel and the rate of fare applying thereto, and after the conductors have had several days' experience in the new method of fare collection, no slowing down of schedules will occur and that the public will be well satisfied with the new system of fare collection. The opportunity afforded passengers to select their exact fare from their supply of small change while riding to destination will also be a great convenience, especially in winter weather or on rainy days. It is believed that even a larger percentage of persons will have their exact fare ready than is now the case, since it is to the passenger's interest to pay his fare as quickly as possible in order that neither he nor those who follow him may be delayed in leaving the car. There is nothing inherent in the plan, it is thought, which complicates the problem of making change.

Percentage of Increase in Food Prices

According to reports received from retail dealers by the Bureau of Labor Statistics, the retail price of twenty-two of the most essential articles of food, combined, for the United States was 2 per cent higher on Dec. 15, 1918, than on Nov. 15, 1918. Comparing December, 1918, with December, 1917, the increase in the cost of these twenty-two food articles, combined, was 19 per cent. During the five-year period, December, 1913, to December, 1918, the cost of all articles combined shows an increase of 79 per cent.

Car Maintenance Data from Aberdeen

From 8000 to 15,000 Miles Wear Is Obtained from Motor Bearings, and Wheels Wear About ⅛ In. per 5000 Miles

THROUGH the courtesy of William Forbes, general manager, and A. R. Fyfe, works superintendent Aberdeen Corporation Tramways, some interesting comparative statistics are available on equipment life in that city.

Four types of motors are in use: Old-style 25-hp. Westinghouse motors, whose white metal bearings are good for 8000 miles on 32-in. wheels; Westinghouse No. 200 35-hp. special high-speed motors, whose white metal bearings are good for 15,000 miles wear before renewal; Brush No. 1010-G motors, with oil (syphon) lubrication whose bearings are renewed after 12,000 miles wear; British Thomson-Houston No. 200-K 35-hp. interpole motors which first went into service on April 3, 1916, and after two years and ten months of service the tin-lined armature bearings show very little sign of wear. These latest motors are now on eighteen cars. Their lubrication is waste packing and Galena oil. Figuring weekday mileage at 130 miles and Sunday mileage at 100 miles, the first of the GE-200-K equipments has now given most satisfactory service for about 125,000 miles.

Of the motors named above, the first three have gears of 5-in. face and a ratio of 14/68; the GE-200-K gears have a face of 4½ in. and a ratio of 14/67. All gears are lubricated with graphite. Recently the only gears obtainable have been of the split form, although solid gears are preferred. Gears are good for 250,000 miles; pinions for 100,000 miles.

At present all motor coils are bought complete from the motor manufacturers. An impregnating plant will be installed in the new works at an early date. Morganite brushes, used at 5 to 6-lb. tension per brush-holder, are standard for all motors.

Recently the wheelbase of the trucks has been lengthened from 6 ft. to 7 ft. to decrease oscillation. These trucks are fitted with the Glasgow Engineering Company's axles of 4-in. diameter, 4¼ in. at gear seat and 3½ in. at the journals. To minimize breakage, the keyway of these axles is no longer square but is undercut about ⅛ in. at the sides to get a rounding effect. These axles are used with steel-tired wheels which are of 32-in. diameter when new and 28½-in. diameter when discarded for retiring. About 35 per cent of the wheels make the full tire life of 75,000 miles without being turned, the remainder being turned once before scrapping. A turned tire averages 65,000 miles. Roughly, the wear of tires is at the rate of ⅛ in. per 5000 miles. The allowance in case of shrinking on tires is $\frac{1}{16}$ in. less 9/1000 in. Axles are pressed into the centers at an average of 32 (long) tons per square inch with an allowance of 6/1000 in. The wheels come from Brown, Bayley's Steel Works, Ltd.

Even in the existing cramped quarters of the car maintenance department several thoroughly modern features are noticeable, such as separate motor drive for most of the machine tools. At an early date the Aberdeen Corporation Tramways hope to secure possession of the building erected for the new works but now occupied for military purposes, and it will then be possible to carry on the upkeep of equipment under more favorable conditions.

Conservative Views of Electrification

At A. I. E. E. Meeting Held in Boston On March 14 Discussion Brought Out Limitations as Well as Virtues of Electrification of Steam Railroads

THE American Institute of Electrical Engineers held its 348th meeting at the Hotel Copley Plaza in Boston, Mass. The morning session was devoted to the subject of "Electrification of Steam Railroads," with an introduction by Calvert Townley and informal statements by several other leaders in this part of the electrical field. Abstracts of Mr. Townley's paper and of some of the contributions to the discussion follow:

Some Possibilities of Steam Railroad Electrification as Affecting Future Policies

BY CALVERT TOWNLEY
Assistant to the President, Westinghouse Electric & Manufacturing Company, New York City

ELECTRICITY now performs every railroad service previously rendered exclusively by steam locomotives, and in every case does it better than it was done before. But in order to use electricity a large investment in equipment and installation must be made and electrification has proceeded slowly because railroad executives were not convinced that the advantages to be gained are always worth the cost.

The progress of electrification has also been impeded, first, before the war by the difficulty in financing due to conditions other then the merits of electrification, and second, since the war began because every one has been too busy to consider any work that could be deferred and because the government's taking over the railroads has created an unsettled situation not conducive to the investment of new capital for future returns. Now, however, there seems to be ground for hoping that these bars to progress will be removed in the not distant future so that electrification can be again studied on its merits. Therefore our consideration of the subject is timely.

The electrification of a railroad is not simply the substitution of one kind of locomotive for another; it is the adoption of a fundamentally different method of train propulsion. It is conservative to say that, within the bounds of ordinary practice, electricity can furnish every train with all the pulling power that can be used. The limitations of the steam locomotive in this respect disappear and ruling grades rule no longer. A strictly limited motive power is replaced by one that is practically unlimited.

ELECTRIFICATION SYSTEMS ARE ESSENTIALLY ALIKE

There are a number of so-called "systems" of electric traction, and heavy emphasis has been laid by the advocates of each upon its points of difference from every other. So much has been said about these differences and so little about the points of similarity as to create an entirely misleading impression. It is a fact that there are more kinds and types of steam locomotives in use many times over than there are electric systems. It is a fact that except for the storage-battery locomotive, which has but a limited field of application, all electric systems have many more common features than differences. It is a fact that they agree on fundamentals and differ in detail only. Their costs may not be the same, their efficiencies may vary but they all do their work and do it successfully and well. The possibility of unlimited electric power is a characteristic not of any one system but of all. It is due to basic differences between steam and electric equipment. A steam locomotive is a complete independent unit which not only generates but also utilizes its power. The electric locomotive generates no power at all. It is only a translating device receiving energy from an outside and a remote source. The electric power house, always having much greater capacity than any one locomotive, can supply ample power for the heaviest train on the steepest grade. The steam locomotive which carries its own power house with it is limited to the capacity of its one boiler. By the multiple-unit principle, as many electric locomotives as may be needed can be coupled together and operated in synchronism by one crew from any cab. Any required tractive effort can thus be exerted without slipping the wheels, without imposing undue strains on the rails or bridges and without increasing the number of engine crews.

ELECTRIFICATION ACCOMPLISHES SEVERAL SPECIFIC THINGS

The business of a railroad is to transport freight and passengers. I put freight first because on the average it produces 73 per cent of the revenue. Unlimited motive power permits longer trains and higher schedule speeds. It cuts the operating cost by hauling more cars with the same or a smaller crew. These new opportunities at one fell swoop banish many of the railroad's time-honored traditions. The traffic possibilities must be studied from a new angle and advantage taken of every facility. It is a new thought to realize that train length is limited not by motive power but by the yard tracks and length of sidings, or that all the trailing tonnage that the drawbars will stand can be hauled. Nor are these new limits fundamental. Sidings can be extended, drawbars can be made stronger, if it pays to do it. In a word electrification opens up tremendous possibilities of increasing the freight capacity of a road and without it being necessary to build additional tracks.

While not as important as freight, passenger traffic likewise comes in for its share in the widened horizon and the vanishing tradition. Unlimited power, of course, is available but the absence of combustion is another basic advantage. Smoke and cinders disappear. Tunnel operation loses its terrors. Unobscured signals permit normal speeds with undiminished safety. Aerial rights over city terminals are now valuable. Multi-unit operation has in fact made suburban traffic. The rapid acceleration made possible by electric traction has directed attention to the equal value of rapid retardation and has quickened the study of braking accordingly; also of modified coach design to bring about the more efficient loading and discharge of passengers. These combined possibilities secure increased schedule speeds and attract patronage. In passenger as in freight traffic the ability to do something that could not be done before, rather than to do the same thing at a lower cost, is the most valuable attribute of electrification, and again we find a greatly augmented capacity without the need of additional tracks.

SHOULD ALL RAILROADS BE ELECTRIFIED?

It is not my purpose to make an exhaustive comparison of the relative advantages of steam and electric operation. That has been done often and well by others. What I have said about the expanding opportunities for electrified service is by way of illustration to emphasize my plea that the question should always be viewed in its broader aspect and not hampered and restricted within any narrower limitations than properly belong to it.

I am going to assume, then, the broadest possible treatment and to suppose that every electrification project is to have its pros and cons most fully examined. The real and vital question then is, "How far will this lead us?" "To what extent may we expect complete electrification of all our roads?" Parts of a number of them have already been equipped. Many of these are numbered among our prominent roads, successful corporations which have had the advice of the most highly skilled executives and engineers, and which are progressive. Now, every one of these projects has been successful. Every one has justified itself. Nearly every one in its present scope represents an extension of the zone initially electrified, the most convincing evidence possible as to what views the operating companies hold regarding these several projects. Railroad officials are generally glad to give others the benefit of their experience, so it is reasonably safe to say that operating statistics are available covering long enough periods so that the results to be expected from any proposed undertakings may be predicated on established facts and not upon theories. In the light of present-day knowledge, therefore, what answer can we make to the question "Should all railroads be electrified?"

Taken together in 1910 there were in the United States 240,000 miles of railroad main line regardless of the number of tracks. Of this mileage approximately 1250 or one-half of one per cent has been electrified or is today in process. The remaining 99½ per cent comprises, of course, roads performing every variety of service. They range from the back country branch line built by some over enthusiastic promoter and now, perhaps, operated as part of a large system only because operation cannot be avoided and regularly contributing its annual deficit, up to the most important through arteries of travel upon which the commerce and industry of the nation depend. Every sort of community is served; every kind of railroading has its place in this vast aggregation of effort and the variables in the problem are so multitudinous and their nature often so profound as well to daunt the courage of one who seeks to formulate them for incorporation in a general statement. Fortunately or unfortunately, depending on the point of view, it has been my lot to have to deal with this electrification problem from both sides.

I am a thorough believer in the virtues of electrification and an enthusiast about the wonders which it can accomplish, but I also have a keen appreciation of the almost infinite variations in the railroad problem and a very wholesome respect for the dollar. I do not believe that all railroads will ever be electrified. I am not sanguine even that all the tracks of any one really big system will be so equipped in our time. It is a question of economics. Electrification will increase the track capacity. But there are thousands of miles of railroad that have sufficient capacity now, frequently several times over, and where the wildest stretch of imagination fails to picture a future need of this kind. Electrification works wonders in suburban and interurban passenger service. I have ridden for hours across the western prairies without seeing a single town, much less a city where these advantages would count. Electrification effects marked economies in fuel, in maintenance, in labor and otherwise through a long list; but electrification calls for a heavy investment and unless these economies bulk large enough, the interest on such investment will wipe them out and turn the enterprise into a losing venture. I do not believe the cause of electrification is helped by undue optimism on the part of its advocates. Rather should there be an enlightened partisanship, enthusiastic where enthusiasm is justified but tinged with the sober conservatism of the man who has to put his own dollars to work.

There need be no discouragement to the electrical engineer in the views just given, nor to the railroad man who has looked toward the new motive power for salvation. There are so many cases where electricity should be used, where its advantages are clear and conclusive, that once the railroads escape from the financial slough of despond in which they are now wallowing and are again able to get capital for their needs there will not be enough engineers, there will not be enough electric factories in the country to serve them. Every big system has need of electricity somewhere. For some small roads it may mean the difference between solvency and bankruptcy. There can be no rule established. Generalities are sure to be misleading but electrification is now firmly intrenched and successful. It is recognized by railroads generally as an effective agency with great possibilities and one which is particularly valuable for certain specific purposes. Time alone will tell how broad its application is to be but I am confident we can await developments with tranquility assured that the art is in a healthy condition and the progress will be along the right lines.

Discussion of Mr. Townley's Paper

Frank H. Shepard, Westinghouse Electric & Manufacturing Company, said that every "hard-shelled" railroad man will concede that electrification means better service and a better railroad. The broadest vision is necessary in expanding our railroad facilities. New terminals, second tracks, revision of lines, etc., are not always immediately remunerative, hence the long look ahead is necessary. Admittedly the cost of electrification is of the order of the expense required to duplicate the present way and tracks, say $15,000,000,000 for all the roads of the country. The railroad traffic of the country doubles about every twelve years. Electrification will enable double the traffic of a railroad to be handled with virtually the same plant in roadway and tracks. Studies have been made for the application of as high as 18,000 hp. Tests of a single locomotive utilizing 8000 hp. and of a train consuming 15,000 kw. have already been made.

More efficient use of labor results from electrification, said Mr. Shepard. All steam railroad practice has been built up around the steam locomotive and its limitations. Engine stages of 100 miles or thereabouts are an outcome of these limitations. An electric locomotive engine stage of 500 miles is conceivable. The economies of electrification are greater than are ordinarily pictured.

THE POWER TRUNK LINE AND ELECTRIFICATION

W. S. Murray, consulting engineer New York City, pointed out that in future a composite railroad-electrical man will be needed to meet electrification requirements properly. The attempt to electrify all the railroads of the country should not be made. It is very significant, however, that electrical operation has succeeded in every branch of railroad service—terminal, freight, passenger and switching.

Referring to the plan of trunk-line power supply lately fostered by Secretary Franklin K. Lane, Mr. Murray pointed out that in 1914 he had become interested as an engineer in the possibilities of centralized motive power supply for the six principal railroads operating into the New York City district on the western side of the Hudson River. Here appeared an excellent opportunity to form a power equipment company to work out a standard equipment for service in this district. This plan gradually evolved into a regional one.

Mr. Murray said that he had given much thought to Secretary Lane's proposed super-power generation, transmission and distribution plan for application in the regional districts between Boston and Washington and was in accord with it. By such an arrangement is offered the opportunity for propelling all trains in the region by electricity, and at the same time supplying all industrial concerns with like power. He said further that at first blush the super-power plan would appear to be a "large order." This is so, but the world is full of big problems and of as big men to solve them. The importance of reducing the fuel consumption per kilowatt-hour can hardly be exaggerated. The amount of wasted coal in this country, especially in the Eastern district, is almost criminal.

Carl Schwartz, electrical engineer New York Central Lines, in a written communication pointed out that the cost of electrification involves many other items in the way of track, terminal and signal system changes which make its economic success more difficult under present conditions. The general standardization of motive power along broad lines is highly desirable, he stated. This can now be done without the exclusion of special systems which have proved their merit.

FUEL CONSERVATION DEMANDS EXTENSIVE ELECTRIFICATION

W. B. Potter, chief engineer of electric traction General Electric Company, contributed a written discussion pointing out that electrification necessitates no radical changes in the handling of transportation, but minor changes are usually essential in order to secure the full benefits made possible by the increased power, speed and continuity of service in the individual unit as compared with steam. The objection is sometimes cited that electrification does not provide equal facilities with steam for handling an emergency congestion of traffic. This is not always true, but granting it in some instances, it is an emergency only and should be regarded as such. This condition is more than offset by features of electric railway operation which go far toward removing the possibility of congestion. Thus, the electric locomotive is at its best during the coldest weather, when the steam locomotive is most limited in its capacity.

The investment for electrification is, Mr. Potter said, undoubtedly the most influential factor affecting its advance. With the engineer rests the responsibility for revising and utilizing such equipment as will insure the best economical return to successful service. Electrification operated from hydraulic power offers the only known method of conserving our limited supply of coal and oil. Even when hydraulic power is not available, a saving of more than two-thirds of the fuel and much of the fuel haulage can be obviated by the erection of steam power plants suitably located and furnishing electrical energy from the coal burned in modern practice. An illustration of the coal consumption and the traffic lost incidentally by burning fuel on a small scale in individual units is given by the fact that nearly one-fourth of the coal mined in the United States is used on steam locomotive tenders; that 5 per cent of the ton-mileage moving over our railroads is occupied with hauling this coal again for railway purposes, and that 7 per cent of the ton-mileage is occupied with hauling this coal again in the tenders back of the steam locomotives.

The coal and equivalent oil used on the steam locomotives of the United States in 1914 totaled 140,000,000 tons of coal. The ton-miles moved in the same period, excluding the tonnage of locomotive tenders and 75 per cent of the railway coal was 930,000,000,000 ton-miles. If the same tonnage had been moved electrically, basing figures on an energy consumption of 40 watt-hours per ton-mile, the annual energy consumption would have been 37,200,000,000 kw.-hr. If this energy had been obtained from steam power houses at 2.2 lb. of coal per kilowatt-hour, instead of the 140,000,000 tons actually used there would have been required 40,000,000 tons of coal. This shows a net saving of 100,000,000 tons in one year. A still greater saving would have been accomplished in proportion to the amount of hydroelectric power available.

LESS THAN 5,000,000 KW. WOULD MEET PRESENT REQUIREMENTS

There are frequent misconceptions as to the amount of power involved in railway electrification. The figures just given form a basis for illustrating this rather emphatic point. If the tonnage moved in the United States on steam railroads could have been handled by the expenditure of 37,200,000,000 kw.-hr., this would be equivalent to an average load of 4,250,000 kw. This is not an exorbitant amount compared with the power plants already installed. In 1917 the power station capacity in the United States, including central stations, electric railways and isolated plants was about 20,000,000 kw. Thus there is installed electric power station capacity equivalent to four or five times the power which would be required for operating all the railroads in the United States electrically.

Mr. Potter stated that while he agreed with Mr. Townley that it is very improbable that all the railroads in the United States will ever be electrified, it is at the same time interesting to note what the power demand of these roads would be and the saving of coal that would result from their electrification. The further development of central district stations with either fuel or water as their source of power will afford the most direct means of conserving coal. The existence of such large central stations located at strategic points throughout the country, even if primarily installed for railway use, would of itself further and develop the use of electricity for various industrial purposes, and by so doing would affect the coal consumption more widely than the item of railway coal alone.

FINANCIAL FEASIBILITY IS NOW THE CRITERION

George Gibbs, chief engineer Pennsylvania electrification, New York City, also presented a written discussion. He maintained that it is most important to combine the advantages of electric operation with improved railroad practice, and that something beside the purely electrical specialist is needed to solve such problems. In the early days of electrification the chief concern of railroad men was whether electrical apparatus was capable of performing heavy railroad service and electrical engineers were busy weeding out defects and limitations. During this period that much-heated controversy arose among engineers as to the best electrical system for general adaptation. The settlement of this particular question at that time was, to say the least, premature; as has since been demonstrated by the parallel development of systems having great flexibility. Even now, when it has been conclusively proved that electric traction by more than one system is technically feasible, evolution is still in process and the standardization of systems and apparatus, except as regards certain general features, should be relegated to the background in discussing the results following railway electrification.

The question, Mr. Gibbs said, had really now changed from technical to financial feasibility. There are few railroads which in these times face the very heavy expenditures required for electrification except to secure immediate large operating economies either directly or by an increase in the capacity of the road, or in the stimulation of new business, any one of which or all taken together produces sufficient added net increase to at least pay the fixed charges on the new investment. The attention of our government was directed during the war toward the electrification of railways as a possible way of increasing capacity for emergency service; also as a means of fuel conservation. The railroad administration was somewhat at a loss to determine just what it should do in the matter on account of the conflicting views expressed in and out of railroad circles by technical and non-technical advisors. Some way must now be found of attacking the railroad electrification problem with a combined technical and transportation knowledge.

Any general electrification of railway systems in this country is an absurdity economically, by any present electrical system. But on the other hand, there are a number of instances where electric traction is indicated as necessary or advantageous. In some cases the direct savings will be sufficiently attractive to warrant the expenditure, but more often the deciding factor should be the indirect savings produced. The determination of these indirect savings generally involves important alterations in operating methods, facilities, etc., and it is therefore essential that engineers who are called upon to report upon electrification projects should be familiar with transportation methods as well as with the electro-technical side of the problem.

John Murphy, electrical engineer, department of railways, Ottawa, Can., pointed out that only 3 or 4 per cent of the heat energy of the fuel is utilized at the driving wheels of the steam locomotive. He spoke appreciatively of the co-operation of the United States Fuel Administration in supplying coal to Canada during the war period, thereby averting much suffering.

ELECTRIC LOCOMOTIVE CANNOT BE OPERATED ON STEAM BASIS

N. W. Storer, Westinghouse Electric & Manufacturing Company, said that the ultimate results of electrical operation are too broad for present vision; that years of evolution will follow the initial development. "We must thank the steam railroad man for his conservatism," said Mr. Storer. "It is a mistake, however, to operate the electric locomotive on the same basis as the steam outfit. The whole plan of operation must be changed to fit the service possibilities of the electric locomotive." The speaker touched upon the value of proper distribution of traffic throughout the twenty-four hours, and pointed out that where shipments are heavily bunched, as in sending out fruit trains in California, with intervals perhaps of days between successive dispatches, electrification *per se* would not be economically attractive. Again, the cost of providing extra equipment to enable wrecks to be cleared up more quickly than normally is not warranted. The opportunities of the future are very great, and all that need be considered at present are cases where the need for electrical operation is a crying one, as in the case of tunnels, large terminals, etc. Building over city tracks where electrical operation is carried on, is a most desirable procedure. The speaker characterized Mr. Murray's vision of a super-power system as most inspiring and easily within the range of possibilities. He contended that we owe it to future generations to conserve natural resources. The United States spent in four or five days of war enough money to electrify all the terminals in Chicago. "Why then," said he, "should we hesitate to spend money for such a constructive improvement as electrification?"

Major George F. Sever, New York, spoke briefly of the importance of fuel conservation on the Pacific Coast, where coal is an almost unknown quantity. Oil and water are there the chief sources of electrical energy. The railroads are now using about 40,000,000 bbl. of oil yearly and the public utilities of California 1,000,000 bbl. The United States shipping now needs 30,000,000 bbl. yearly, and other users in California consume 40,000,000 bbl. per annum. California produces 110,000,000 bbl. of oil yearly, compared with 350,000,000 bbl. in the entire country. Hydroelectric power development is therefore absolutely necessary in California for both railroad and public utility operation. In 1914 oil cost 40 to 50 cents per barrel; it is now $1.50 at the California wells, and at some other points on the Coast is $1.85. More than $3,500,000 easily can be saved in California yearly by interconnection and hydroelectric supply; the mountain passes are well suited to electrical operation of trains, and the increasing scarcity of oil deserves close consideration. In closing, Major Sever commended the fuel saving work done in New England during the past year, and pointed out that there is at present little if any surplus of water power available for exportation from this section of the country.

Prof. Charles F. Scott, Yale University, then suggested a resolution indorsing Secretary Lane's "super-power" project, and it was unanimously voted that the board of directors prepare and transmit it.

American Association News

The Engineering Association Assigns Subjects to Its Various Committees and Announces New Committee Appointments—The T. & T. Association Also Announces Personnel of Committees—Report from the Bureau of Statistics and Information—Company Section Activity.

Engineering Association Committee Assignments

AS EXPLAINED in the issue of this paper for Jan. 25, page 196, a committee on subjects was authorized by the executive committee of the Engineering Association on Jan. 10 to lay out committee work for the balance of the current association year. The instructions to the committee were that attention should be confined to a few essential topics. Accordingly the following subjects have been assigned:

To the Committee on Buildings and Structures: (1) Further study of the subject of fences, with particular reference to concrete posts and methods of casting them. (2) Design of carhouse inspection pits.

To the Committee on Electrolysis: Co-operation with the association's representative on the American Committee on Electrolysis, continuing a study of the general subject.

To the Committee on Equipment: (1) Co-operation with the National Fire Protection Association in formulating a new code, or a revision of the 600-Volt Code for 1200-volt car wiring. (2) Development of check gages and templates for wheels and truck parts. There are no such standards in existence. The following items are suggested as an outline of the work only, and the committee is asked to go only as far as deemed advisable at present: (a) Gaging points and terms for wheel and track. (b) Wheel mounting and check gage. (c) Brake-beam gage, covering spacing of brakehead. (d) Wheel-flange and tread-contour gage for new wheels. (e) Standard wheel tape. (f) Plane gage for solid steel wheels. (g) Rotundity gage for solid steel wheels. (h) Journal and wedge gages. (3) Standardization of motor parts. It is very desirable that all small parts which go to make up railway motors in the various sizes should be standardized so that they will be interchangeable. This should be possible now in view of the lessons learned during the war and because of similar action already taken by various manufacturers of automobiles and trucks.

To the Committee on Heavy Electric Traction: (1) Revision of diagram of location and clearance of overhead conductors, with the suggestion that the height of the hand-brake staff be indicated and that the height of car running board be dimensioned on the diagram in Cases Nos. 4 and 5. (Engineering Manual Ds-62.). The subject before final action is to have the approval of the committee on power distribution. (2) Revision of dimensions on standard diagram of location and clearance of overhead conductors, to include provisions for pantagraph clearance. (3) Advise committee on power distribution of approval or rejection of specification for catenary overhead trolley construction, to cover high-voltage as well as 600-volt direct-current service.

To the Committee of Power Distribution: (1) Revision of joint specifications for overhead and underground wire and cable crossings with railroad company's right-of-way. The special committee which was appointed to consider this subject is made a sub-committee of the power distribution committee without change in the personnel of the committee. At present the representation on the joint committee consists of the American Railway Association, the American Railway Engineering Association and the American Electric Railway Engineering Association. It is the expectation that other associations will be invited to participate in this work. This activity results from the fact that the present association standards made in 1913 are somewhat obsolete due to the completion of the National Electric Safety Code. (2) Revision of specifications on wires and cables with special reference to stranding of cables and thickness of 600-volt insulation. The special committee on this subject is made a sub-committee of the power distribution committee without change in the personnel of the committee. This subject is taken up at the request of the American Institute of Electrical Engineers and the War Department, in view of the desirability of using standard-size wires in the make-up of large stranded cables. (3) Standard thread for pins and insulators. This special committee is made a sub-committee of the power distribution committee. The work of this committee has been in progress for some time and it is the desire to secure a final report on this subject as early as possible in order that suitable standards may be adopted.

To the Committee on Power Generation: (1) Report on the development of automatic substations. (2) Recommendation of standard form of power contract, for the purchase of railway power. (3) Further consideration of operating performances of railway power stations.

To the Committee on Way Matters: (1) Specifications for special work, with particular reference to steam railroad crossings. (2) Development of a spiral for use in the design of switches, mates and frogs. (3) Report on the development of hand and power tools for track construction. (4) Report on the use of a curved head for girder rails with special reference to wheel and track wear. This is to be considered jointly with the committee on equipment.

Engineering Association Committee Appointments

THE executive committee of the Engineering Association has announced the following list of committee appointments, subject to some revision. In a few cases it is probable that the committees will be expanded somewhat in order that certain subjects may be more completely considered:

Committee on Buildings and Structures: C. S. Kimball, engineer of way and structures Washington Railway & Electric Company, Washington, D. C., chairman. R. C. Bird, Central Traction & Lighting Bureau, New York, N. Y.; G. C. Estill, engineer Cumberland County Power & Light Company, Portland, Me.; H. E. Funk, superintendent of buildings Brooklyn Rapid Transit Company, Brooklyn, N. Y.; James Link, chief engineer Knoxville Railway & Light Company, Knoxville, Tenn.;

F. F. Lowe, architect Boston Elevated Railway, Boston, Mass.; H. G. Throop, engineer of way and structures New York State Railways, Syracuse, N. Y.; H. R. Whitney, special assistant to president Springfield Street Railway, Springfield, Mass.

Committee on Issuance and Distribution of Engineering Manual: Martin Schreiber, chief engineer Public Service Railway, Newark, N. J., chairman; L. P. Crecelius, superintendent of power Cleveland Railway, Cleveland, Ohio.

Committee on Equipment: Daniel Durie, general superintendent West Penn Railways, Connellsville, Pa., chairman; W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, Broklyn, N. Y., vice-chairman; W. S. Adams, designing engineer J. G. Brill Company, Philadelphia, Pa.; J. M. Bosenbury, superintendent of motive power Illinois Traction System, Peoria, Ill.; R. H. Dalgleish, electrical engineer Capital Traction Company, Washington, D. C.; H. A. Johnson, superintendent of equipment and shops Metropolitan West Side Elevated Railway, Chicago, Ill.; G. W. Lyndon, president Association of Manufacturers of Chilled Car Wheels, Chicago, Ill.; E. D. Priest, railway engineering department General Electric Company, Schenectady, N. Y.; K. A. Simmon, general engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; N. B. Trist, special representative Carnegie Steel Company, Pittsburgh, Pa.

Committee on Electrolysis: Prof. A. S. Richey, Worcester Polytechnic Institute, Worcester, Mass., chairman; E. B. Katté, chief engineer of electric traction New York Central Railroad, New York, N. Y.; E. J. Blair, electrical engineer Metropolitan West Side Elevated Railway, Chicago, Ill.

Committee on Heavy Electric Traction: C. H. Quinn, chief electrical engineer Norfolk & Western Railway, Roanoke, Va., chairman; A. H. Armstrong, chairman of electrification committee General Electric Company, Schenectady, N. Y.; E. B. Katté, chief engineer of electric traction New York Central Railroad, New York, N. Y.; W. S. Murray, consulting engineer The Connecticut Light & Power Company, Waterbury, Conn.; F. H. Shepard, director of heavy traction Westinghouse Electric & Manufacturing Company, New York, N. Y.; L. S. Wells, superintendent of electricity Huntington Railroad, New York, N. Y.

Committee on Power Distribution: C. L. Cadle, chief engineer New York State Railways, Rochester, N. Y., chairman; C. C. Beck, assistant chief engineer The Ohio Brass Company, Mansfield, Ohio; E. J. Blair, electrical engineer Metropolitan West Side Elevated Railway, Chicago, Ill.; James H. Drew, president Drew Electric & Manufacturing Company, Indianapolis, Ind.; C. R. Harte, construction engineer The Connecticut Company, New Haven, Conn.; J. H. Libbey, electrical engineer Bay State Street Railway, Boston, Mass.; P. M. Lincoln, general engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; A. Schlesinger, superintendent of distribution and substations Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; Francis J. White, The Okonite Company, New York, N. Y.

Committee on Power Generation: A. B. Stitzer, chief engineer Republic Engineers, Inc., New York, N. Y., chairman; C. W. DeForrest, manager electrical department Union Gas & Electric Company, Cincinnati, Ohio; R. W. Eaton, public service engineer, Providence, R. I.; E. F. Gould, consulting engineer Aurora, Elgin & Chicago Railroad, Cleveland, Ohio; C. R. Greenidge, chief engineer J. G. White Management Corporation, New York, N. Y.; G. H. Kelsay, superintendent of power and equipment Cleveland, Southwestern & Columbus Railway, Elyria, Ohio; E. H. Scofield, engineer of power and equipment Minneapolis Street Railway, Minneapolis, Minn.; W. C. Slade, superintendent of power and lines The Rhode Island Company, Providence, R. I.; Howell Van Blarcom, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; E. P. Waller, assistant manager railway department General Electric Company, Schenectady, N. Y.

Joint Committee to Consider Safety Code of United States Bureau of Standards: C. L. Cadle, chief engineer New York State Railways, Rochester, N. Y., chairman; Hugh Hazelton, electrical engineer with L. B. Stillwell & H. S. Putnam, consulting engineers, New York, N. Y.; C. S. Kimball, engineer of maintenance of way Washington Railway & Electric Company, Washington, D. C.

Joint Committee on Standardization of Method for Determining the Cost of Power: L. P. Crecelius, superintendent of power Cleveland Railway, Cleveland, Ohio, chairman; E. H. Scofield, engineer of power and equipment, Minneapolis Street Railway, Minneapolis, Minn.

Committee on Way Matters: C. H. Clark, engineer of maintenance of way Cleveland Railway, Cleveland, Ohio, chairman; A. E. Harvey, superintendent of way and structures Kansas City Railways, Kansas City, Mo.; vice-chairman; William R. Dunham, Jr., engineer of maintenance of way The Connecticut Company, New Haven, Conn.; H. Fort Flowers, president Differential Car Company, New York, N. Y.; W. P. Graves, chief engineer Montreal Tramways, Montreal, Quebec; C. G. Keen, engineer way and structures American Railways, Philadelphia, Pa.; H. H. Ross, chief engineer Toledo Railways & Light Company, Toledo, Ohio; E. M. T. Ryder, engineer of way Third Avenue Railway, New York, N. Y.; N. B. Trist, special representative Carnegie Steel Company, Pittsburgh, Pa.

The personnel of the committee on engineering standards is not yet complete. It is planned to augment the present committee to secure further co-operation with the engineers of manufacturing companies.

T. & T. Committees for 1919

THE minutes of a meeting of the executive committee of the Transportation & Traffic Association, outlining plans for the balance of the year, were given in the issue of this paper for Feb. 1, page 244. The personnel of the committees which will carry out these plans is as follows:

Committee on Code of Traffic Principles: H. B. Flowers, assistant general manager United Railways & Electric Co., Baltimore, Md., chairman; E. J. Burdick, assistant general manager Detroit United Railway, Detroit, Mich.; A. Gaboury, superintendent Montreal Tramways, Montreal, Canada; Paul E. Wilson, assistant to president Cleveland Railway, Cleveland, Ohio; J. H. Stephens, superintendent Washington Railway & Electric Company, Washington, D. C.

Committee on Proper Basis of Compensation to City Companies by Interurban Companies, etc.: R. T. Sullivan, general manager Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, chairman; H. W. Clapp, vice-president East St. Louis & Suburban Railway, Columbus, Ohio; J. F. Collins, general manager Michigan Railway, Jackson, Mich.; A. Swartz, vice-president Toledo & Western Railroad, Toledo, Ohio.

Committee on One-Man Car Operation: C. W. Kellogg, Stone & Webster, Boston, Mass., chairman; S. W. Greenland, general manager Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.; J. K. Punderford, vice-president The Connecticut Company, New Haven, Conn. Representing Engineering Association on this committee: J. M. Bosenbury, superintendent of motive power Illinois Traction System, Peoria, Ill.; Clarence Renshaw, railway engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; J. C. Thirlwall, railway engineer General Electric Company, Schenectady, N. Y.

Committee on Collection and Registration of Fares: R. R. Anderson, superintendent of transportation, The Rhode Island Company, Providence, R. I., chairman; T. C. Cherry, vice-president Auburn & Syracuse Electric Railroad, Syracuse, N. Y.; Louis D. Pellissier, president Holyoke Street Railway, Holyoke, Mass.; E. C. Spring, superintendent of transportation Lehigh Valley Transit Company, Allentown, Pa.; C. W. Stocks, general passenger agent, Bay State Street Railway, Boston, Mass.

Bureau of Statistics and Information Needs Co-operation

THE American Association Bureau of Statistics and Information has prepared a report on its recent activities, from which the following abstracts have been made:

Bulletin on Wages and Working Conditions of Trainmen (No. 121). The first edition of this bulletin was issued on March 1, 1919, including replies received to date from 212 companies on Data Sheet No. 185. It contains the most recent information available on the wages of trainmen, including such decisions of the National War Labor Board as apply to above companies. It further contains a very complete summary of working conditions and the general labor situation. It includes the following tables: Wages of motormen and conductors operating two-man cars in passenger service. Wages of operators of "one-man" cars. Wages of motormen, conductors and guards on urban rapid-transit lines. Wages of motormen and conductors operating express and freight cars. Working conditions of trainmen.

The last-named table includes a description of the length, kind (whether straight or swing) and maximum spread of runs; compensation or time allowed trainmen for special work such as over-time, Sundays and holidays, snow plows and sweepers, work cars, reporting for duty, making out accident reports, time taken for meals, etc.; limitations in the making of time-tables, regarding number of parts of runs, method of working meal reliefs, maximum time on cars without relief, payment for intervening time in schedules, length of meal relief, working of maximum number of men in rush hours; ratio of cars operated in rush hours, midday and after supper periods.

Another table relates to the labor situation. It includes data on employment of women, labor turnover, strikes and average annual earnings of trainmen.

The bureau urges all companies that have not as yet sent in data sheets do so at once in order that the second edition of this wage bulletin, which will be issued as soon after April 1 as possible, may include all the companies that have not yet reported.

Income Accounts and Operating Expenses. (Data Sheet No. 186). The principal financial statistics of the electric railway industry are contained in the compilation which is now being made. A report was made at the mid-year meeting, based on replies from 136 companies. These are the same data as requested by the Association War Board and published in Bulletin No. 36. These covered 388 companies and proved effective in the presentation of the electric railway case before the national authorities.

Report forms showing operating expenses in greater detail and conforming to the I. C. C. classification of accounts, have been sent out by the association, which will permit the compilation of these data to be made each month. It is the expectation to show from this information the monthly operating expenses per car-mile, segregated by the operating department and divided into groups representing city operation, interurban operation and combined city and interurban operation. It is believed such information representing the most recent available data will be extremely useful to member companies.

In this connection, President Pardee in his letter to electric railway executives, dated Feb. 13, 1919, states:

> Such information should be continuously available and we trust that we may have your further co-operation in a continuance of these reports from month to month, in order that the association and its various committees which are grappling with the problems now before us, may have at all times full information upon the condition of the industry. Monthly blanks for this purpose are inclosed herewith. Unlike the case of the steam railroads, there is no clearing house of statistics to which electric railways report. The need of a central agency of this kind is pressing. The association is undoubtedly best equipped to perform this work and will perform it if you will furnish us with the date.

Skip-stop Bulletin. A bulletin on skip stops was issued on Feb. 15, 1919, containing the replies of more than 100 companies on Data Sheet No. 183. This bulletin is in the form of a report, showing the advantages and reasons for retention of the skip-stop system. The purpose of this bulletin is to explain to the public at large the general advantages of the skip-stop plan, based upon the actual experience of a number of typical companies throughout the country. Additional copies of this bulletin will be sent to companies upon request.

Increased Rates of Fare. An up-to-date tabulation is maintained of all cities that have received increased rates of fare. These cities are classified in groups based upon the present rate of fare in effect. The tabulation shows the name of the city, the population served, the name of the operating company, the former rate of fare and the date when the present rate of fare became effective. The association has further prepared a statement showing the effect of increased rates of fare on operating revenues in a number of typical cities. This is based upon replies to letters sent out during the last month and represents the situation probably as well as it is possible to present it, in view of the many factors which have interfered with such comparisons, such as the influenza epidemic, the abnormal weather conditions last winter, the effect of war industries, thrift campaigns, etc.

Taxes and Other State, Municipal and Federal Requirements Levied on Electric Railway Companies. Data Sheet No. 182 is now being compiled by the association for the purpose of showing the extent to which the electric railway industry is subjected to financial burdens as a result of the above requirements. The committee on readjustment, as a result of the resolution adopted at the New York conference on Nov. 1, expects to use this information in its effort to secure a readjustment of the relationship between the electric railway companies and public authorities. Member companies are urged to return the above data sheet filled in, at the earliest possible moment in order that the work of this committee may not be delayed.

Summons Ordered for Waterbury (Conn.) Meeting

THE Waterbury local committee of the Connecticut Company section has issued a notice of the meeting to be held on March 27 in the following unique form:

TO THE HIGH SHERIFF OF ALL COUNTIES:
Greeting:

You are hereby ordered to summon each and every member of the Connecticut Company Section A. E. R. A. to appear at Hotel Elton, Waterbury, Thursday, March 27, 1919, at 6.30 p.m. to sit in judgment on such entertainment and speaking as may thereafter be provided.

Owner Judd of the Elton, in deep sympathy with the defendant committee, has agreed to furnish jurors from afar, attachés in Waterbury and all members of high or low degree, a dinner (price $1.25) that is guaranteed to produce a feeling of instant appreciation and good-will.

SPEAKERS:

WILLIAM B. SANDLAND, *Mayor of Waterbury.*
C. A. TEMPLETON, *president of Board of Aldermen, State Senator.*
FREDERICK S. CHASE, *president Chase interests.*
JOHN H. CASSIDY, *secretary and treasurer, Waterbury & Milldale Tramway Company (Green Line).*
JOHN H. GOSS, *general superintendent, Scovill Manufacturing Company.*
Entertainment furnished in spasms.
Song Leader—ALVIN GILLETTE.
Reception committee on double time.

Therefore fail not under penalty of heavy losses in the things that make life worth living.

Fraternally yours,
WATERBURY GENERAL COMMITTEE.

On March 20 the local committee sent out a 3-page follow-up letter containing well-written descriptions of points of interest along the route from New Haven. Attention was directed also to engineering and transportation features of the route. The letter contained reference to company incidents giving "local color" to the story and sufficient historical detail to render the document of considerable reference value.

The holding of this meeting in Waterbury is part of a general plan to secure the active participation of the company section members located away from New Haven, the headquarters of the company.

Toledo Section Membership Passes 1100 Mark

MORE than 800 members attended the meeting of the Toledo joint section on March 4. At this meeting the announcement was made that 762 new members had been secured in a "drive" launched on Jan. 29. This brings the total membership to 1102, and F. R. Coates, president Toledo Railways & Light Company, announced that valuable prizes would be awarded to the five members bringing in the most new members prior to May 1. The program at the meeting was practically all of an entertainment character.

I. E. R. A. Officers and Committeemen

THE complete list of officers and committees of the Illinois Electric Railways Association for the year 1919 is as follows:

Officers: President, W. C. Sparks; first vice-president, E. M. Walker; second vice-president, W. L. Arnold; secretary-treasurer, R. V. Prather.

Executive Committee: D. E. Parsons, chairman; Frank J. Baker, W. C. Sparks, H. E. Chubbuck, C. F. Handshy, Britton I. Budd, E. C. Faber, E. M. Walker, J. R. Blackhall, W. L. Arnold.

Membership Committee: Frank E. Johnson, chairman; E. H. Noyes, G. T. Seely.

Electrical Engineering Committee: E. S. Gillette, chairman; John Leisenring, Charles H. Jones, G. W. Welsh.

Mechanical Engineering Committee: H. A. Johnson, chairman; J. M. Bosenbury, John Sutherland.

Way Committee: John B. Tinnon, chairman; B. J. Fallon, H. F. Merker.

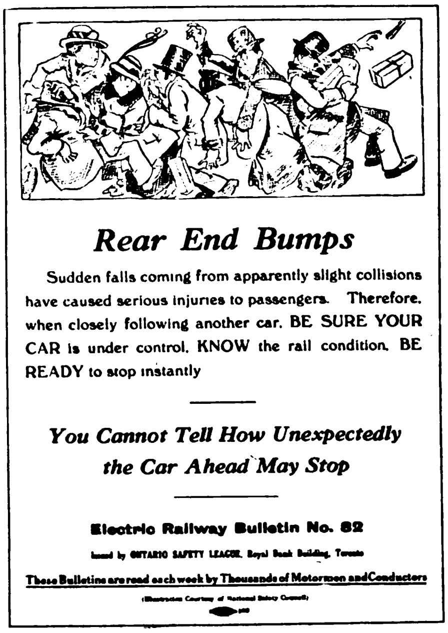
Traffic Committee: C. C. Shockley, chairman; R. Breckenridge, C. F. Speed, E. M. Walker.

Safety Committee: H. B. Adams, chairman; W. H. Heun, Joseph O'Hara, Dr. H. E. Fisher.

Publicity Committee: E. E. Soules, chairman; J. M. Strasser, H. E. Weeks, F. C. Eckman, R. H. Hayward, W. W. Crawford.

Program Committee: H. J. Kenfield, chairman; L. E. Gould, J. W. Busch, A. P. Jenks, W. V. Griffin, Lesley C. Paul.

Ontario Safety League Active



Rear End Bumps

Sudden falls coming from apparently slight collisions have caused serious injuries to passengers. Therefore, when closely following another car, BE SURE YOUR CAR is under control. KNOW the rail condition. BE READY to stop instantly

You Cannot Tell How Unexpectedly the Car Ahead May Stop

Electric Railway Bulletin No. 82

Issued by ONTARIO SAFETY LEAGUE, Royal Bank Building, Toronto

These Bulletins are read each week by Thousands of Motormen and Conductors

RECENT ONTARIO SAFETY BULLETIN

The fifth annual report of the Ontario Safety League shows that during 1918 the League issued 2500 large cards for posting in street cars, 22,000 bulletins for posting in carhouses and shops and elsewhere, 110,000 cards to motorists, 100,000 letters to parents, 540,000 gummed seals, and other warnings. Through the co-operation of the Ontario Department of Highways a safety card is issued with every automobile license issued by the Province, and the gummed seals are used by merchants and others on outgoing mail. They carry the message, "Be careful. Avoid accidents." The question of how interest can be maintained in the safety movement seems to have been satisfactorily settled by the League, of which J. F. H. Wyse is organizer and engineer.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

New Jersey Strike Settled

Company Will Treat Only with Bodies of Its Employees—Other Matters to Be Arbitrated

Announcement that the joint conference board of the union and officials of the Public Service Railway, Newark, N. J., had accepted the proposed basis of settlement from the federal representatives was made on the afternoon of March 16 by Mr. Ogburn, who is in charge of the railway department of the War Labor Board. Immediately after giving out this information Mr. Ogburn left for Washington, where he reported the situation before the board.

Mr. Ogburn was designated by former President Taft, co-chairman of the War Labor Board, to settle the controversy, if possible, following the appearance before the board on March 14 of representatives of the railway and the union.

Mr. Ogburn arranged for a conference on the morning of March 15 with President Thomas N. McCarter and Edmund W. Wakelee, vice-president of the railway. It was at this conference that Mr. Ogburn and his colleagues submitted the proposed basis of settlement which was accepted by the company. They had previously met the representatives of the employees. In the afternoon the War Labor Board representatives offered the plan to the joint conference board of the men's union, and the board refused to accept the clause in the program submitted by the National War Labor Board's representative which provided that the question of putting into effect of the company's collective bargaining plan be referred to the War Labor Board. The men insisted that the collective bargaining plan be withdrawn, as President McCarter had offered to do on the evening before the strike was called.

On March 16 Mr. Ogburn returned from Washington with a slightly altered draft of the War Labor Board proposition, which the company accepted, and this was put up to representatives of the men on the afternoon of March 16. They promptly accepted it. It was submitted to the union locals on March 17 and approved.

TERMS OF AGREEMENT

The terms, made public by Mr. Ogburn provide:

> That any committee or joint conference board, composed of the employees of the Public Service Railway appointed at a meeting of any division of the Amalgamated Association of Street & Electric Railway Employees of America, shall have the right to deal with the officials of the company concerning any matter or matters in controversy. This does not negative the right of employees to treat with the company directly or through other committees.
>
> It is understood that the company has withdrawn and abandoned its so-called co-operative or collective bargaining plan, recently promulgated.
>
> Any other matters in controversy between the company and its employees may be referred by either party to the National War Labor Board for decision.

It also was provided that all men on strike should return to work upon acceptance of this proposition, and that the workers be reinstated in their old jobs. All matters of wages and conditions of work which were part of the union's demands may be placed before the War Labor Board for decision in the near future.

The principal bone of contention was recognition of the Amalgamated Association, and the withdrawal by the company officials of their collective bargaining plan. The men also asked for ten hours' pay for a nine-hour day.

Thomas N. McCarter, president of the railway, issued a statement declaring that although the agreement provides for recognition of committees of employees the company is supported in its refusal to sign contracts with the Amalgamated Association or any other union of employees.

John L. O'Toole, assistant to President McCarter, when informed that the strikers had interpreted the decision as a recognition of the union, is reported to have said:

> We will only treat with bodies of our employees. They can call themselves anything they like.

Mr. Shonts Discusses Port Problem

At a meeting of the Board of Trade & Transportation of New York on Feb. 26 to hear the report of the special committee which made a study of the proposed treaty between New York and New Jersey for joint control and improvement of the waters about New York, Theodore P. Shonts, president of the Interborough Rapid Transit Company, told of the urgent necessity of immediate action to keep clear at this port the channel of the commerce of the world. He declared the problem was one of congestion and advocated the co-ordination of all railroads and spoke in favor of a tunnel under the Hudson River. The situation demanded instant attention, he said, and added that it was not the result of planning, but that it simply grew.

He said that all the New Jersey railroads could be linked up as a solid unit and this done it would afford an economical method for the exchange of freight and would afford one clearing yard for all the boroughs of New York, for New England and for ocean cargoes.

Buffalo Retains Prof. Richey

Will Represent City on Board with James E. Allison to Draw Up New Operating Plan There

Albert S. Richey, Worcester, Mass., professor of electric railway engineering in the Worcester Polytechnic Institute, has been chosen by the City Council of Buffalo, N. Y., as its representative on the board of arbitration which will formulate a plan whereby the International Railway, Buffalo, will be placed under municipal control. Mr. Richey will take the place of Peter Witt, Cleveland, Ohio, who declined to represent the city on the board. The conditions under which Professor Richey accepted this appointment are such that he is not obliged to be the partisan of the city, but can exercise his best judgment on all matters which may come up for decision. The International Railway's representative is James E. Allison, Jr., St. Louis, Mo.

START ON AGREEMENT SOON

During his work in Buffalo, Mr. Richey will be paid at the rate of $150 a day. As soon as the two arbiters agree upon the third member of the board the work of drawing up an agreement between the city and company will be started. The board must also agree upon certain intangible assets of the railway's city lines upon which a fair return will be allowed.

A new phase of the railway tangle in Buffalo developed during the week ended March 15 when a bill was introduced in the State Legislature at Albany giving the municipal authorities permission to enter into an agreement with the International Railway for a service-at-cost plan of operation and guaranteeing the company a fixed return upon its investment. The bill also provides for a compulsory reference of the measure to the voters before it becomes effective, even though it is approved by the Legislature. It is predicted the measure will be defeated. The bill has been approved by the City Council.

The City Council has rescinded its action allowing the International Railway to collect a 6-cent fare with a 1-cent rebate slip pending the determination by the Public Service Commission, Second District, of a just and reasonable rate of fare to be charged in Buffalo. The voters filed petitions and the referendum on the question was to have been held on March 25. The action of the Council rescinding its former action saves the cost of a second referendum, which would be close to $40,000. It was generally conceded the action of the Council would be repealed by the voters.

Ten-Year Grant Suggested

Mayor of Cleveland, Thwarted in Attempt to Extend Tayler Franchise for Year, Makes New Proposal

The Council of Cleveland, Ohio, on March 11 by a vote of twelve to twelve defeated the city administration's proposal for a year's extension of the Tayler grant to the Cleveland Railway pending a vote at the next election on municipal ownership and operation of the railway property.

On March 13 Mayor Davis, in a letter to City Council, proposed that an ordinance be enacted providing for a vote next fall on municipal ownership and operation of the Cleveland Railway property. The Mayor also suggested that Council immediately open negotiations with executives of the railway for a ten-year franchise containing better terms for the car riders than the present grant provides. The Mayor asserted that although, in his opinion, Council made a serious mistake in rejecting the proposed one-year franchise extension, it is imperative that the Tayler grant be extended. He suggested daily sessions of Council, the public and city officials with the railway executives until the railway problem is solved.

In a letter placing his proposal before Council the Mayor said in part:

> I feel the present arrangement of private ownership with private operation and public control does not adequately protect the rights of car riders in many essential particulars, and I suggest and insist that the only proper remedy short of municipal ownership is municipal operation and that:
>
> 1. A franchise should be drafted and offered to the railway providing for a renewal of the franchise, providing for operation of the lines by the city with the present fixed return to the stockholders by way of rental with proper security given them for the maintenance of the property, and providing therein a separate arrangement by which extensions can be built as required by the needs of the city without the restrictions upon the same, as provided by the present grant.
>
> 2. (a) If the present scheme of private ownership and private operation is to be continued, which I deem inadvisable, I suggest and insist that a renewal of the franchise carry with it an incentive for economy of operation by the company, by providing for an increase in the stockholders' return for the period in which the company, by economical management, expends less than its operating allowance and its maintenance, depreciation and renewal allowances, and providing for a decrease in the return to the stockholders when the company over expends its allowances, said allowances to be fixed yearly by a budget system, but otherwise as provided in the present ordinance, thereby making the rate of return to the stockholders depend upon the rate of fare.
>
> (b) If the present general plan is renewed, proper provision should be made in the extension franchise for the making of renewals adequate to promote the growth of the city, by a revision of section thirty of the present ordinance, which at the present time makes it almost impossible for the city to compel extensions in the undeveloped territory.
>
> (c) Provision should also be made in the franchise to do away with the probability of future strikes on the system by providing that the city, in case of disputes between the company and its employees about working conditions, rates of wages, the class and conduct of employees (including grounds of discharge) shall be the final arbitrator, with proper provisions that the company's investment shall not thereby be impaired.
>
> I would ask that each member make it his business to aid these negotiations by presenting the result of his experience and submitting amendments which he deems necessary in the interest of his constituents, to the end that the citizens of Cleveland may secure the best railway service.

On the eve of the negotiations for the renewal of the Tayler grant President Stanley of the Cleveland Railway issued a statement in which he said that while he agreed to the opening negotiations with the city, he was opposed to making any changes that would interfere with rights now held by the company and city. These, he defined, as the security of the company's investment and certainty of dividend, and the city's control of fare and service. According to Mr. Stanley Cleveland has enjoyed the lowest fare and the best service of any of the large American cities under the Tayler grant and this important fact should not be lost sight of in the negotiations.

Among the complaints against the ordinance raised by the city administration is lack of incentive for economy.

In a communication read before the Council on March 17, the Mayor expressed his conviction that Council made a mistake in rejecting his original proposal for a one-year extension of the Tayler grant pending a vote next fall on municipal ownership. He ended with the suggestion that Council should enact his ordinance for a vote next fall and then should proceed to negotiate with railway executives for a ten-year franchise, subject to the right of the electorate to vote at any time on municipal ownership.

A suggestion to meet the complaint of a lack of incentive for economy has come from Fred H. Goff, president of the Cleveland Trust Company, who proposed that the minimum dividend be limited to 6 per cent and that it shall rise as the fare is lowered beyond a certain point, at which the minimum return is to be paid.

Official Acquitted in Brooklyn Accident Trial

After deliberating for four hours and eighteen minutes the jurors in the case of Thomas F. Blewitt, a division superintendent of the Brooklyn (N. Y.) Rapid Transit Company, indicted of manslaughter as a result of the Malbone Street wreck, on Nov. 1, in which more than ninety-five persons were killed and 200 injured, returned a verdict of not guilty in the Supreme Court, at Mineola, Long Island, on March 18. It was charged in the indictment that Blewitt had permitted an inexperienced motorman to take out the train.

The entire day was occupied by both sides in summing up. District Attorney Lewis of Kings severely arraigned the defendant, charging he had assigned men to run trains on the day of the accident who had never acted as motormen before.

A jury will now be drawn to try Anthony D. Lewis, the motorman, whose trial will be called next week. Following the disposal of this case, those of several other indicted officials of the company will probably come up. Lewis ran his train into the walls of a tunnel while acting as a motorman following a strike of the trainmen of the railroad.

Detroit M. O. Vote April 7

Price of $31,500,000 for Detroit United Lines Within City Goes Before Voters at Spring Election

Citizens of Detroit, Mich., will be asked to vote on April 7 whether they approve of the city acquiring the Detroit United Railway system within the 5-cent fare zone at a price of $31,500,000. This was definitely decided at a recent joint meeting of the Street Railway Commission and the Common Council. If approved by the people the city will take possession of the railway system on July 1, 1919. The Common Council informally and in advance approved the financial plans of the Railway Commission for the acquisition of the properties.

COMMISSION OUTLINES PLANS

These plans were outlined in a statement issued by the commission:

> The city will pay $15,000,000 in cash to the Detroit United Railway. The balance of the total sum will be made on the partial payment basis.
>
> Interurban, freight and construction cars will continue to be operated by the Detroit United Railway, which is to recompense the city for the use of tracks, etc., on the basis of cost plus 30 per cent.

With the question of the acquisition of the railway system there also will be submitted to the people a proposition to issue public utility bonds to the amount of 2 per cent of the assessed valuation of the city. The sale of these bonds would realize in the neighborhood of $27,000,000. Of this amount, $15,000,000 will be used to make a cash payment to the railway.

The resolution already passed by the Common Council to submit to the voters a bond issue of $10,000,000 for the purpose of piecemeal construction of a municipal system will be withdrawn, and extensions and betterments will be cared for from the proceeds of the one issue of public utility bonds.

Mayor Couzens is quoted as follows:

> We are going to submit this price of $31,500,000 to the voters at the next election. If the people want to get control of the lines at once, all right; if not, we are willing to go on with the fight if it is the wish of the people we do so.
>
> It is the best we are able to do at the present time. The present situation is like the smallpox, only worse. The people would be willing to pay $2,000,000 to get rid of the smallpox and have nothing but the fact they were rid of the disease to show for their money.
>
> It is a question now of whether the city is willing to pay an extra $2,000,000 and wipe the Detroit United Railway out as a problem.

The text of the agreement for the sale of the city lines to the municipality was signed by representatives of the city and the company on March 18. As previously stated, an initial payment of $15,000,000 will be made on or about the first day of July and the balance of $16,500,000 on Dec. 31, 1931, with interest at 6 per cent a year from the date of the payment of the $15,000,000. In case the city is unable to make the initial payment of $15,000,000 on July 1 the time is to be extended for not more than ninety days after July 1. After that further extensions are to be secured only by mutual agreement between the railway and the city.

Ex-President Taft on Labor

Explains Basis Upon Which War Labor Board Based Its Action in Making Wage Awards

An unusually interesting speech was made by former President Taft in Atlanta, Ga., recently on the Proposed League of Nations. In the course of his remarks Mr. Taft discussed incidentally the problems of labor, and it is believed that he told for the first time the considerations that governed much of the work of the War Labor Board while he was a member of that body. For this reason the words of the ex-President are of special interest to electric railway representatives and to the employees of such companies. Mr. Taft is quoted in part as follows:

> Perhaps you have a right to know why I should speak at a labor meeting. For nine months, as a member of the War Labor Board, I have been forced to study the question of the relations between capital and labor in this country.
>
> The members of the board occupied three weeks in constant discussion, and after a while, to our own great surprise, and I think to the surprise of all twelve of the commission, we agreed and signed the paper.
>
> Now, that paper contained a number of principles. One was that no employer had the right to interfere with the complete right of the laborers to organize into trades unions, to be represented in their dealings with their employers by committees of their own; that no working men had a right to interfere with the organizations of employers, and that we approved in the strongest possible way the principle of collective bargaining and of the group system.
>
> And upon that basis we laid down other principles and created machinery by which we took up the differences that might arise between the employers and employees during the war.
>
> The laborers of the world have acquired a greater consciousness of power, and it is for the benefit of the community that the trades unions should be encouraged and recognized and dealt with on the principles of the group system. This will give to the leaders of labor a sense of responsibility and a conservatism that they will not have if employers occupy an attitude of hostility. Unless this is done labor will be driven into hostility and into being reds and radicals, and you will encourage that anarchistic, socialistic spirit that is rife now the world over.
>
> It is essential that the laboring men should acquire a sense of responsibility to society; that the business men who employ should recognize them and deal with them, and come together with them in collective bargaining, so that differences shall be removed.
>
> We have increased wages often and then we have recognized in connection with the increases the necessity especially in public utilities of increasing rates of fare, so that the companies may have the means by which they can pay that rate of wages and other expenses.
>
> That has been done right here in Atlanta and in New Orleans and elsewhere, and the character of the relation is such that if you welcome the organization of labor and put it in a position of responsibility, they ought to feel the obligation to help their employers get what is just for them, because it is not the square thing to get an increase in wages and then ignore the other part of the recommendation of the decree, namely; that the rates of fare also be increased to meet these additional expenses involved in excess costs and higher prices of everything which should be met in some way in order to increase the revenue of the street railway.

New Wage Scale at Wheeling

At a meeting of the Street Railway Men's Local No. 108, embracing the entire Wheeling district, a new wage scale was adopted, as drawn up by the executive board of the organization. The new scale asks for 55, 60 and 65 cents an hour and time and a half for overtime for all motormen and conductors, and a proportionate increase over the old scale for all carhouse men and for women. The present scale is 38, 40 and 45 cents an hour, according to the length of service. It has been stated that the other new working terms are practically the same as the present ones.

The new scale will be submitted to the local railways at once and, if approved, it will become effective on May 1. The union embraces all the Wheeling lines, those in adjacent sections up the Ohio River as far as Steubenville and all lines in the Bellaire, Bridgeport and Martins Ferry section of eastern Ohio. The agreement affects about 500 men and a score or more of women, the latter being employed principally as car cleaners at the carhouses.

Scranton Men Will Ask More

Employees of the Scranton (Pa.) Railway, numbering more than 500 conductors, motormen, track men and barn men, have framed demands for an increase in wages after April 1 of 15 cents an hour. Also, the union is demanding that conductors and motormen shall have every eighth day off and other changes in the present agreement. They request a one-year agreement.

Conductors and motormen are now receiving 41, 43 and 45 cents an hour, this scale having been awarded them by the War Labor Board, following the strike last summer. The demands of the men are for increases to 56, 58 and 60 cents an hour.

The War Labor Board award dates from June 2, 1918, and it provides that "this scale shall prevail during the duration of the war but after Feb. 1, 1919, it may be opened at periodical intervals of six months for the making of adjustments as may be deemed necessary." The present agreement between the union and the company was signed on April 1, 1916, and expires April 1, 1919.

Officers of the union say that they are taking the stand that the war is over and that the War Labor Board award must be superseded after April 1 by a new agreement made between the workers and the company.

Women Again the Issue

Arguments in the appeal from the recommendation of the National War Labor Board that women conductors at Cleveland, Ohio, be discharged to satisfy demands of striking male employees were heard on March 13 by the board. The case was taken under advisement.

Dr. Anna Howard Shaw, honorary president of the National American Woman Suffrage Association; Frank P. Walsh, former joint chairman of the board, and Miss Mary Van Kleeck, director of the women-in-industry service of the labor department, were among those who appeared in behalf of the discharged women workers, while James H. Vahey, attorney for the Amalgamated Association of Street & Electric Railway Employees, opposed the appeal.

Dr. Shaw declared that during the war women in all parts of the country had responded nobly to the nation's call for workers, but now that the acute need for workers had passed, there was a tendency to "get rid of" the women. Dr. Shaw said:

> Men employes demand it, and because they are organized, they have power to enforce their demands. The worst of it is that many of the men so employed were never in the military service, but had left to enter "safe" employment.

Mr. Walsh said the board should declare that women were legally entitled to the same rights in industry as men. The women conductors of Cleveland were unjustly discharged, he said, and should be reinstated.

Miss Van Kleeck told the board that women's claim of freedom to choose occupations was the greatest labor issue before the country.

Mr. Vahey argued that the board was not legally empowered to order the re-employment of the women conductors, since its jurisdiction extended only to cases where labor disputes between employees and employers threatened to result in a strike.

B. R. T.'s Labor Policy Stated

Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, has expressed a willingness to recognize the right of the men to organize, but he has made it plain that the company will deal only with its own employees. In the current issue of the *B. R. T. Monthly* Mr. Garrison writes:

> No attempt will be made to prevent any employee from joining any organization that he pleases. On the other hand the management of the system will, as heretofore, deal with the committees of its own employees in all matters affecting the relation of its employees to the system.
>
> The purpose in addressing the employees, in view of the recent newspaper publicity given to the most recent ruling of the War Labor Board, is to indicate the position of the system under its present management and to prevent any misunderstanding in respect thereto.

The Amalgamated Association is at present engaged in an effort to organize the trainmen in Brooklyn into a local under its domination.

At a recent labor meeting in Brooklyn a tentative draft was read of the conditions and suggestions that are to be taken up with the company. It calls for a better working understanding and a board of arbitration representing the workers and the company. Section 5 of the temporary preamble calls for an eight-hour day for all conductors, ticket agents and station men, and demands that all work in excess shall be overtime, and shall be paid for at the rate of time and a half. It is also demanded that the company pay all extra men who answer to the rollcall at the rate of $21 a week. The proposed agreement will also stipulate that entries shall not be placed against an employee without the opportunity of a hearing to answer the charge.

The Proper Spirit

The electric railways were in the vanguard of those employers who announced that places were open to all men who entered the service of the government during the war. The instances of the large companies that did this are many. Public recognition in their cases has been freely given. The smaller companies, however, have been no less active in the interest of their men returning from the front. Their work, too, has attracted much attention and been commented on favorably. One of the more recent instances among the smaller companies is that of the Hot Springs (Ark.) Street Railway. Here is what the *New Era* of that city said under "The Proper Spirit" on Feb. 21:

> Of course all corporations are soulless. And this especially applies to public utility corporations. But there is one particular corporation of which we know that seems to have risen to the "Great Idea," and in a manner that would indicate that one corporation is at least part human, and possesses some modicum of soul.
>
> This is our own Hot Springs Public Utility Company. When the big doings started over in Europe many of their men promptly volunteered while others were taken by the selective service plan. No objection was made to their departure—in fact they were encouraged. Neither was any promise made as to holding their jobs for them, but every man that has returned has stepped into his old job.
>
> The street railway has put ten of its men back to work, with all the rights, seniority and increased pay that they would have secured by remaining at home.

The paper named the men at the conclusion of its editorial.

N. E. L. A. Deprecates Advocacy of Municipal Ownership

Public ownership is discussed in the interim report of the public policy committee of the National Electric Light Association. Among the members of the committee are H. G. Bradlee, Walton Clark, H. L. Doherty and Samuel Insull. In referring to the electric railways the committee says:

> Prominence has been given in recent months, and is likely to increase, with regard to the financial condition of the electric railways throughout the country.
>
> In the stress of conditions above outlined, it has been suggested in some quarters that the most practicable and effective solution of the electric railway problem is in municipal ownership since, if the municipalities should acquire the electric railways, the additional revenue required would be forthcoming either through increased fares or indirectly through taxation.
>
> We recognize the extremity of the railway companies and the advantage that such suggestion may offer to some of them individually, but we deem it necessary to say that the opinion of your public policy committee, as hitherto frequently expressed, continues with increasing conviction that municipal ownership of electric lighting, gas and electric railway companies is economically unsound and cannot redound to the mutual benefit of the consumers and the municipality. We think it is only fair publicly to reaffirm our views upon this subject at this time when temptation to the encouragement of municipal ownership by utilities companies themselves seems apparent.

Urges Franchise Forfeiture

Urging that the city of Birmingham, Ala., institute quo warranto proceedings in the courts seeking to have the franchise of the Birmingham Railway, Light & Power Company forfeited to the city, a statement has been issued by the public utilities committee of the Birmingham Civic Association. The statement urged that the city institute the proceedings before properties pass into the hands of a reorganization committee in the course of the present receivership proceedings.

The statement issued by the committee deals with a statement previously issued by Forney Johnston, special attorney for the city, in which he said that he had evidence on which a forfeiture of the franchise could be asked. In his statement Mr. Johnston suggested that satisfactory terms could probably be made by the city with the receiver and a re-organization committee.

The committee of the Civic Association in its statement asks that litigation be started in an effort to revoke the franchise and points out that in the event the franchise is revoked the city will be in a position to dictate terms and arrange, if it is desired, for the purchase of the property.

News Notes

Sioux City Men Want More.—Employees of the Sioux City (Ia.) Traction Company have petitioned the company for an increase of 15 cents an hour effective on May 1. The men are now receiving 30 and 35 cents an hour.

Railway Brotherhood Again Active.—A movement is under way in Terre Haute, Ind., asking organized labor in that city to support a demand of the trainmen of the Terre Haute, Indianapolis & Eastern Traction Company that the company recognize the Order of Railway Conductors and the Brotherhood of Locomotive Engineers as the official unions of traction conductors and motormen.

Labor Department Commends St. Louis Company.—The United States Department of Labor at Washington has commended the United Railways, St. Louis, Mo., for the co-operation of the company in taking back men, with seniority pay, who served during the war in the army, navy and marine corps. The Labor Department was informed of the United Railways co-operation by Frederick B. Dolan, special agent of the department, who forwarded to Washington a card which the railway is displaying in vestibules of 1300 cars.

Municipal Ownership Bill in Missouri.—A series of four bills and two joint and concurrent resolutions submitting constitutional amendments permitting St. Louis, Mo., to own and operate electric railroads and terminals and providing the machinery for condemning property for such purposes have been introduced in the House of Representatives by Representative Davidson of St. Louis. One measure provides that cities of more than 500,000 are "hereby given the power to build and operate street railroads, terminal railroads and railroads of all other descriptions."

Rights Waived to Hasten Purchase.—To facilitate the closing of the deal for the purchase of the railway lines of the Puget Sound Traction, Light & Power Company in Seattle, Wash., by the city all parties to the recent "friendly" action against the city in the State Supreme Court, to test the validity of the deal, have agreed to waive their statutory rights, and consent to an immediate closing of the transaction. The law provides that the plaintiffs have thirty days from the date the Supreme Court upheld the city's right to buy the Seattle railway system to file a motion for rehearing.

St. Louis Men to Ask More.—Motormen and conductors of Division No. 788 of the Amalgamated Association at St. Louis, Mo., have voted unanimously to open their contract with the United Railways on April 1 and demand a new wage scale of 60 cents and 65 cents an hour and the basic eight-hour day. The present wage is 36 cents and 42 cents an hour, based on nine hours for the day's work. This wage was fixed at the conclusion of the strike, in February, 1918, and the contract entered into was for three years, dating from June 1, 1918, with the privilege of reopening the matter for the adjustment of wages and hours.

New Jersey Tunnel Bill Defeated.—The Upper House of the Legislature of New Jersey on March 18 defeated the bill of Senator Edwards of Hudson, providing for a thirty-five-year bond issue of $12,000,000 toward the construction of the proposed vehicular tunnel under the Hudson River from Jersey City to New York and a bridge over the Delaware from Camden to Philadelphia. It is possible the matter will now be taken up by referendum. New York and New Jersey had already made preliminary appropriations. The Public Service Corporation of New Jersey had made extensive studies of the matter on its own account at considerable expense to itself.

No Funds for Paving.—Charles L. Kurtz, president of the Columbus Railway, Power & Light Company, Columbus, Ohio, recently sent a communication to Director of Public Service Bordon in which he stated that it will be impossible for the company to co-operate with the city this spring in paving portions of Broad, Main and Fourth Streets, because of a lack of funds for the purpose. He expressed a willingness to bear a portion of the expense when the company is financially able to do so. The letter called attention to the fact that legislation is pending in the City Council for an increase in the rate of fare and that this may afford sufficient relief for the company to pave its portion of the streets at some future time. The city engineer has advised against paving the city's portion of the streets until the company can take care of the remainder.

Another Attempt to Curb Commission.—Measures designed to curtail the jurisdiction of the Public Service Commission of Missouri and to give to the cities control of the public utilities which operate within the municipalities have been reported unfavorably by the House judiciary committee. In December representatives of towns and cities met in Kansas City and agreed to take concerted action to curb the powers of the commission in retaliation for decisions considered by city representatives as inimical to their best interests. Later two bills along these lines were approved by representatives of the municipalities, and delegations from Kansas City and other towns and cities appeared before the judiciary committee urging that the measures be approved. The bills have been reported unfavorably and the matter of curtailing the power of the commission will probably be dropped.

Labor Board Jurisdiction Denied.—The Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, New Albany, Ind., through the president, Harry L. Reid, has refused to recognize the jurisdiction of the War Labor Board in settling the wage grievances of employees. This announcement was made when employees of the companies met with representatives of the War Labor Board to present their grievances. Men employees on the lines receive a wage scale ranging from 31½ cents an hour to 36½ cents an hour. The motormen and conductors on the lines running between Louisville and New Albany, and Louisville and Jeffersonville receive from 34 cents to the maximum of 39 cents an hour. The men contended that they were unable to live properly on these wages and requested the War Labor Board to grant them an increase. The exact rate of increase is not set forth.

No Enthusiasm for Local Ownership.—The committee of twelve representative business men and taxpayers headed by W. E. Massey, Ocean City, N. J., appointed some weeks ago to look into the feasibility of raising subscriptions to purchase the Ocean City Electric Railway, made its report at a recent meeting. The committee said it was difficult to interest a sufficient number of property owners to raise the $84,000 necessary, and recommended that the road be operated through the co-operation of the city. The taxpayers at the meeting said that the electric railway must be in operation during the coming season. The committee, the city commissioners and representatives of the bondholders of the railway will hold another meeting when an effort will be made to arrange with the company to operate the road under a guarantee from the city to make up any deficit. It is thought the road will lose not more than $4,000 for the season.

$1,000,000 for Grade Crossing Removal.—The Public Service Commission for the First District of New York has asked the Legislature to make an appropriation of $250,000 to be applied toward the removal of dangerous grade crossings in the Borough of Queens. The twenty-one grade crossings referred to are on the Atlantic Avenue electric division of the Long Island Railroad between East New York and Jamaica. The appropriation of $250,000 by the State will make available $1,000,000 to be applied to this project, as the State's appropriation under the grade crossings law must be met by a like sum from the city and twice as much by the railroad company. With $1,000,000 available the work can be begun and advanced substantially before an additional appropriation will be required.

General Harries Before Supreme War Council.—Brig.-Gen. George H. Harries, commander of the American military force at Berlin, has been at Paris for several days to appear before the Supreme War Council to render a report on the military and economic situation at the German capital and throughout Germany. He has given an account of events in Berlin during the last three months, culminating in the serious street fighting of the last fortnight. When the American party left Berlin, the Government forces under Gustave Noske, the German War Minister, had the upper hand and, in General Harries' opinion, the government will control the situation, particularly if food is sent to aid in holding back the Bolshevik menace from the eastern border. It will be recalled that General Harries, who is a former president of the American Electric Railway Association, was reported some few weeks ago to have had a narrow escape from serious injury during the street fighting in Berlin in which the Spartacides participated.

Franchise Controversy in Bellaire.—The City Council of Bellaire and the Wheeling (W. Va.) Traction Company are engaged in a battle which is attracting considerable attention throughout West Virginia. Some time ago the franchise of the company to operate cars through Bellaire expired, and no agreement on a new franchise having been reached the city decided to charge the company $20 a day for the use of the streets. A bill of upwards of $7,000 has accumulated under the order and an effort is to be made to collect it. Superintendent Billings of the railway has announced that the company intends to ask permission to establish a 10-cent fare between Bellaire and Wheeling, the 5-cent fare limit to be at Stop 9, West Wheeling. The superintendent has also stated that if Bellaire insists on the company paying $300 a mile rental for the use of the city streets by the company, the company would discontinue operating cars in the city rather than establish the precedent of paying the franchise rental.

Programs of Meetings

New England Street Railway Club

The nineteenth annual meeting and dinner of the New England Street Railway Club will be held at the Copley-Plaza Hotel, Boston, Mass., on March 27. The annual meeting will be held at 3 p.m., and the dinner at 6 p.m. The speakers at the dinner will be:

Calvin Coolidge, Governor of Massachusetts.

Andrew J. Peters, Mayor of Boston.

James E. Watson, United States Senator from Indiana.

R. W. Perkins, president of the club, will preside.

The tickets to the dinner will be $5 each. Applications, accompanied by cash, money order or check, should be made promptly to George W. Knowlton, secretary of the club, or to Fred F. Stockwell, chairman of the banquet committee.

Pacific Claim Agents' Association

At a meeting of the executive committee of the Pacific Claim Agents' Association held in Portland, Ore., on March 1, it was decided to hold the next meeting of the association on June 19, 20 and 21 in Oakland, Cal. The following papers are to be discussed:

JUNE 19

"The Psychology of Claims Adjustments," by J. H. Handlon, claim agent of the United Railroads, San Francisco, Cal.

"The Claimant, the Claim Department and the Physician and Surgeon," by F. J. Lonergan, attorney for the Portland Railway, Light & Power Company, Portland, Ore.

"Motor Vehicle Accident Investigation and Adjustment," by S. A. Bishop, claim agent of the Pacific Electric Railway, Los Angeles, Cal., and V. Laursen, solicitor of the British Columbia Electric Railway, Ltd., Vancouver, B. C.

JUNE 20

"The Safety Problem":

(a) "Of the Companies," by Thomas G. Aston, claim agent of the Washington Water Power Company, Spokane, Wash.

(b) "Of the Public," by Sergeant Lewis of Portland Police Traffic Bureau, Portland, Ore.

Written discussion by Charles A. Blackburn, claim agent of the Butte (Mont.) Electric Railway, Butte, Mont.

"Office Kinks in Claim Departments," by Thomas A. Cole, claim agent of the Los Angeles (Cal.) Railway Corporation.

"How to Handle Fraudulent Claims and Actions Having No Merit," by Frank D. Oakley, attorney for the Tacoma Railway & Power Company, Tacoma, Wash.

"Benefits of the Pacific Claim Agents' Association," by B. F. Boynton, claim agent of the Portland Railway, Light & Power Company, Portland, Ore.

The morning session on June 21 will be devoted to an open discussion of claim department problems.

Financial and Corporate

Sufferings of St. Louis

Percentage of Increase in Operating Expenses Five Times That in Passenger Revenue

Although the passenger revenue of the United Railways, St. Louis, Mo., for the calendar year 1918 increased $507,806, or 3.90 per cent, owing to the fare increase on June 1, the current operating expenses rose $1,500,685, or 19.68 per cent. The passenger revenue for the first five months of the year decreased 4.57 per cent, while for the last seven months' period of 6-cent fare it increased 9.82 per cent. The large increases in expenses became effective in June. The amount paid out in wages in 1918 was 42.61 per cent of the gross operating revenue.

The operating expenses for 1918 showed the following increases as compared with 1917:

Way and structures	$66,982	9.50%
Equipment	248,982	24.61%
Power	31,341	2.11%
Conducting transportation	974,230	31.69%
General and miscellaneous	179,149	13.27%
Total	$1,500,685	19.68%

The increase in operating expenses was caused by the increase in wages amounting to 35 per cent, effective March 1, 1918, and an increase in the price of all material used in the operation and maintenance of the property. Operating expenses (including depreciation) increased $1,562,372, or 16.98 per cent.

The interest charges increased $17,641, or 0.69 per cent, and the result for the year suffered a loss from a net income of $642,976 in 1917 to a deficit of $400,299 for 1918.

The loss in earnings during the strike period in February was approximately $185,000. The back wages paid employees amounted to $349,800, which was paid out of the 5-cent fare effective until June 1.

The 6-cent fare, which was in effect during seven months of the year, showed only a 10.32 per cent increase in revenues, while the decrease in the number of passengers was 7.82 per cent. The total number of passengers carried during 1918 was 376,985,727, or 26,314,969 passengers less than the previous year. The passengers in 1918 averaged 8.90 per car-mile as compared with 9.17 per car-mile in 1917. The percentage of passengers using transfers was 53.32 per cent, and the average fare per passenger was 3.59 cents.

COMPARATIVE INCOME STATEMENT OF UNITED RAILWAYS OF ST. LOUIS FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Revenue from transportation	$13,551,542	99.4	$13,038,622	99.3
Revenue from other railway operations	88,077	0.6	86,937	0.7
Gross operating revenue	$13,639,619	100.0	$13,125,559	100.0
Current operating expenses	$9,126,514	66.9	$7,625,827	58.1
Depreciation	1,636,754	12.0	1,575,067	12.0
Taxes	852,476	6.3	853,161	6.5
Total	$11,615,744	85.2	$10,054,055	76.6
Income from operation	$2,023,875	14.8	$3,071,504	23.4
Non-operating income	116,698	0.9	94,702	0.7
Gross income	$2,140,573	15.7	$3,166,206	24.1
Interest and miscellaneous charges	2,540,872	18.6	2,523,230	19.2
Net income	$400,299	†2.9	$642,976	4.9

†Deficit

Union Traction Net Falls

Increase in Operating Costs in 1918 Outweighs the Gain in Revenues, Cut by Jitney Competition

The annual report of the Union Traction Company of Indiana, Anderson, Ind., shows a deficit of $98,542 in net income of the company for 1918. This was caused principally by a decrease in business and an increase of 10 per cent in the cost of operation.

The revenue from operation for 1918 was $3,198,820, and the operating expenses $2,236,487. While the operating revenue in 1918 was 4.32 per cent greater than in 1917, the operating expenses were 10.52 per cent greater than in the year previous. The net operating revenue suffered a loss of 7.42 per cent.

For the year 1918, after a deduction of sinking funds, the deficit amounted to $98,542 as compared with a net of $42,142 in 1917. Officials of the company report that the business outlook has improved since Jan. 10.

A total of 16,597,199 passengers were carried on interurban and city lines in 1918, which was 3,086,077 fewer than in 1917. The inroad made by the jitney bus traffic was demonstrated by the fact that the company carried 7,402,744 passengers on its city lines in 1918, as compared with 8,375,460 in 1917.

Detailed financial and statistical statements for the last two calendar years are given in the accompanying statements.

INCOME STATEMENT OF UNION TRACTION COMPANY OF INDIANA FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Revenue from transportation:				
Passenger	$2,577,556	80.54	$2,588,176	84.40
Baggage	7,703	00.25	8,966	00.29
Parlor, chair and special car	2,215	00.07	7,787	00.52
Mail	2,744	00.09	1,836	00.05
Express	111,912	03.50	107,330	03.50
Milk	16,190	00.51	15,011	00.48
Freight	404,333	12.65	262,721	08.59
Switching	72	.....	....	.....
Total	$3,122,725	97.61	$2,991,830	97.56
Revenue from operation other than transportation	76,095	2.39	74,636	02.44
Operating revenues	$3,198,820	100.00	$3,066,466	100.00
Way and structures	$430,992	13.47	$366,641	11.95
Equipment	282,691	08.84	227,902	07.46
Power	570,907	17.85	496,420	16.18
Conducting transportation	592,216	18.51	547,091	17,84
Traffic	8,807	00.28	16,218	00.52
General and miscellaneous	350,874	10.96	369,334	12.04
Total	$2,236,487	69.91	$2,023,609	65.99
Net operating revenue	$962,333	30.09	$1,042,857	34.61
Taxes	138,909	04.34	142,589	04.65
Operating income	$823,424	25.75	$900,268	29.36
Other income	21,627	0.67	16,531	0.54
Gross income	$845,051	26.42	$916,799	29.90
Deductions	943,593	29.50	874,657	28.52
Net income	†$98,542	03.08	$42,142	01.38

†Deficit

COMPARATIVE STATISTICS FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918	1917
Passengers carried, interurban lines	9,194,455	11,307,816
Passengers carried, city lines	7,402,744	8,375,460
Total passengers carried	16,597,199	19,683,276
Freight handled (tons)	110,613	100,234
Express handled, exclusive of Wells, Fargo & Company Express (tons)	8,821	7,816
Mileage of cars, interurban lines	6,288,345	6,915,933
Mileage of cars, city lines	1,494,056	1,675,822
Total mileage of cars	7,782,401	8,590,755
Coal consumed at all plants (tons)	114,646	120,045
Power generated (a.c.) at all plants (kw.-hr.)	44,786,500	50,397,180
Power generated (d.c.) at all plants (kw.-hr.)	26,094,237	28,591,247

Receiver for New York Railways

Company Operating Many Surface Lines in Manhattan Borough Succumbs Under War-Time Burdens

Job E. Hedges, lawyer, noted after-dinner speaker, and one-time Republican candidate for Governor, was appointed receiver of the New York (N. Y.) Railways on March 20 by United States Judge Mayer. The petition was presented by the American Brake Shoe & Foundry Company, which is a creditor to the amount of $36,806. An answer filed by the railway at the same time that the petition was presented admitted all the allegations made in the complaint. The concurrence of the defendant in the action makes the transfer of the railroad property to the court a friendly proceeding.

Theodore P. Shonts, president of the railway, when asked how the receivership would affect the Interborough Consolidated Corporation and the Interborough Rapid Transit Company, declined to comment except to make it clear that only the New York Railways had been put in the hands of the court.

The New York Railways has been in financial straits for some time. The recent failure of the directors to declare a dividend on Interborough Rapid Transit Company stock aroused interest in the Interborough Consolidated, the holding company which has interest to pay on April 1 on Interborough-Metropolitan bonds. The holding company has depended almost entirely in the past for its income on the dividends paid on the stock of the Interborough Rapid Transit Company.

The allegations contained in the papers filed in court followed the line of statements issued by Mr. Shonts in the last eighteen months. They speak of the threatened disintegration of the property through lack of income to meet pressing obligations, the danger that inefficiency in operation resulting from lack of money and of borrowing capacity will embarrass the public, that a complete cessation of operation may be brought about, and that if many suits for debts were instituted the property might be entirely destroyed. The petition speaks thus of the earnings of the company:

> For the fiscal year ended June 30, 1918, the results from operation of defendant's system were such that the income was $153,633 less than the amount required to pay the interest on the first real estate and refunding mortgage 4 per cent bonds; that for the second six months of 1918, the defendant's income of the period was $738,187 less than the amount sufficient to pay such interest; that on Dec. 31, 1918, defendant's corporate deficit was $2,125,039; that all of the defendant's special and reserve funds have been exhausted and that the defendant has not sufficient credit to obtain the moneys requisite for the operation of its property.

In its answer to the complaint the railways admitted all of the allegations and joined in the prayer for the appointment of a receiver in order to preserve the system "as it has been maintained and operated," and particularly to preserve the "franchises, privileges, and property" and its corporate existence and the real and personal property. The petition makes no mention of any value set upon the property beyond stating the amount of the capital stock.

Mr. Hedges' appointment is temporary. At a hearing to be held on March 31 the appointment will doubtless be made permanent.

The New York *Times* says that Travis H. Whitney, acting chairman of the Public Service Commission, in discussing the receivership said that as the floating debts of the company amounted to $1,600,000 the receivership was inevitable. Asked what the value of the company's plant was he replied that the most recent statement of figures placed it at $65,000,000 in normal times and $85,000,000 at war-time prices. Mr. Whitney was quoted as follows:

> I shall be glad to co-operate in any way possible to insure a continuation of the service so that the public will not be inconvenienced. I hope the receiver will be able to handle the property so as to avoid a separation of the various lines, which would result in additional fares through the abolishment of transfers. The situation has been so serious that there was really no way out but to apply to the courts for relief.

Francis Sisson, vice-president of the Guaranty Trust Company, gave an interview to the *Sun* on March 19 which clarifies some of the questions at issue in connection with the inter-corporate relations of the New York companies and their need for more revenue. He also went over much of the ground covered by him in his address before the American Electric Railway Association at the meeting on March 14.

Oakland Valuation Planned

Following the plan outlined by the advisory board named by the City Council of Oakland, Cal., to take up the matter of the purchase by the city of the properties of the San Francisco-Oakland Terminal Railways, there was filed with the Railroad Commission of California on March 11 by the city attorney of Oakland, a request that the commission place a value upon the properties involved, which consist of the entire holdings of the company as they existed on Sept. 24, 1918, the date of the company's second application for a resettlement franchise. The original application was filed on Feb. 28, 1917. With the present request is filed a stipulation by the railway in which it agrees not to urge in the valuation proceedings the use of higher unit prices resulting from increases in the price of labor and materials occurring between the applications; also an agreement to reimburse the city of Oakland for the expense entailed by the valuation proceedings.

The application involves sixty-nine franchises in Oakland. The earliest franchise was issued in 1883 to the Oakland Railway. The sale will include all franchises held by the company in the city of Oakland except the suburban and interurban railroad franchises which were granted to the San Francisco, Oakland & San Jose Consolidated Railway and are used in connection with the ferry system.

$1,403,585 Is St. Louis Estimate of Year's Loss

A report submitted to the Public Service Commission of Missouri by the United Railways, St. Louis, Mo., for January shows that although fares have increased 20 per cent the passenger revenue increase is only 11.52 per cent for the eight months the 6-cent fare has been in operation. During the same period the number of revenue passengers has decreased 6.51 per cent. The communication of the railway to the commission follows in part:

> Complying with your order of May 15, 1918, we are hereby transmitting our operating report for January, 1919.
>
> We also inclose—
>
> (a) A table of statistics showing that for the eight months during which the 6-cent fare has been collected on city lines, the passenger revenue has increased 11.52 per cent, although the increase in fare was 20 per cent, and during this period the number of revenue passengers on city lines has decreased 6.81 per cent.
>
> (b) An estimate of the results of a year's operation under the 6-cent fare, based on the actual results of the eight months' operation, showing that for the year ending May 31, 1919:
>
> 1. The city lines will show a deficit of $695,285 in earning 6 per cent on a valuation of $52,800,000.
> 2. The county lines will show a deficit of $708,300 in earning 6 per cent on a valuation of $7,200,000.
> 3. The combined system of city and county lines will show a deficit of $1,404,585 in earning 6 per cent on a valuation of $60,000,000, which was the tentative valuation adopted in your order of May 15, 1918.
>
> We are submitting these figures so that your honorable commission may fully understand the situation.

Six New Directors at Dallas

The annual meeting of the directors of the Dallas (Texas) Railway was held in Dallas during the week ended March 15 for the election of officers and the transaction of other business. According to a statement given out from the office of President J. F. Strickland following the meeting, the poor showing which the company is making in financial returns and how to improve these conditions and increase the earnings were the most important matters considered. It was said that no line of action was determined on.

The program of improvements for 1919 under which $1,250,000 must be spent also was discussed. The company is not yet ready to announce all the new improvements to be made to comply with its franchise provisions for which it is bonded to the city.

Six new directors were elected as follows: La Monte Daniels, Charles F. Weiland, John V. Hughes, W. B. Head, C. E. Calder and G. A. Trumbull. The following directors were re-elected: Fred E. Johnston, J. C. Duke, M. L. Morris, W. R. Ellis, C. W. Hobson, H. A. Olmsted, J. H. McDonough, J. F. Strickland, J. K. Hexter, S. W. King, Jr., R. D. Suddarth, Orville Thorp, M. B. Shannon, W. S. Mosher and F. R. Bissell. Officers were elected as follows: C. W. Hobson, chairman of Board; J. F. Strickland, president; J. C. Duke, W. B. Head, C. E. Calder and Richard Meriwether, vice-presidents; J. B. Walker, secretary and treasurer; C. L. Cox, J. C. Thompson and W. R. Burns, assistants to the secretary and treasurer.

Financial News Notes

Dividend Action Put Off.—No action was taken in regard to the declaration of a dividend by the directors of the Toronto (Ont.) Railway at the meeting on March 11.

Receiver for Philadelphia Railways.—Judge Rogers in the Common Pleas Court No. 2 at Philadelphia, Pa., on March 13 appointed Murdock Kendrick as temporary receiver of the Philadelphia Railways. A further hearing will be held on April 15 to decide whether or not the receivership shall be made permanent.

Buffalo-Lockport Line Sold.—The property of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., was sold under foreclosure at Rochester on March 12 for $500,000 to W. A. Matson and W. W. Foster, Rochester, representing the bondholders. The plans for the reorganization of the company have been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Service Resumed in Natchez.—Electric railway service at Natchez, Miss., has been resumed after a suspension on all but one line for three months. It was stated by the Southern Railway & Light Company, owners of the system, that the suspension was made in order that repairs on track and equipment could be made. With the resumption of service the transfer system is eliminated but the old fare of 5 cents is retained.

New Jersey Company Increases Dividend.—The Public Service Corporation of New Jersey, Newark, N. J., has declared a quarterly dividend of 1½ per cent on the common stock, payable on March 31 to stock of record of March 28. The last two quarterly disbursements were of 1 per cent each, while two previous quarterly payments were 2 per cent, making a total of 6 per cent paid during 1918. A monthly dividend of ⅔ of 1 per cent was declared on the new 8 per cent cumulative preferred stock of the company, payable on March 31 to stock of record of March 20. This is at the rate of 8 per cent annually, but it was announced that hereafter payments on the preferred stock would be made quarterly.

Plans to Increase Authorized Stock.—Stockholders of Cities Service Company, New York, N. Y., at the annual meeting of the company in Dover, Del., on April 8 will be asked to approve an increase in the authorized preferred capital stock of the company from $100,000,000 to $150,000,000. It is felt by the directors in view of the great expansion of activities of the company, that provision should be made for its future financial requirements as well as for the conversion of the outstanding senior securities through the approval by the stockholders of a larger authorized amount of preferred stock, even though it is not the intention of the directors to issue any of the new stock in the near future.

Bay State Foreclosure Decree Entered.—Judge Morton in the United States District Court at Boston, Mass., has ordered the entry of a decree for the foreclosure of two refunding mortgages totaling $15,000,000 against the Bay State Street Railway. This is an important step toward the reorganization of the Bay State Street Railway. The Old Colony Trust Company and the American Trust Company petitioned the court. The Boston & Northern Street Railway and the Old Colony Street Railway are subject to the foreclosure order. The decree, when presented, will provide for transfer of the mortgage from the Bay State Street Railway to its successor under the reorganization plan, the Eastern Massachusetts Street Railway. When the reorganization is completed, the Bay State Street Railway will be under public control, similar to the Boston Elevated Railway. The terms of the proposed reorganization were reviewed in the ELECTRIC RAILWAY JOURNAL for March 15.

Holders of Birmingham Notes Act.—A committee which has addressed the holders of the 6 per cent two-year gold notes of the Birmingham Railway, Light & Power Company, Birmingham, Ala., due on April 1, 1919, says it is advised that there are no funds available for the payment of the notes, or interest thereon, due on April 1, 1919, and that in all probability default will be made in the payment of the notes and the interest. The company is already in the hands of a receiver and the committee representing the notes says the appointment of a receiver creates a condition which confers upon the trustee for the note issue the right, upon the written request of 35 per cent in amount of the notes outstanding, to declare the principle of all said notes immediately due and payable. Holders of the notes are being urged to deposit their securities with the Equitable Trust Company, New York, the depositary under the noteholders' protective agreement dated Feb. 15. The chairman of the committee representing the holders of the notes is Thomas J. Walsh, of E. H. Rollins & Sons, New York, N. Y.

Commission Can't Act Pending Dissolution Action.—The Public Service Commission for the Second District of New York has ordered closed on its records the complaint of the residents of Melville, L. I., against the Huntington Railroad over proposed discontinuance of service. Commissioner Fennell, who heard the complaint, said that, since the company is continuing to operate its road pending an action in the Supreme Court for dissolution, no issue is left for determination by the commission. It was stated that the papers in the proceedings for a dissolution are prepared and ready for service. The company, prior to 1910, operated from Huntington Station to Huntington Village and Huntington Harbor, Long Island, 3 miles. It was then extended about 15 miles across Long Island to Amityville. The company showed that from 1910 to 1917 its operating loss was $55,180, and in 1918, $15,764; operating revenue 1910 to 1917 inclusive, $380,423, and expenses including taxes, $435,603; operating expenses 1918, $56,964. The capital stock is $30,000; bonded debt $26,000; accrued interest since 1910 $11,000, and unfunded debt, $600,000.

Buffalo Troubles Multiplying.—The International Traction Company of New Jersey, which owns a large part of the stock of the International Railway, Buffalo, N. Y., faces foreclosure proceedings on April 1 when the ninety days of grace expire on the payment of interest on its $18,000,000 of collateral trust 4 per cent gold bonds. The interest became due on Jan. 1, 1919, and was not paid because the International Railway has not declared a dividend since March, 1918. The interest on the railway's bonds was paid a month ago at the expiration of the ninety days of grace, after $425,000 had been borrowed from New York interests. An addition of 5 per cent was made to the unpaid taxes of the International Railway on March 15. The taxes were due the city on March 1. The bill is approximately $300,000. An additional fee will be charged every month the tax is not paid. The $300,000 due the trainmen as back wages is due in April. The back pay is based on the award of the War Labor Board which gave the men a retroactive wage increase from June 1, 1918, to the time of the strike in October. The company has not sufficient funds with which to pay the men this award.

More People at Greater Cost.—The Dallas (Tex.) Railway carried more people during January, 1919, than in any previous month of its history, according to a report compiled by Grover C. Bland, chief accountant in the office of the Supervisor of Public Utilities. The report shows net earnings at the rate of only 3.63 per cent, however, despite the large number of passengers carried. Under the service-at-cost franchise the company is permitted to make a net return of 7 per cent on the agreed valuation. The report shows total revenues of $175,569 as compared with $120,676 in January a year ago, a gain of $54,892. The net return on the investment during January, 1918, amounted to 2.22 per cent. The operating expenses during January, 1919, amounted to $155,143, while the expenses during January a year ago amounted to $109,104. The report further shows that 3,468,396 revenue passengers and 540,950 transfer passengers (a total of 4,000,346) were carried during January, 1919. It is also shown that the Dallas Railway increased its mileage operation 18 per cent over a year ago. The total car-miles for January, 1919, was 609,049. Expenditures for maintenance and repairs amounted to $30,839 as compared with $12,447 during January, 1918.

Traffic and Transportation

Wants Eight-Cent Fare

Los Angeles Line Plans Open Five-Cent Zone of One and One-Half Miles with Eight Cents Outside

The Pacific Electric Railway, Los Angeles, Cal., suffered a net loss of $1,695,143 during the year 1918. The increase in revenue which will be derived from increased fares now proposed by the company, if granted, will fall far short of making up this deficit for 1918, or the deficit which the company is facing for 1919, but will afford some much needed relief. The company has applied to the State Railroad Commission for authority to establish the following fares within the city of Los Angeles:

> An open 5-cent fare zone to extend approximately 1½ miles from the center of the business district with an open 8-cent fare in the remaining territory on all lines where the fare is 5 cents at the present time. It is also proposed to sell a commutation ticket containing twenty rides for $1 or 5 cents per ride. This ticket will be good to any point within the proposed 8-cent zone and will include transfers. It will be sold by conductors as well as by ticket agents but will be limited to ten days from date of sale providing two rides only for any one day during that period. Ticket will be transferable and will be good for the use of any person presenting the same, but only two rides can be used on any one day. The purpose of this ticket is to accommodate the daily rider who will continue by using the same to have the benefit of the 5-cent fare.

In the cities outside of Los Angeles, including Pasadena, South Pasadena, Long Beach, Santa Monica, Venice, Pomona, San Bernardino, Riverside, Redlands, etc., the company has applied to the Railroad Commission for permission to establish an open 7-cent fare with the same 8-cent ride commutation ticket at 5 cents per ride as proposed for Los Angeles.

Permission was granted to the Pacific Electric Railway in September, 1918, to increase and adjust its interurban fares. This was done, but no increase was made in fares within the city of Los Angeles and other outside cities.

It is not proposed by the Pacific Electric Railway to change its present interurban fares except to increase to 7 cents fares which are now 5 cents or 6 cents. This will place the minimum for interurban fares the same as the proposed 7-cent fare in cities outside of Los Angeles.

Six Cents in Cincinnati April 1

The Cincinnati (Ohio) Traction Company made public announcement on March 15 that beginning on April 1 it will charge a 6-cent fare. Under the terms of the revised franchise the company does not have to notify William C. Culkins, street railroad director, of its intention, but must give its patrons public notice by March 15.

The fare was increased to 5½ cents at the beginning of this year under the service-at-cost arrangement.

At present children under ten years may ride on tickets that, in strips, cost 2¾ cents each. There will be a flat rate of 3 cents for children under the revision.

By the terms of the franchise revision grant the company is allowed to raise the cost of fare until it creates a certain reserve or stabilizing fund.

Recently it announced the per capita cost of carrying passengers was more than 6 cents.

Raising of $1,200,000 by the Cincinnati Traction Company through equipment trust certificates at 6 per cent interest, to be paid in ten annual installments, has been approved by Director Culkins. The issue also must be approved by the State Public Utilities Commission. The money will be spent for 150 new double-truck cars.

Indianapolis Case Carried Up

A complaint asking that the Indianapolis Traction & Terminal Company, Indianapolis, Ind., be enjoined from collecting a straight 5-cent fare in the city of Indianapolis, because of its franchise contract providing for the sale of six tickets for 25 cents and twenty-five tickets for $1 was filed in the Superior Court of Marion County on Feb. 26.

The complaint is brought in the name of Edward Barry, a member of the Typographical Union, representing the Central Labor Union which caused the proceedings to be instituted, and also names as defendants the Indianapolis Street Railway and members of the Public Service Commission of Indiana. It is alleged in the complaint that the order of the Public Service Commission issued in October, 1918, authorizing increased rates, gives the railway the right to take property without just compensation, in violation of the terms of the state constitution and also in violation of the constitution of the United States.

It is also alleged that the city officials in Indianapolis have failed to take the proper steps to have the order of the commission set aside and a demand was served upon the city by the organization represented by Mr. Barry.

It is expected that the case finally will be taken to the Supreme Court of Indiana on appeal, regardless of the decision in the Superior Court. No date has been set for a hearing of the complaint.

This action is the result of the refusal of the Public Service Commission of Indiana on Feb. 12 to consider a petition filed by the West Side Improvement Organization and Edward P. Barry asking for a re-hearing in the fare case of the Indianapolis Traction & Terminal Company, as reported in the ELECTRIC RAILWAY JOURNAL for Feb. 22, page 385.

Board Ruling Forecast

Chicago Hears Illinois Commission Will Deny Request of Surface Lines to Charge Seven Cents

Coincident with the announcement on March 17 of the report of the Chicago (Ill.) Surface Lines for the year ended Jan. 31, 1919, showing a decrease in residue receipts of $3,034,776, there was published in the newspapers a statement that the Public Utilities Commission of Illinois would allow no increase in the rate of fare. While this statement regarding the prospective ruling on the fare case is unofficial, it has been hinted in the financial district of Chicago for some time that the commission would refuse to give relief to the surface companies.

The commissioners are said to take the position that the war-time stringencies which caused these companies to ask for an increase are rapidly passing. It is true that the business of the Chicago Surface Lines has been picking up slightly, but the annual report indicates that a considerable gain in revenue will be required to meet the heavy burden of wages and materials. At the present time the surface companies are not earning the 5 per cent interest rate allowed by ordinance on the purchase price.

While the Chicago companies are awaiting an official announcement on the fare petition from the Public Utilities Commission, the Mayor and the Aldermen are busy in the State Legislature in a fight for "home rule." The city wants to regulate traction, telephone, electric light and gas rates and service as it did before the creation of the commission. The City Council recently adopted resolutions to this effect.

Portland Suburban Fares Protested

The Public Service Commission of Oregon recently set March 11 as the date for reopening of the rate case, and rehearing of evidence on rates on all interurban lines, following protest by the city of Portland against the new schedule of passenger rates on interurban lines of the Portland Railway, Light & Power Company. The new rates became effective on Jan. 1, 1919. The principal protest against them came to the Council from the Ardenwald and Errol Heights districts, where patrons declare the 7-cent fare, without transfer privilege, to be discriminatory, because patrons at Lents, a greater distance from the city, have a 6-cent fare, with transfer. Particular protest has been voiced by interurban patrons at the failure to require issuance of transfers with commutations or cash fares on interurban lines. The transfer privilege was removed by the Public Service Commission, on the theory that the interurban system was separate and distinct from the local lines and that transfers should not be interchanged between the two divisions of the railway.

Another Partial Fare Victory

Supreme Court Holds Atlanta Company May Increase Fare to East Point, but Not to College Park

The Georgia Supreme Court on March 15 handed down its decision, in the fare case between the city of Atlanta and the Georgia Railway & Power Company. The company lost its mandamus suit in the Superior Court, at which time it pleaded that the Railroad Commission of Georgia should assume jurisdiction in authorizing an increase in fare. Prior to this suit, the commission recommended to the City Council of Atlanta that the company be permitted to charge a 6-cent fare. The commission held that it did not have jurisdiction to order an increased fare as the city and the company had executed certain franchises previous to 1907 when the State Legislature clothed the commission with power to regulate electric railways and lighting utilities. The salient features of the decision just rendered are as follows:

> 1. Under the proviso contained under the fifth section of the act approved on Aug. 23, 1907, now embodied in the civil code 2662, the Railroad Commission of this State was without authority to exercise the powers conferred and extended by that act, so as to determine or fix fares upon lines of electric railroads within the limits of any town or city between which and the railroad operating such line there was a valid, subsisting contract at the time of the passage of the act.
>
> (a) There was such a contract between the city of College Park and the Georgia Railway & Power Company, and between that company and the city of Decatur as to one line, running from Decatur to Atlanta.
>
> (b) But, as between the cities of Atlanta and East Point and the Georgia Railway & Power Company there was no such contract.
>
> (c) But there was a contract covering the subject of transfers, which provided that upon the payment of one full fare a transfer should be given and the railroad commission was without jurisdiction to deal with the matter of transfers.
>
> 2. A grant of power to a municipal corporation must be strictly construed and such a corporation can exercise no powers except those that are expressly given, or are necessarily implied from expressed grants. Applying this principle to the facts contained in this record the city of Attanta was without authority to pass an ordinance fixing the rates of fare upon the railway lines constructed within the limits of the municipality, and any attempt by the municipality to pass such ordinances was nugatory.
>
> 3. In the absence of a valid, subsisting contract and ordinance on the subject of fares, it was the duty of the Railroad Commission, upon application by the Georgia Railway & Power Company, a street railroad company, to fix and determine the rates of fare upon the line of the street railroad in the city, in accordance with the law defining the powers and duties of the commission.

Mayor Key of Atlanta made the following statement:

> I have not been advised by the city attorney yet as to the exact course the proceeding will take from this point on, but the probability is that the case will again be before the Railroad Commission for a hearing on its merits, and that all the facts will be gone into, particularly those facts which have developed since the last hearing before the commission. The case before the commission was for a 6-cent fare. I presume that unless a new case is made the investigation will be confined to that issue.
>
> The consideration heretofore given the case was mainly that of an emergency war matter, this emergency will probably be given more amplitude on the next trial, the commission will have time and opportunity of going definitely into the question of valuation which it did not before.
>
> As a matter of general interest, however, it must be borne in mind that the experience of the country is that increases in fare, however high, are very disappointing as a method of increasing revenue. It is a grievous burden to be borne by those who must use the cars, but does not affect those who do not have to use them.
>
> All of these things are surely and certainly pointing the way to municipal ownershop.

P. S. Arkwright, president of the Georgia Railway & Power Company, is of the opinion that although the war is over, labor and material have shown no decrease, and the commission will, therefore, follow its original recommendation with an order for higher fares. The Supreme Court's decision is not quite clear, in that it says the company may increase its fare to the city of East Point, but cannot increase the fare to the city of College Park, which is 1 mile beyond East Point on the same route.

Jersey Zone Hearing March 26

The Public Service Railway, Newark, N. J., which has submitted to the Board of Public Utility Commissioners a plan for a zone system of fare collections on its lines effective on April 1, has asked the board to permit this system to become effective on the date mentioned and to modify its order requiring the company to charge on and after April 1 a fare of 6 cents and an additional charge for transfer where 7 cents and an additional charge for transfer are now charged. The board has placed the application on its calendar for hearing in Newark on March 26.

Contract or No Contract, Rates Must Be Fair

A city is not empowered to make a binding contract with a traction company, or other public utility company, regarding rates, but such rates, regardless of ordinance provisions to the contrary, are at all times subject to a revision on a basis of a fair return to the public service company concerned, according to a decision rendered by Judge Duval West of the United States District Court for the Western District of Texas, sitting at San Antonio. The decision was rendered in a suit brought by the San Antonio Public Service Company against the city of San Antonio to gain authority to increase its fares from 5 cents to 6 cents, as referred to previously in the ELECTRIC RAILWAY JOURNAL.

Judge West held that the franchise ordinance under which the Public Service Company operates its cars does not constitute a binding contract in so far as the 5-cent fare is concerned. The immediate effect of the decision is to bring the railway company's case within the jurisdiction of the United States Courts and to open the way for the trial of the case in that court on its merits. Under Judge West's holding, any public service corporation may go into the courts and on a proper showing secure an annulment of a franchise rate fixed by the city, and obtain a rate sufficient to enable it to receive what the trial court deems a fair return on the corporate investment made by the company.

Ticket System at Portland, Me.

A new fare system substituting tickets for cash was inaugurated on the railway lines of the Cumberland County Power & Light Company in Portland, Me., on March 2, in accordance with recent findings of the Public Utilities Commission of Maine. The entire electric railway system known as the old Portland Railroad has been divided into zones in which the fare is figured at the rate of 2 cents per zone, with a minimum ticket fare of 6 cents and a cash fare of 10 cents. A 4-cent rebate is given to all passengers paying a 10-cent cash fare, redeemable before midnight of the day following at fifteen specified points on the system. The great majority of the company's patrons will use a ticket good for five rides and selling for 30 cents on the cars and at the main office of the railway in Monument Square in the heart of the city of Portland.

For use in paying fares in zones beyond the first three traversed a zone ticket may be used, also selling for 30 cents and covering transportation through fifteen zones. A central transfer area has been established in the heart of the city, so that practically all points within a mile of Monument Square may be reached on a single fare. Various through commutation tickets are also sold. An extended campaign of education was carried on before the new system went into effect, and the public appears to be receiving it most favorably. In a later issue the details of the new schedule will be described, with particulars of the campaign conducted.

New Fare Tariff Statute Interpreted

The Public Service Commission of Washington has construed the new statute passed by the recent session of the Legislature to mean that affirmative action by the commission is required under the regulation statute as amended, before a change in railway rates can become effective. The statute gives the commission power to exceed the 5-cent fare limit on all but municipally owned lines. The commission's view of the statute will abolish the former rule permitting a rate increase to become effective automatically thirty days after filing with the commission if no protests are made. Under the rule now established, hearings will have to be held and orders issued by the commission whether or not formal protest is filed on behalf of the patrons against an increase in rates by the railway.

Transportation News Notes

New Commutation Rates Suspended.—The Public Utilities Commission of Illinois has resuspended until Sept. 8, 1919, proposed advances of commutation fares by the East St. Louis & Suburban Railway, East St. Louis, Ill.

Electors Revoke Fare Increase.—The electors of Saginaw, Mich., have defeated the revocable franchise providing 6-cent fares granted the Saginaw-Bay City Railway last summer, piling up 9000 votes against the increased rate and but 4000 for it.

Worcester Fare Increase Postponed.—The tariff of the Worcester (Mass.) Consolidated Street Railway, which established a 7-cent fare unit on the system, has been suspended until March 31 by the Public Service Commission in an order dated March 7.

In Favor of the Railway.—Judge Martin J. Wade of the Federal Court has ruled against the application of Samuel Seeman, Des Moines, Ia., in his petition to make the receivers for the Des Moines City Railway parties to his suit to force the sale of six tickets for a quarter.

Wants Further Fare Increase.—The Sherbrooke Railway & Power Company, Sherbrooke, Que., is seeking an increase in fare to 7 cents cash or five tickets for 30 cents. Last December the company was authorized to increase fares from 5 cents cash or six tickets for 25 cents to 6 cents cash or five tickets for 25 cents.

Back to Its Peace-Time Basis.—The Illinois Traction System, Peoria, Ill., is at work on its new time-card and is planning better and quicker train service. Two fast trains have been added between Champaign and Springfield and it is said that the company will arrange to restore parlor car and other pre-war service very soon.

Yonkers Abandonment Case Closed.—The Public Service Commission for the Second District of New York heard oral argument at Albany a few days ago on the appeal of the Yonkers (N. Y.) Railroad for permission to abandon certain of its lines. Briefs have already been filed. The commission has reserved decision.

Authority Over Autos.—The Phipps bill recently passed by the Senate at Olympia, Wash., gives the Public Service Commission control over auto stages, and municipal authorities power to regulate city jitneys. The 5 and 10-cent buses are required to operate along routes selected by the city authorities and to continue in operation regularly.

Six Cents for Akron.—The Council of Akron, Ohio, on March 10 reconsidered its action against the 6-cent fare ordinance and passed an amended ordinance granting the fare to Northern Ohio Traction & Light Company. The amendment provides that work shall be begun thirty days after the ordinance takes effect on the extension of the lines as provided for in the ordinance, known as the Myers-Morse-Witwer ordinance.

Fare Advance in Violation of Franchise.—By order of the Public Utilities Commission of Ohio effective on March 3, the Portsmouth Street Railroad & Light Company, Portsmouth, Ohio, cannot charge increased fares on its line from New Boston to Sciotoville and Wheelersburg, as proposed in a new schedule filed with the commission several weeks ago. The commission holds the proposed increase is in violation of the company's franchise rights in New Boston.

Wants Legislature to Oppose Zones.—Assemblyman Rowland, of Camden County, has introduced a resolution in the Legislature of New Jersey asking the House to go on record with a request to the Board of Public Utilities Commissioners that the application of the Public Service Railway to establish the zone system be denied. The resolution has been referred to the judiciary committee. The Assembly will be requested to take action on the resolution later.

Quid pro Quo in Los Angeles.—President Edgerton, of the State Railroad Commission of California, in a recent address said, in effect: "The public in general does not object to paying a reasonable rate providing they get adequate service." To this the Pacific Electric Railway, Los Angeles, Cal., in its own magazine has replied: "Officers and employees of the Pacific Electric Railway, therefore, must bend their energies to perfecting prompt, fast and efficient service."

Spokane Fare Hearing March 31.—A hearing will be held in Spokane, Wash., on March 31 by the State Public Service Commission, on the application of the Spokane & Inland Empire Railroad and the Washington Water Power Company for permission to increase their fares to 7 cents, with 1 cent additional for each transfer. Proposals by city officials that concessions in the way of waivers of franchises and bridge taxes, paving maintenance, etc., be accepted in lieu of fare increases, have been rejected by the railways. The Spokane & Island Empire Railroad is in the hands of a receiver.

Want Eight Cents in Yakima.—N. C. Richards, president of the Yakima Valley Transportation Company, Yakima, Wash., has announced that he will apply immediately to the State Public Service Commission for permission to raise the fare on the company's city lines here from 5 cents to 8 cents, the plan including the sale of five tickets for 35 cents. According to Mr. Richards, the city lines, taking into account taxes and interest charges, showed a loss last year of about $45,000. Including suburban lines, the system, as a whole, had a deficit of $59,000.

Jitneys Resume in Dallas.—Jitneys have resumed operations in Dallas, Tex., following an opinion from the office of the City Attorney that the jitneys could operate unhindered provided they remained outside the zone marked out by the law within which their operations is prohibited by the city ordinance that has been upheld by the state courts. The jitneys are now operating on Ervay Street as far as Young, which marks the southern boundary of the prohibited zone. Since the Ervay cars are being turned at Ervay and Commerce on account of the laying of new rails on Main Street, the jitneys are proving strong competitors.

Increase for Nebraska Interurban.—An order was issued by the State Railway Commission recently to the Omaha, Lincoln & Beatrice Railway, Lincoln, Neb., authorizing the company to increase rates beginning on March 15. The company is authorized to collect 6 cents for each ride between Lincoln and University Place, and Lincoln and Bethany; 5 cents within the Lincoln zone; 5 cents between the University Place zone and the Bethany zone and 5 cents between University Place and Bethany. The road has never paid expenses. It has maintained a 5-cent fare to University Place and Bethany ever since the Lincoln Traction Company got a 6-cent fare, but the commission finds this difference in rates made no appreciable increase in revenues for the interurban.

Fare Case in Binghamton Put Over.—At a hearing before the Public Service Commission for the Second District of New York on March 11 it was decided to postpone for three weeks the argument in regard to the affairs of the Binghamton Railway. It is hoped that in the meantime the appeal taken by the city of Binghamton and town of Union from United States Judge Rays' decision favoring the receiver, to the United States Circuit Court of Appeals, New York City, will be determined by the higher court. The company seeks authority to add 1 cent to the fare. The city alleges a contract exists between city and company, preventing such a raise in the fare. This, the company denies. The appeal was returnable on March 17.

Another Partial Victory at Des Moines.—Both the Des Moines City Railway and the city of Des Moines, Ia., won a partial victory in the hearing before Federal Judge Martin J. Wade at Ottumwa, Ia., when Judge Wade took the service case out of the hands of Polk County District Courts. Judge Wade ruled that so long as the Des Moines City Railway was being operated by receivers the state courts had no jurisdiction and that no more injunctions could be issued by the state courts against reductions in service. On the other hand Judge Wade held that the Des Moines City Railway could not put into effect new schedules covering reductions in service without first making a showing to him that the service cuts were necessary in order to meet expense.

Steady Improvement in Birmingham.—The number of cars being operated daily by the Birmingham Railway, Light & Power Company, Birmingham, Ala., is showing a steady increase as the railway system gets more nearly on a normal basis. The report made by J. S. Pevear, general manager of the company, to the Public Service Commission of Alabama shows that for the seven years ending on Feb. 28, an average of 208 cars was operated. The maximum number operated during the same period was 211. The report is comparative and shows that for the seven days ending Feb. 15 an average of 182 cars was operated with a maximum of 194. During the period covered by the report there was a gain of four men in the train service, six dispatchers, and one shop employee.

Youngstown Has Deficit Under Service at Cost.—Service at cost for the lines of the Mahoning & Shenango Railway & Light Company in Youngstown, Ohio, shows a deficit of $259 for the first sixteen days of operation, according to the first report of Street Railway Commissioner W. L. Sause, submitted to City Council recently. The service-at-cost ordinance became effective on Jan. 16, and the report is for the period of Jan. 16 to 31 inclusive. The terms of the service-at-cost grant in Youngstown were reviewed in the ELECTRIC RAILWAY JOURNAL for Jan. 11, page 99. The action of the city in passing the ordinance ended a controversy between the company and the city on the subject of service and a more recent dispute between the company and its employees about wages. The initial fare was 5 cents cash and 1 cent for a transfer. The next highest fare is 6 cents cash with nine tickets for 50 cents.

P. R. T. Denies Commission Has Authority.—A demurrer has been filed by counsel for the Philadelphia (Pa.) Rapid Transit Company challenging the jurisdiction of the Public Service Commission over the rate of fare on the ground that the 1907 contract with the city, in which the rate was fixed, antedates the formation of the Commission in 1912. The demurrer sets forth that, "the various rates of fare in use upon the consolidated system have been approved and fixed by contract entered into with the city of Philadelphia on July 1, 1907, and that the rates of fare having been so regularly fixed by agreement before the date upon which the Public Service Company law became effective, are not subject to alteration or adjustment without the consent of both parties." The company in Philadelphia has in use an 8-cent exchange ticket. Complaint against this system was made to the commission on July 16, 1917, by the Northwest Business Men's Association. On account of the demurrer the hearing before the commission has again been put over indefinitely.

Personal Mention

Changes in Birmingham Personnel

Fred V. Underwood has been made assistant general manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala. He took up his duties with the company on March 10, after having resigned his position as superintendent of production with the Alabama Power Company to accept the place. Mr. Underwood is a brother of Senator Oscar Underwood. He was connected with the Birmingham Railway, Light & Power Company for a number of years, but resigned from the company last October to go with the Alabama Power Company.

J. S. Pevear, general manager, will be relieved of some of his duties by the appointment of Mr. Underwood. Mr. Pevear will devote a good deal of his time to the work of rehabilitating the properties of the company. This work has been undertaken by the receiver and is being pushed through as rapidly as possible.

L. L. Newman has been named chief engineer. He will devote practically all his time to maintenance work.

H. E. Cox, formerly an engineer for the Birmingham Steel Products Company, will be Mr. Newman's assistant.

In a statement to the press Mr. Pevear said that in view of the fact that the receiver intended to rehabilitate the property as rapidly as possible Mr. Newman would devote practically his entire time to the work of getting the tracks, ways and structures of the company in shape in the shortest possible time.

Changes in Power Department

R. W. Lamar has been appointed manager of the power department of the Monongahela Valley Traction Company, Fairmont, W. Va., and Francis McQuillan has been appointed assistant manager of the power department.

Both Mr. Lamar and Mr. McQuillan will have headquarters in Fairmont, W. Va.

Captain Lamar has only recently secured his discharge from the United States Army. For the past several months he has been connected with the power section of the War Industries Board where he rendered valuable service to the government and won the commendation of his superior officers. He is a graduate electrical engineer, having secured his education at Washington University, St. Louis, Mo.

The assistant manager of power has been with the Monongahela Valley Traction Company for some time. He held the title of commercial engineer in the power department, so that he will be entirely familiar with his duties in that department.

A reorganization of the power department became necessary because of the enlarged responsibilities of that department with the construction of the Riversville power plant, and also because D. A. Maurer, who has been chief electrical engineer for the company for several years, recently decided to devote his entire time to his private interests. He is the head of the Fairmont Electrical Service Company and also the Mine Service Supply Company, Fairmont.

Personnel of Seattle's Municipal Railway

Thomas F. Murphine, superintendent of Public Utilities, Seattle, Wash., has been appointed to have charge of the electric railway system which the city has purchased from the Puget Sound Traction, Light & Power Company. The property will be taken over by the city early in April. Mr. Murphine is rapidly completing plans for organization of his department. He has accordingly announced that three members of his present staff will be retained. Edward I. O'Brien, assistant superintendent of the utilities department for nine years, will continue in that position. J. J. Wettrick, chief engineer, will become chief engineer of the new railway and will also be superintendent of way and structure. Allen B. Hiatt, chief accountant in the utilities department, will become auditor of the railway system.

Present plans contemplate the operation of the railway system through five general departments—the mechanical, engineering, transportation or operation, correspondence and intelligence. The latter department has been originated by Mr. Murphine, who intends it to represent the public, and to act as a buffer between the people who use the cars and the department. Service complaints or other matters affecting the public will be investigated by this department. The members of it will be responsible only to the superintendent of utilities. The department will also include an educational branch, for the purpose of familiarizing the public with measures that will ultimately result in better service.

The intelligence department will also be required to follow the three contracts which are part of the railway deal. Mr. Murphine believes that with the right man on the job, considerable saving may be effected on the contract for purchase of electric current from the traction company for the operation of the cars. The intelligence department will also be required to keep a lookout for leaks in the use of current. Mr Murphine further believes that the department will be able to make money for the city on the interurban contracts. The city has agreed to permit the Tacoma and Everett interurban trains, which will continue under the Puget Sound Traction, Light & Power ownership, to operate over the municipal tracks on a mileage basis, taking into consideration the weight and number of cars.

E. Commodore Bowman, general superintendent of the Monongahela Valley Traction Co., will be transferred to Fairmont, W. Va., on April 1. Mr. Bowman has had his offices in Clarksburg for some time.

Frank T. Hamilton, vice-president of the Omaha & Council Bluffs Street Railway, Omaha, Neb., has been elected president of the company to succeed G. W. Wattles, resigned. Mr. Wattles has been made chairman of the board. No succession to the first vice-presidency has yet been announced.

J. N. Tabb, assistant treasurer of the Monongahela Valley Traction Company, Fairmont, W. Va., has resigned and moved to Parkersburg, W. Va., where he will be associated with the Crawford oil interests. Mr. Tabb went to Fairmont as assistant treasurer of the Monongahela Valley Traction Company when the Kanawha Traction & Electric Company's interests were absorbed by the Monongahela Valley Traction company several years ago.

W. V. Neal, former resident of Parkersburg, W. Va., but more recently connected with the Trinidad (Col.) Traction Company, has been appointed assistant general manager of the Monongahela Valley Traction Company with headquarters at Clarksburg, W. Va. For several years Mr. Neal was connected with the Stone & Webster interests at El Paso, Tex. He was also for several years an employee of the United States government and had charge of the construction of numerous government projects in the Philippine Islands.

George M. Alexander, who returned to Fairmont, W. Va., recently after a number of months' service in the ordnance department of the War Department has been elected president of the Monongahela Valley Traction Company. This action followed the resignation of S. L. Watson, chairman of the board of directors, and the advancement of J. O. Watson, until this time president of the company, to the position of chairman of the board. The new president has been identified with the company for a number of years as the head of its legal department. Upon him fell much of the detail involved in the absorption of the Parkersburg lines, the purchase of the Stafford mine and the beginning of the great power plant at Rivesville, which undertaking is now nearing completion.

Edward A. West, formerly chief engineer of the Denver (Col.) Tramway and the Denver & Intermountain Railroad, has been appointed general superintendent of the companies. Mr. West was called to Washington early last year and requested to take charge of passenger transportation and housing matters for the United States Shipping Board, Emergency Fleet Corporation, on the Pacific Coast. The territory covered extended from San Diego, Cal., to Bellingham, Wash., and comprised three shipyard districts, the Southern Pacific District, North Shipping District and Wood Ship Division No. 11. About the first of the year he resigned from the Emergency Fleet Corporation and returned to the Denver Tramway and the Denver & Intermountain Companies as general superintendent.

J. E. LAWLESS

J. E. Lawless has recently been appointed master mechanic of the El Paso (Tex.) Electric Railway. Mr. Lawless was born in Smithland, Ky., on June 3, 1880, and was graduated from the English High School, Hampton, Ky., in 1896. Subsequently he completed the correspondence course in electrical engineering with the International Correspondence Schools. He entered electric railway work in 1898 and has been connected with Stone & Webster for a number of years in different branches of that company's organization. He was formerly master mechanic of the Paducah Traction & Light Company, Paducah, Ky., and later general foreman of the Northern Texas Traction Company, Fort Worth, Tex. He entered upon his duties as master mechanic of the El Paso Electric Railway on Jan. 1 of this year.

J. R. Wilson, traffic manager of the Sacramento Northern Railroad, office at Sacramento, Cal., has tendered his resignation to President G. F. Detrick effective on April 30. Mr. Wilson went to Sacramento nearly five years ago to become traffic manager of the Northern Electric Railway, which, after its reorganization, adopted the name of Sacramento Northern Railroad. Prior to this he was with the Southern Pacific Company general freight office in San Francisco and later commercial agent for the Illinois Central Railroad in that city. Mr. Wilson has made no announcement as to his future connections. The appointment of his successor will be made later.

Guy C. Pierce, Los Angeles, Cal., has been elected vice-president and general manager of the Northwestern Electric Company, Portland, Ore., succeeding Wilbur E. Coman, who, as noted previously in the ELECTRIC RAILWAY JOURNAL, has become connected with the Washington Water Power Company at Spokane. During the greater part of 1909 and 1910 Mr. Pierce represented Eastern capital interested with R. C. Gillis in the development of the Mt. Hood Railway & Power Company's projects at Portland, which later were taken over by the Portland Railway, Light & Power Company. Mr. Pierce became identified with the electrical industry at Sacramento in 1887 and was responsible for a number of the pioneer lighting and power installations in California. In the three years from 1901 he was located at Mexico City in charge of electrical properties and during the two years following he was chief inspector for the Hudson & Manhattan Railroad at New York. From 1906 to 1909 he was identified with the East St. Louis & Suburban Railway, controlled by E. W. Clark & Company, Philadelphia, now interested in the Portland Railway, Light & Power Company. In the four years following his temporary residence in Portland, Mr. Pierce represented Eastern capital in reporting on proposed railway and hydroelectric power projects in states bordering on the Pacific Coast.

Obituary

Charles F. Bachman, East Orange, N. J., master mechanic of the Essex division of the Public Service Railway, died recently after a brief illness from pneumonia. Mr. Bachman was born in Wilkes-Barre, Pa., in 1885. After graduating from the school of mechanical engineering at Cornell University he moved to Elizabeth, N. J. He had been employed by the Public Service Railway for the last eleven years. Mr. Bachman leaves a widow and an infant son.

John J. Gettings, superintendent of the Central division of the Public Service Railway at Elizabeth, N. J., died recently at St. Elizabeth's hospital at that place after a brief illness from pneumonia. He was stricken while at work at the carhouse. Mr. Gettings was born in Brooklyn forty-nine years ago. For a time he was employed by the Brooklyn Rapid Transit Company, and in 1903 became identified with the Public Service Railway. He was stationed at Newark at first. Several years ago he was appointed superintendent of the Central division. Mr. Gettings is survived by a widow.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Lower Prices Required for Successful Export Trade

Better Co-operation as to Consumer Requirements and More Consideration on Deliveries Needed

In outlining the steps which American manufactureres must take to hold their foreign trade, E. M. Herr, president of the Westinghouse Electric & Manufacturing Company and a director in the American Manufacturers' Export Association, declared recently that reductions in high wages accompanied by a reduction of prices were essential.

"The development of export business in electrical machinery, under the present condition of export markets," said Mr. Herr, "would be very rapid and of unusual extent were it not for the high prices which must now be charged for this product. There are some countries which, owing to the ravages of war and the necessity of first remedying the most serious destructive effects of this strife, cannot immediately take up the development of peaceful pursuits. It is in this that electrical machinery finds its legitimate field.

"The most vigorous effort should be made by those engaged in the manufacture of electrical machinery to bring prices to a point approximating those obtained for this material in foreign countries, as with the domestic market slowing down, due to the transition from war to peace conditions, the present time is particularly advantageous for the development of the export field. It is encouraging to note important decreases in the cost of a few of our raw materials and if some yielding of the very high labor costs can also be obtained, we would very soon find an expansion of the export demand for electrical machinery that would more than compensate labor for any sacrifices in hourly rates by the longer hours and more continuous employment which would result.

"In the industrial countries of the world the enormous increase in demand for manufactured products caused by the war has shown the great need for and advantage in the use of electrical machinery, making those countries particularly keen to avail themselves of the economies and advantages of electrical power. This is especially true in countries where fuel is scarce and expensive and where water power is available. Plans are already well matured for the development of larger central electrical power stations in some of the most important industrial countries and extensive projects for the electrification of some of their railroads are well under way. The smaller and less economical steam plants will in this way be displaced by larger and more economical ones and the demand for transmission and current-consuming devices be greatly enlarged.

"The largest electrical manufacturing companies abroad are in Germany and it will be some time before they can operate advantageously. This will give the American companies an unusual opportunity, if promptly seized, of bringing our exports of electrical machinery to an amount and value which is not possible under normal conditions.

"In seeking electrical machinery business in export territory, our agents must make their principals realize that the machinery we sell these people must be designed and built for their requirements and not, as has in the past too often been the case, as we are accustomed to build it. Much effort has been expended in trying to convince the foreign buyer that our styles and construction were best and should be satisfactory to him, instead of making a real effort to ascertain just what he desired and then furnishing it.

SERVICE MUST BE GIVEN

"In addition to adapting our goods to export requirements, we must arrange to give service in this trade at least as good as in our domestic market. Too often export shipments have been delayed and foreign customers disappointed on account of the domestic demand becoming suddenly unusually active, when export orders were made to wait while the rush of domestic orders was worked off. This policy is fatal to proper progress in export trade and must be abandoned if real development of the foreign field is to be secured. In fact, just the opposite policy should be pursued and export shipments given preference over domestic, as, because of infrequent transportation service, failure to meet sailing dates results in a very much more serious delay to the customer than the actual delay in production—a condition which does not obtain in domestic business because of better transportation facilities.

"We should never forget in any industrial business that we are selling service as well as product and that however good the quality of one's product, if the material does not come when needed, is not packed properly, or in any other way our service to the customer is unsatisfactory, the transaction fails to tend to tie him to the producer and permits a competitor to obtain a foothold not otherwise possible. These are ordinary principles of business but apply with unusual force when we are dealing with foreign customers.

Maintenance Prices Show Little Change

Copper Products Affected According to Relation of Metal to Labor—Rail Bonds Show Improvement

There has been little price change in general in the maintenance line of electric railway materials for the past six months. Copper products have shown decreases in several instances and some of the track and line equipment has decreased within this time, but these latter changes have been slight compared to those in copper.

Crossarms have just decreased 5 to 7½ per cent on some sizes on all quantities from stock.

Cross-ties of the hewn variety are still selling for $1.20 to $1.60 each, the scarcity of labor in tie-camps generally accounting for the price remaining at this level. Small stocks are kept cut near rights-of-way in many parts of the country.

Friction tape has a constant call in maintenance work, and, regardless of the lower cost of raw cotton, is not being sold at any appreciable reduction. Prices for different manufacturers vary due to the different qualities involved. Labor cost after the raw cotton is delivered is the determining factor.

Varnished cambric has been found off about 2 cents a pound.

Lubricating oil has been reported as holding to the prices of last fall, with an upward rather than a downward tendency.

Rubber-covered wire manufacturers are for the most part using a 20-cent base at this time, and some very satisfactory business has been uncovered.

Bare wire is being quoted on about a 17½ cent base. Many fair sized orders for railway maintenance have been reported, and inquiries from the export field have been numerous. Weatherproof wire is quoted from 18½ to 20 cent base with rather satisfactory orders of a maintenance character.

T-rails are still holding at from $55 to $65, but it is expected that this price will be reduced following the decisions of the steel manufacturers and the government interests.

Grooved rails continue at a quotation of 4¼ cents per pound, and this price also is expected to be affected.

Railroad spikes are down to 3.65 cents a pound, but screw spikes have not shown any change from the 8 cents which has been holding for some time.

Tie plates and rods, fish plates, angle plates and angle bars fell off one-quarter of a cent from the government price and are at 3 cents a pound. Rail bolts and nuts, however, are still holding their former price of 4.90 cents a pound.

Car window glass has shown no change in price for some months, and there appears to be no reason to expect any decrease in the immediate future.

Cotton waste is quoted at 8 to 13½ cents per pound, and wool waste at 14 to 17 cents. Some railways use wood waste for journal packing up to 40 cents a pound. On account of the curtailment of the cotton and wool products from which this waste comes, the tendency of the price of each kind is upward.

The continually decreasing price of copper has brought down the price of several kinds of railway materials to a greater or a lesser extent as the amount of copper in the article varies and as the labor item varies. For instance, commutator bars have recently dropped 20 per cent, and such products as armature coils, field coils and strap copper fuses have dropped from 10 to 20 per cent.

Trolley crossings and splicers for trolley wire are still on February discount lists, the crossings at 43 per cent and the copper sleeves at 48 per cent.

Rail bonds have changed for the better a number of times since January 1, and the last quotation leaves them at 25 per cent off list.

Welding rods for use in filling cups and other imperfections in rails are varying from 12 to 18 cents per pound, depending on the quantity ordered, while rods for normal use in railway shops for repair work vary from 10 to 15 cents per pound, depending on the quantity.

Permanent High-Price Level

Prominent Economist Urges Buyers to Face the Facts and Act Accordingly

Goods are on a permanently higher price level and the sooner the business men of the country take this view and adjust themselves to it the sooner will they save themselves and the nation from the misfortune which will come by persisting in the present false hope of lower prices, according to Irving Fisher, professor of political economy of Yale University. This sentiment was the theme of his discourse before the recent conference of governors and mayors at the White House.

"The main reason why business is not going ahead better," declared Prof. Fisher, "is that most people expect prices to drop. It is interesting to observe that many manufacturers think that prices must come down, including the price of labor; but they are ready to demonstrate to you that their prices cannot come down, nor can they pay lower wages. Almost everything they buy somehow costs twice as much as before the war, and their labor is twice as dear. They cannot pay their labor less if labor is to meet the increased cost of living. Now, as a matter of fact, when we investigate almost any individual one of the so-called high prices for industrial products we are likely to find that individually it is not high; that is, it is not high relatively to the rest. Our quarrel is with the general level of prices."

Prof. Fisher then went on to explain the dependence of prices on the circulating medium. Greater circulation of money for the same volume of goods means higher prices. Vast government loans and the large credits have the same effect. The present tendency, however, is not to contract credits, but to enlarge them. In conclusion, therefore, Prof. Fisher states:

"Business men should face the facts. To talk reverently of 1913-14 prices is to speak a dead language today. The buyers of the country, since the armistice, have made an unexampled attack upon prices through their waiting attitude, and yet price recessions have been insignificant. The reason is that we are on a new high-price level, which will be found a stubborn reality. Business men are going to find out that the clever man is not the man who waits, but the one who finds out the new price facts and acts accordingly."

Rolling Stock

Granite City Railway, St. Cloud, Minn., has just placed a contract for six new cars.

Jersey Central Traction Company, Keyport, N. J., is converting four fourteen-bench open cars into a closed type. The company is also rebuilding trucks of fifteen semi-convertible interurban cars. The work is being done through a loan from the United States Bureau of Housing.

Portland Railway, Light & Power Company, Portland, Ore., has recently received and put into operation twenty-five one-man cars purchased by the Emergency Fleet Corporation for the use of the traction company. The purchase was noted in these columns of Aug. 3, 1918.

Cincinnati (Ohio) Traction Company has received permission from the Ohio Public Utilities Commission to issue $1,250,000 equipment trust certificates, the proceeds to be used in the purchase of 105 double-truck closed cars of the pay-within type.

Franchises

Babylon, L. I.—The Babylon Railroad is negotiating with town officials of Babylon for a franchise covering the supply of electric energy for lighting and power purposes to the municipality.

Gary, Ind.—The Board of Public Works of Gary has granted a franchise to the Gary Street Railway to establish a car storage yard and tracks at the southwest corner of Adams Street and Twenty-second Avenue, where the company will expend about $15,000 in laying tracks and making connections with the main line.

Recent Incorporations

Levis (Que.) Tramways.—A bill has been introduced in the Quebec Legislature for the incorporation of the Levis Tramways, as a reorganization of the Levis County Railway. Capital stock, $1,500,000. The petitioners are Senator Raoul Dandurand, S. H. Ewing, J. A. Ewing, Montreal; E. A. Macnutt, Westmount, and J. C. Blouin, who are to be provisional directors. The applicants ask authority to extend the present railway in Levis and in or between any of the various municipalities of the counties of Levis, Bellechasse, Dorchester and Beauce; authority to build branches not exceeding 15 miles in any one case from the main line; also power to enter into agreements for extending the line as far as the Quebec Bridge and over the same and also on the north shore of the River St. Lawrence, and to connect at some point with the line of the Quebec Railway, Light, Heat & Power Company.

Track and Roadway

Birmingham, Ala.—It is reported that Major John R. Fordyce of the United States Engineers, serving with the Mississippi-Warrior Waterways Administration, will survey the territory between Birmingham and the Warrior River and will also prepare estimates of the cost of terminals and of the railway which is contemplated to connect the city with the waterway. This work is to be undertaken immediately. W. D. Nesbitt of Birmingham is chairman of the Warrior River Development Committee.

Gadsden, Ala.—It is reported that plans are being considered for the construction of an interurban line to connect Gadsden, Alabama City, Attalla, Boaz and Albertville. According to the report, the company will establish a distribution system in Gadsden and will furnish electricity to consumers in that city and in Alabama City. It is said that the company will obtain its power from the Alabama Power Company.

British Columbia Electric Railway, Vancouver, B. C.—The construction of a line on the Alma Road from Kerrisdale to Fourth Avenue is contemplated by the British Columbia Electric Railway.

Georgia Railway & Power Company, Atlanta, Ga.—The Georgia Railway & Power Company will rebuild its tracks on Edgewood Avenue between Peachtree and Pryor Streets.

Boston (Mass.) Elevated Railway.—Operation has been begun on the extension of the Boston Elevated Railway from Sullivan Square, Boston, to Everett.

Kansas City, Lawrence & Topeka Railroad, Kansas City, Mo.—The Kansas City, Lawrence & Topeka Railroad will rehabilitate its line at a cost of about $15,000.

Tulsa (Okla.) Street Railway.—Work will be begun at once by the Tulsa Street Railway on the extension of its lines on North Main Street, North Cheyenne Avenue and South Main Street.

Toronto, Ont.—At a recent executive committee meeting of the Hydro-Electric Railway Association at the office of the provincial Hydro-Electric Power Commission at Toronto it was decided to move in the matter of constructing an electrical railway in the district extending westerly from Toronto through Brampton, Guelph, Kitchener, Stratford and St. Marys to London as soon as possible, as desired by the municipalities concerned. A preparatory move will be the urging of the immediate repeal of certain amendments to the hydro-electric railway as requested by the municipalities.

Toronto (Ont.) Electric Railway.—It is reported that the Toronto Electric Railway will construct 3 miles of new track at an estimated cost of $800,000. The cost of the construction of the substructure is estimated at $580,000.

Scranton & Binghamton Railroad, Scranton, Pa.—Reorganization plans for the Scranton & Binghamton Railroad contemplate the merger and consolidation of the Binghamton Railway and the Northern Electric Company with the Scranton & Binghamton Railroad, the construction of a new terminal station at Scranton and the extension of the line from Tiffany Junction to Binghamton. Preliminary surveys have been made of the proposed route for this extension and options taken on much of the necessary right-of-way.

Burkeville (Tex.) Railway.—It is reported that the Burkeville Railway has been organized to construct a line from Burkeville to Wiergate, about 3 miles. Officers: E. F. Montgomery, president; J. F. Woods, first vice-president; K. Jackson, second vice-president; L. C. Wood, treasurer, and J. M. Nation, secretary.

Dallas, Tex.—Plans are being prepared by engineers for the proposed electric railway to be built from Dallas to Wichita Falls. The following publicity committee is working on the project: Wiley Blair, John N. Simpson, T. E. Jackson, E. J. Kiest and Tom Finty. At a recent meeting held at Dallas a resolution was adopted pledging $75,000 to the enterprise, of which two-thirds is to be raised in Dallas and the rest in Wichita Falls. [Feb. 8, '19.]

Richmond & Chesapeake Bay Railway, Richmond, Va.—Plans are under way at Richmond to organize the Richmond-Ashland Railway to purchase and operate the line of the Richmond & Chesapeake Railway from Richmond to Ashland. First mortgage bonds will be issued and opened for public subscription immediately to raise the $200,000 necessary to buy and rehabilitate the line. J. L. Vaughn, president of the Petersburg, Hopewell & City Point Electric Railway, has agreed to direct the operation. The Richmond & Chesapeake Bay Railway ceased operating in December, 1917.

Seattle (Wash.) Municipal Railway.—Arrangements have been made to resume work immediately on the municipal elevated railway in Seattle to the West Side, following assurances that money to complete the project will be provided in not to exceed two weeks from the recent $400,000 bond sale. The connection with the surface lines at Washington Street, and construction of the trestle to connect with the Lake Burien line west of the Spokane Street bridge are required to complete the project.

Wisconsin Public Service Company, Green Bay, Wis.—A committee of business men has been appointed in Luxemburg, Casco, Algoma, New Franken and Kewaunee to meet officials of the Wisconsin Public Service Company and ascertain under what conditions the company will extend their lines from Green Bay through Kewaunee County to these cities and villages.

Power Houses, Shops and Buildings

Hanover Light, Heat & Power Company, Hanover, Pa.—Plans have been prepared by the Hanover Light, Heat & Power Company, which supplies power to the Hanover & McSherrystown Street Railway for the installation of a 1000-kw. turbo-generator and surface condenser with a suitable spray cooling system. Revamping of certain existing distributing lines by raising the voltage to 13,000 volts is also under consideration. A new switchboard is now being installed to meet the requirements of the new plant.

New Advertising Literature

Barrett Company, New York City: Pamphlet on the application of "Carbosota" creosote oil to posts, poles, etc., with suggestions for constructing simple treating plants.

Metal & Thermit Corporation, New York City: Large map calendar, the map showing the railroad time zones in the United States, which went into effect on Jan. 1, 1919.

Bonham Recorder Company, Hamilton, Ohio: Eight-page leaflet on latest type of traffic recorder. It records miles traveled, kind of fare paid, amount of cash fare, total number of passengers, number of cash passengers, month, day, train and division. It also gives the autograph of the conductor who made it. From this printed record the following may be obtained: Travel between stations, density of traffic, revenue per passenger-mile, revenue per car-mile, revenue by trains, revenue by stations, per cent of ticket revenue, per cent of cash revenue.

Trade Notes

J. S. Cullinan has recently been elected president of the Galena Signal Oil Company.

Scovill Manufacturing Company, Waterbury, Conn., has recently filled several orders for metal tokens, paying particular attention to factors that would make counterfeiting impracticable if not completely impossible.

J. F. Mackin, Columbus, Ohio, has recently become connected with the Black & Decker Manufacturing Company of Baltimore, as representative throughout the entire State of Ohio. Mr. Mackin has been connected with the portable electric drill industry for years, his former connection being with the Independent Pneumatic Tool Company.

J. E. Slimp, who has for many years been connected with the sales department of the Ohio Brass Company, has resigned to become associated with H. C. Dodge of Boston, who is at the head of several manufacturing companies in New England. Mr. Slimp will remain with the Ohio Brass Company until approximately April 1.

E. V. Adams succeeds G. K. Heyer as railway sales engineer of the Western Electric Company. He has been a Western Electric man since 1910 when he began in the railway sales department of the Chicago house. He was transferred to St. Louis in 1912 and the following year went to 195 Broadway, New York, where his headquarters will remain.

W. D. Hamer, representative of the Electric Service Supplies Company, Philadelphia, Pa., has been transferred from his former territory in the Middle West to a Southern territory with headquarters in Atlanta, Ga. He has been connected with this company for fourteen years. Prior to 1905 he was employed in the stores and engineering department of the Lehigh Valley Railroad Company. In 1907 with the courtesy and co-operation of the Nashville Railway & Light Company, he proposed and developed what is reported to be the first prepayment car operated in the South. Mr. Hamer is inventor of the Keystone triangle arm.

Pulverized Fuel Equipment Corporation has recently been organized for the purpose of taking over the business of the Locomotive Pulverized Fuel Company and to broaden the activities of the latter to cover the central power station, metallurgical and industrial fields. The head offices are at 30 Church Street, New York City, with a Canadian office in the Transportation Building, Montreal. The officers of the new company will be J. S. Coffin, chairman; J. E. Muhfeld, president; H. F. Ball, vice-president, executive; H. D. Savage, vice-president, in charge of sales; V. Z. Caracristi, vice-president, in charge of engineering, and Samuel G. Allen, secretary-treasurer.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, March 29, 1919 *Number* 13

How Glasgow Collects Its Fares

The third and concluding article on the Glasgow tramways, which we are publishing in this issue, will, we believe, prove to many readers the most interesting in the series, because it deals largely with the duties and pay of the employees and the method of checking and auditing the differential system of graded fares.

Perhaps the point which will impress the average railway reader first in this account is the difference in pay of platform employees in England and America. Thus, the motormen and conductors in Glasgow start in at slightly more than 25½ cents an hour and work up to about 29½ cents an hour at the end of seven years. The women employees, who constitute more than half of those who work on the platform, receive somewhat less because the men are more steady in showing up for duty and also because they expect to stay in the business. The women conductors start in at 14 cents an hour and work up to 22 cents an hour. The motoresses earn about 1¼ cents more an hour. These wages and the proportional lower rush-hour peaks undoubtedly account, to some extent at least, for the lower fares which are charged in Glasgow. Articles on other properties in Great Britain and Ireland will appear in early issues of this paper.

Engineering Talent and Judgment Are Needed in Public Life

WHY has the engineer in general not taken the part in public life in which his talents and training fit him to be most widely useful? Some such question as this must have been in the minds of those who planned the conference on "The Engineer as a Citizen" which was held in New York City this week. Members of a dozen or more engineering societies of national standing participated in the conference, which was held for the purpose of securing constructive suggestions for the benefit of the several committees on development of these associations. The discussion was significant of the awakening conviction on the part of engineers that it is "up to them" to show how they can be more serviceable to the country. The war has helped them in this regard, for they were quick to seize the opportunity to place themselves at the disposal of the government when diplomatic relations with the then Central Empires were broken off, and they were given many opportunities and responsibilities in the preparations for and prosecution of the war.

The true engineer ought to be a useful citizen not only in doing first-class work in his profession but in applying engineering principles to the solution of civic problems. The same principles underlie both the technical and the general phases of the country's life, but undoubtedly in the past the engineers have been so wrapped up in their own peculiar and fascinating problems that they have not given sufficient attention to the broader aspects of the situation. Other professions, notably the law, bring their members more naturally and prominently into the public eye than does engineering, and this also is a factor in bringing about the disproportion of engineers that exists. The engineer ought to be a good public servant because he is in the habit of dealing with realities rather than theories.

Do Railway Companies Overlook Their Best Publicity Medium?

MANY thousands of dollars are spent annually in publicity. And provided the spending is placed under wise jurisdiction it would be well if many additional thousands were so spent. We believe in publicity. Give the public credit for some brains, tell them the facts straight to the point and keep them posted on all subjects in which they are interested and upon which they seek information.

However, things we say about ourselves do not carry the same weight as things said about us—whether they are good or bad, although in this case we refer to favorable statements. It was this thought which was back of a suggestion made at a recent electric railway convention that due to the natural antagonistic feeling of the public toward the railways, publicity advertising conducted by the large manufacturing companies would have more value in assisting the electric railways to combat the motor truck than would advertising issued by the railways themselves.

It is the same thought also which causes us to inquire whether electric railway companies do not often overlook their best publicity medium, namely, their employees. When the 6-cent fare went into effect in a certain city the railway company, pending a decision of the validity of the increase, gave a receipt for each extra cent. A certain man instructed all members of his family to refuse the receipts and to tell the conductor that the service was worth 6 cents. During the period the receipts were being given out, this man and his family did this about 200 times and in only three instances did the conductor show any appreciation, one conductor having thanked two members of the family.

This incident gave our investigative friend an idea, and he instructed all his plant managers to notify him by memorandum of each instance coming to their notice where an employee went out of his way to boost the company. From 1000 employees about two memoranda a week are received.

It would seem that in many instances the utility employees are being overlooked as instruments of propaganda to spread information about their company and to create a favorable public opinion. Actually, they are vitally interested in the prosperity of the company for which they are working, and most of them realize it when the matter is brought to their attention, but most of them are not sufficiently well informed about the company's business to talk intelligently about it without seeming to be continually praising. If the company will take the trouble to supply them directly with the facts and so give them something to talk about, they will spread the propaganda among the public at large. Their influence will have more weight than a great deal of the advertising publicity often put out because they will be enthusiastic boosters without realizing it. Why not think it over?

Facts Should Not Be Silently Disregarded

IN A RECENT editorial commenting upon the proposal of the Public Service Railway to establish a 5-cent charge for each first mile-zone and 1 cent per zone thereafter, the Philadelphia *Public Ledger* speaks in part as follows:

> The Public Service Railway wants all the benefits of the old flat fare and an additional fare for long-distance riders besides. By making the initial unit 5 cents for the first zone-mile, the railway would inflict a double injustice upon its riders—a gross overcharge for the short rider and an undue burden on the suburban residents who have established homes on the outskirts of the city on the faith of low transportation charges to and from the business centers.

The *Public Ledger* usually has cogent arguments as the basis for its attitude of support or disfavor, but in the present instance its opposition seems to be merely that of begging the question.

We grant that there may be some justification for the statement that suburban residents founded their homes upon the "solid rock" of a 5-cent fare. There is a myth to this effect largely manufactured for the occasion by designing public leaders. Why do we assert this? In the first place, because, in the absence of a definite policy of city payment of railway deficits through taxation, most men are not foolish enough in these days to move into the suburbs with the hope of erecting a squatter's right to a 5-cent fare. In the second place, because the car-fare expenditure of even the average workman's family, according to authoritative statistics, is such a small portion of his annual budget that he seldom if ever considers this in deciding whether he can afford to pay suburban rents—which, by the way, are always high when car fares are low.

But we will pass over this point to the wholly unjustified premise of the *Public Ledger*, i.e., that the proposed fares in New Jersey will grossly overcharge short-haul riders and unduly burden long-haul riders. Such a statement without proof is not admissible. There is nothing new in the fundamental theory of the proposed fares; a "terminal" or "readiness-to-serve" or "stand-by" charge and a "consumption" or "movement" charge have been accepted by many courts and commissions for gas, water, electric light and steam railroad rates. The system has not yet been applied to electric railway rates, but such a fact does not prove it unfair.

As a matter of fact, it is interesting to note that in 1911 the Board of Public Utility Commissioners of New Jersey itself made the following statement in an electric railway case before it:

> It would thus appear that a uniform basic rate or charge which permits, without additional charge, a ride of short but definite length might properly be accorded for a uniform basic fare, and that every mile or fraction thereof in excess should be paid for at a stipulated rate per mile. . . . Precisely what price should be charged for the basic part of the fare, and what rates per mile for the excess distance over the minimum ride covered by the basic fare, are practical questions which experience must determine, but that economic necessity will eventually establish such a fare seems as probable as it is necessary.

The proposal in theory is not unfair to either the short-haul or long-haul rider. Is it so in practice? This is a question of fact. The sole object of the plan is to make every rider pay for the amount of service used. Taking all its costs of operation, the Public Service Railway has apportioned them upon bases approved by leading commissions and public consultants, and it has arrived at a figure of 4.038 cents as the cost of standing ready to serve any passenger, no matter what his length of ride, and 0.99 cent as the additional cost of each mile of haulage.

The company has presented these figures for public scrutiny. If the *Public Ledger* can prove that a miscalculation has been made, it is welcome to do so, but it has no right to disregard the figures. It has fallen into error by jumping to the conclusion that a present stand-by cost of 4.038 cents cannot be correct because the old fare, providing for reasonable profit, was only 5 cents. Can it not realize that under operating conditions a few years ago the stand-by cost would have been say only 2 or 3 cents? It then did not cost 5 cents to carry the short-haul rider, but he was paying part of the fare of the suburbanite. Had the proposed system of fares been installed say in 1912, the fares for all concerned would undoubtedly have been less than they must be now, but that fact by no means proves their inequity now.

Touching the High Spots in Maintenance Work

THE past two or three years have brought out previously unthought-of, or at least unrealized, schemes for cutting down maintenance costs. Last week's issue of this paper was taken up very largely with an account of some of the practices that have been evolved. The plan of the issue was not to produce a comprehensive text on the subject but rather to point out some of the places where worth-while savings are possible on almost any property.

At least three things stand out prominently as one studies the issue as a whole. First is the availability of concentrated heat, especially in the electric arc, the oxy-acetylene flame and the thermit reaction crucible. A new art has been created in this field and a national society was formed only this week to foster it. Electric railway track and equipment men will need to make the most of this art.

A second maintenance possibility is in timber preservation. Electric railways use an enormous quantity of wood; in ties, in bridges, in poles, in miscellaneous structural work. Heretofore the art of wood preservation has made some, but rather slow, progress. Conditions now favor much greater attention to prolonging the life of timber, and electric railway men are alive to the possibilities of conservation here.

A third point is the importance of inspection. Some time ago S. L. Foster wrote an article for this paper on the suggestive topic "Keep Up versus Pick Up." His argument, of course, was that it is more economical to maintain line work by means of watchful care than by expensive emergency repairs. Inspection reveals the need for replacement or repair before the danger of interruption to service has developed.

There is one factor in maintenance also that has nothing to do with maintenance directly, namely, care in the selection of supplies in the first place. Inspection plays an important part here, especially as an adjunct to skillfully drawn specifications.

This Is the Time For Action and Not Merely Words

"THE problem is not merely local or political, but of nation-wide business importance, and, if it is not fairly met, is capable of having a widespread and disastrous effect on business—an effect which every business interest, directly or indirectly, but inevitably, must share." In these words, Francis H. Sisson, vice-president Guaranty Trust Company of New York, at the mid-year meeting of the American Electric Railway Association, sounded the warning of impending cataclysm for the public utilities of the nation. And, as if to emphasize his warning, announcement was made within a week of the appointment of receivers for the New York Railways and its holding company, the Interborough Consolidated Corporation.

While these developments, like that affecting the Brooklyn Rapid Transit Company, are serious, they are by no means local in significance. A statement that more than one-tenth of the electric railway mileage in the United States is in the hands of receivers is ominous, but when we consider that practically every transportation company in the country is approaching the brink, the outlook is certainly most threatening. This can be illustrated no better than by study of a statement which is printed in the Financial and Corporate columns of this week's issue, reviewing a year's results on twelve of the largest railway properties in the United States.

The story told in those statistics, representing almost one-tenth of the mileage in the industry, is too plain to need much comment. It shows that the "big fellows" are governed by the same economic laws as the smaller properties. It is a sad commentary on the fairness of the public authorities that living rates have not been allowed and that only seven out of the twelve companies are permitted to charge more than a straight 5-cent fare. Data of this kind have a value for the executive. He can discover that his troubles are not peculiar to his own property and perhaps in studying the results elsewhere he may see the way in which his own situation can be improved. He should at least "get into the game" for co-operation.

An editorial in our Annual Statistical Number touched on the financial history of 1918 and the outlook for the current year. In that we said: "The concentration of trained minds on this problem is bound to find a solution in time." The recent gathering of leaders of the industry in New York proved that these executives, the bankers and the public authorities have not despaired of finding a solution. Many constructive suggestions were offered, and we have no doubt that good will result from them. As one of the speakers said: "There are manhood, brains and energy enough to pull the industry up the grade which it is now climbing. The situation is not hopeless. It is going to clear."

We quite agree with this view, even while facing such developments as those in New York. We insist, however, that all those who are interested in saving the situation must realize that the present is a time for action and not merely for optimistic words.

Committee Work of the Two Railway Engineering Societies

THE American Railway Engineering Association held its annual meeting in Chicago last week and the reports, while not so extensive as those prepared when the several committees were not working under the stress of war conditions, represented a great amount of work and progress. The results justified the decision of the association to continue committee activities during the war period. The handicaps arising from the war and particularly from governmental control of the railroads must have made committee work very difficult. The reports are the more creditable for this reason. They bring out the fact that the engineering departments of the two great divisions of the railway field have much in common. Electric railway men will benefit by much of this work performed by their brethren in the steam railroad field; hence several of the reports are abstracted in this issue.

Committee work of the American Electric Railway Engineering Association is under way again after a period of suspension and the assignments to the several committees are as listed last week in this paper. The work outlined is not unduly extensive. Our only criticism of the program is that the program is quite long, in view of the time available for committee work, and some of the topics assigned, while important, do not seem to be of a nature which require immediate solution because of war conditions. This situation can be helped by the committees in charge if they treat their topics in a way which will put "pep" into their reports. Some, at least, of the assigned subjects will allow this.

In addition to the topics assigned there are certain others which have assumed such special importance within the last year or two as to deserve consideration with respect to the possible need for the appointment of special committees to consider them. Among these are tie and timber preservation and corrugation of rails. The former is treated by the committee on wood preservation of the American Railway Engineering Association, while the latter has had special committee research in Great Britain. We believe that these are subjects of such moment as to warrant the appointment of special committees to study them for the benefit of the American Electric Railway Engineering Association. On subjects, like these, of mutual interest to the two railway engineering associations, it ought to be possible to co-operate and thus save duplication of effort.

We are pleased to note the automatic substation among the assignments for the A. E. R. E. A. committee on power generation. While it might better be considered as a power distribution matter the main thing is to bring out the salient operating features of automatic control. This will be a fine opportunity for men who have had actual experience in keeping automatics going to tell of their successes and their tribulations, if any, with the improvements made to overcome minor defects. No subject at the convention could arouse greater interest among the engineers unless possibly it is the application of welding to electric railway maintenance.

The Zone Fare in Practice—Glasgow

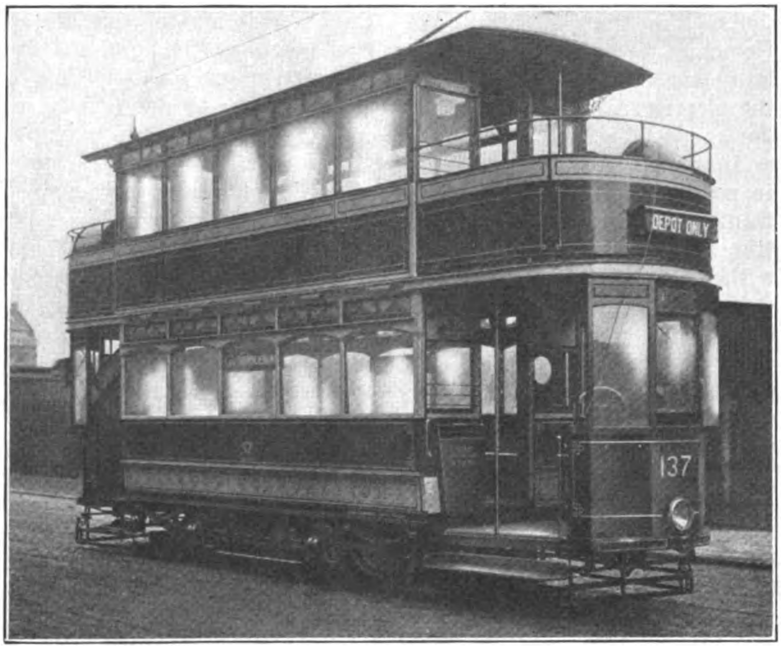
By WALTER JACKSON

This, the Concluding Article on Glasgow's Tramways, Considers the Standard Double-Deck Car, the Make-up of Schedules, the Hours and Rates of Pay of Transportation Employees and the Checking and Auditing of the Differential System of Graded Fares

PART THREE

Cars, Schedule Making, Employees, Fare Accounting

IT WILL be recalled that the first article on Glasgow brought out the fact that the housing and distribution of population of that city had not been adversely affected although the charge for transportation is based on the distance traveled, and the second article showed that Glasgow's combination of short headways and zone fares had encouraged most intensive street car riding. It is now in order to describe the tools with which this heavy traffic is handled, namely, the car and the traffic employees; and with these the control of the car movement through the schedule department and the handling of the car revenue through the receiving department. Perhaps, it is not out of order to point out here the difficulty of making conclusive parallels between British and American rates of fare, standards of riding and handling of the wage problem. Such parallels are particularly difficult in the case of Glasgow, which is the only British system of importance that has not had to raise its fare during the war. Rates of fare for given distances must necessarily be higher in the United States because of higher operating costs. In the matter of riding standards, the American is likely to have a better upholstered car, but rougher track and longer waits to offset the faster running of the car. In the handling of employees, the better load curves obtained through the encouragement of mid-day riding, make it relatively easier for British roads to avoid the long hours that have made it so hard for our operators to hold their platform men despite higher wages. These differences in conditions will be brought out in some detail in the following paragraphs.



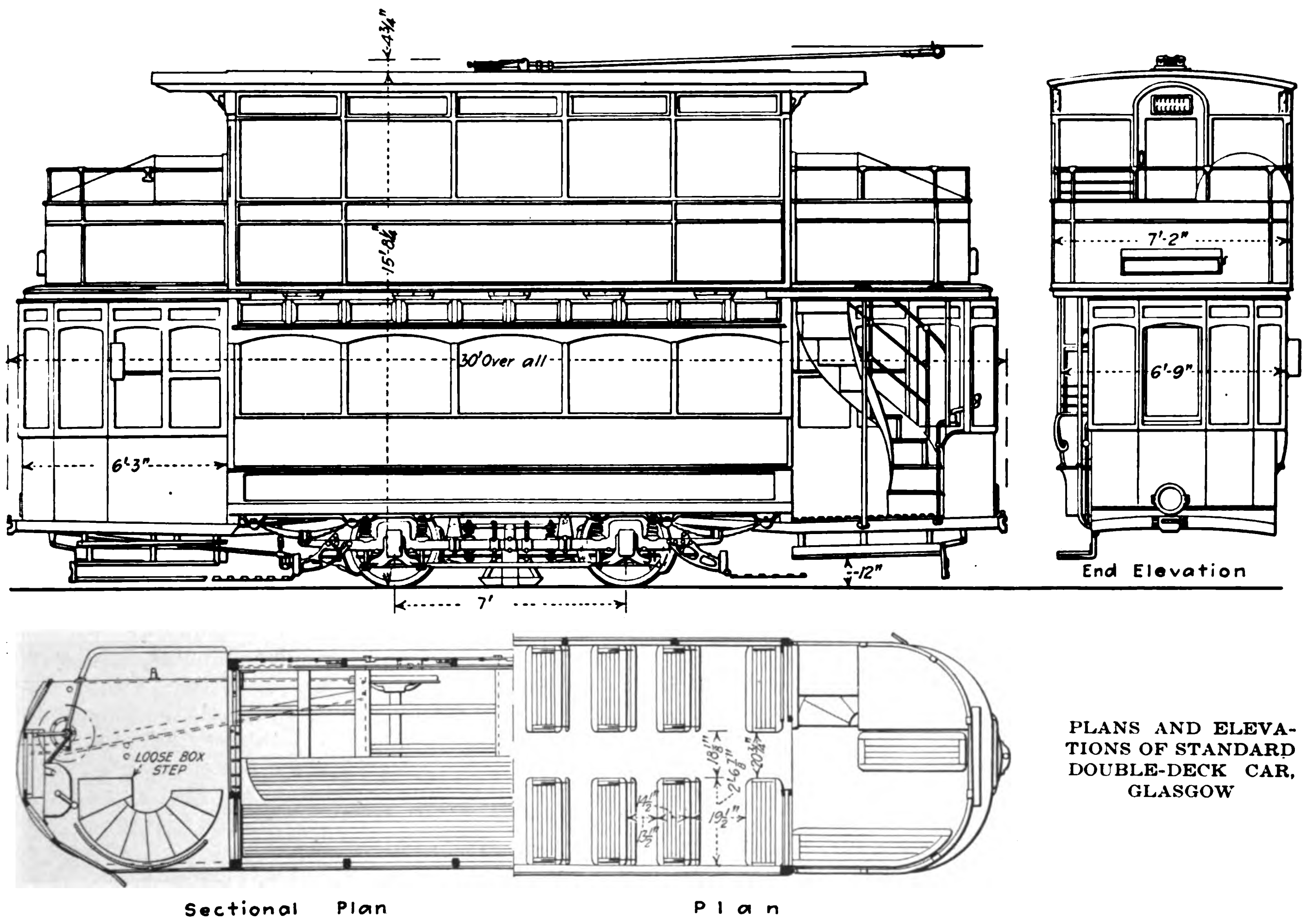
DOUBLE-DECK CAR, BEFORE ADDITION OF FRONT ROUTE-NUMBER SIGN AND WOODEN SIDE SIGNS

In accordance with the usual British practice, the standard Glasgow car is of the double-deck type. As it seats sixty-two pasengers and six more passengers are permitted to stand on the lower deck, this car may be said to have a right to the name "large." In fact, it is doubtful whether cars anywhere else come so close to carry their rated capacity for the greater part of the day! The cars are fitted for train operation. They do not differ materially from those of a decade or more ago, except that first the principle of inclosing nearly all of the top deck was adopted and then the vestibuling of the platforms followed. At present, about one-half of the cars are vestibuled, this reconstruction having been interrupted by the war. They are of wood practically throughout, and, fully reconstructed weigh only 397 lb. per passenger. These cars, operated on an average schedule of 8.18 m.p.h. with possible stops spaced 600 ft., average 1.4 to 1.5 kw.-hr. per car-mile for the whole system, but careful motormen under test have actually made the same schedules with less than 1 kw.-hr. per car-mile.

Most of the cars are carried on Brill single trucks. The motor equipment comprises either two Westinghouse 49-B motors, rated at 30 hp. each, or two of the later Westinghouse 220 motors, rated at 35 to 40 hp. each. The controllers embody the electric braking features customary in British practice, but much more frequent use is made of the hand brake. Two sander mechanisms are provided, one is pedal operated, and the other electrically operated as a part of the electric brake when emergency conditions arise and a continuous flow of sand is desirable. Brake rigging is adjusted by hand.

To avoid short-circuiting and burn-out troubles from snow, the resistor grids are being transferred to a box on one of the platforms. On the other platform are cabinets for the solenoid and rheostat used in connection with the electrically-operated sander, for the main fuse and for the possible installation of a car-checking meter. The main circuits are carried in rubber hose, first under the platform from the controller leads, then inside the car under the longitudinal seating to outlets over the motor leads.

Owing to the lighting restrictions in force on account of fuel shortage, one of the three six-lamp (530-volt) circuits is still cut out. These lamps are rated at 25 cp. each. Of the eighteen lamps installed, one is installed on each of the four platforms and in each of the headlights. In each bulkhead is a lens or bull's-eye lamp, illuminated from inside the car by the nearest lamp, which has a slide arrangement to show red when used as a tail-light and whatever the route color may be when used as a destination marker.



PLANS AND ELEVATIONS OF STANDARD DOUBLE-DECK CAR, GLASGOW

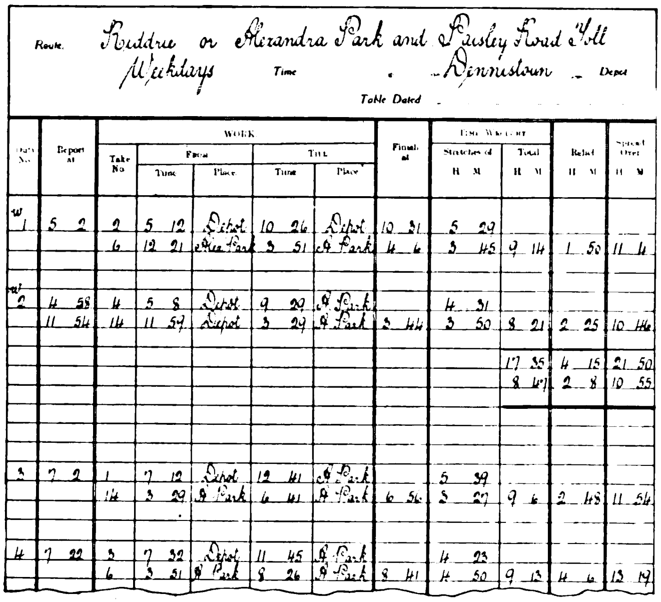
The only other auxiliary circuit on these cars is that for the push buttons, dry batteries being used. These push buttons are installed in the bulkheads for operation by the conductors and at two or three places on each side within the car for operation by either passengers or conductors. The signals are of the single-stroke bell type. When the conductor is on the lower deck, the motorman waits for the usual two-bell signal; otherwise he is guided by his mirror.

One large item of operating expense which the Glasgow system is spared is that of car heating; nor does the public expect the cars to be heated. British homes are rarely equipped with central heating systems, and weather that would chill the pampered American to the bone leaves a Briton indifferent. In the Glasgow cars, only the sliding door in the front bulkhead on the lower deck is kept closed while the rear door on this deck is open almost all of the time. However, the passengers are at least spared the blowing in of rain or snow through monitor sash, as the air that comes in from outside through the louvers first enters perforated ducts. These side ducts are connected with longitudinal ducts running through the ceilings of both decks in such fashion as to expel bad air as well as to take in fresh air. The side louvers which permit the entrance of air are under the control of the conductor.

When the first vestibules were installed it was found that the inclosure of one side did not prevent heavy drafts from coming down the stairway. It was necessary, therefore, to hood this stairway with a rolling shutter. The hood, incidentally prevents upper-deck passengers from trying to leave by way of the front platform.

The car interior is finished in American three-ply maple veneer. The lively appearance given by the variety of artistic car cards found in our cars is missing as the only advertising carried is of the non-revenue sort, such as notices to passengers and government war placards; nor is there any kind of advertisement on the outside of the cars—something entirely contrary to British tramway and bus practice.

Practically everything on the Glasgow cars, exclusive of the trucks and electrical equipment, is made by the



Route. Riddrie or Alexandra Park and Paisley Road Toll
Weekdays Time . Dennistoun Depot
Table Dated

Duty No.	Report at	Take No	From Time	From Place	Till Time	Till Place	Finish at	Time Worked: Stretches of H M	Total H M	Relief H M	Spread Over H M
w 1	5 2	2	5 12	Depot	10 26	Depot	10 31	5 29			
		6	12 21	Alex Park	3 51	A Park	4 6	3 45	9 14	1 50	11 4
w 2	4 58	4	5 8	Depot	9 29	A Park		4 31			
	11 54	14	11 59	Depot	3 29	A Park	3 44	3 50	8 21	2 25	10 46
									17 35	4 15	21 50
									8 47	2 8	10 55
3	7 2	1	7 12	Depot	12 41	A Park		5 39			
		14	3 29	A Park	6 41	A Park	6 56	3 27	9 6	2 48	11 54
4	7 22	3	7 32	Depot	11 45	A Park		4 23			
		6	3 51	A Park	8 26	A Park	8 41	4 50	9 13	4 6	13 19

CARHOUSE RUN OR DUTY RUN, GLASGOW CORPORATION TRAMWAYS

Glasgow Corporation Tramways. This home manufacture extends even to the seats, which are of wood and much simpler in construction than American roads feel they have to provide for their passengers.

In concluding these notes on the rolling stock, it may be mentioned that cars are inspected two or three times a week; that armature clearances are gaged, oil cups filled and gear cases examined about every 4000 miles and that a general overhauling is carried out every twelve months in peace times, war conditions having extended this period to eighteen months.

SCHEDULE MAKING

In spite of the heavy traffic in Glasgow, no cars whatever are operated between midnight and 4 a.m., plans for owl-car service having been interrupted by the war. If the labor union plans of two or three shifts a day in industrial plants are carried out, the addition will be made.

The work of the crews is laid out upon the basis of a fifty-one hour week at regular pay with a permissible addition of three hours at time and one-half. These crews are divided into three classes: "W" men, the oldest, who get their runs early and who finish early; the extras or trippers who are assigned for the morning, noon and evening peaks or Saturday afternoons and who get a full week's work; and, third, the most recent employees who finish early one week and late the following week. Individual choice of runs according to seniority is not practiced. As a matter of fact, this method is unnecessary in view of the easier hours. The runs are assigned directly by the chief time-table clerk according to the three classifications.

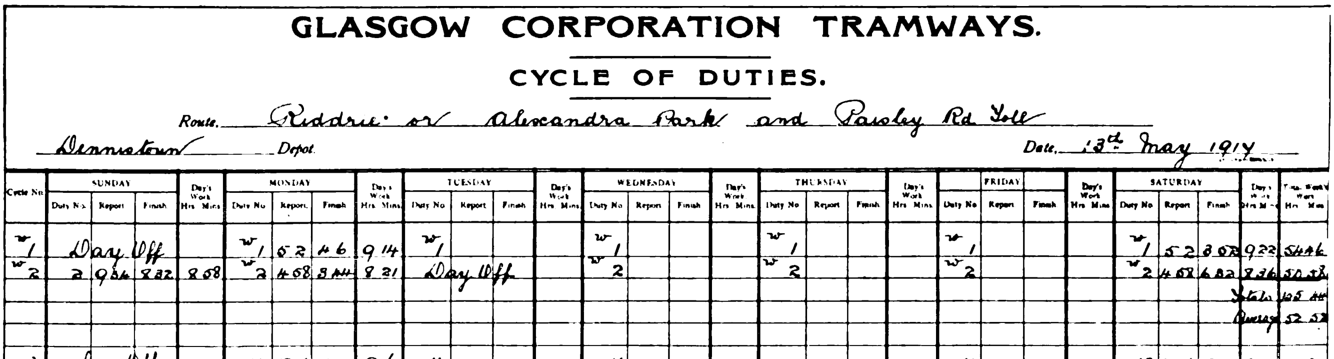
Two swings a day are usual, but no continuous assignment is desired to exceed six hours. Adherence to schedule is properly held to be a matter of prime importance. Motormen must take their time daily from the timekeepers and punch their time of arrival on Bundy time clocks. They also punch similar clocks just before reaching terminals and on their way back. Layovers average only two and one-half minutes, which is not surprising in view of the short headways and the use of cross-overs.

For the guidance of the motormen who handle the same car in the course of the day, the time-table department prepares an individual time-point form, which shows when the car is due to pass certain important places on its route. One of these forms is pasted on a board, varnished over for preservation and then hung in the vestibule of the car to which it applies. Thus every car carries its individual schedule. Copies of these individual schedules are retained by the time-table department in a master record book so that duplicates, in case of loss, can be made at once.

A typical run or duty sheet, which the men at a given car station consult before beginning their day's work, is reproduced on this page. The reporting time is ten minutes in advance of the taking out of the car and this period counts as part of actual working time. Allowance is also made for time needed to make out daily reports.

In this particular instance, the man at the head of the list has one straight tour of five hours twenty-nine minutes, a relief of one hour fifty minutes and a second swing of three hours forty-five minutes, giving nine hours fourteen minutes working time within eleven hours and four minutes. In general, the longest total working period is nine hours thirteen minutes and the longest spread, thirteen hours nineteen minutes. Hence, even under the better conditions afforded by better load factor and absence of owl service, the Glasgow Corporation Tramways would be hard put to it to obey the Massachusetts nine-hour-in-eleven law!

Another blank reproduced is the "cycle of duties" sheet, which is made up for every depot to show each man's work for the whole week in order to take care of days off. It is customary for every platform employee



GLASGOW CORPORATION TRAMWAYS.

CYCLE OF DUTIES.

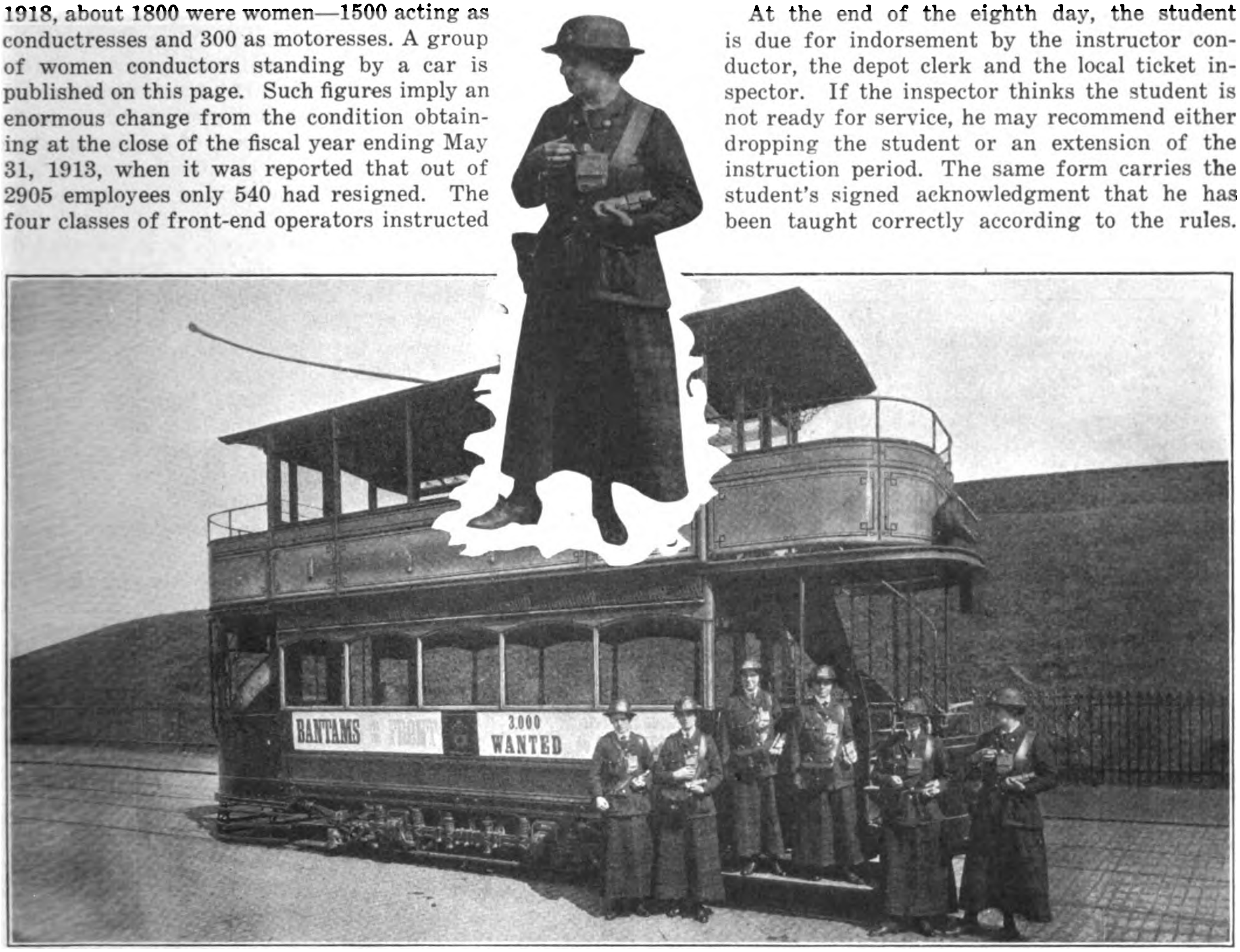
Route. Riddrie or Alexandra Park and Paisley Rd Toll
Dennistoun Depot. Date, 13th May 1917

Cycle No.	SUNDAY Duty No	SUNDAY Report	SUNDAY Finish	Day's Work Hrs Mins	MONDAY Duty No	MONDAY Report	MONDAY Finish	Day's Work Hrs Mins	TUESDAY Duty No	TUESDAY Report	TUESDAY Finish	Day's Work Hrs Mins	WEDNESDAY Duty No	WEDNESDAY Report	WEDNESDAY Finish	Day's Work Hrs Mins	THURSDAY Duty No	THURSDAY Report	THURSDAY Finish	Day's Work Hrs Mins	FRIDAY Duty No	FRIDAY Report	FRIDAY Finish	Day's Work Hrs Mins	SATURDAY Duty No	SATURDAY Report	SATURDAY Finish	Day's Work Hrs Mins	Total Week's Work Hrs Mins
w 1	Day Off				w 1	5 2	4 6	9 14	w 1				w 1				w 1				w 1				w 1	5 2	3 02	9 22	54 46
w 2	2	9 54	8 32	8 58	w 2	4 58	3 44	8 21	Day Off				w 2				w 2				w 2				w 2	4 58	6 32	8 36	50 3
																												Total	105 44
																												Average	52 5
3	Day Off				11	12 16	12 2	9 6	11				11				11				11				13	1 26	12 4	9 1	54 31
4	8	11 4	10 44	9 13	Day Off				5	4 40	4 46	9 1	5				5				5				4	4 9	8 24	9 4	54 21
5	4	11 16	10 34	9 38	4	9 14	8 15	9 1	Day Off				4				4				4				14	12 4	12 11	8 59	54 26
6	Day Off				12	12 41	12 4	8 33	12				12				12				12				12	11 0	12 3	9 23	52 8

CYCLE OF DUTIES SHEET FOR A GIVEN CARHOUSE SHOWING ASSIGNMENTS FROM WEEK TO WEEK to have one day off weekly, the arrangement calling for Sunday off one week and some other day off during the following week. This cycle sheet shows at a glance also whether every mans is getting within the fifty-four-hour maximum and whether at least nine hours has been allowed between his runs on successive days.

TRAINING AND RATES OF PAY FOR TRANSPORTATION PERSONNEL

It is hardly necessary to say that the tremendous sacrifices of man-power which Great Britain has had to make in the Great War sadly upset its labor conditions and nowhere more so than on the street railways. What facts could tell more in a few words than this: Out of 3234 platform employees in service on Dec. 21, 1918, about 1800 were women—1500 acting as conductresses and 300 as motoresses. A group of women conductors standing by a car is published on this page. Such figures imply an enormous change from the condition obtaining at the close of the fiscal year ending May 31, 1913, when it was reported that out of 2905 employees only 540 had resigned. The four classes of front-end operators instructed during December, 1918, and the week previous thereto were the first womanless classes handled in a long time, and it is hoped that the progress of demobilization will make the employment of more motoresses unnecessary.



A GROUP OF GLASGOW CONDUCTRESSES, WITH ENLARGED INSERT AT CENTER, TO SHOW MANNER OF CANCELING TICKET IN THE BELL PUNCH AND COUNTER

The instruction of motormen or motoresses, who must come from the rear platform, comprises three days in school, four days with a platform instructor, one day return to school for a preliminary examination, three days more with the platform instructor and then return to school on the twelfth day for the final examination. Upon this follows a probationary period of thirty days. The students are on their full pay during the entire period. The instructor motormen receive a bonus of 3d. for every day they have a student. To become a full-fledged motorman the indorsement of the instructor and the motor inspector is necessary.

That the zone-fare system cannot be very complicated as carried out at Glasgow would appear from the short period allowed for the training of conductors—one day in the classroom and seven days on the car under an instructor. The lesson in the classroom is carried out by assuming that the students are passengers. Each one comes out in turn to collect fare, make change, punch tickets, give signals and perform the other functions of the job. The students are taught to collect fares from the front of the car when on the lower deck, but to face forward on the upper deck in order to prevent passengers from departing without paying.

At the end of the eighth day, the student is due for indorsement by the instructor conductor, the depot clerk and the local ticket inspector. If the inspector thinks the student is not ready for service, he may recommend either dropping the student or an extension of the instruction period. The same form carries the student's signed acknowledgment that he has been taught correctly according to the rules. The conductors who teach students also receive a daily bonus of 3d. The probationary period is three months, during which the student is paid 30s. ($6.90) a week, at the exchange rate of $4.60 to the pound sterling, which is the rate assumed in the following calculations.

All platform employees receive their uniforms and operating equipment, such as the bag and punch of the conductors, without charge and subject to return upon resignation. No surety bonds are demanded from either class of platform workers. All that applicants for employment need do is to refer to two previous employers and one other person of proved character.

On entering the service, each platform employee is provided with a rule book containing instructions for both motormen and conductors, a list of telephones for emergency use, instructions for ticket inspectors and depot clerks, the corporation by-laws governing the conduct of passengers, various enactments relating to tramway construction and operation and an alphabetical list of streets, squares, places, etc. Transportation employees are also furnished with a handbook showing routes, stops, first and last cars, places of interest and importance, etc., so that they can give intelligent answers to almost any traffic inquiry.

A distinction is made in the rates of pay according to sex because the men are more steady in showing up for duty and also because they expect to stay in the business. Quite a number of the women are satisfied to work but five days instead of six. Motresses and conductresses are on the following scale of wages:

Original Rate	Per Week	War Bonus	Present Rate Fifty-one-Hr. Week	Total Earnings Fifty-four-Hr. Week
First three months	29s.	1s.	30s.	32s. 7d.
Thereafter........	47s.	...	47s.	51s. 2d.

The extra three hours in the fifty-four -hour week are at overtime rates.

Motresses are allowed an additional 6d. per diem, and their total earnings amount to 35s. 7d. ($8.19) and 54s. 2d. ($12.46), respectively.

The scale of wages for motormen and conductors follows:

	Pre-War Rates per Week	War Advances	Present Rate Fifty-one-Hour Week	Total Earnings Fifty-four-Hour Week
First year.........	27s.	28s. 6d.	55s. 6d.	60s. 5d.
Second year, first six months......	28s.	28s. 6d.	56s. 6d.	61s. 6d.
Second year, second six months......	29s.	28s. 6d.	57s. 6d.	62s. 7d.
Third year, first six months......	31s.	28s. 6d.	59s. 6d.	64s. 9d.
Third year, second six months......	32s.	28s. 6d.	60s. 6d.	65s. 10d.
Fourth year.......	33s.	28s. 6d.	61s. 6d.	66s. 11d.
Fifth year........	34s.	28s. 6d.	62s. 6d.	68s.
Sixth year	34s.	28s. 6d.	62s. 6d.	68s.
Seventh year......	34s.	28s. 6d.	62s. 6d.	68s.
Thereafter........	35s.	28s. 6d.	63s. 6d.	69s. 1d.

From the foregoing table it will be seen that all grades of platform men received a total war advance of $6.55 weekly, which is more than equal to the original starting wage of $6.21. The maximum wage today is $15.89 per week.

A bonus of 26s. ($5.98) or at the rate of 1s. a week is paid every six months to platform employees who have incurred no accidents. All classes of transportation employees also receive six days vacation per annum with pay.

DUTIES AND PAY OF PETTY OFFICERS

At Glasgow, the uniformed supervisory force is differentiated into ticket inspectors and timekeepers, 100 in all for 3234 platform employees. Of this number, thirty-six act as timekeepers and fifty-four as ticket inspectors. About ten plain-clothes men, who are conductors on special service, are also employed to report on violations of speed ordinances by other vehicles, to watch for ride-stealing boys, etc. There is no secret service.

The chief duty of the ticket inspector, as the name indicates, is to examine the tickets of passengers on the cars to ascertain if the proper fares have been paid and the tickets issued and punched correctly. On boarding a car, they require the conductor to produce his waybill (trip sheet) and the working packet of tickets in use in order that they may check the passengers' tickets. If a passenger refuses to show his ticket or to pay the proper fare, it is sufficient to secure his name and address for a report to the general manager; but if the passenger refuses even this information, the police may be called. Ticket inspectors must also report every case of a passenger who has paid a fare being without a ticket, or having an unpunched or improperly punched ticket, or having a ticket the number of which does not correspond with the fare paid or the waybill. This report must be accompanied by the name and address of the passenger and of any witnesses of the occurrence.

The miscellaneous duties of ticket inspectors include reports on the efficiency shown by instructor conductors, on reckless car operation and on failures to adhere to time points, and the inspectors are expected to telephone at once concerning accidents, fires, damage to car, track and line, etc. In general, the ticket inspectors are authorized to enforce proper operation, car cleanliness, and the like. If necessary, they may suspend (but not discharge) any motorman, conductor or outside traffic employee in case of insubordination, drunkenness, neglect of duty or other improper conduct, reporting the facts in writing to the general manager.

The chief duty of the timekeepers is to see that the cars are run according to schedule. These men are generally stationed at crew relief points where they note the on and off times of departing and arriving platform employees. At depots, crews must report ten minutes before the time of taking out the car, but at junctions and other relief points they are expected simply to be on time for their cars. The place at which every car employee first reports for duty is at a depot. Timekeepers may use their discretion in asking the depots for substitutes for absentees.

Both the ticket inspectors and timekeepers receive more pay than the ranks from which they come. During the first year they are on probation at their old platform pay. Their days off, vacation, etc., are planned as in the case of platform employees; in addition, no time is deducted for illness. No better instance of the effect of the war on wages could be afforded than the following comparison of the pre-war and present wages of the supervisory officers:

TICKET AND MOTORMEN (STREET) INSPECTORS

First year from 35s. to 70s............................	$8.05 to $16.10
Second year from 37s. to 72s............................	8.51 to 16.56
Third year from 39s. to 74s............................	8.97 to 17.02
Fourth year from 41s. to 76s............................	9.43 to 17.48
Fifth year from 43s. to 78s............................	9.89 to 17.94
Thereafter from 45s. to 80s............................	10.35 to 18.40

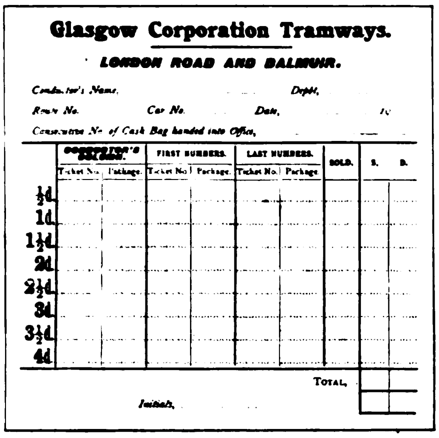
TIMEKEEPERS OR TRAFFIC REGULATORS

First year from 35s. to 70s............................	$8.05 to $16.10
Second year from 36s. to 71s............................	8.28 to 16.33
Third year from 37s. to 72s............................	8.51 to 16.56
Fourth year from 38s. to 73s............................	8.74 to 16.79
Fifth year from 39s. to 74s............................	8.97 to 17.02
Sixth year from 40s. to 75s............................	9.20 to 17.75
Thereafter from 42s. to 77s............................	9.66 to 17.71

Thus Glasgow's war wages are about the same as America's pre-war wages.

AUDITING OF ZONE FARES FROM CONDUCTOR TO TREASURY

Every conductor begins the day's work with packets of the serially-numbered fare receipts applicable to his route. These receipts are obtained from the depot clerk. The tickets of each classification are made up in pads of twenty-five or fifty and bear an initialing identification in addition to the colors and numbers.



Glasgow Corporation Tramways.

LONDON ROAD AND BALMUIR.

Conductor's Name, Depôt,
Route No. Car No. Date, 19
Consecutive No. of Cash Bag handed into Office,

	CONDUCTOR'S BALANCE.		FIRST NUMBERS.		LAST NUMBERS.		SOLD.	S.	D.
	Ticket No.	Package.	Ticket No.	Package.	Ticket No.	Package.			
½d.									
1d.									
1½d.									
2d.									
2½d.									
3d.									
3½d.									
4d.									
							TOTAL,		

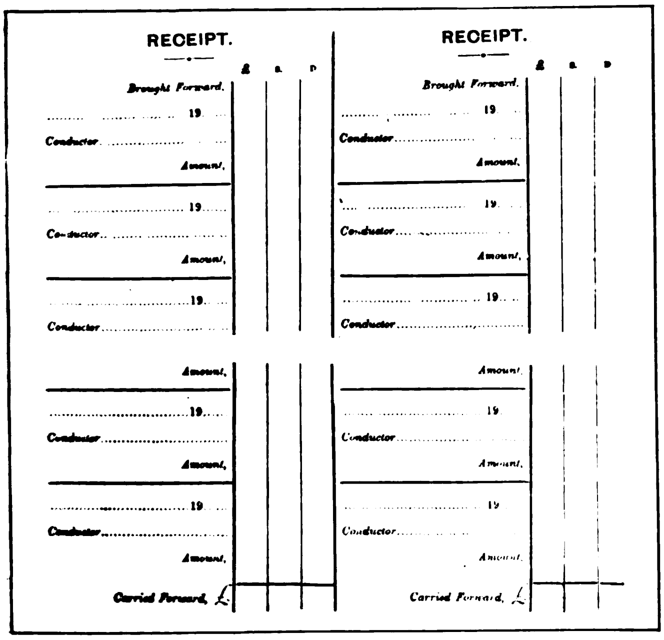
Initials,

CONDUCTOR'S WAYBILL OR TRIP SHEET, SHOWING RECORD OF TICKETS RECEIVED AND ISSUED AND THE CHECK BY THE RECEIVING DEPARTMENT

As many as eight rates of fare (½d. to 4d.) are used at Glasgow, which corresponds to the number of sections in the conductor's ticket-holder. However, as the ½d. tickets are sold in greater quantity than all the others combined, the conductor at his discretion uses several sections for these tickets and places the less popular varieties in his reserve ticket cabinet. Conductors issue as many as 2000 tickets a day. Reproductions of tickets were shown in the second Glasgow article on page 448 of the issue of this paper for March 8. They are canceled by a punch mark in the destination section.

A record of the first number and letter identification of each classification issued is made on the conductor's waybill (trip sheet), reproduced, which is issued in duplicate. Receipt for the tickets and their correctness in numbering a quantity is knowledged by his initialing of the waybill.

During the day, the conductor makes his returns to cash clerks en route and not to the depot clerks. In making the return for either a half or round trip as the case may be, he hands in the original of the waybill with his own record of the top numbers left on the pad of each classification. It is the function of the cash clerk, and not of the conductor, to figure how many of each class of ticket have been sold, what the revenue per classification is and what the last numbers of each kind of ticket are. In other words, the conductor makes a blind return by giving up all the money in his bag exclusive of the 3s. 6d. with which he starts the day, leaving the cash clerk to note down the shorts or overs.



RECEIPT.

£ s. D.

Brought Forward,
19
Conductor
Amount,

19
Conductor
Amount,

19
Conductor
Amount,

19
Conductor
Amount,

19
Conductor
Amount,

Carried Forward, £

RECEIPT.

£ s. D.

Brought Forward,
19
Conductor
Amount,

19
Conductor
Amount,

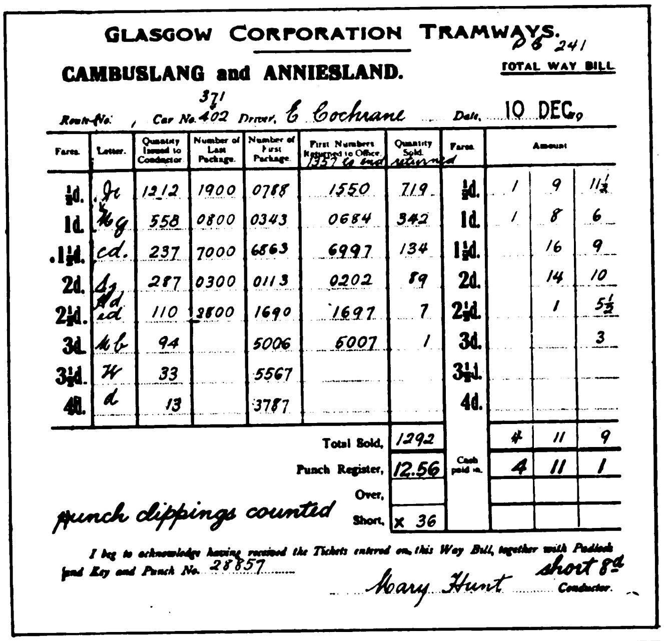
19
Conductor
Amount,

19
Conductor
Amount,

19
Conductor
Amount,

Carried Forward, £

PART OF PAGE IN DEPOT CLERK'S CASH RECEIPT BOOK



GLASGOW CORPORATION TRAMWAYS. DG 241

CAMBUSLANG and ANNIESLAND.

TOTAL WAY BILL

Route No. , Car No. 371 402 Driver, E Cochrane Date, 10 DEC 9

Fares.	Letter.	Quantity Issued to Conductor.	Number of Last Package.	Number of First Package.	First Numbers Returned to Office. 1357 to end returned	Quantity Sold.	Fares.	Amount		
½d.	Jc	1212	1900	0788	1550	719	½d.	1	9	11½
1d.	Kg	558	0800	0343	0684	342	1d.	1	8	6
1½d.	cd.	237	7000	6863	6997	134	1½d.		16	9
2d.	Sj	287	0300	0113	0202	89	2d.		14	10
2½d.	Hd ed	110	2800	1690	1697	7	2½d.		1	5½
3d.	Mb	94		5006	5007	1	3d.			3
3½d.	W	33		5567			3½d.			
4d.	d	13		3787			4d.			
					Total Sold,	1292		4	11	9
					Punch Register,	12.56	Cash paid in.	4	11	1
					Over,					
					Short,	x 36				

punch clippings counted

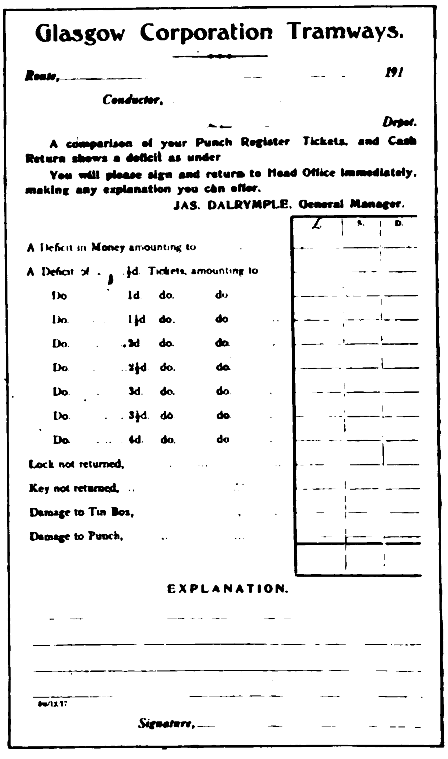
I beg to acknowledge having received the Tickets entered on this Way Bill, together with Padlock and Key and Punch No. 28857

Mary Hunt short 8d. Conductor.

CONDUCTOR'S TOTAL WAYBILL MADE UP AND CHECKED THROUGH BY THE RECEIVING DEPARTMENT FROM THE INDIVIDUAL TRIP OR HALF-TRIP SHEETS

On concluding his last trip at the depot, the conductor turns in his tickets, cash and punch to the depot clerk. The latter simply counts the cash and leaves the checking of the ticket numbers to the receiving department. The receipt of this cash for individual conductors is entered in a cash receipt book which goes to the receiving department daily. Part of a page from one of these books is reproduced on this page.

The transactions shown on the individual waybills are summarized on the "total" waybill, which is also reproduced, and covers a conductor's full day's work. This record which is made up by the receiving department, shows not only the actual total discrepancy based on the difference between the tickets issued and the cash received but also whether the punch registration itself is equivalent to the number of tickets issued. So far as the cash discrepancies are concerned, 1½d. in one day or 1s. in one



Glasgow Corporation Tramways.

Route, 191

Conductor,

Depot.

A comparison of your Punch Register Tickets, and Cash Return shows a deficit as under

You will please sign and return to Head Office immediately, making any explanation you can offer.

JAS. DALRYMPLE, General Manager.

	£	s.	D.
A Deficit in Money amounting to			
A Deficit of ½d. Tickets, amounting to			
Do 1d. do. do			
Do. 1½d. do. do			
Do. 2d. do. do			
Do 2½d. do. do			
Do. 3d. do. do			
Do. 3½d. do do			
Do. 4d. do. do			
Lock not returned,			
Key not returned,			
Damage to Tin Box,			
Damage to Punch,			

EXPLANATION.

Signature,

FORM FILLED OUT BY CONDUCTOR WITH GROSS DISCREPANCIES IN HIS RETURN week is admissible. Discrepancies between the registration shown by the punch and the number of tickets issued generally are due to failure to punch every ticket as issued. A difference in excess of 6 means the counting of the punchings. This is a tedious job since it is necessary to assort more than 1000 punchings of different colors, a separate shade being used for each rate of fare. In ordinary times, it is necessary to make checks of this kind from thirty-five to fifty times a day; at the present time, however, the figure is about 50 per cent greater because of the large number of inexperienced conductresses.

As soon as shorts have been entered, the original waybills containing the notation of error are returned to the conductor's depot for his signed acknowledgment. On going back to the receiving department, entry is made in the "shorts" ledger and the waybills are filed for a time for reference in case of dispute. The final blank reproduced shows a more elaborate form which must be filled out by conductors whose reports are grossly incorrect or who have failed to turn in their cash and ticket-handling equipment at the end of the day.

Overs are not returned to the conductors. Formerly they were divided among the men at the end of the year; now they go directly into their benefit organization known as the Friendly Society.

Should a conductor catch himself issuing a higher-rate ticket by mistake, he may turn it in for credit provided he gives the name and address of the passenger affected. In any event, if he retains the wrongly-issued ticket, he must issue another one of the correct denomination since every passenger must have a receipt. Occurrences of this kind are rare. He may also put aside and turn in any ticket which is too thick for the bell punch.

SIZE OF STAFF REQUIRED

The personnel employed by the receiving department in connection with the auditing of cash and tickets comprises 131 women or girls classified as follows: Cash room, ten; outside cash offices, thirty-eight; ticket room, sixty-eight; traffic sheets, nine, and punches, six. All counting and checking are done by hand, the management having found that the individual amounts handled are too small to justify the use of calculating machines. It is probable, nevertheless, that a decimal coinage would simplify the work, judging by the fact that the clerks may be seen referring to calculating tables.

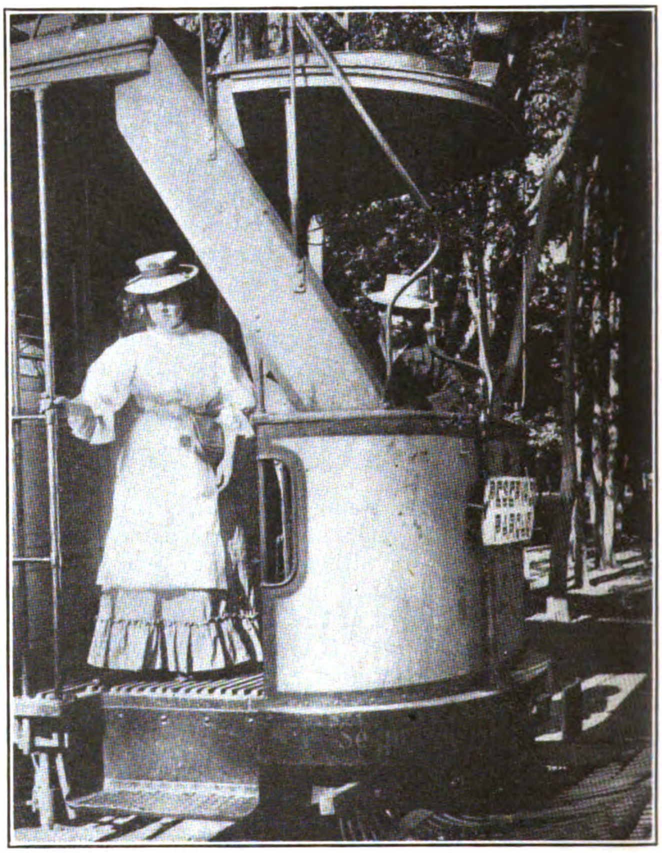
The returns from the depot clerks and cash clerks go to the receiving department in locked cases which are fitted with compartments for copper, silver, punches, waybills, etc. Delivery is made in motor trucks twice a day.

The fare receipts used at Glasgow are printed by the Glasgow Numerical Ticket & Check Book Printing Company. The Tramway purchased 430,946,566 tickets for the fiscal year ended May 31, 1918, of which 2,877,300 were scrapped. The punches are leased from the Bell Punch & Printing Company, London. As no work is done at the receiving department on Sundays, it is necessary to have at least two punches per conductor since the punchings chamber cannot hold more than 2000 cuttings comfortably.

From the foregoing account, it will be seen that the handling of fare receipts in Glasgow is a comparatively simple affair, especially as there are no transfer tickets to complicate the situation. Furthermore, the checking up of the fare receipts is far easier than the checking of the time limit and other features of the American transfer.

Women Conductors in Chile

THE electric railway companies of Valparaiso, Chile, found it possible to employ women as conductors on the railway cars of that city long before they were so employed in the United States. For that reason the accompanying photograph, which has been loaned to the Washington correspondent of this paper by the Pan-American Union, will perhaps prove of interest.



WOMAN CONDUCTOR AT VALPARAISO

This view was taken almost ten years ago, it is stated at the Pan-American Union in Washington, with the additional remark that the picture holds good for to-day, even to the fact, it is declared, that the women conductors go about their work in voluminous skirts rather than the shorter ones used by the women conductors in the United States, although, as women's fashions in Valparaiso change as frequently as they do in other communities, there is a possibility that the skirts worn by the conductors in Chile now are not quite so voluminous as those shown in the picture.

Conservation of Fuel by "Daylight Saving"

Because of the fact that the clocks of this country will be moved forward one hour at 2 o'clock to-morrow morning March 30, in compliance with the "Daylight Saving" law, the statement by the United States Fuel Administration is interesting that it estimates 1,250,000 tons of coal were saved during seven months last year through the operation of this law.

How the Public Feels About It

Representative Public Leaders of Various Classes Give in Replies to Questionnaire Their Opinions Regarding Guarantee of Return, Aid Through Taxation, Municipal Versus State Ownership, and Indeterminate Franchises

RECENTLY the ELECTRIC RAILWAY JOURNAL, it will be recalled, sent out a questionnaire to more than 400 public service commissioners, mayors, representatives of chambers of commerce and other leaders interested in municipal affairs. The desire was to secure helpful expressions of public opinion in regard to the electric railway situation.

Although only about 15 per cent of the total mailing list replied, it was possible in the issue of Feb. 22 to present a striking summary showing that the difficulties encountered by electric lines in trying to secure higher fares were due generally to the lack of public understanding, politics, defects in the regulatory system, and utility sins of omission and commission.

Similarly, in the issue of March 1, it was possible to give a résumé of what to the various public representatives seemed constructive suggestions for overcoming the above-mentioned difficulties. It seemed to be the consensus of opinion that the railways can convince the public of their needs by frankly stating all the facts, subject perhaps to public verification, asking only for a fair return on a reasonable investment and winning the public confidence through efficient and adequate service and a manifest desire to please.

These two summaries covered the replies to about two-thirds of the questionnaire. The replies to the remaining queries will be summarized in this concluding article. In advance of a statement of the questions and answers, it may be remarked that the third section of the questionnaire covered certain moot points of franchise construction, municipal ownership and railway economics, and the constructive suggestions resulting were somewhat limited because of the complexity of the subject matter.

The several questions and a brief analysis of the replies follow:

Can the franchise relationship fairly be made to provide a guaranteed return upon the invested capital, and if so, should this return be fixed at a uniform percentage throughout the life of the franchise or should the return on the portion of the investment made in any particular period be made to vary according to the circumstances of that time?

The replies to the first part of this question were both favorable and unfavorable, but the supporters of a guaranteed return seemed to have slightly the better of the argument. In the advocacy of a guaranteed return, however, there was in some cases the reservation that public representation in control was a necessary adjunct.

As for the second part of the question, those who met the issue squarely seemed inclined, in the case of the commissioners and civicists, to recognize the advisability of a flexible rate of return so that the current market rate for new money invested in any particular period might be met. The mayors and representatives of chambers of commerce, however, favored to a small degree a fixed return to avoid "confusion" and "disagreement." One business man averred that this policy would check extensions in periods of high costs and encourage them in periods of low costs, "thus resulting in the good of both the public and the company."

Some of the more detailed replies are published below:

COMMISSIONERS

If possible, the franchise should provide for a guaranteed minimum rate of return on the property value to be fixed or ascertained yearly or at stated intervals.

A fair return should be guaranteed or provided, but in a great crisis like the one just gone through, the public should not be required to bear all the burden. The utility should stand its share in the lean years, having enjoyed the advantage in the fatter ones.

It would be very difficult, for traffic costs and other elements are fluctuating. A fixed rate of fare sufficient to provide an operating surplus to be held in trust for the preservation and continuance of the service is a reasonable suggestion.

Under commission regulation the franchise granted by a municipality should contain no provision as to rates or return upon the investment.

A guaranteed rate of return can fairly be provided upon stockholders' capital, subject to adjustment every ten years in harmony with prevailing interest rates on prime securities.

A guaranteed return is feasible and desirable under a coöperative plan of operation, but with the necessary proviso that capital expenditures cannot be made without approval of standards and extent of track, equipment, etc., and that the publish shall not be financially responsible for obsolescence due to changes or improvements in the art of transportation.

The return should not be fixed as a uniform percentage throughout the life of the franchise, but it should be made to vary according to the circumstances of the time.

I do not favor a guaranteed return as a general legislative policy, but I do believe that the basis of the return should be made a definite matter. It should be clear in any case what the investors are entitled to receive, and the rates should be such as to give full opportunity to obtain a fair return, but the risk of getting the business in most cases would probably better remain with the companies.

The rate of return on the investment in any period should vary according to the conditions of that period.

The rate of return should be uniform, as indicated by average over many years. But the fare should be flexible to maintain the fixed rate of return plus a reasonable surplus in prosperous years, to meet cost changes.

MAYORS

The new ordinance in this city provides for a fixed return on the investment with an additional return as fares are reduced as an incentive to economical management.

The rate of return should vary according to circumstances.

A fixed percentage would be preferable, as it would remove an additional point of contention.

No guaranteed return should be thought of unless the public receives a representation in the management.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

To be perfectly fair, the rate of return should vary with the interest rate.

I believe that the first point is to obtain the actual, liberal fair value of the property without regard to capitalization; allow the company a fixed percentage (about 8 per cent) on this as return on investment. Capital expenditures after that should be added to the fixed valuation and the same percentage paid. There should be an elastic fare but no guarantee by the public treasury. Service and capital expenses should be controlled by the municipal government, through a department with an administrator paid by the city.

The return should be guaranteed at a uniform percentage in order that capital may be willing to help finance such properties.

The nearest thing I have heard toward a fair solution is the proposal to fix a definite rate of return to the stockholders, the earnings beyond that point to be divided between the stockholders and the city. Franchises to be drawn up in the future will have to carry a large element of public control in order to enjoy any popularity among the laboring classes.

The rate of return should be agreed on in the franchise. Any other plan would lead to uncertainty, confusion and possible juggling.

The return can fairly be guaranteed, and it should be made a uniform percentage on the investment during the term of the franchise. A varying return subject to the changes of the general economic status would result in disagreements. While this might be regarded as an arbitrary rule, yet it would check extensions during periods of high costs and encourage them during periods of low costs, thereby resulting in the good of both the public and the company.

The franchise relationship can and should be made to provide a guaranteed return upon invested capital, and at a rate to correspond to that obtainable in comparable enterprises at the time of the investment or adjustment. This may be adjusted from time to time as conditions vary, or as security issues are refunded.

The franchise should be sufficiently elastic to provide reasonable investment return under all circumstances. These hard and fast bargains, in which one or the other suffers, are not desirable. They breed trouble all the time.

Civicists

It is, of course, logical that the state which attempts to limit the return to a maximum should protect the investor by guaranteeing a minimum, but I do not believe that this is practicable. If adopted, the return should be uniform.

The return of investment made should vary according to the circumstances of the time.

If the government is going to guarantee a return it should control and direct operation.

The return must be capable of responding to market conditions. There should be no artificial terms in an arrangement.

To what extent, if at all, would social politics justify the support of electric railway service in communities by some contribution through the taxation power of the state?

It is difficult to determine the relative weights of the varying sorts of replies to this question. The trend of thought underlying them all, however, seems to run in this way. It has generally been believed to be theoretically just for the car rider to support the service, and the idea of support through taxation is one up to which the public is not educated, although its proponents are apparently growing.

If for any vital reason, such as the necessity of preventing city congestion or curtailment or suspension of service, public aid through taxation is necessitated as a practical last-resort matter, whatever the theoretical justice of the procedure may be, the public is likely, several replies assert, to insist upon closer union with the utility, even to the extent of ownership of the property.

Various specimen replies follow:

Commissioners

Tax payers would perhaps properly say that if the state or municipality is going to support public utilities, it would better own them. Public ownership would probably follow efforts to secure tax aid.

Inasmuch as the utilities are publicly controlled and the man who has his money invested has little to say about his own business, the guarantee plan through taxation would seem to be just, but I doubt whether public sentiment has been sufficiently educated up to that.

It has not dawned on the social political mind of the middle west that utility service should be supported b taxation. There is still lurking the other idea—that such companies should contribute to the public fund through franchise taxes, taxes on earnings, paving repairs, etc.

The rates charged by a utility should be sufficient to support it without resort to taxation.

Any actual deficit under a 5-cent fare should be made good from a tax on land values only.

With a guaranteed return I favor support thereof by taxation of all property instead of the entire burden being placed on the traveling public. Every form of property benefits directly or indirectly by these necessary public facilities and should therefore pay its share.

Yes, with substantial public control—not merely regulation subject to court review.

In some cases, in order to prevent undue congestion of population, the cost of service may very well be made up by taxation. But that should not be fixed by general policy but left to local settlement.

Such a policy would be unfair to the taxpayer who makes no use of the electric railway. The users should pay such a price for the use as to give the company a fair return upon its investment or the property should be scrapped.

If there is any valid strong social reason for any kind of preferential rates, such as labor tickets, school tickets, etc., the difference in fair cost of that special service over receipts should be paid out of tax funds rather than loaded onto the other fare payers, who may not be represented in the same proportion as they pay fares. School tickets at low rates are a social necessity.

Mayors

Support through taxation is justified to prevent congestion of population where a 5-cent fare must be maintained to assure a movement of population to the outskirts of the city.

Municipal ownership either with or without municipal operation would be preferable if resort must be made to direct taxation.

Under existing conditions, the policy of aid through taxation would be indefensible and totally without funds to support it.

There is no justification for support of electric railway service by contribution from state taxes—any more than there would be in the case of newspapers, gas and electric utilities or express companies. It is true that state highways are partly maintained by general taxation, but the time is coming when the vehicle tax will bear the whole cost.

Aid through taxation is justified to an extent large enough to encourage riding—to make electric railways practically moving sidewalks.

Every public utility should stand on its own feet.

Representatives of Chambers of Commerce

Let those who use utility service pay a just amount for it. Real estate is taxed enough now.

Taxes are high now, and car riders should pay enough to support the roads. State support to the electric lines would open a door through which other privately-owned public service corporations might want to crowd in.

If after thorough examination reasonable cause is shown for community aid, it should be done only when expenditures are controlled by a public official directly responsible to the people.

Public opinion is not ready for this yet. Many people still think public utility operation should yield a profit to the city so as to reduce taxes.

Electric railway service is essential to every community of any consequence, and if private capital unaided cannot be enlisted, then the community would be justified in guaranteeing the deficit from operation and interest on the investment by a general tax levy.

In communities badly needing transportation, the grant of aid would be a local proposition, as through subscription to bonds, capital stock, etc., by individuals.

Electric railways should be self-supported as far as financial support is concerned. Possibly concessions should be made in public works benefits.

Aid through taxation should be granted only on condition that the company make an entirely new contract with the community.

Civicists

The taxing power of the state should not be used to support industries which render variable service to individual citizens.

We may have to come to some arrangement for public subsidies. I do not feel sure that the public ever will be educated to pay more than 5 cents, but with the shrinking power of the dollar the public may finally look on the dime as they formerly looked upon the nickel.

If the state or cities took over the utilities, there is no question but that general taxes would have to aid in maintaining the utilities, but the people would be in favor of this as long as they owned the roads.

No general rule is possible. If this question is answered in the affirmative, the government should operate the railway.

Aid should be granted through taxation only to the extent that the public adequately participates in the management and in the results of joint investment.

This is entirely a matter of local policy and should be attempted only after every practicable device to develop higher load factors and subordinate sources of revenue have been used.

Free transportation would be as reasonable and as civilizing an agency as free education.

To what extent, if at all, should the car riders in a large municipality support non-paying service to suburban communities?

Several of the replies to this question favored the idea that all railway service to suburban communities should be self-supporting. The majority, however, seemed inclined toward the belief that a limited part of the burden of non-paying suburban lines should be borne by the urban car riders in order to foster suburban development and thus promote the general community welfare. Several urged the desirabilty of having suburban real estate bear a larger part of the burden than it now does.

Some of the detailed replies follow:

COMMISSIONERS

For a reasonable period pending the development of new districts, all patrons of all transportation lines should bear a share of development costs. The company should be allowed to amortize a share. Many unprofitable extensions and new lines are built to develop tracks of land, in which event the land men should aid or guarantee.

This is inevitable in the building of a city and is not contrary to good government or regulation.

The urban car riders should support suburban service only to such an extent as to prevent prohibitive or unreasonable suburban fares upon lines reasonably demanded by the general welfare of the locality served. No fixed rule any more specific could be made to fit all cases.

For the general public interest a utility should expect to maintain non-paying service to a limited extent, and the loss would have to be made up by the remainder of the system.

None whatever. A tax on land values of the entire zone should be provided.

The property of all communities served should pay its share, and likewise the traveling public should pay in proportion to the service rendered to all suburban additions and towns outside of reasonably defined city limits.

About 15 per cent.

Each service should be self-supporting.

It is undoubtedly an advantage sociably to encourage means which reduce crowded living conditions, but this may be carried so far as to mean an uneconomic, wasteful scattering of the population. Low car fares mean almost always higher prices for outlying real estate, so that what the city community pays in carrying low-priced transportation to outlying districts really goes wholly into speculators' pockets. A fare proportioned to cost of service for each reasonably-sized zone seems the logical one.

MAYORS

Only to prevent congestion of population.

Theoretically they should support it, but actually they would not knowingly tolerate it. The public knows that companies in the past have built on to "boom" additions, in consideration of a bonus paid by the land company.

The burden should be put on the real estate benefited.

All lines are parts of one system, and no part can be segregated and its profits or losses separately determined.

A city should bear the burden of a system giving service to suburban districts. In no other way can such districts obtain good service. How far this principle should apply is a question.

A city should support suburban service only to the extent that it benefits therefrom.

It depends entirely on the suburban buying power.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

Urban car riders should not be called upon to support non-paying suburban service, but the railway might ask for assistance in building the lines from the new communities served and from the larger merchants, etc., in the populous center.

Give the suburbs a zone system by which they will pay for what they get. This might delay development of the suburbs, but it seems the only fair way.

The fares paid in the entire municipality should be sufficiently high to pay a just return on the investment on the entire system, taking into account both the paying and the non-paying divisions when operated as one enterprise.

City riders should not support non-paying suburban routes. This loss could be remedied, perhaps, by curtailed service or increased rates to suburbs.

Suburban fares outside city limits can and should be regulated on the zone or mileage system.

Except for unreasonable distances, the fare should be exactly the same in the suburbs as in the crowded sections.

While the municipality may be benefited by ready transportation service to its suburban communities, it is also true that the suburbs are as much beholden to the center municipality. Their interests and benefits are reciprocal and, with the exception of specific cases, each should pay its own way.

Practically not at all. The dweller outside of the municipality chooses that residence to avoid taxation and other burdens of city residence, and he should properly pay a higher rate of car fare.

CIVICISTS

Theoretically, not at all; practically, I see no way to avoid it.

At the present time we permit real estate speculators to take off the cream of real estate values created by the extension of electric railway lines to the suburbs. It would seem that some method should be devised for making the land owners directly benefited pay for these extensions. The principle of special assessment ought to be applied here. If this were done, there would not be much of a problem left.

It frequently would be advantageous to a community to provide suburban service for the sake of promoting business, facilitating the accommodation of workers and laying the basis for urban development. The question so much depends upon local conditions that I do not believe it is susceptible of any general answer.

I believe there is much to be hoped for from a zone system of fares for large cities. It is logical and wholesome.

It would not be necessary for city car riders to support suburban service if the municipality had the power to collect the unearned investment on the property values created by improved transportation.

Is it necessary that, in any new relationship between electric railways and the communities they serve, provision be made for public ownership at the option of the public?

Although a good many of the respondents felt constrained to avow their disapproval of municipal ownership, they and most of the others stated the conviction that it would be desirable, if not necessary, to give the public an opportunity to take over electric railways if and when it so desired. Several felt that the public would lose interest in municipal ownership if it knew that it could buy the properties. Those who answered the above-stated query in the negative constituted a small minority in the first three classes, *i. e.*, except the civicists.

Some of the more striking replies are given below:

COMMISSIONERS

It would be a wise provision, because if the public knew that it might acquire properties at its pleasure the public would lose interest in the chase.

It would probably be wise and would make it easier for the utility to secure an adjustment by making such a provision.

Such a provision would doubtless contribute to a more favorable public sentiment on the theory that it furnished the public with a possible remedy in the event of unsatisfactory private operation. Note I say "on the theory" that it provided a remedy.

No objection if this will stimulate public confidence and interest, the real object to be attained.

While I do not favor a general public ownership program, the communities should be free by law to determine for themselves how they will use their local utilities with, of course, fair dealings with the investors. The basis of purchase might very well be made a matter of general policy.

Most certainly. The public is more and more viewing a utility as only its temporary substitute in management and investment. When a definite basis for taking over the property is outlined in the franchise and accounts are open to audit by public authority, the pressure for public ownership will be reduced, for I can scarcely see how unfair practices can exist under this condition.

MAYORS

Provision should be made for muncipal ownership at the option of the public, and if the franchise is not a limited one, there should be also the provision that if a new franchise is granted to any other company, it shall purchase the property of the old company at some fair valuation. If this is not done, it will not be possible for the operating company to finance any improvements or to keep up its property during the growing years of the franchise period.

Yes—or something approaching an equivalent like the "London Sliding Scale" in gas franchises with a city director in the board.

Public sentiment leans in this direction now.

No franchise should be granted without this provision.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

The giving of such an option might disarm suspicion.

A purchase provision can be included in the franchise and would be a beautiful dream to help the contract through, but most companies are bonded for more than any liberal fair value and the community could not purchase for less than the indebtedness. In time depreciation might bring the two amounts together. Most thinking people are opposed to municipal ownership.

This would be a wise provision to make, to be taken advantage of or not, as the public demand might dictate.

Such a provision is not necessary, but most communities would insist upon it.

It might be best, so as to avoid lengthy proceedings should the community decide for public ownership.

CIVICISTS

A provision for purchase is not necessary but seems desirable. Government should have the option upon fair terms always.

Necessary and desirable. But with enlightened management and greater education the resort to public ownership will be long postponed.

Potential public ownership is imperative for the promotion of scientific transportation and public morality.

If ultimate public ownership is an aim to be attained, should such ownership of electric railways be vested in municipalities or in the state, the fact being borne in mind that most electric railways serve communities other than the largest municipality in their district?

In regard to whether public ownership, if it were to come, should be vested in municipalities or the state, the mayors and civicists took for the most part the city side. The commissioners and representatives of chambers of commerce, however, were divided almost evenly.

The idea was expressed in a large number of instances that the territorial extent of the railway should be the determining factor. A purely urban system would thus be left in the hands of the city, but a railway extending out into the suburbs and into other cities would better be placed under state ownership. An alternative in the latter case, however, would be the formation under state authority of a utility "district" with power to issue bonds.

Various detailed replies to this question are given in the following paragraphs:

COMMISSIONERS

The state should own the properties if the lines are partly within and partly without municipalities, and the city if the lines are strictly intra-city.

If public ownership comes at all, it should be through the organization and medium of "private companies" in hands of trustees for the public investment or guarantee.

It should be vested in a separate public corporation covering the entire transportation district.

Both state and municipality. The state should have superior jurisdiction and the power to use the city system as the terminal and operating organization for the lines serving the suburban towns.

In the municipalities under state regulation and supervision.

In most instances municipal ownership would probably prove the better, but in others state or even national ownership would doubtless be necessary.

All public utilities radiating from a populous center should be controlled by a metropolitan district, in which the state should be represented but the local communities largely in joint control, so adjusted that one community should not dominate the whole situation.

MAYORS

Ownership would be vested in municipalities. It would not be difficult for several municipalities to get together.

Perhaps laws might be passed extending the jurisdiction of cities outside their limits as in the case of the Metropolitan Park Commission of Boston. This would take care of the situation up to the point where the service becomes interurban.

State ownership, except where a railway serves a municipality exclusively.

Possibly a so-called "district" which would have power from the state to issue bonds, and which would be made up from the communities served.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

Ownership should be vested in the governmental unit to which the utility is by jurisdiction responsible.

Railways should be owned in zones of service, like a school district, but this is probably impracticable.

State ownership would be more likely to be satisfactory, as it would keep the roads out of the field of local politics.

Of the two evils, state ownership would be the less.

Ownership of city electric railways should be municipal, and traffic arrangements should be entered into between municipalities and private suburban companies using the city streets. Suburban electric railways would probably continue under private ownership until public opinion justified their acquirement by the state.

Fundamentally such ownership should be vested in the state, but such a plan would not be popular because it kills all local interest and pride in the proposition.

The railways should be owned by the cities, with state regulation of service to outside communities.

Control should lie with municipalities, for cities have had more experience in operating utilities, and control would be vested only in the hands of the patrons.

CIVICISTS

No civic unit should attempt to operate except for its own people, and therefore ownership should vest in the state.

State ownership would not be feasible. Ownership should be vested in the predominating municipality, irrespective of the number of communities served.

The "public utility district" of California points the way to the necessity of home rule in the administration of transportation as of all other public services. Public regulation is a failure.

If an electric railway were owned by one municipality, how could suburban communities be assured of adequate service and fair rates?

In the event of public ownership by cities, the question of control over suburban service and rates would be of more than usual importance. It was the opinion of some mayors that the municipalities could be trusted to give fair rates and adequate service to the suburban communities, especially in view of their self-interest in suburban property.

Other mayors doubted this, but only one suggested that the only safe method would be to have control over suburban service and rates in the hands of the state regulatory body. The majority of the commissioners, business men and civicists agreed as to the advisability of this latter method. Two commissioners would supervise even municipally-owned urban utilities.

Some of the replies were as follows:

COMMISSIONERS

Unless the regulatory body of the state had jurisdiction over the municipal authorities, a very difficult problem would be presented. If the state could have authority over joint rates and service, the matter would be simplified, but it is not likely the cities would submit in states where power is vested in cities.

Let state control and regulation apply to municipally owned utilities just as it now applies to those privately owned.

Only through the exercise of state police power of rate regulation and control.

The interest of the municipality in becoming the commercial center of the community would prompt suburban extensions. Indeed, the tendency would be to over-build rather than to refuse to make extensions.

Self-interest of the larger municipality could be depended upon to give satisfactory service and rates to suburbs.

The municipality would become a public utility and as such the state would regulate it as it now regulates private utilities.

Through the formation of a municipal utility district.

This is a problem which would unquestionably cause no end of trouble, unless some larger authority sufficiently free from domination by the principal city were created to have final authority. The metropolitan district idea appeals to me as feasible.

All electric service outside of the municipality should be under control of the state railway commission.

MAYORS

The railway should be left subject to the public service commission as it is now.

Adequate control of extensions by municipalities with authority to establish reasonable rates of fares on a particular extension, even though higher than the general city fare, backed by public opinion, would probably take care of such situation.

I should expect no difficulty here.

Suburban patrons probably would not get adequate service and fair rates.

The patrons of suburban lines would be treated fairly by the city.

Assurance can probably not be given, but the service can be made as adequate as it is now. What a private corporation can do the municipality can do.

That is easy. How are water rates kept fair in publicly owned plants? The management stands or falls on the judgment of the voters on this matter.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

By the establishment of a state public service commission, with authority to fix rates and schedules.

Through commissions formed to adjudicate such matters, as the Interstate Commerce Commission has controlled the practices of the steam roads.

Suburban railways should be under regulation and control of state commissions and be permitted to effect proper traffic arrangements with municipally owned lines just as they do at present with privately owned lines.

It would be impossible to handle satisfactorily the charge for service if the railways were controlled by one community.

CIVICISTS

The present state commissions would have to make the necessary adjustment. This would not be a vital problem as cities are more and more interested in the suburbs since they realize that suburbs are a main factor in a healthy city.

Outside companies could receive running rights into centers of large towns.

It is done in Great Britain. State public utility commissioners do not deal fairly with municipalities here. There must be worked out an organic relationship governing the spheres of federal, state and municipal ownership.

If under a franchise public ownership could be secured at any time, at the option of the public, would there be any objection to having the franchise not otherwise limited as to duration?

This last question brought a swarm of answers to the effect that an indeterminate franchise is not objectionable provided the public can at its will secure ownership of the railways. Several, however, preferred term franchises because of the opportunity for bargaining and revision under changed conditions. One combination view was that there should be definite terms with recurring periods of privilege of purchase.

A few of the replies follow:

COMMISSIONERS

I like the Wiconsin law, which provides for continuing franchises, with full control vested in the state.

No. A public utility franchise should be unlimited but subject to cancellation or revocation under proper circumstances and by a proper tribunal.

No, granted gradual amortization is provided.

If a property may be taken over any time by the public, I see no reason for any other time limit on the franchise.

Absolutely none—provided the fares and conditions of service as originally defined are subject to adjustment at reasonable intervals according to costs, etc.

All franchises should have a limitation.

MAYORS

It is very undesirable from the point of view of the municipality to grant franchises unlimited as to time.

Complete municipal control over the operation of the property with a simple method for its purchase by the municipality, with the allowance of an additional return on the actual investment, should give better results than the limited franchise.

There should be no time limitation as to date of expiration if the franchise contains a provision for public ownership at the option of the public.

I believe in a fairly long term franchise.

Yes. Public ownership might not be possible or desirable. Yet some local control is necessary, and the only way to obtain this is in revision at the end of the period.

REPRESENTATIVES OF CHAMBERS OF COMMERCE

Yes. Franchises should be limited, so that the two parties—railway and citizen—can arrange their affairs as conditions change. A franchise with option to purchase at any time could be drawn which would be fair to all, but I doubt if any railway is as yet so hard up that it would agree to one fair to anyone but itself.

I can see no objection, unless that it might offer a precedent for other public service corporations, not open to public ownership, to ask unlimited franchises.

It seems to me that the franchise should be subject to review at stated intervals.

The policy of giving only revocable locations and not franchises of definite or unlimited periods appears in the practice of years to be sound and best.

I prefer definite franchise terms with recurring periods of the privilege of purchase on reasonable notice.

CIVICISTS

I see none, except that in a community which does not believe in public ownership this might be equivalent to a perpetual franchise.

Yes, there should be some other limitation as to time. Cities are not always in a position to finance such projects.

Yes—unless an amortization plan were adopted. It is possible so to draw a grant as to make it indeterminate and yet protect the public.

An unlimited franchise under any circumstances would be undesirable because of changing conditions which would make necessary the adjustment of provisions other than those relating to option of purchase by the public.

Theoretically the indeterminate franchise is best, but the experience with it in Massachusetts is not reassuring.

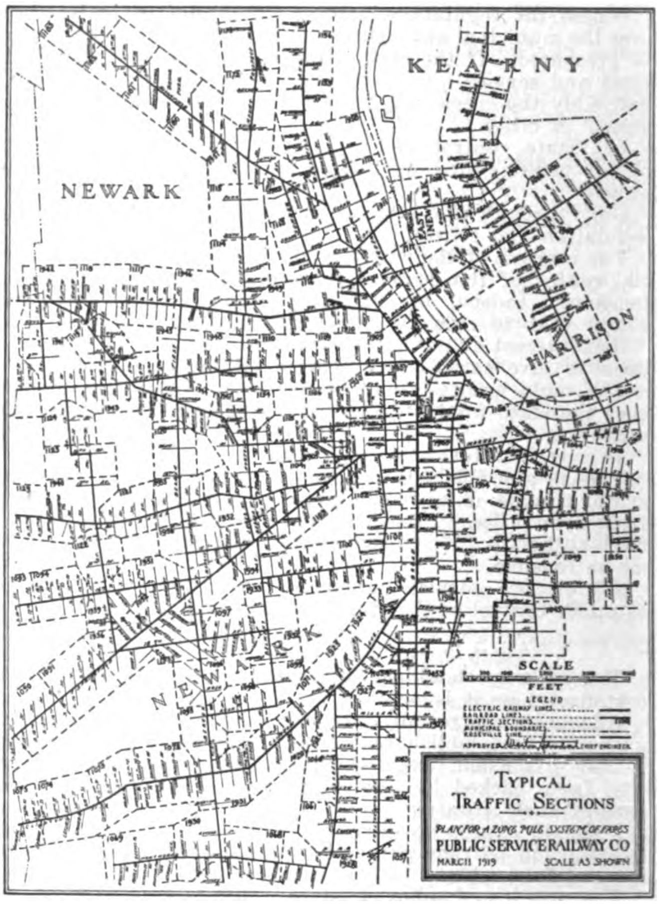
The Traffic Check and What It Showed on the Public Service Railway

Extensive "Origin to Destination" Check of Passenger Traffic, Conducted During Latter Part of Last Year, and Study of Location of Various Traffic Centers, Indicated Desirability of Multiplicity of Zones with Low Progressive Charge per Zone — This Principle Was Adopted in Zone System Proposed

IN THE TWO preceding issues of this paper an account has been given of the proposed zone fare system of the Public Service Railway, as described in a report submitted on March 11 to the Board of Public Utility Commissioners of New Jersey. The conclusion in the report as to the adoption of the particular fare system selected was based on a traffic survey taken on the entire system between Aug. 19 and Oct. 11, 1918. The report describes three kinds of traffic count, which have been used in the past, namely, the "on and off" check, the "cordon" count and the origin to destination check."

The "on and off" check, the report explains, is obtained by stationing checkers on as many cars as the circumstances require to record the number of persons boarding and alighting at each stop of the car. From this record, when tabulated, can be determined the number of persons riding in the car past any given point. This method of traffic count has generally been employed in connection with the determination of the adequacy of the service. In the cordon count, observers at designated points note the number of persons on each car as it passes. If the points selected are possible zone limits, this count will determine the number of persons riding from one zone to another.

According to the report, the great defect of both of these kinds of check is the fact that the traffic information obtained by them is necessarily incomplete. Under either method it is impossible to determine the distance traveled by any particular passenger or group of passengers. The "on and off" check shows where a person boards the car but it does not show where that particular person leaves the car. It is impossible to determine by this method the number of people taking short rides or the number taking rides of any given length. As soon as a passenger boards the car his indentity is lost. He becomes one of the total number on the car. It is impossible to tell whether he gets off at the next stop or rides 5 miles or more. All that can be determined from the use of the "on and off" check, or this check combined with the "cordon count," is the number of persons who board or alight within a given area and the number of persons passing a given point. It is impossible to determine the amount of short riding which exists between two or more zones or whether persons boarding a car at a transfer point began their journey at that point or whether they traveled to the transfer point on another car. Even though the character of fare paid by the passenger is noted, no information can be secured as to the length of the ride previously taken on other cars by persons boarding at transfer points and presenting transfers.



PORTION OF TRAFFIC SECTION MAP FOR ESSEX DIVISION, MADE FOR TRAFFIC COUNT

The report also observes that the experience of companies in other cities in which a zone system has been tried, showed that in almost every case there was a wide divergence between the traffic estimated under the zone system and that which was actually handled after the system became effective. In every instance the travel was overestimated and the earnings were correspondingly overestimated. This led the management of the Public Service Railway to the conclusion that the traffic data upon which these previous decisions were based were faulty and that in its case a more elaborate method of traffic count should be adopted. In consequence, the third method, which was very similar to that employed by the Director of Transit of Philadelphia in 1913, was employed. In this, a record is taken of the point at which the passenger gets on the car and the point to which he travels.

PREPARING FOR THE TRAFFIC CHECK

The first step was to divide the territory covered by the lines of the Public Service Railway into arbitrary districts or sections, known as traffic sections. These sections were usually ¼ mile in length, that is to say, in the direction in which the line runs. In thinly-settled territory, sections of ½ mile, and in some cases

1 mile, were adopted. The subdivision of each operating division into traffic sections was begun from the main points of traffic, such as for example, Broad and Market Streets and the Public Service Terminal in Newark, and each traffic section was given an individual number. A portion of the traffic section map for the Essex division, showing the district surrounding Broad and Market Streets, is illustrated by the map on page 644. The boundaries of the sections and the number of each section are indicated in the original map in red.

The ¼-mile division adopted was smaller than that in the Philadelphia count mentioned where districts 1 mile square were used, but the purpose of the traffic count on the Public Service Railway was different from that which inspired the Philadelphia count. The latter check was taken to determine the necessity for rapid transit lines and the traffic which would be handled by such lines when and if constructed. The traffic section of 1 mile square was not considered advisable for the Public Service Railway because, while it simplified the work of compilation, it did not permit of sufficient elasticity in later applying the traffic data for the purpose of accurately determining proper zone points or the revenue which would be derived under a zone plan.

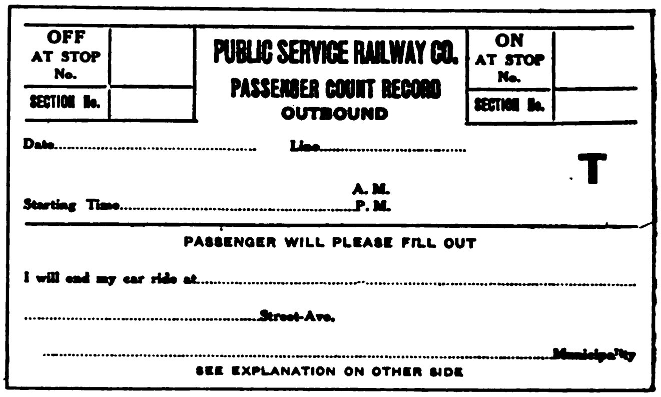
Following the division of the property into traffic sections, the next step was the preparation of "stop number cards." The stops on each line at which passengers may board or leave the cars were listed in sequence in each direction. An arbitrary number was then assigned to each stop. A list was then prepared showing the stops, in sequence, in each direction, together with the stop number and the section number for each stop. This information was then printed upon heavy Manila cards, showing on one side the stops in sequence "outbound" and on the reverse side the stops in sequence "inbound."

METHOD OF TAKING THE CHECK

The method of taking the check on the cars was to provide two checkers on each car, one of whom, called the "distributer checker," was required to station himself at the rear of the car near the conductor (when prepayment cars were under check) in a position where he could see the character of fare paid to the conductor by the passenger. This checker was supplied with "count slips," the appearance of which is shown in the cut on this page. On the reverse side of this slip the following words appeared:

> Collection of this information is necessitated by an order of the Board of Public Utility Commissioners of the State of New Jersey. We ask your co-operation.
>
> HOW TO FILL OUT THIS SLIP
>
> Please write in space opposite words "I will end my car ride at" the street to which you intend to ride. If that street is on some line to which you intend to transfer, write in your destination on the transfer line and not the point where you leave this car to transfer.

These slips, identical in form, were used in two colors, white slips being used on all inbound trips and pink slips on outbound trips. As the passenger boarded the car the distributer observed whether he paid a cash fare or presented a transfer. A passenger presenting a transfer was not given a count slip, because of the fact that his journey on the transfer was presumably covered by the information furnished on the count slip given to him on the original line at the time he boarded the car and paid his initial fare. If the passenger paid a cash fare the distributer was instructed to observe whether he purchased a transfer. If he did so, the distributer crossed the large T appearing on the right-hand side of the count slip; the purpose of doing so being to call the attention of the second checker, known as the "collector checker," to the fact that the passenger had bought a transfer and was destined to some point on another line than that on which the check was then being taken. While the passenger was paying his fare the distributer checker noted in the upper right-hand corner the number of the stop at which the passenger boarded the car, ascertaining this number from his "stop number card." Having filled in the "stop number," the distributer handed the count slip to the passenger, with the request that he write in his destination. After the passenger had been seated and had had sufficient time to look over the slip and fill in the desired information, the second checker, known as the "collector checker," approached the passenger and requested the slip. In practice, a large proportion of passengers did not themselves write in their destination, owing to the fact that they did not have a pencil with them. In such cases the collector requested the passenger to hand him the count slip. The collector observed whether the T was crossed, thereby ascertaining whether the passenger had bought a transfer. The collector requested the passenger to inform him as to the passenger's destination. As an extra precaution checkers were instructed to ascertain from passengers giving their destination a transfer point whether the passenger intended to transfer to another line. The information as to the destination of the passenger was written in on the lower part of the count slip, the name of the street intersection and the municipality being given. If the passenger for any reason refused to give the desired information, the collector was instructed to thank the passenger and to note the fact that the passenger had refused to furnish the information. In a large proportion of such cases, which were comparatively few in number, the collector secured the blank count slip from the passenger and wrote across the face of it "Refused," turning this slip in, together with the others.



OFF AT STOP No.		PUBLIC SERVICE RAILWAY CO. PASSENGER COUNT RECORD OUTBOUND	ON AT STOP No.	
SECTION No.			SECTION No.	

Date.. Line..............................

T

Starting Time...A. M. P. M.

PASSENGER WILL PLEASE FILL OUT

I will end my car ride at..

....Street-Ave.

....Municipality

SEE EXPLANATION ON OTHER SIDE

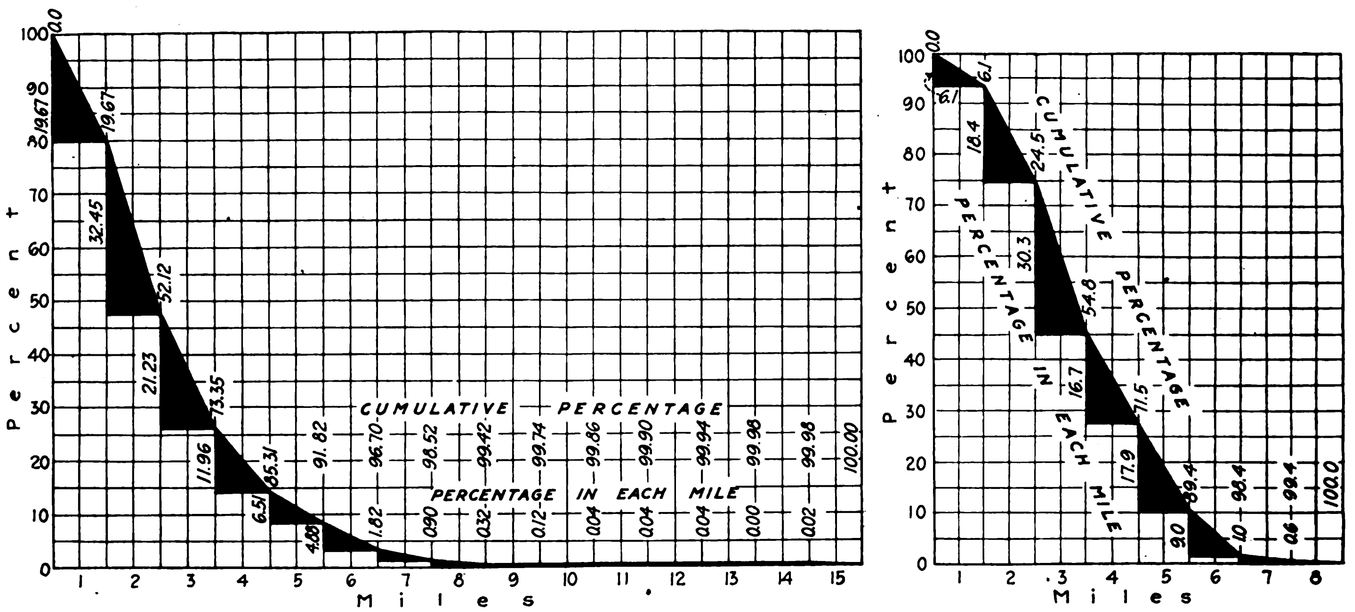
FRONT OF "COUNT SLIP"—ONE OF THESE WAS FILLED OUT FOR EACH PASSENGER

Incidentally it might be said that a notable spirit of co-operation was displayed by car riders, as evidenced by the comparative infrequency of refusals to furnish the desired information. This co-operation was fostered by a series of newspaper advertisements and posters displayed in the cars, explaining the reason for the check and the necessity for public co-operation to enable the company to carry out the order of the Board of Public Utility Commissioners concerning the formulation of a zone plan. It will be remembered that the reverse side of the count slip carried an explanation to the effect that the collection of the information was necessitated by an order of the Board of Public Utility Commissioners.

At the end of each half trip the "collector checker" inserted the count slips collected during that half trip in an envelope, which he sealed, filling out the following information on the face of the envelope:—date, name of line, inbound or outbound, run number, trip number, time of beginning half round trip, number of count slips inclosed, number of persons refusing information, any unusual circumstances, such as delays due to street blockades, the name of the distributer and the name of the collector.

PROPORTION OF CARS CHECKED

The matter of the proportion of service or the percentage of cars which should be checked was given most careful consideration. The investigation by the Director of Transit of the City of Philadelphia, already mentioned, was based upon counting the passengers on about one car in every five (eighteen-hour) cars operated. The percentage of service thus checked was fully as great as had been covered in other checks previously taken. In view of the great importance of an accurate record it was deemed advisable by the Public Service Railway to take a larger percentage of the cars than were covered in Philadelphia and to extend the check to include not only eighteen-hour cars operated but also to make provision by which the desired percentage of service could be checked in the rush-hour period as well as when the lines were operated on the base schedule. The percentage of cars checked varied somewhat between the different lines, depending upon the headway and the traffic characteristics of the line, but averaged for the system 5 per cent of the total number of trips.



A NUMBER OF THESE CHARTS WERE PREPARED, SHOWING THE DISTRIBUTION OF HOMES OF EMPLOYEES OF MANUFACTURING ESTABLISHMENTS SERVED BY THE COMPANY. THAT AT THE LEFT IS THE AVERAGE OF TWELVE SUCH CHARTS; THAT AT THE RIGHT SHOWS THE SITUATION IN THE WESTINGHOUSE LAMP WORKS

ENGAGEMENT AND TRAINING OF CHECKERS

The problem of securing a large number of competent persons to take the check at a time when war industries had practically depleted the labor market was one which required some time for its solution. Owing to the season of the year in which the check was taken, it was believed possible to recruit the required number of checkers from the student bodies of some half dozen colleges and universities. Because of the large number of men called for military service under the selective service act, however, it was necessary to make many substitutions and it was found necessary to extend the field from which the substitutes were recruited to include seniors in high schools and other men possessing the required education. At the outset, at the time the check was inaugurated on Aug. 19, forty-seven men were available for service. The number was steadily increased, reaching a maximum of 100 men. The men were thoroughly trained for their duties; in addition, careful supervision of the work was provided through the regular street inspectors of the company.

The company followed the same plan used in the Philadelphia investigation of confining the check to what might be termed the normal days of the week, that is, Monday to Friday, both inclusive; in other words, no checks were taken on Saturdays, Sundays or holidays, or on the day following a holiday. Special provision was made for checking the lines entering the Public Service terminal and other points where a system of prepayment areas prevailed.

The compilation of the results of this check was a stupendous task and required a large staff of clerks until the data showing the movement in both directions between each traffic section and every other traffic section on the system were finally compiled.

OTHER STUDIES CONDUCTED

While this traffic count was being taken and tabulated, the company made a study of other factors which had a bearing on the fare system to be selected. These included: (1) a distribution of the population in the district served; (2) the location of the factories, railroad stations and other centers controlling or creating traffic; (3) trackage built by the company within recent years to indicate tendencies in traffic movement; (4) growth in assessed valuations of sections served; (5) fares on competing steam railroads; (6) equalization of fares over the system, and (7) effect of the zone fare system on various classes of riders.

Maps showing the distribution of population were prepared and clearly demonstrated the impossibility of creating central fare zones, sufficiently small to permit of a charge of a 5-cent fare and include therein even a considerable part of the built-up city areas. The situation in this respect, the report says, is entirely different from that which prevails in the smaller cities of New England served by the Bay State Street Railway, or the conditions existing in Providence or Pawtucket served by the Rhode Island Company. Not only is the territory comprised in Hudson, Bergen and Essex divisions more thickly populated than any sections in which a zone system has heretofore been tried, but the thickly populated area covers a wider range of territory than any city in America in which a zone experiment has been undertaken. Reproductions of two of these maps, those for the Essex Division and for the Hudson and Bergen Divisions, were published on pages 526 and 527 of the issue of this paper for March 15, although the titles under those maps were transposed.

LOCATION OF FACTORIES AS DETERMINING SYSTEM

Maps of the locations of the various factories, schools, theaters, etc., were also made and showed a condition which had an important bearing on the selection of the fare system finally adopted. The commonly assumed condition of cities with a central district in which is found not only office buildings and retail stores, but in which manufacturing establishments, giving employment to the workers of the community, are also located did not exist in the communities served by the Public Service Railway. It is true, of course, that there is a concentration of retail establishments, department stores and office buildings in the limited area ordinarily referred to as the business center of the city, but the large manufacturing establishments which give employment to the major portion of the population are widely scattered. Thus, if Broad and Market Streets, Newark, the business heart of the city, is taken as a center, the distribution of factories, employing 250 or more men each, is as indicated in the table above. The same general condition applies to Jersey City. It is less true of Paterson and Passaic, but even in these communities, the larger proportion of the establishments and their employees are found outside the 1-mile zone. A study was also made of the distances at which the employees in some of the larger factories lived from the works, and typical diagrams are shown. These facts had an important influence in deciding the company in favor of the zone system adopted, with its multiplicity of zones and small added rate per zone.

DISTRIBUTION OF FACTORIES AROUND NEWARK

	No. Factories	Total Employees
Located within 1 mile from Broad and Market.	18	12,190
Located between 1 and 2 miles from Broad and Market	29	29,220
Located between 2 and 3 miles from Broad and Market	18	14,075
Located between 3 and 4 miles from Broad and Market	13	28,900
Located between 4 and 5 miles from Broad and Market	10	10,240
Totals	88	94,625

DETERMINING STANDBY AND MOVEMENT COSTS

There remains to be given a description of the process by which the fairness and reasonableness of the proposed rates of 5 cents for the first zone and 1 cent per zone-mile thereafter were determined. The Public Service Railway followed the general method employed by the Wisconsin Railroad Commission in the Milwaukee Electric Railway & Light case, with such variations from the Milwaukee basis of apportionment of terminal and movement expenses, and the basis used by Sloan, Huddle, Feustel & Freeman in the Bay State Street Railway case, as were necessary to fit conditions peculiar to the New Jersey company.

APPORTIONMENT OF OPERATING ACCOUNTS TO DETERMINE COST OF SERVICE OF PUBLIC SERVICE RAILWAY

	Track-Mile	Car-Mile	Car-Hour	Revenue Passengers Carried
Way and Structures:				
1 Superintendence	*a*	*a*	....	.....
2 Ballast	100%	....	....	.....
3 Ties	100%	....	....	.....
4 Rails	10%	90%	....	.....
5 Rails, rail fastenings and joints	10%	90%	....	.....
6 Special work	....	100%	....	.....
8 Roadway and track labor	40%	60%	....	.....
9 Miscellaneous track and roadway expense	*b*	*b*	....	.....
10 Paving	50%	50%	....	.....
11 Cleaning and sanding track	90%	10%	....	.....
12 Removal of snow and ice	90%	10%	....	.....
14 Elevated structures and foundations	90%	10%	....	.....
15 Bridges, trestles and culverts	90%	10%	....	.....
16 Crossings, fences and signs	100%	....	....	.....
17 Signal and interlocking apparatus	90%	10%	....	.....
18 Telephone and telegraph lines	90%	10%	....	.....
19 Miscellaneous way expenses	*c*	*c*	....	.....
20 Poles and fixtures	100%	....	....	.....
21 Underground conduits	100%	....	....	.....
22 Distribution system	....	100%	....	.....
23 Miscellaneous distribution expense	*d*	*d*	....	.....
24 Buildings, fixtures and grounds	90%	10%	....	.....
25 Depreciation of way and structures was distributed among the various accounts affected.	....	....	....	.....
Equipment:				
29 Superintendence	*e*4.02%	*e*95.98%	....	.....
30 Passenger and combination cars *	*f*	*f*	....	.....
32 Service cars	....	100%	....	.....
33 Electric equipment of cars	....	100%	....	.....
36 Shop equipment	*g*4.02%	*g*95.98%	....	.....
37 Shop expenses	*g*4.02%	*g*95.98%	....	.....
38 Repairs of vehicles	*g*4.02%	*g*95.98%	....	.....
40 Depreciation of equipment distributed to various accounts, as shown above	....	....	....	.....
Power:				
59 Power from other sources	....	100%	....	.....
Conducting Transportation:				
63 Superintendence	....	*h*	*h*	*h*
63c†	....	....	100%	.....
64 Passenger conductors, motormen and trainmen	....	....	100%	.....
66 Miscellaneous car service employees	....	....	100%	.....
67 Miscellaneous car service expenses§	....	§	§	§
68 Station employees	....	....	....	100%
69 Station expenses	....	....	....	100%
70 Carhouse employees	....	....	....	100%
71 Carhouse expenses	....	....	....	100%
72 Operation of signal and interlocking system	....	....	....	100%
78 Other transportation expenses	....	*i*	*i*	*i*
Traffic:				
79 } Superintendence and solicita- 80 } tion and advertising	....	....	....	100%
92 Injuries and damages	....	....	....	100%
General and Miscellaneous:				
97 Rent of tracks and facilities	....	100%	....	.....
*Summary of Other General and Miscellaneous Expenses and Taxes***	7.28%	39.67%	41.06%	11.99%

(*a*) Overhead, Accounts Nos. 2-24.
(*b*) Overhead, Accounts Nos. 2-8 and 10-11.
(*c*) Overhead, Accounts Nos. 2-16.
(*d*) Overhead, Accounts Nos. 17-18 and 20-22.
(*e*) Overhead, Accounts Nos. 30-38.
(*f*) Twenty-five per cent of depreciation (for obsolcscense) charged to track miles and 100 per cent of the balance to car-miles.
(*g*) Overhead, Accounts Nos. 30-33.
(*h*) Overhead, Accounts Nos. 63c. and 64-78.
(*i*) Overhead, Accounts Nos. 63c. and 64-72.

* One-half of 6½ per cent of Account No. 30 (for painting cars) is charged to track-miles.

† Inspectors, assistants and starters represent 50 per cent of Account No. 63 taken as Account No. 63c.

§ Account No. 67 is apportioned as follows: 55 per cent — Lamp Lubricants, Waste and Miscellaneous Supplies, 100 per cent to car-miles, $158,400. 40 per cent — Inspection (secret), 100 per cent revenue passengers carried, $115,200. 5 per cent — Miscellaneous Car Service Expense, 100 per cent to car-miles, $14,400.

** All general expenses and taxes are treated as overhead and apportioned on baiss of total direct expenses, with exceptions of Account No. 92, "Injuries and Damages," and Account No. 97, "Rent of Tracks and Facilities."

The theory underlying the apportionment of operating costs, as expressed by the Wisconsin commission, is that, in the first place, costs such as a portion of maintenance and repair of roadway and rolling stock, power expenses varying with the demand, depreciation due to the elements, and a portion of the return on the investment are dependent upon the size or location of the plant and are not affected by any possibility of increased traffic. These are terminal costs.

SOME COSTS PARTLY VARIABLE

With a limited demand for service, however, certain additional costs are occasioned. Among these are wages of conductors and motormen, the output cost of power, and that portion of maintenance and depreciation of roadway and rolling stock caused by travel and wear. A portion of such costs will vary with the number of passengers hauled. These expenses are partly fixed and partly variable and may hence be divided between movement and terminal costs dependent upon traffic conditions on each line. The ratio of the average carload to the comfortable load will determine the division.

Moreover, there are additional costs which undoubtedly vary with the number of passengers carried or density of traffic. Among these are the cost of injuries and damages and a certain part of the transportation expenses, notably the cost of car station employees, dispatchers, operation of the telephone system, and the cost of printing tickets and transfers. This entire group of expenses is included in movement costs.

In addition to the foregoing three groups there is a small additional portion of the total expenditures which cannot be definitely localized, such as administrative costs. Such overhead costs are prorated in the proportion that the direct movement and terminal costs bear to their total.

The rule promulgated by the Wisconsin commission and since generally followed in such investigations, the report of the Public Service Railway says, has been to select for expenses varying with the volume of traffic a traffic unit, such as the car-mile or the car-hour, and for expenses not affected by the volume of traffic a stationary unit, such as the track-mile. In addition, there remains a class of expense varying directly with the number of passengers carried. Accordingly the operating accounts prescribed by the Board of Public Utility Commissioners of New Jersey were apportioned among these four groups, as shown in the accompanying table on page 647.

TRANSFER PASSENGERS COST MORE

The most important variation in the present case concerns the matter of a repetition of the full terminal charge against a transfer passenger. The "readiness-to-serve" cost for the person about to board a car on a transfer is as great as that of the person paying a cash fare. The same facilities must be provided for each. The transfer passenger uses two cars, boards and alights twice—increasing the accident hazard from this source—requires the issuance of a paper ticket and the expense of checking, auditing and accounting for the same, and in other ways is a more expensive passenger to haul for a given distance than the passenger travelling on only one car.

If the terminal or "stand-by" costs were figured on the basis of the total number of persons boarding the cars, irrespective of whether they paid a cash fare or secured a transfer, the average stand-by cost of the Public Service Railway for the year ending June 30, 1920, would be about 3.384 cents. This sum would represent, on a strict basis of accounting, the stand-by cost which should be paid by the transfer rider when he boarded the initial car and again when he boarded the transfer car, the movement cost also being paid for the distance ridden on each car.

While the company felt it to be manifestly impractical to work such a radical revision in American practice, it believed that the transfer passenger should contribute something toward the extra expense which he causes. It decided to recommend that of the total stand-by cost of a transfer passenger 1 cent should be charged to him and the balance of 2.384 cents distributed over those using transfers and those riding on only one car. The transfer for which the passenger would pay 1 cent on the initial car would enable him to escape the payment of the stand-by charge on the transfer car, and, therefore, would effect in substance a saving of 4 cents below the rate which would be charged a person beginning his journey on the transfer car at the transfer point and paying an initial fare.

The company, therefore, calculated its cost of ride as follows for the year ending June 30, 1920:

Expenses varying with car-mile	$7,463,197
Expenses varying with car-hour	7,724,471
Fixed charges	5,350,000
Contingencies and return on investment	1,228,988
Total	$21,766,656
44.29 per cent (percentage of passenger-miles to seat-miles) represents movement costs	9,640,452
55.71 per cent (for extra seats) represents stand-by costs	12,126,204
Stand-by costs are made up as follows:	
Expenses varying with track-mile or those independent of traffic	1,368,447
Proportion of movement costs, as above	12,126,204
Total	$13,494,651
Deduction for revenue from 1 cent for transfer	858,048
Balance for passengers paying initial fares	$12,636,603
Division by the number of passengers paying initial fare gives 4.03811 cents for the stand-by cost per passenger.	
Movement costs are made up as follows:	
Expenses varying with the passengers carried	$2,255,745
Proportion of movement costs, as above	9,640,452
Total	$11,896,197
Division by number of zone miles gives 0.99007 cent for the movement cost per zone-mile.	

A table showing what would be the total cost of handling passengers for rides up to ten zone-miles was published in the ELECTRIC RAILWAY JOURNAL of March 15, page 528.

How Soldiers Are Trained

Those interested in the training of railway employees according to army methods will have an opportunity to examine an exhibit on this subject on the third floor of the Engineering Societies Building, New York, from April 1 to April 12, 1919. The exhibit shows the methods developed by the committee on classification of personnel in the army and consists of a collection of wall charts, forms, photographs and models showing how the army finds out what men can do best and how it uses that information, how officers are rated and fitted into place and how their work is checked and supervised. The collection is being shown under the auspices of the National Association of Corporation Schools and the United Engineering Society. It was on exhibition for several weeks at Washington where it attracted so much attention that in response to many requests the adjutant-general consented to its display in other cities.

A. R. E. A. Holds Post-War Convention

Assembly of Railway Engineers at Chicago Last Week Was the Largest Gathering in the History of the Association—A Summary of the Reports of Interest to Electric Railways Is Given

THE twentieth annual convention of the American Railway Engineering Association was held at the Congress Hotel, Chicago, on March 18, 19 and 20, while the National Railway Appliance Association simultaneously held its exhibit in the Coliseum. That the return to peace conditions and the prospects of the return of the railroads to private operation has had a stimulating influence on this industry is evidenced by the exceptionally large attendance. The registration at the A. R. E. A. sessions reached the high-water mark of 509 and it is stated that the attendance at the Coliseum aggregated more than 23,000. No little credit for this large attendance is due to the fact that the Railroad Administration urged all engineering and maintenance of way officers who could be spared to attend, and also to the fact that little construction and maintenance work is now being done.

The A. R. E. A. program began on Tuesday morning at 10 with an address by President C. A. Morse. He spoke of the benefits to be derived from the arrangements by which the association is to work in closer connection with the American Railway Association and of the importance of the fact that the report of the track committee giving recommendations for standard frogs and switches had been approved by a committee of manufacturers, and he urged a wider adoption by the larger railroads of the standards of the association. Greater uniformity is needed in the matter of forms for reports and records in connection with maintenance of way and structures and in the rail sections used.

Following the reports of the secretary and the treasurer which showed ninety-seven new members admitted during the year and more than $37,000 on hand on Dec. 31, 1918, the various reports were received and acted upon. Those reports which are of especial interest to electric railway men are abstracted very briefly below.

REPORTS PRESENTED

Signals and Interlocking—A very complete report was presented on the problem of signaling single-track roads with reference to the effect of signaling and proper location of passing sidings on the capacity of the line. In order to apply and test formulas and methods in use, the committee worked out an analysis of the effect of passing track locations on 88 miles of line. Results were given in the form of graphical charts showing results obtained with the present as well as with proposed arrangements of passing sidings. A report was also given on automatic train control, which should be of particular interest to large electric railway rapid transit systems.

It was brought out in the discussion on this report that all the matter submitted has been passed on and approved by the Signal Association.

Economics of Railway Labor—In a report on labor-saving devices the committee presented a list of sixty such devices with short descriptions of these machines and their purposes.

The discussion on this subject concerned the advisability of giving the roadmaster more latitude in the placing of men on his division and emphasized the fact that the low rate of efficiency of laborers is due to the housing and food furnished these men by the railroads. At an evening session this report was continued by the presentation of a series of slides illustrating the use of labor-saving devices.

Track—The committee on track presented plans for split switches, split-switch fixtures, rigid frogs and spring frogs. A progress report was also presented on the matter of reducing the taper of the tread of wheels from 1 in 20 to 1 in 38, and on canting the rail inward.

A considerable discussion arose as to the wisdom of adopting the committee report recommending the bolted frog as standard practice without showing any alternate or permissible plan including the clamped frog, for many thousand miles of railroad are using this latter type successfully. The plans were adopted with the provision that the committee at the next convention recommend a plan for a clamped frog and report further on adjustment of the connecting rods.

CONCRETE FENCE POSTS FAVORED

Signs, Fences and Crossings—The reports of this committee consisted of the presentation of the subjects of the protection of grade crossings, of the operation of crossing signal bells and of concrete and steel fence posts. Many data were presented on concrete types of posts, together with steel fence posts and braces. Comparatively few steel posts were used during the year. Those roads on which wood posts are standard were not inclined to change to other types at present prices. In general, those roads using concrete and steel posts report satisfactory service.

Wood Preservation—Important revisions were made in specifications for creosote oil and for creosote coal-tar solution. The method for determining absorption was revised to include a method covering creosote coal-tar solution. The wording and details of the analysis of creosote oils was revised to include fuller details. Important revisions were also made in the specifications for zinc chloride to bring them up to date. A specification was adopted covering a method for determining the strength of the zinc chloride solution, as well as a revision in the specification for treatment of ties by the Burnett process.

An extensive report was presented on zinc-treated ties. Particular attention was called to the need for thoroughly air seasoning zinc chloride-treated ties at least sixty days before placing them in the tracks. This will increase their spike-holding power, save in shipping weight, reduce the tendency to leaching, and prevent signal disturbance. Climatic conditions control results obtained with this treatment more than with any other, and in localities where excessive rainfall is found, as on the Gulf and Atlantic coasts, the zinc chloride treatment will not give as good results as in the Central and Western states, but in any event the treatment will double the life of the timber. The committee recommended as a subject for future consideration "the availability and use of sodium fluoride as a preservative for cross-ties."

These revised specifications adopted are the same as proposed for adoption by the American Wood Preservers' Association.

Stresses on Track—The work of this important committee was hindered by the war, and comparatively little progress was reported, although considerable data have been gathered on stresses under and in the tie, and work is progressing on the principles governing the design of tracks.

Roadway—This committee presented conclusions on the methods of preventing and curing water pockets in the roadway, and included an abstract of the report of the deputy commissioner of public highways for the State of New York on the subject of frost action with reference to the maintenance of pavements. Considerable information was presented on rolling roadbed with a steam roller.

After some discussion as to the value of the profiles submitted as indicating losses due to shrinkage of embankments, because nothing was said about subsidence or materials, they were received as information. The remainder of the report concerning the prevention of water pockets was also accepted.

REVISED SPECIFICATION FOR STEEL RAILS PRESENTED

Rail—This committee presented a report on the methods of testing rail joints, together with a revised specification for steel rails. This latter includes a change in the manganese content, an increase in the carbon content for rails over 111 lb. per yard in weight, a change in the acceptance analysis so that acceptance depends on a sample from the finished rail instead of a ladle test ingot. The quick bend test was also included as an alternative for the drop test.

The results of an investigation of heat treatment of joint bars shows that while ordinarily the rail joint has a lower elastic limit than the unbroken rail, still joints made with bars of suitable design and heat treatment have elastic limits higher than the continuous rail. A further report of interest was presented on the subject of transverse fissures in rails. Investigations have shown that failures from this source have been much less numerous in rails from reheated blooms than from direct-rolled rails. A report on the results secured by seventeen roads with frictionless rail on curves gives data of interest.

The revised rail specifications were accepted for discussion and printing in the Proceedings and the recommended method of testing rail joints was adopted.

Electricity—This committee submitted a list of definitions of electrical terms for insertion in the Manual.

Delegates from the committee have met with a committee from the American Electric Railway Engineering Association and discussed the subject of specifications for transmission-line crossings over railroad right-of-way and the report is now being printed. It will be ready for action of the fall meeting of the A. E. R. E. A.

Ties—Reports for information were presented covering the effect of the design of tie plates and track spikes on the durability of ties, and on the methods used by railroads for controlling tie renewals. The usual report on substitute ties contains one item of interest in its reference to the test of the Goodlett ties on the Oakland, Antioch & Eastern Railway. This type of track tie was described in the ELECTRIC RAILWAY JOURNAL of Jan. 11, page 100.

As usual, considerable discussion developed on the screw spike. One statement was to the effect that this spike would undoubtedly prolong the life of soft pine ties and another was that one of the errors made in its use was the substitution in a tie of the screw spike by another with the same diameter of shank, but a different thread. This naturally spoils the thread in the wood. The Lackawanna uses the screw spike with flat-bottomed plates to eliminate the excessive wear of flanged plates on creosoted bridge ties. The committee reported that it was not prepared to present conclusions on the relative merits of cut and screw spikes.

It was urged that preliminary inspection of ties for renewal rather than post mortem examination be given more consideration. One road stipulates that a track foreman cannot renew more than a designated number of ties per rail length without inspection and permission by his superior. The reports were received as information.

INCREASED ATTENTION GIVEN TO CONCRETE SLAB BALLAST

Ballast—The report of this committee contained additions to bibliography of ballast and ballasting. The elimination of soft spots in roadbeds by means of concrete slab ballast is receiving increased attention and merits further study. The diagram of a ballast gang of seventy-seven men was accepted as a suggested diagram for such a force, but some of the members felt this was a larger force than necessary.

Economics of Railway Location—The report of this committee included the effect of curvature on the cost of maintenance of way and equipment.

It should be pointed out here that the theory heretofore accepted is that curve expenses, including rail wear, generally vary directly with the degree of central angle irrespective of the degree of curve, while this committee suggests that excess rail wear on curves and some other curve expenses, vary with the square of the degree of curve. This report brought out extended debate in which it was stated that rail wear depends to some extent on elevation in curves and upon the class of traffic using the curves. High elevation in track used by both passenger and freight causes excessive wear of rail. It was also suggested that co-operation with the motive power engineers would be helpful as flange wear on certain types of electric locomotives is much greater than on other types.

Further reports of interest to electric railway officials were those presented by the committee on uniform general contract forms, which included a form of agreement for railway grade crossings; a report by the committee on buildings, which contained conclusions covering the design and merit of high and low station platforms, and a comparison of "umbrella" vs. "butterfly" sheds at stations.

OTHER REPORTS

A report of the committee on conservation of national resources included recommendation of the Fuel Conservation Section of the Division of Operation, United States Railroad Administration, covering the saving of fuel in stationary power and heating plants. A report of the committee on wooden bridges and trestles included results on the effect of preservative treatment on long-leaf and loblolly pine and Douglas fir bridge timbers, and an interesting report by the committee on water service included the design of impounding reservoirs and conditions under which they are economical. This also included a report on the types of water meters for use in railway service and methods of testing and reading meters.

NEW OFFICERS

The convention adjourned on Thursday afternoon, following the announcement and installation of the following new officers: President, Earl Stimson, general superintendent maintenance of way Baltimore & Ohio Railroad, Baltimore; first vice-president, H. R. Safford, engineering assistant to regional director Central Western region, Chicago; second vice-president, J. A. Atwood, chief engineer Pittsburgh & Lake Erie Railroad, Pittsburgh; treasurer, George H. Bremner, district engineer Division of Valuation, Interstate Commerce Commission, Chicago; secretary, E. H. Fritch, Chicago.

Reclaiming Contact Shoes by Welding

Wrought-Iron Plate Is Welded into Wearing Face of Worn-Out Shoes at $1 Less than Cost of New Shoe

WROUGHT-IRON contact shoes of the type shown in the accompanying illustrations are used by the Brooklyn Rapid Transit Company on its elevated cars. These are forged and machined in the shops of the company. The construction is very simple and the expense of making these shoes is very low.

Due to war conditions, the obtaining of material from which to make these shoes was very difficult during the past year. It thus became necessary to provide a means for repairing worn shoes in order to keep the cars in service. Examination of the worn shoes showed that a wrought-iron plate of the same thickness as the wearing portion of the shoe could be very readily welded into place and the shoes thus made as good as new. The Eastern Division elevated shop of this company is used largely for the manufacture of various equipment parts required for car operation. The shop is equipped with three different types of welding equipment, electric, oxy-acetylene and thermit, and so was admirably adapted to carry on this work.

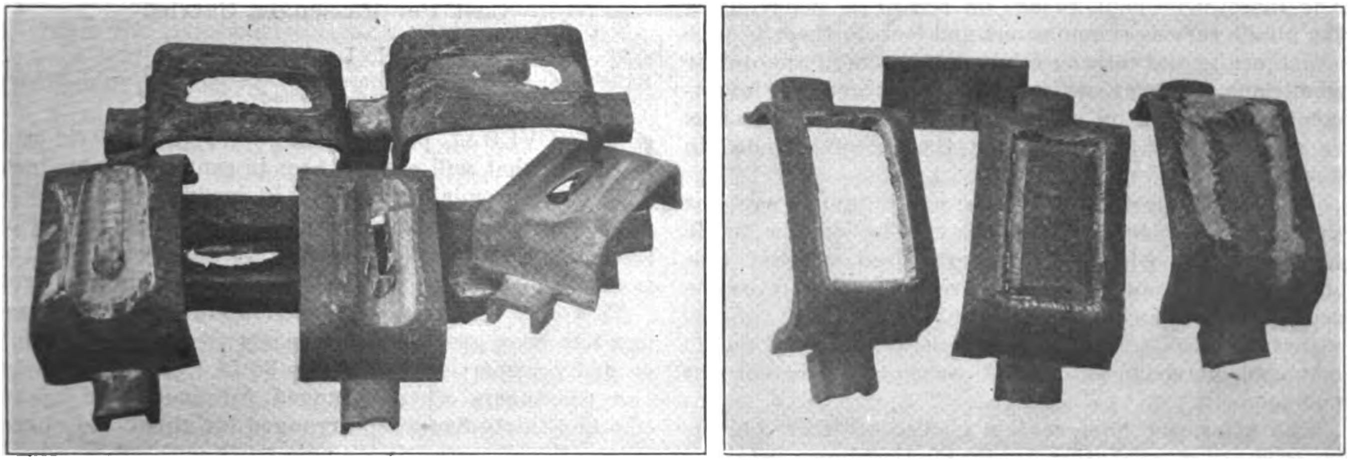
An accompanying illustration shows several of the contact shoes as they have been removed from cars for being excessively worn. It will be noted that the wear is confined to a space of approximately 4 in. x 8 in., and that outside of the worn portion there is ample metal to provide for welding in a plate. The process as now being carried out consists first of cutting out a square hole in the wearing surface of the contact shoe. The edges of this hole are beveled so that when the plate is inserted a V will be formed for holding the welded metal. This cutting out of the face of the contact shoe is done with an oxy-acetylene torch. These holes are cut to uniform dimensions of 4 in. x 8 in. The plates are of the same dimensions as the hole cut and of the same thickness as the wearing surface of the shoe. The edges of the plate are also beveled to form the other side of the V already referred to.

After inserting the plate in position, it is held in place by welding the corners slightly, after which the welding by filling in the V may be done by either the oxy-acetylene or electric methods. Both have proved equally efficient.

The various steps in the repair of the shoes are shown in the accompanying illustration. This work, which was originally begun as a war measure, has shown a decided saving in the cost of maintaining the contact shoes. In comparing costs under the present prices it is found that a saving of approximately $1 per shoe is made by welding in the plate instead of scrapping the shoe and making a new one. As approximately 6,000 of these shoes are replaced each year this would result in a considerable saving.

Electric Railways in Japan

According to a recent report of the Department of Commerce there are forty-two electric tramways in Japan and forty-eight combined tramway and lighting systems. American manufacturers have sold most of the equipment used on these lines in the past. The Mitsubishi Dockyards & Engineering Company is a Japanese manufacturer which has recently entered the construction field for electric railway equipment. In connection with the railway shops of the South Manchuria Railway at Darien in Manchuria, this company is reported to be making electric locomotives for service where American and German apparatus was previously purchased. Another large company which is apparently entering the electric railway field to some extent is the Hidachi Company, which has built several electric locomotives for its own use.



RENEWING WEARING FACES OF CONTACT SHOES

At Left, Several Worn-out Shoes. At Right, Hole Cut Out for Plate, Plate Inserted and Repaired Shoe Completed.

Wisconsin Association Discusses Service and Securities

Papers Delivered at Annual Convention of the Wisconsin Electrical Association Contained Views of Utility from Standpoints of Banker, Commissioner and Operator —Safety Car Was Not Forgotten

"SERVICE FIRST" was the paramount thought of the first day's session of the Wisconsin Electrical Association meeting held at Milwaukee on March 26 and 27. This was the eleventh annual convention of the association. The greater part of the first day was devoted to a joint meeting with the Wisconsin Gas Association at which papers of a general character were read.

A BANKER'S VIEWS ON THE UTILITY SITUATION

The first speaker was Chester Corey, Harrison Trust & Savings Bank, Chicago, whose topic was "Public Utilities and Securities." He stated that public utility securities, omitting those of the steam railroads, are a creation of a comparatively few years. He divided the duties of the utility into three groups arranged in order of importance as follows: (1) Furnishing good service; (2) furnishing this service at reasonable rates; (3) making extensions of service which may not at first prove paying investments. He explained the unrealized interest which the public has in the success of the public utilities on account of the direct influence upon banks and insurance companies holding the securities, these institutions being the depository of the public's savings. The investment banker is responsible for financing the utilities along sound lines, and the utilities' chief problem is to maintain proper credit.

In speaking of credit Mr. Corey said it is generally conceded that an interurban railway which does not earn more than $2,000 a mile is not entitled to credit; neither is a company having faulty capitalization. If fixed charges amount to 85 per cent of earnings, fluctuations of prices and periods of poor business may very easily wipe out the 15 per cent margin. Any company to retain good credit should earn one and one-half times its charges. As a result of the war the electric railways have suffered more than any other utilities and increased costs have destroyed the railways' credit. The investment bankers are on record as believing in the public service commissions and look to them to give assistance to the railway companies. One of the unfair conditions, however, which the utilities and the investment bankers are up against is that some commissions do not have the authority that they were intended to have.

In Mr. Corey's opinion the public must pay for the service which it gets and will be willing to do so if properly educated. He expressed a belief that some form of zone system of fare payment may be the scientific solution of the present predicament of the railways; also that private ownership under public management conduces to most economical and efficient management.

The afternoon joint session opened with an address on safety and sanitation by R. McA. Keown, engineer Industrial Commission of Wisconsin, followed by one on the value of the quality of service by Hon. John S. Allen of the Wisconsin Railroad Commission. After a brief recess the Electrical Association convened and, following routine business, John St. John, assistant general manager Milwaukee Northern Railway, Cedarburg, Wis., delivered his presidential address. An important recommendation covered in the address was that hereafter the second session of the convention be divided into two parts, one to deal with problems relating to light and power companies and the other to take up those of interest to railways. This arrangement the speaker believed will increase the membership in the association and the attendance at the conventions. For the past two years there have been but few papers of interest to electric railway representatives. A committee was appointed to formulate a plan along the lines of this suggestion.

After the appointment of a nominating committee, N. J. Whelan, Wisconsin-Minnesota Light & Power Company, Eau Claire, read a paper on "Public Utilities' Services to Industries," which is abstracted elsewhere.

As this issue of the ELECTRIC RAILWAY JOURNAL goes to press the March 27 session is being held. Papers are scheduled to be presented by F. A. Robbins, Superior Light, Water & Power Company, entitled "Comments on Overhead Distribution"; by Alfred Alfaker, consulting engineer, Chicago, Ill., on "High-Tension Outdoor Substations and Switching Equipment"; by A. J. Goodjen, statistician Wisconsin Public Service Company, on "A Review of Policies of Service Extensions," and by H. L. Andrews, General Electric Company, Schenectady, N. Y., on "Safety Cars." An abstract of Mr. Andrews' paper follows:

Why the Safety Car Is Popular

Its Use Results in Increased Receipts and Decreased Cost Per Passenger Carried

BY H. L. ANDREWS
Railway and Traction Engineering Department General Electric Company, Schenectady, N. Y.

OF SEVERAL possibilities before the electric railways that will enable them to continue in business the most promising consist in making the service more attractive and effecting substantial operating economies. The means for obtaining the greatest operating economy and increasing the service is the safety car.

This car, which was designed some three years ago and has been operating for nearly that length of time on many properties, has a body 28 ft. long, seats thirty-two passengers when arranged for double-end operation and thirty-five when arranged for single-end operation. It is mounted on a single truck with 26-in. wheels and a wheelbase of 8 ft. The equipment consists of two 25-hp. motors, a drum controller, and a "10-ft." air compressor. The safety features are incorporated in the controller handle and the motorman's valve, which are so arranged that should the motorman become incapacitated the power will automatically be cut off, the brakes will be applied in emergency position, sand will be blown on the track and the front and rear doors will be unlatched so they can be opened by hand. Only one operator is required, who is seated to the left of the center of the car platform with the fare box to his right and with foot pedals conveniently located for operating the fare registers.

The savings in platform labor by the use of one operator represent but little more than half the possible economies in the application of this type of car. By way of illustration of the possible saving due to the use of the safety car, we may compare the operating costs of a two-man car with the possible cost of operation of a safety car.

DATA FROM ELEVEN TYPICAL CITIES

The average operating cost for a two-man car on eleven representative roads operating in the smaller cities of the Middle West is approximately 22 cents per car-mile. The minimum is 15.69 cents and the maximum 25.81 cents. These figures include maintenance of way and structure, maintenance of equipment, power, conducting transportation, conducting traffic, and general and undistributed accounts. The average cost of each subdivision is as follows: Maintenance of way and structure, 2.2 cents; maintenance of equipment, 2.14 cents; power, 4.2 cents; conducting transportation, 8.7 cents; conducting traffic, 0.68 cent; general, 2.1 cents; undistributed, 1.93 cents; total, 21.95 cents. The average platform wage is 32 cents per hour, the minimum 29 cents and the maximum 37 cents. The average cost of power is 1.3 cents per kilowatt-hour, the minimum 0.58 cent and the maximum 2.1 cents.

The schedule speeds on the above roads vary from 7.7 m.p.h. to 10 m.p.h., with an average of 8.7 m.p.h. Headways vary from ten to thirty minutes with sixteen minutes as an average, and receipts per car-mile vary from 16.8 cents to 30 cents with an average of 24 cents. Car weights on these roads vary from a minimum of 18,000 lb. to a maximum of 40,000 lb. with an average weight approaching 30,000 lb.

The application of safety cars affects mainly the maintenance of equipment, power and platform expense. Actual records of maintenance from several roads which have been operating them for a sufficient length of time to obtain the maintenance costs indicate that the maintenance will not be more than 1.2 cents per car-mile. The saving in power is obvious as the safety car weighs less than half the two-man car. Its construction permits higher rates of acceleration and braking which affect an additional saving. Tests show that the car requires less than 1 kw.-hr. per car-mile for power, and including heat and light, about 1.5 kw.-hr. The saving in platform expense is obvious as only one operator is employed. It has been the custom to give the operator an increase in wages to compensate for the additional responsibility placed upon him, the usual increase being 10 per cent. The reduction in platform cost is therefore approximately 45 per cent.

A comparison of the totals of these three items for two-man and safety-car operation shows for the former 15.04 cents per car-mile, and for the latter 7.95 cents. The reduction is nearly 50 per cent in the main items which affect the cost of producing service.

Consider these operating costs and assume an eighteen-hour car operating at 8.7 m.p.h. schedule speed. This car will operate 6570 hours annually. Allowing 5 per cent reporting time, the total of car-hours becomes 6900, and that of wages $4,416 annually, allowing a rate of 64 cents. At 8.7 m.p.h. this car will run 57,159 miles annually and the cost for power at 4.2 cents per car-mile will be $2,400. Maintenance, at 2.14 cents per car-mile, will cost $1,223 annually, making the total cost of operation $8,039.

A safety car making the same mileage will cost $2,419 for platform labor, assuming 35 cents per hour as a rate for the safety-car operator. The maintenance cost at 1.2 cents per car-mile will be $685, while the power cost at 1.95 cents per car-mile will be $1,113. The total cost of operation is thus $4,217, or $3,822 less than that with the two-man car.

The safety car can be purchased for approximately $6,000 ready to roll or, including 10 per cent for spares, the car will cost $6,600. The annual reduction in operating costs is therefore equal to a return of approximately 58 per cent on the investment, on the basis of car-for-car replacement. Experience in the application of these cars, however, has demonstrated that they are more than a means of reducing the cost of producing service, and that the best results can be obtained by applying them in the ratio of three safety cars to two cars of the old type. In most cases, the schedule speed can be increased 10 per cent or more with the safety car, so that by operating 30 per cent more cars on a 10 per cent higher schedule a 40 per cent better service can be given with no increase in the operating costs. That the effect of improved service is reflected in earnings is shown by the experience that an increase of 40 per cent in service results in at least 20 per cent increase in gross receipts.

MORE SERVICE GIVEN AT LESS COST

Consider now the effects of a service improved by 40 per cent. First—car-hours are increased 30 per cent (since the schedule is increased 10 per cent), or for each car displaced the safety cars will operate 8970 hours annually. Assuming a platform rate of 35 cents per hour, the annual cost for platform labor is $3,140. The car-mileage is increased 40 per cent, or to 80,000 car-miles as against 57,159 car-miles for each two-man car operating on a longer headway. Assuming car maintenance at 1.2 cents per car-mile and power at 1.95 cents per car-mile, the annual costs for these two items become $960 and $1,560 respectively.

The total cost for the above three items is $5,660 as against $8,039 annually for a two-man car operating at the lower schedule and with longer headway, a reduction of $2,379 in operating costs. The improved service will, however, result in increased earnings, and on lines where a two-man car is earning 24 cents per car-mile or $13,700 annually the operation of the safety car on shorter headway will result in an increase of at least 20 per cent or $2,740 annually. These increased receipts together with the reduction in operating costs result in an annual increase in net of $5,119, or equivalent to a return of nearly 60 per cent on an investment of $8,600 (which would be the approximate price of the safety car, per each old-type car replaced, plus 10 per cent for spares). These savings are estimated from operating costs. Consider in comparison the results actually obtained in the application of these cars in many cities.

THIS IS WHAT ACTUALLY HAS BEEN DONE

To-day there are more than 600 safety cars operating in more than sixty cities, with over 200 cars on order for twenty additional cities. The cities include those having populations from 36,000 to 345,000. After the initial installation of safety cars in any community their use has spread rapidly. From one car originally in Seattle, three in Bellingham and two in Everett, there are now thirty in Seattle, sixty in Tacoma, thirty in Bellingham and twenty-one in Everett. One of the oldest installations is in Fort Worth, where safety cars have been used for nearly 2½ years. The East has been slower in adopting them, but within the past few months installations have been made at Bangor, Bridgeport, Brooklyn and Trenton, while Philadelphia will shortly place twenty-five in operation.

In Fort Worth ten cars were installed in November, 1916, and twenty additional in October, 1917. Five lines were equipped with these thirty cars and the mileage was increased 27 per cent with a total reduction in operating costs of $18,000 annually. The gross receipts on these lines have increased $106,000 annually, which is 57 per cent. Of this $60,000 or 30 per cent can be attributed to improved service. The net increase is, therefore, $78,000. Ten additional cars were commissioned in September, 1918.

In Austin, Texas, three cars were placed in operation in April, 1916, and four more in August, 1917. They handle less than half of the total service of the town but the operating ratio for the system has been reduced from 66 per cent to 56 per cent as a result of increased receipts and decreased operating costs.

El Paso, Texas, introduced ten cars in February, 1918, equipping two lines. On one line the car mileage has been increased 47.9 per cent and the receipts 50 per cent. On the other line the increase in mileage has been 50 per cent and in receipts 36.7 per cent. The power consumption shows a reduction of 45 per cent.

Tacoma, Wash., equipped three lines with a total of thirty-two cars in December, 1917. On one the car mileage was increased 20.9 per cent with an increase of 25.8 per cent in receipts. On the second line the increase in car-mileage was 75 per cent and in receipts 42 per cent. On the third line, the increases were 3.4 per cent and 17.31 per cent respectively. Twenty-nine additional cars were placed in service in October, 1918.

In Seattle, Wash., two cars were placed in operation in 1915, two more in July, 1917, and twenty-five more in February, 1918. The first line completely equipped with ten cars, giving 55 per cent more mileage than formerly, shows an increase of 67 per cent in gross receipts or $26,000 annually. Another line with 21.4 per cent more car-miles showed 29.5 per cent increase in receipts. On a third line 29 per cent increase in car mileage produced 49 per cent increase in receipts.

In Everett, Wash., service was inaugurated with four cars in October, 1916. Ten more were added in October, 1917, together with seven rebuilt cars. The service was increased 24 per cent and the earnings increased 38 per cent or $47,000 annually. The power consumption was decreased 46 per cent. The annual net increase in earnings is $75,000.

In Bellingham, Wash., three cars were placed in service in December, 1916, thirteen more in August, 1917, and twelve more in 1918. Of the last-named eight were rebuilt cars. The service was increased 26 per cent, the receipts increased 42 per cent, and the power consumption was reduced 43 per cent. Fifteen more cars were added in September, 1918.

In Houston, Texas, one line is equipped with safety cars. Here the car mileage was increased 68.8 per cent and the receipts increased 41.2 per cent.

In Tampa, Fla., on one line the mileage was increased 51 per cent; a 51.4 per cent increase in receipts resulted. On another 29 per cent increased mileage produced 13 per cent increased receipts.

A city in the Middle West of approximately 75,000 population installed twenty of these cars a few months ago. During the first month the car mileage was increased 22 per cent, the receipts increased 13 per cent and the power was reduced 8 per cent. The second month's operation showed 24 per cent increased receipts for 27 per cent increased mileage, and the third 40 per cent increased earnings for 28 per cent increased mileage. Seventy-five per cent of the increase in earnings is attributed to the improved service. On one line the headway was reduced from ten to eight minutes without increasing the number of cars. On another line operating six cars the headway was reduced from eight to seven minutes. The increase in gross receipts due to this improved service was 7 per cent.

BRIDGEPORT AND GARY BRING THE LIST NEARLY UP TO DATE

Bridgeport, Conn., placed nine cars in operation in January, 1919. These operate on a line through the center of the city where traffic is as congested as in any city in New England. The service was increased 50 per cent and the increased gross receipts amounted to 30 per cent.

Gary, Ind., placed ten cars in operation about Feb. 1, 1919. The service was improved 35 per cent and the receipts increased 14 per cent. These cars are operating on a slower schedule than in most installations and it is entirely practicable to increase the service 20 per cent by increasing the schedule speed. Gary is a large manufacturing town and the new cars operate on a line serving the Indiana Steel Company's plant.

The results obtained with the safety car clearly indicate what has been accomplished under all conditions of service and prove conclusively that the field of the safety car is not limited to light riding lines, but that the car can handle all of the service in moderate-size cities and it can be economically applied to a large number of the lines in such cities as Brooklyn, Philadelphia and Chicago.

In conclusion it should be emphasized that the safety features, and the size and location of the controlling apparatus, are essential parts of the new cars. These features facilitate operation, and by minimizing manual labor make it possible for the operator to perform additional duties without interfering with the normal operation of the cars, or sacrificing safety. The safety features make it possible to handle a heavier traffic on a fast schedule with but one operator, and they help to overcome the objections of many public service commissioners to one-man operation. The higher schedule speeds possible with these cars are due entirely to the construction which permits high rates of acceleration and braking.

Public Utilities Rendering Service to Industries

Public Utility Companies Should Establish an Industrial Department and Take an Active Interest in Community Development

By N. J. Whelan
Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis.

IN TREATING this subject I shall not discuss the good which can be accomplished in rendering service to industrial corporations by street railways, interurban railways, electric light plants or gas plants, but shall describe the work carried on in the industrial department instituted about three years ago by the Wisconsin-Minnesota Light & Power Company. This will necessarily limit the paper to a review of what can be accomplished by public utilities to encourage the securing of industries for the communities in which they operate and thereby to become a part in community development.

Our industrial department was organized for the purpose of carrying out several clearly defined lines of work. First, a complete survey was made of the resources of the communities served by the corporation, data were collected as to the number of factories in each community, the numbers of people employed, the unemployed help available in contiguous localities, wage scales, prices of factory sites, railroad facilities, housing accommodations and adaptability of the community to various lines of manufacturing. The department was also at the disposal of each community to assist in the organization of commercial bodies where none existed in the locality and, in places where such organizations were in existence, to co-operate in work of an industrial character.

When conditions warranted and trips of investigation of industrial matters were desired, a representative of the department acted in conjunction with representatives of the board of trade or commercial club of the city interested, and without expense to it took such trips. While I do not claim for this department all of the credit for a number of industrial developments that have taken place, I believe that but for the direct and indirect assistance given through this department, a considerable number of these industries would not to-day be in existence in the localities in which they are now situated.

In addition to the work done along manufacturing lines the department also co-operated in the development of the natural resources of the different localities. A survey of industries in general was made also, with a view to ascertaining which industries promised most for community development. As a result of this work the conclusion was reached that among industries deserving of encouragement were automobile, truck and tractor manufacturing, the rubber industry, the iron-working industry and others.

A summary of the results of the work of the department shows that industries have been placed necessitating the employment of 975 people. In addition to the direct benefits to the communities and to the public utility company, a corresponding benefit of an indirect character must not be overlooked. That is, the increase in population has brought additional business to the grocer, butcher, barber, moving picture man, apartment house proprietor, hotel keeper and many others.

AMERICAN ASSOCIATION NEWS

One-Man Car Committee Prepares Questionnaire

AS A RESULT of the meeting of the joint committee on one-man car operation, composed of representatives of the Transportation & Traffic and Engineering Associations, held in New York City on March 26, members of the association will shortly receive blank forms with requests for data regarding experience with safety cars and opinions on the subject of the operation of such cars. The personnel of this committee is as listed on page 611 of the issue of this paper for March 22 except that since the list was printed C. H. Beck, St. Louis, Mo., has also been asked to serve upon it. The meeting was attended by C. W. Kellogg, Boston, Mass., chairman; S. W. Greenland, Fort Wayne, Ind.; J. K. Punderford, New Haven, Conn.; Clarence Renshaw, East Pittsburgh, Pa., and J. C. Thirlwall, Schenectady, N. Y.

In the preparation of the questionnaire a number of salient points were brought out. The chairman, for example, outlined as the four important features of safety-car operation the following: (1) Decrease in power costs; (2) elimination of jitney competition; (3) saving in trainmen's wages; (4) increase in earnings. A letter was read from an operator who had extended experience with safety cars in which the statement was made that the best results are secured when these are used in eighteen-hour service, such heavy cars as form part of the railway's equipment being used for tripper service. Operating data presented showed somewhat less than 1.6 kw.-hr. per car-mile for typical installations, about one-third of which is for heating, lighting, etc., two-thirds being for motive power. Informal discussion showed that experience of companies using safety cars has been that an increase in car-mileage produces at least one-half as great an increase in receipts and in some places the receipts are even proportional to the mileage.

There was some discussion as to just what constitutes a safety car, and one speaker pointed out that the present safety car is due to an original idea of saving weight in car construction.

Power Saving the Topic at New Haven Meeting

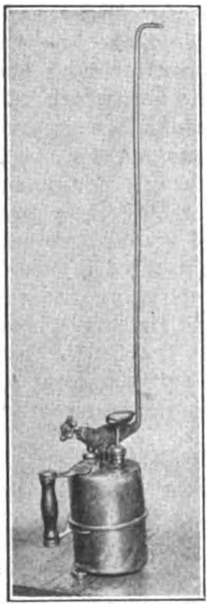
THE Connecticut Company section held its twenty-sixth meeting at New Haven on Feb. 26. A dinner at the New Haven Lawn Club preceded the meeting, and instrumental and vocal music enlivened the program. The principal speaker was William Arthur who directs the power-saving work of the company. He was followed by Neil Lawson, power-saving inspector, who spoke of the motorman's point of view with respect to this matter, and by John Sayers, also of the power-saving department, who gave some reminiscences of the recent naval operations in the Mediterranean Sea.

In his talk Mr. Arthur presented figures and charts showing the reduction in coal consumption and in kilowatt-hours per car-mile which had taken place during the past year on each division of the company's lines. These results showed considerable variation, due chiefly to the fact that on certain divisions the power-saving campaign had been but recently started, and so far only a portion of the cars have been equipped with power-saving recorders. The splendid showing made, however, on every division that was fully equipped was most noticeable when compared with those only partially equipped. During the discussion which followed and in which many members participated the fact was brought out that based upon the month's figures, the coal saving on a tonnage basis when all factors were equated, was about 20 per cent for the entire property.

There was a discussion also as to the effect of the use of power-saving recorders upon safety of operation and maintenance of equipment, and it was generally agreed that both of these features had been favorably affected, although it was not possible to state in figures the exact degree.

At the business session of this meeting the committee appointments for the year were made. Following are the names of the chairmen of the committees: Program, John W. Colton, New Haven; entertainment, W. A. Gordon, New Haven; reception, J. S. Goodwin, Bridgeport; membership, C. H. Chapman, Waterbury.

Pressure Oiling Device Made from an Old Kerosene Torch



PRESSURE OILING DEVICE FOR LUBRICATING INACCESSIBLE PARTS

TO MAKE the oiling of inaccessible parts easier a pressure-oiling device shown in the accompanying illustration is used at the southern division inspection and overhauling shop of the Brooklyn Rapid Transit System. This oiling device has been made from an old kerosene torch by replacing the torch connection with a ⅛-in. pipe about 4 ft. long. The pipe is bent slightly at the extreme end in order to make it easier to insert it at some inaccessible point and also so that the oil will not drip and flow down the pipe when it is used.

The regular air-pump attachment supplies the pressure to force the oil through the pipe, and by opening the torch valve the oil is forced out in a steady stream. Much time and labor is saved by the use of this device and there is no tendency on the part of the repairman to slight the oiling of the inaccessible parts. The lubrication of center bearings, side bearings and brake rigging on electric cars often presents severe difficulties. When cars are over inspection pits the rigging is far above the workman's head and cannot be readily reached from the side of the car. Some roads make use of a short stepladder in the pits to reach parts close to the car body. Others use planks laid across the rails.

The subway cars of the Brooklyn Rapid Transit Company have a rack and pinion working inside the truck bolster for operating the empty and load braking device which forms a part of the equipment of these cars. Previous to the use of this pressure-oiling device it was necessary to jack up the car body in order to lubricate this rack and pinion. By the use of this pressure-oiling device the parts can be reached and lubricated without trouble.

New England Club Dines at Boston

Representative Men in Public Life Give Assurance to the Electric Railway Industry of Their Appreciation and Co-operation

THREE HUNDRED AND FIFTY persons attended the annual dinner of the New England Street Railway Club on March 27 at the Copley-Plaza Hotel, Boston. President R. W. Perkins, Shore Line Electric Railway, acted as toastmaster and the speakers were Lieut.-Gov. Channing Cox of Massachusetts, Hon. Thomas F. Sullivan, commissioner of public works, Boston, and United States Senator James A. Watson of Indiana.

Mr. Perkins criticized regulation without responsibility and urged recognition of the necessity for adequate electric railway income with removal of burdensome restrictions inherited from the early days of the industry and continued until the present time. Lieut.-Gov. Cox emphasized the vital importance of trolley transportation to community welfare. He claimed that the public is ready to meet the fair cost of service even if part of the burden must be lifted from the car rider. He said that the public must have a continuance and further development of electric railway service and that Massachusetts seeks to give the electric railways a square deal and a fair return upon the capital invested under state regulation. In closing he made a strong plea for the support of Americanism against Bolshevism.

Commissioner Sullivan brought greetings from Mayor Peters, who had been scheduled to speak. Senator Watson made a powerful attack on the policy of government ownership and operation, illustrating his point by reference to the huge excessive cost of railroad operation by the government. Despite increased rates the railroads had a deficit of $275,000,000 during the first year of government operation. It has cost $1,600,000,000 more to run the roads under the government than under private operation. Under these conditions Senator Watson urged the resumption of private operation with rate and security regulation by the Interstate Commerce Commission with abler and more courageous membership. He emphasized the dangers of government control leading to the formation of a great political machine with the fine edge of initiative dulled and socialism threatened. Senator Watson would repeal the Sherman and pooling laws as affecting railroads. In closing, he attacked the League of Nations constitutions as made public to date, and urged the retention of the Monroe Doctrine and national independence.

At the dinner the following were announced to have been elected to the positions named for the coming year: President, J. E. Dozier, Lynn, Mass.; vice-presidents—David A. Belden, Haverhill, Mass., I. A. May, New Haven, Conn., T. H. Kendrigan, Manchester, N. H., F. S. Nicholson, Rutland, Vt., Alfred Sweeney, Lewiston, Me., A. E. Potter, Providence, R. I.; temporary secretary, George W. Knowlton, Boston, Mass.; treasurer, Fred F. Stockwell, Cambridge, Mass.; executive committee—R. W. Perkins, Norwich, Conn., C. D. Emmons, Boston, Mass., W. W. Field, Cambridge, Mass., John W. Belling, Boston, Mass., L. P. Morris, Boston, Mass., A. A. Hale, Boston, Mass., W. C. Bolt, Boston, Mass.; finance committee—J. E. Dozier, Lynn, Mass., Charles A. Record, Cambridge, Mass., B. W. Barnwell, Boston, Mass.

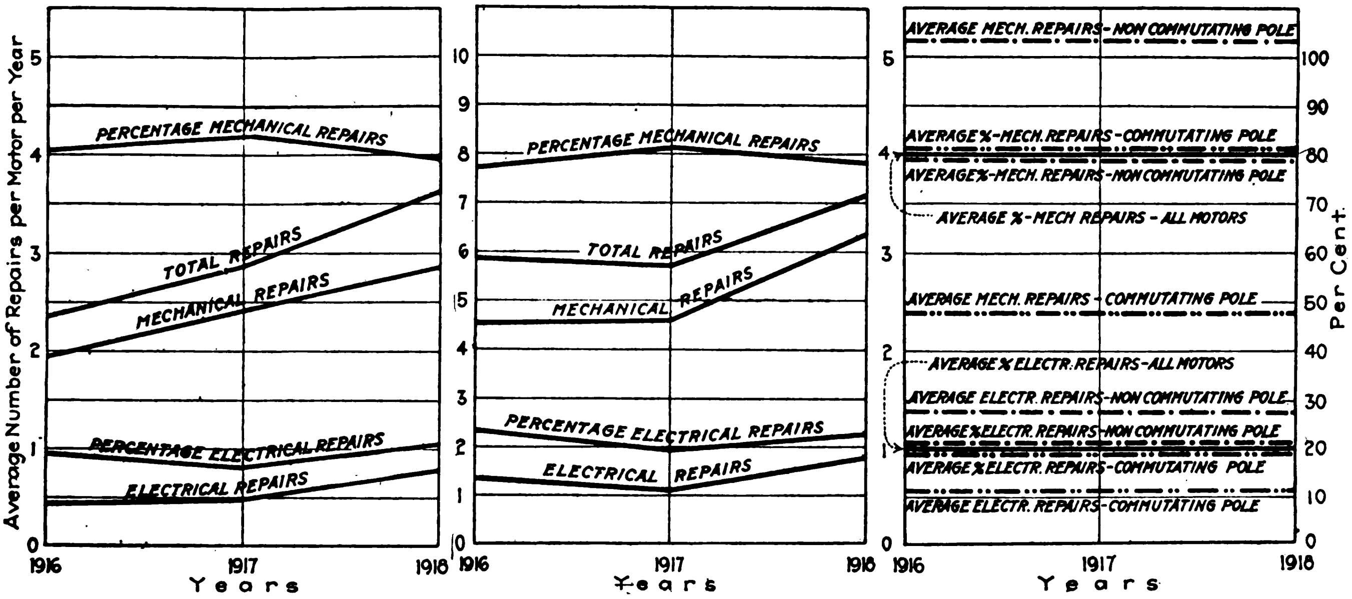
Electrical Versus Mechanical Troubles With Railway Motor Armatures

BY JOHN S. DEAN
Railway Department, Westinghouse Electric and Manufacturing Company

IN DISCUSSING maintenance of railway equipment, with various master mechanics, representing railway operating companies throughout the country, you will find that, in general, their opinions regarding maintenance matters vary over a considerably wide range. For instance, some operators consider 40,000-mile brush life low, while others never get more than 25,000 miles and are quite well satisfied. Motor bearings on some roads average 75,000 miles, while on others they are changed every 15,000 to 20,000 miles. On some properties, 75 per cent of the armatures sent in for winding trouble are entirely rewound, the other 25 per cent are repaired; while other operators rewind 35 per cent and repair 65 per cent of the windings. The bearings of certain type motors on some roads are oiled every other night, while other master mechanics get along by oiling similar bearings every week or ten days.

These various conditions are, no doubt, brought about to a large extent by purely local conditions, such as the age of motors, service conditions, materials used, method of maintenance and inspection of equipment, grade of available labor and to the enthusiasm and progressiveness of the master mechanic in charge.

In contrast to this wide variation of opinion, regarding questions of maintenance, there is almost a universal expression of opinion that at least 75 per cent of all railway motor troubles are due to mechanical failures. In this connection, there are available actual maintenance data on repaired armatures submitted by a large city company operating all sizes of cars, in city and interurban service, which further confirm the above general statement. These figures represent armature repairs only and are segregated so as to show this comparison on old non-commutating pole motors and on the modern commutating pole motors. Included under the heading of "Electrical Troubles" are such repairs as grounded and short-circuited commutators, also grounded short-circuited and open-circuited armature windings. All the other armature troubles are classified as mechanical.



Commutating Poles

Non-Commutating Poles

Average Values

DIAGRAMS SHOWING NUMBERS AND PERCENTAGES OF MOTOR ARMATURE REPAIRS

NON-COMMUTATING POLE ARMATURES REPAIRED

1225 Motors—7 Types—14½ Years Average Age

Causes	Year 1916 Repairs per Motor per Year	Year 1916 Percentage	Year 1917 Repairs per Motor per Year	Year 1917 Percentage	Year 1918 Repairs per Motor per Year	Year 1918 Percentage
Mechanical	4.53	77	4.60	81	6.38	78
Electrical	1.32	23	1.07	19	1.74	22
Total	5.85	100	5.67	100	8.12	100

The above figures are plotted in the center chart.

COMMUTATING POLE MOTOR ARMATURES REPAIRED

546 Motors—4 Types—4½ Years Average Age

Causes	Year 1916 Repairs per Motor per Year	Year 1916 Percentage	Year 1917 Repairs per Motor per Year	Year 1917 Percentage	Year 1918 Repairs per Motor per Year	Year 1918 Percentage
Mechanical	1.93	81	2.40	84	2.84	79
Electrical	.44	19	.47	16	.77	21
Total	2.37	100	2.87	100	3.61	100

The above figures are plotted in the left hand chart.

The data referred to have been arranged in graphical form in the accompanying charts. In these the scales for numbers are at the left in each case. The percentage scale at the extreme right applies to all three of the charts.

It is to be noted from these charts that there is quite an appreciable difference between the average number of repairs per motor per year, both mechanical and electrical, of the commutating pole and non-commutating pole motors, which is no doubt largely due to the difference in the average ages of these respective types of motors. On the other hand, the percentages of mechanical and electrical repairs for both classes of motors are approximately the same. This would indicate that irrespective of design, size, age, operating conditions, etc., 75 to 80 per cent can be considered as a representative average figure for the mechanical troubles on railway motor armatures, and as armature troubles predominate these figures can be considered as applicable to the complete motor.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Relief Measures Suggested

Connecticut Commissioner Urges Trial of Other Means Before Public Ownership or State Aid

Richard T. Higgins, chairman of the Connecticut Public Utilities Commission, has issued a statement, after discussion with his associates, in regard to means of bettering the present electric railway situation. The immediate occasion for the statement was the recent beginning of the investigation of railway conditions in Connecticut.

STATE OWNERSHIP AS LAST RESORT

While admitting without question that electric railways are in a critical condition and need some measure of assistance, Mr. Higgins would avoid, if possible, public ownership, although even that might be preferable to some methods of relief. For example, he does not believe that electric railways should be aided by special taxation or out of the public treasury.

If such assistance should ultimately be found necessary, Mr. Higgins would go still further and recommend State ownership and control, rather than require either the State or the municipalities to guarantee a specified return for privately owned railways with any form of semi-public control. In his opinion, this would be a bad and altogether too paternalistic precedent.

A LIBERAL POLICY NECESSARY

If government ownership or State aid to the extent of directly financing operation is to be avoided, a liberal policy in regard to other means of aiding railways must be adopted. In view of the fact that present abnormal conditions will improve, the remedies adopted need not cure all present ills. Upon this basis, therefore, Mr. Higgins makes the following concrete suggestions:

1. Relieve the companies permanently of the present statutory burden of laying and maintaining street pavements.
2. Relieve them permanently from the present statutory burden in the construction of highway bridges.
3. Relieve the companies from the burden of taxation by reducing the percentage of tax on gross income, and suspend payment for a period of two years, ultimately requiring payment thereof with a low rate of interest whenever the revenues of the companies will permit, and before any dividends are paid.
4. Regulate properly jitneys or automobiles transporting passengers for hire in and along public highways, so as to eliminate unjust and unnecessary competition.
5. Amend the companies' charters to permit them to maintain and operate motor vehicles for the transportation of freight and passengers along the routes and highways over which they already have charter rights to operate electric railways, and along such other routes and highways as the Public Utilities Commission shall find to be of public convenience and necessity.

   The automobile or motor vehicle is an important factor and, with the constantly improved State highways, will in the future be a still more important factor in all kinds of short-haul or intrastate transportation. In the natural development of this kind of public service the chartered electric railway companies should have the opportunity of developing their transportation systems along such lines as the public may demand.
6. Loan to the electric railways new capital for necessary extensions and betterments, but not without the approval of the State board of control and of the Public Utilities Commission as to amount, security and general terms and conditions thereof.

If such relief is granted and at the end of two years is found to be insufficient, Mr. Higgins believes formerly successful electric railways are doomed and must be abandoned or taken over by the State and operated by the public at public expense. In his opinion, however, if there is a public demand and necessity for electric railway transportation, as he believes there is, and all other similar forms of public transportation on the highways are publicly regulated and controlled so as to avoid unreasonable or destructive competition, then electric railways, relieved of undue burdens, should be self-supporting as any business industry.

$1,100 to the St. Louis Conscience Fund

Restitution of $1,100 stolen from the United Railways, St. Louis, Mo., in one year's time by a former conductor is the unique experience of Richard McCulloch, president of the company.

The first payment from the former conductor came recently in the form of a check for $100 accompanied by a letter postmarked at a town in Iowa. In this letter the writer expressed his penitence over having taken the company's money. It was written in the same vein of other letters Mr. McCulloch has received at intervals from conscience-stricken pilferers, but in two important respects it was different being signed with the full name and address of the sender. The amount, too, was larger than the average contribution to the conscience fund.

In acknowledging receipt of the letter and the $100 President McCulloch complimented the former conductor upon his manliness in confessing his misdeeds and making amends.

About two weeks later President McCulloch received another letter from the conductor in Iowa inclosing an indorsed negotiable note for $1,000.

A search of the records showed that the signer of the letter was a conductor on the suburban line for about a year in 1904-1905 and according to his own confession took money which apparently he invested in Oklahoma land. There were no black marks against the man's record while with the company and he was not under suspicion.

Government on Relief Work

Recent Conference of Mayors and Governors Seems About to Bear Fruit

Roger W. Babson of the information and educational service of the Department of Labor, and Eugene Meyer, Jr., managing director of the War Finance Corporation, are working on a government relief program for the electric railways, according to Washington reports. One of the measures which, it is hoped, will be brought about is the immediate cancellation of unnecessary taxation of the companies.

FIVE-CENT FARE DOOMED

Mr. Babson declared on March 19 that he regarded the 5-cent fare as doomed. Cost of operation, he stated, has reached the point where companies no longer are able to keep going on the old rate of fare.

The recent conference of Mayors and Governors held in Washington apparently has spurred the government to a realization that the electric railway problem has become a matter of material importance and concern. It will be recalled that the conference adopted a resolution asking the government to investigate the traction situation and recommend relief where needed.

An appeal has been made also by the American Electric Railway Association that the government appoint a commission to investigate railway conditions and authorize measures for stabilizing the industry.

The United States Census Bureau has been getting up some electric railway figures, one of the compilations showing that seventy-two companies which had a combined net income of $4,000,000 in 1912 experienced a deficit of $544,000 in 1917, before war conditions had begun to affect the companies most seriously.

RELIEF COMMISSION PLANNED

The plan of relief for the electric railways, already tentatively worked out by the Treasury Department and the Department of Labor, provides, it is stated, for a commission of five members or one representative each for the Treasury Department, Department of Labor, Department of Commerce, the banks of the country and the electric railways. Powers of the proposed commission will be similar to those of the National War Labor Board. The belief was indicated recently in government circles that the electric railway situation has become so serious that the creation of a federal body to deal with the problems of the companies practically is a certainty.

Mr. Babson is of the opinion that so far as the local railways in the District of Columbia are concerned the local Public Utilities Commission has sufficient authority to stabilize the local lines by installing a service-at-cost plan or the so-called Currier method of sliding fares and sliding dividends. Mr. Babson will discuss in a series of articles in the Washington *Star* the practical application of such methods. He has pointed out that relief for the companies in the form of cancellation of unnecessary taxes could not be accomplished by the commission, but rather by congressional action.

"The Good of the Service"

The Kansas City Railways Provides New Representation and Co-operation for Employees

The Kansas City (Mo.) Railways has announced a plan, effective April 1, for bringing into one big family the new organization built up as a result of the recent strike. Following the motto, "For the Good of the Service," the company purposes to deal directly only with representatives elected by all the employees rather than with committees of any organization to which but a portion of the men belong. It is believed that with the co-operation of the employees, the present financial difficulties can be obliterated. If this can be done, it is the desire of the company that the employees shall share in the profits through increased wages and other rewards.

Every employee is urged to make suggestions. All those adopted will be suitably rewarded, and the name of the employee making the suggestion will be placed on the list of those in line for promotion. Suggestions are to be deposited in a box placed for this purpose in every department. The reward will be determined by practical working value of the suggestions.

COMMITTEES FOR EACH DIVISION

Committees are to be formed at each division and in every department. In the transportation and mechanical departments there shall be at each division a committee composed of two transportation employees, one mechanical department employee, the foreman of the mechanical department and the division supervisor. This committee shall meet the first Monday of each month. Recommendations are to go to the superintendent of transportation or superintendent of the mechanical department. The members of this committee, other than the mechanical department foreman and the division supervisor, may meet when necessary during the month in addition to the above to discuss upon service suggestions. This committee shall dispose of these cases either by its own action or by requesting a hearing by the supervisor.

The members of the various carhouse committees are to form the general transportation committee, which shall include the superintendent of the mechanical department and the superintendent of transportation. This committee shall hold regular meetings four times a year, recommendations arising therefrom being made to the general manager.

Similar committees shall be formed in the power, shop, electrical and track departments. Each committee shall consist of the head of the department and three employees. Meetings shall be held under the same rules as those above specified for division committees.

All members of committees other than officials shall be paid their regular rate or at least $5 per month for their time on these committees. To be eligible for committee membership an employee must have been in the service of the company for at least three years.

It is stipulated that there shall be no interference or dictation in the work of these committees from any official of the company. The committees are to be elected each year by secret ballot, any eligible man being allowed to nominate himself.

HANDLING APPEALS

Any employee either individually or through his carhouse committee, or the committee on its own initiative, shall, in the case of a desire to appeal from the decision of an officer, address a request direct to the superintendent of transportation, the superintendent of the mechanical department or the general manager. Those in the transportation department, after a hearing by the superintendent of transportation or superintendent of division mechanical department, may request a review by the general manager. A final appeal may be made to the president.

Each officer named is to announce a day not less than once a month at which time he shall receive any employee or committee of employees on any matter affecting the interests of the employees or "The Good of the Service."

Betterment plans now in effect, which are available to all employees and will be continued, are as follows:

A building, savings and loan association whereby employees may deposit savings and which guarantees at least 6 per cent interest in addition to accrued earnings.

Free legal aid bureau, by which any employee of the company may secure legal advice without charge.

A pension fund whereby employees who have been in the service of the company twenty years may receive a monthly sum based on average earnings and length of service for life.

The company also maintains in hospitals in the city a number of rooms which are available for the use of employees up to their capacity.

There now exists among the employees an organization known as the Kansas City Railways Employees' Brotherhood. The company is in full accord with the spirit and purposes of this organization, which provides sick and accident insurance benefits at a very low cost. The company, in order to assist its employees secure these insurance benefits, will contribute toward the cost of insurance 50 cents per month per member in accordance with the by-laws of this organization. This association is open to the employees of the company, but is not compulsory.

Reasons for City's Purchase

Detroit Street Railway Commission States Why Purchase Plan Was Preferable to Competition

In a statement issued by the Street Railway Commission of Detroit, Mich., the board points out that "piecemeal" construction of a railway system by the city to compete with the Detroit United Railway would be a lengthy and costly procedure and asserts that the company would combat by every means the building up of a municipal system to compete with its lines. The statement follows substantially in full:

> In its deliberations, the Board of Street Railway Commissioners gave earnest consideration to the so-called "piecemeal" plan of constructing a railway, after the manner of San Francisco.
>
> The board is conscious of the fact that many sincere advocates of municipal ownership favor this method of acquiring a street railway system, but a thorough study convinced the board that the "piecemeal" plan would be a difficult and lengthy way of improving conditions.
>
> In the words of Mayor Couzens, the board believes, that "time is the essence of the problem."
>
> To begin with, the Detroit United Railway is to-day in possession of the most desirable routes for street railway lines. While it is true that the city might order the company from streets where its franchises have expired, such a course would mean a cessation of service for several months, inasmuch as the railway would have three months' time to remove its tracks and restore the streets.
>
> Should the city resort to the alternative and construct lines on parallel streets, an economic waste would result in the end, even if the Detroit United Railway was forced into bankruptcy, for unquestionably the city would wish to run its cars over the main arteries, leaving the tracks which it had constructed during warfare as waste.
>
> It is certain that the Detroit United Railway would oppose the construction of the city system every inch of the way. This would at least result in delay, which is not desirable.
>
> Even if the city were successful in constructing units of a system, the absence of transfer privileges with the lines of the privately owned company would prove a serious inconvenience.
>
> In the opinion of the board, therefore, a purchase by agreement was preferable to lengthy warfare for the following reasons:
>
> 1. Provided the people ratify the purchase agreement, the city comes into immediate possession of the present system and can plan without delay for the building of extensions and the addition of cars to improve the service.
> 2. Lawsuits, economic waste, through construction of parallel and competing lines, are avoided, and no interruption of service is involved.
> 3. Experience has shown us that the longer the city delays entering into an agreement with the company, the more it will have to pay for the property. Four years ago it could have been purchased for approximately $25,000,000, and the likelihood is that if purchase of the system is now deferred, the city will be the loser, rather than the gainer.
> 4. The city must plan for a comprehensive rapid-transit system. Lengthy warfare with the Detroit United Railway will postpone progress in this direction.
> 5. The city will be permitted to operate the railway beginning July 1, 1919, in the interest of the people of Detroit, and not in the interest of stockholders.
> 6. The problem which has hindered the development of Detroit for more than a score of years will be settled quickly and for all time.

In this connection it is well to recall that the question of the purchase of the property of the railway within the city by the city for $31,500,000 as agreed mutually between the representatives of the city and the officials of the company will be presented to the voters at the election on April 7 for their approval.

Washington Men Favored

Many Points Not Previously Agreed to Between Railway and Men Decided in Favor of Latter

With a few minor and unimportant exceptions, the National War Labor Board, in a decision made public in connection with the dispute between the Washington Railway & Electric Company, Washington, D. C., and its motormen and conductors, awards to the men all they contended for.

MANY POINTS SETTLED PREVIOUSLY

Fourteen disputed points had been agreed to by the contending parties before the matter was submitted to Joint Chairmen Taft and Manly for final adjudication. These points, at the request of the men, were incorporated in the award. The award provides substantially as follows:

> The company is to meet and treat with duly accredited committees representing the men on all questions and grievances which may arise.
>
> There is to be no discrimination by the company against men on account of union affiliations or membership in any labor organization.
>
> Properly accredited representatives of the men who have duties to perform in connection with the office to which they are properly elected are to be given leave of absence by the company to attend to such duties.
>
> If a man is suspended or discharged without sufficient cause he is to be restored to his former position without loss of pay.
>
> All schedules are to be made with a view to furnishing the best possible working conditions, and straight runs, whenever practicable, are to be given the men.
>
> No regular assigned run is to pay less than eight hours a day.
>
> The company is to pay straight time for all swings of one hour or less than one hour.
>
> Where men report for duty and begin their run they are to receive pay for full time, whether the run is completed or not.
>
> Men holding runs that do not appear on holiday or Sunday schedules are not to be required to report on such days except under unusual conditions.
>
> The wages for motormen and conductors are fixed at 43 cents an hour for the first three months, 46 cents for the next nine months and 48 cents thereafter.
>
> The men will be permitted to post notices in each car and in other ways protect themselves against possible imposition.
>
> Motormen and conductors will receive pay for the time necessary for them to go to the general office and make reports.

The requests not granted by the board relate to additional pay for operating hand-brake cars, time and a half for intervening time, twenty minutes for meal relief, ten minutes for turning in car receipts and free passes. In this connection the board said:

> These requests are not granted and no change is required in the present practice in regard to these specific matters.

AWARD EFFECTIVE IMMEDIATELY

The award is to take effect immediately and will continue until the end of the war, "as announced by executive proclamation." Either party, however, may reopen the case before the board at periods of six months' interval beginning Oct. 1.

The board was silent on the request of W. McK. Clayton that it pass on the question of whether the people of Washington should be made party to the dispute. Mr. Clayton filed a brief in which he declared that as the Washington Railway & Electric Company is a public utility corporation and as the people must pay any additional expenses assumed by the company through an advance in wages or a reduction in working hours, they ought to be heard in any contention between the parties.

Missouri Commissioners Reappointed

The Senate of Missouri has confirmed the reappointment of William G. Busby, chairman of the Public Utilities Commission of Missouri, and Edwin J. Bean, as members of the commission. Both were reappointed for a term of six years. Announcement has also been made that R. P. Spencer, St. Louis, actuary of the State Insurance Department, will succeed A. Z. Patterson as chief counsel for the commission.

Utility Bills Before Legislature

No less than twenty bills affecting public utilities have been introduced in the Legislature of Illinois. Several of these bills are for the complete repeal of the public utilities act, but so far these do not seem to have met with favor. Another bill amends the public utilities act by defining taxicab drivers and operators as a public utility whether or not transportation is over a definite route, or between fixed terminals, while still another defines motor-bus and motor transportation lines operating between two or more cities as a public utility, and subject to the provisions of the public utility act.

A bill known as the home rule municipal league measure provides that any city or municipality may elect by franchise ordinance, when referred to the people at a regular or special election and receiving a majority of the votes cast, to withdraw from the jurisdiction of the commission, and regulate the public utilities within its boundaries. The act further provides that cities may go back under the commission by the same procedure.

A bill which greatly curtails the powers of the commission provides that nothing in the public utilities' act shall give the commission the power or authority to revise, alter or modify in any way contracts entered into in good faith between municipalities and public utilities, or the conditions of any franchise, license or permit to engage in business in any such municipality as a public utility.

There is also a bill for the protection of streets, roads and highways of the State by prescribing the maximum loads, rate of speed and width of tires of commercial motor vehicles used thereon. From the standpoint of the electric railways this measure does not seem to go far enough, and it is felt that a bill should be passed which would require motor transportation companies operating over the highways of the State to pay compensation for the use of the roads, either on a mileage or per-ton basis.

Honolulu Wants a New Deal

Honolulu has a franchise problem, for which the Honolulu Rapid Transit & Land Company, through its president, L. T. Peck, is seeking a solution. The present franchise was granted in 1898 for thirty years by the government of Hawaii to local people who took over from foreign interests the then existing indifferent tramways and merged, modernized and extended them, carrying out improvements far beyond the requirement specified in the new grant. Provision was made in the franchise grant to the new company for a capital stock sinking fund, definite contributions to which from earnings were to take percedence to the right of the government to any part of the company's income. Deposits to this fund, however, have long been diverted to extensions. The time has come now when this can no longer be done if the interests of the stockholders are to be properly protected and the company has announced that henceforth it proposes "to fulfill to our stockholders the duty of protecting them by making all possible deposits to such fund."

This policy if put into effect will work materially to the disadvantage of the city by throttling the work of expansion carried out by the company in the past and this is being pointed out by Mr. Peck to the local authorities. Honolulu needs further additions to its transit system, but the company cannot carry its liberal policy of the past any further unless it is put into a position to do so. This is generally realized in some quarters and the Governor has already recommended to the 1919 Legislature the enactment of an appropriate bill to settle the franchise matter so that a franchise act acceptable to the city and the company can be sent on to Washington for confirmation. Mr. Peck has summarized the franchise conditions necessary to insure a continuation of the policy of expansion which has been in effect in the past. In this connection he said in a recent public statement:

> The extended franchise should be flexible enough in its terms as to rates and government charges, under commission control, that the revenues will always be sufficient to provide the very best of service and a fair return on the capital already invested and on that yet to be sought for immediate and future expansions.

War-Time Privilege Withdrawn

The Council of Danville, Ill., has canceled an ordinance made for the period of the war which allowed the Illinois Traction System to haul coal through the streets at all times during the day and night. The original ordinance provided that coal be hauled only between the hours of midnight and 6 a.m. The demand for coal became so urgent during the winter of 1917-1918 and the difficulties of transportation so great that the Councils of Danville, Champaign, Urbana and other cities in which the Illinois Traction Company operates allowed cars of coal to be hauled at any time.

Seattle Is on Trial, Says Mayor Hanson

It is announced that the *remittitur* in the State Supreme Court hearing to test the legality of the deal for the purchase of the railway property of the Puget Sound Traction, Light & Power Company by the city of Seattle, will be filed on April 6. It is announced that the company will be ready to turn over the property any time after that date. It is understood the date of actual transfer depends only on the time required in signing the 15,000 utility bonds issued in payment for the lines. Mayor Ole Hanson has been forced to take a vacation and Acting Mayor W. D. Lane will fall heir to the job of signing 13,400 of the bonds.

In his message to the City Council before leaving the city, Mayor Hanson urged co-operation in all departments of the city government, and particularly with the handling of the railway problem. He said in part:

> If you play petty politics and refuse to establish fares that in all experience have proved necessary; if you make for votes and not for service, naught but disaster can overtake the municipal railway venture. If, on the other hand, we give the people of Seattle service and charge a fair rate, and use our best business judgment, our municipal-owned system will prove a beacon light to other cities throughout the country.

No Bluffing Here

Too often electric railway companies crying aloud for succor are considered to be "bluffing" and instead of the fabled bread are handed a stone in their trouble. To this fact Norton, Mass., is just awaking. The story of the Norton, Taunton & Attleboro Street Railway, Norton, Mass., is best told perhaps by the following dispatch from that city to the Pawtucket *Times:*

> Many people believed that the threat to discontinue the road was a bluff and was something that would never occur, but certain facts brought out during the past few days leave the plain truth that the road must be sold within a very short time to satisfy the orders of the Comptroller in Washington, and the matter is entirely out of the hands of the bondholders, the agents of the road or even the town and city officials, through whose communities the line passes. A bank in Lowell that held 70 per cent of the bonds of the road failed about four years ago and at that time paid only 90 per cent to the depositors. As the bank was under national supervision the Comptroller has ordered the road sold so that the other 10 per cent may now be paid the depositors. A junk dealer has been over the line and offered $120,000, but the sale is being withheld as long as possible to allow the municipalities or private citizens to make as large a bid so that the line will be left for the use of the public. In 1917 the road was assessed for $240,000. Coming from a federal officer the order to sell must be taken seriously and the voters will have a chance to cast one of the most important votes of their lives at the special meeting which will be called shortly.

Chicago Wage Question Reviewed

The wage situation on the Chicago (Ill.) Surface Lines has been summed up by the Chicago *Tribune* as follows:

> It is understood to be the view of attorneys for the Chicago Surface Lines that with the ending of the war the increased wage scale will, in equity, automatically terminate. It is not expected that the War Labor Board will recommend a reduction to the former level, but it will become a question for the companies in the surface lines to take under consideration.
>
> The companies in June, 1917, entered into a contract with the employees running for three years, or until June, 1920. In this contract increases in wages were provided for amounting to a total of about $1,000,000 a year. This contract has until June of next year to run, and it is held by the companies that with the end of the war there will be a reversion to conditions under the original contract.
>
> There is not at this time any suggestion as to what the companies will do. They merely assert that the occasion for the increase of $3,700,000 will have passed with the signing of the peace treaty and that they will be under no legal obligation to continue the existing scale of wages.

News Notes

Wants Labor Ruling Modified.—The Louisville (Ky.) Railway has asked for a modification in the ruling of the War Labor Board, fixing a minimum wage of 40 cents an hour for common labor.

Sioux City Men Want More.—Trainmen of the Sioux City (Iowa) Service Company have served notice on the company that when the present wage scale agreement expires on May 1 they will demand a flat increase of 15 cents an hour. They are receiving 30 and 35 cents under the present agreement.

Louisville Camp a Permanent Site.—The investment in equipment installed to connect Camp Taylor with Louisville, Ky., will probably be converted from a temporary to a permanent asset to the Louisville Railway as it has been announced from Washington that the camp will be one of fifteen permanent federal military posts.

City May Acquire Outside Lines.—The Senate of the State of Washington has passed Representative Guie's bill authorizing the extension and operation of municipally-owned electric railways to a point not to exceed 8 miles outside of its corporate limits. The bill will enable the city of Seattle to acquire the Seattle & Rainier Valley Railway.

Wants Appropriation for Rapid Transit Work.—The Public Service Commission for the First District of New York has asked the Board of Estimate of New York City to appropriate $577,060 for rapid transit expenses during the second quarter of the year. This amount will provide for the expansion of the number of employees for the purpose of rushing plans for the remaining work, so that contracts may be let at the earliest moment. Only by making some such provision, the commission has pointed out, can the remaining portions of the dual system be rushed to completion.

Professor Richey Accepts.—Prof. Albert S. Richey has accepted his designation as the city's representative on the board of arbitration which will try to effect an agreement between the International Railway, Buffalo, N. Y., and the city whereby the local lines of the International will be placed under municipal control. Mr. Richey and James E. Allison, Jr., St. Louis, the company's representative, have held several informal conferences and efforts are now being made to agree upon a third member of the board. The designation of the third member is expected to be made within the next ten days.

Company Is Opposed to Franchise Modification.—A refusal to consent to amendments to the Tayler grant was made by President John J. Stanley of the Cleveland Railway at the first of a series of daily meetings to consider the railway proposition. Coupled with this refusal was the assertion by Mr. Stanley that he would prefer municipal ownership and operation of the company's property to an amended franchise ordinance. The session ended abruptly a half hour after it convened, but another meeting will be held when amendments proposed by Mayor Davis will be laid before executives of the company.

War Record of Byllesby Properties.—The third edition of the National Service Record of H. M. Byllesby & Company and affiliated companies shows an increase of 256 men in the service since July 1, 1918, making a total of 951 so engaged, or 19 per cent of the organization's male employees. Only twenty casualties are recorded, nine deaths, ten wounded men and one man missing in action. On Jan. 1, 1919, 270 men had been engaged overseas and 112 had returned to civil life. More than $2,500,000 was subscribed by the organization and its employees to the four Liberty Loans, more than $66,000 was invested in war savings certificates and thrift stamps, and they gave more than half a million dollars to various charities.

Programs of Meetings

New York Electric Railway Association

The thirty-seventh annual meeting of the New York Electric Railway Association will be held at the Fort William Henry Hotel, Lake George, on June 7.

Southwestern Electrical & Gas Association

At a meeting of the executive committee of the Southwestern Electrical & Gas Association held on March 17 it was decided to hold a three-day convention on May 12, 13 and 14. The morning of the first day will be devoted to committee meetings, and the mornings of the other two days to separate operating sessions of the gas, electric light and power, and the street and interurban railways. In the afternoons of all three days will be general sessions. A general convention committee was appointed with A. Hardgrave as chairman. A banquet will be held on one of the evenings of the convention and will be in charge of a local committee from Galveston and Houston.

Financial and Corporate

P. R. T. Expenses Rise

Increase of $3,252,000 in Operating Expenses but Gain of Only $1,977,000 in Gross Earnings for 1918

The first annual report of the Philadelphia (Pa.) Rapid Transit Company since the change of its fiscal year to the calendar period shows what is called an abnormal increase in gross earnings of $1,977,501 or 6.65 per cent for 1918. This gain was due to war-time activities. The passenger earnings rose $1,947,606 or 6.80 per cent.

COMPARATIVE INCOME STATEMENT OF PHILADELPHIA RAPID TRANSIT COMPANY FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Gross passenger earnings	$30,568,788	96.42	$28,621,182	96.28
Receipts from other sources	1,135,639	3.58	1,105,744	3.72
Total earnings	$31,704,427	100.00	$29,726,926	100.00
Maintenance and renewals	$4,755,664	15.00	$4,459,039	15.00
Operation of power plants	2,719,097	8.58	2,061,904	6.94
Operation of cars	8,951,880	28.24	7,494,130	25.21
General	2,071,744	6.53	1,529,196	5.14
Taxes	1,871,186	5.90	1,573,269	5.29
Total expenses	$20,369,571	64.25	$17,117,538	57.58
Net earnings from operation	$11,334,856	35.75	$12,609,388	42.42
Interest	$2,314,649	7.30	$2,260,310	7.61
Rentals	7,365,391	23.23	7,365,393	24.78
Sinking fund—city contract	120,000	0.38	120,000	0.40
Total fixed charges	$9,800,040	30.91	$9,745,703	32.79
Surplus	$1,534,816	4.84	$2,863,685	9.63

The operating expenses, however, were excessively high in 1918, owing to the enormously increased cost of both labor and material, and represented an increase of $3,252,032 or 19 per cent. The fixed charges showed a net increase of $54,336, caused mainly by payment of interest on passenger cars secured by lease from the government. The surplus for the year was but $1,534,816, as compared to $2,863,684 for 1917.

Dividends were declared from the surplus earnings as follows: Payable July 31, 1918, 2½ per cent, $749,645, and payable Jan. 1, 1919, 2½ per cent, $749,645. The full comparative income statement for the last two calendar years is given in the accompanying table.

A considerable part of the annual report is devoted to a striking résumé of results obtained during the past eight years of Stotesbury-Mitten management. A summary of information on this point was published in the ELECTRIC RAILWAY JOURNAL of March 8, page 484.

Plan to Reclaim Richmond & Chesapeake Bay Railway

It is proposed to organize the Richmond-Ashland Railway, Richmond, Va., for the purpose of purchasing the right-of-way, rails, etc., from the Richmond & Chesapeake Bay Railway from Ashland to Laburnum station, a distance of approximately 12½ miles, and to put the road into operation between these points at the earliest possible moment.

The new company will issue $200,000 of common stock and $200,000 of twenty-year 6 per cent gold bonds, with interest payable semi-annually, the first interest payment to be made on Jan. 1, 1920. The bonds are to be sold to the subscriber on a basis of $100 par value of bonds and $25 par value of stock for each $100 in cash.

One hundred and fifty thousand dollars of the stock of the company is to be issued to J. L. Vaughan, president of the Petersburg & Hopewell Electric Railway, and his associates, who agree to advance such additional funds as may be necessary for the maintenance and operation of the road during a period of five years. These stockholders, in their individual capacity, guarantee to operate the road, and further guarantee to provide payment of interest on the bond issue for a period of two years should the earnings of the road not be sufficient.

The funds secured from the sale of the bonds are to be used for corporate purposes and requirements only, and the subscribers to the bonds and stocks are to have representation upon the board of directors.

In order that the proposed plan shall become operative subscriptions equal to $150,000 cash must be received before any subscriptions are binding. As soon as subscriptions to the sum of $150,000 cash have been received, 50 per cent of such subscriptions are to become due and payable immediately to the American Trust Company, Richmond, as trustee. Upon the organization of the company the remaining 50 per cent will be payable to the trustee. In the event the organization of the company is not perfected, and the property is not purchased within ninety days, the trustee is to return all subscriptions to the subscribers.

Skimming Off Financial Slag

All Rhode Island Companies Likely to Go Into the Melting Pot and Come Out a Complete Amalgam

A bill asking for a charter for a new corporation to take over the whole or any part of the electric railway system of Rhode Island has been presented in the Rhode Island Legislature. The measure was drawn by Attorney-General Rice with the full consent and approval of all the interests concerned in the present complicated affairs of the Rhode Island Company. The presentation of the bill was made in order that authority might be obtained from the Legislature before its adjournment, as another session will not be held until 1921.

CONFERENCE ON REORGANIZATION

Frank H. Swan, Theodore Francis Green and Zenas W. Bliss, receivers of the Rhode Island Company, conferred on March 24 with the representatives of the various interests and the proposed reorganization of the company was thoroughly discussed. Attorney-General Herbert W. Rice represented the State of Rhode Island; Mayor Joseph H. Gainer represented the city of Providence, the other representatives being Walter F. Angell of the law firm of Edwards & Angell, representing the protective committee of stockholders of the United Traction & Electric Company; Michael F. Dooley, representing the protective committee of the bondholders of the Rhode Island Suburban Railway; Richard B. Comstock, representing the bondholders of the United Traction & Electric Company; Philip Spalding, of Estabrook & Company, Boston, chairman of the protective committee of the United Traction bondholders; and Nathaniel W. Smith, representing the New York, New Haven & Hartford Railroad, which owns the capital stock of the Rhode Island Company.

It was the consensus of opinion at the conference that a complete reorganization of the company with the establishment of one company owning all the trackage and privileges of the present numerous lessor companies, as indicated recently in the ELECTRIC RAILWAY JOURNAL, was the only solution to the problem.

MAYOR WANTS CORPORATE STRUCTURE SIMPLIFIED

Mayor Gainer of Providence advocated the amalgamation of all the various units of which the company is at present composed into one company and the simplification of its organization so that the public could appreciate its position and obligations. He urged an immediate reduction of the capitalization as essential to the restoration of public confidence and he declared that the people would pay any fare necessary to maintain service if they felt that the fares were equitable and the necessary result of the service furnished.

He said, moreover, that the city was prepared to lend its assistance in every way possible and was also willing to make sacrifices and concessions, but he demanded that the other interests affected indicate a similar spirit. The company is at present required to pay the city in franchise taxes and new paving charges approximately $160,000 annually but this income the city would surrender if by so doing the reorganization of the company could be expedited and benefited.

Mayor Gainer's exposition of the city's attitude stirred the conference to concrete action and at the request of the receivers the representatives of the various interests at the conference were requested to constitute a general committee to perfect plans for a complete reorganization of the company and present it to the receivers at the earliest date possible.

Although the Superior Court, through Presiding Justice Tanner, must pass on any plan of reorganization before it can become operative, it was deemed advisable to secure the necessary authority from the Legislature to reorganize, and accordingly Attorney-General Rice was requested to draw up a bill and present it in anticipation of approval of the reorganization by the court.

Mayor Gainer's statements relative to the concessions the city would make were not made on his own initiative, as he had conferred before the conference with the members of the City Council committee on Rhode Island Company affairs and had been vested with full authority to speak for the city.

Another Receiver in New York

Holding Company for Rapid Transit and Surface Lines Unable to Meet April 1 Interest Payment

James R. Sheffield was appointed receiver for the Interborough Consolidated Corporation, New York, N. Y., on the afternoon of March 21 by Judge Julius M. Mayer, in the United States District Court at New York. The appointment was made following the filing of an involuntary petition in bankruptcy by Alexander & Green, attorneys, holders of collateral 4 per cent bonds of the corporation.

CONTROLS RAPID TRANSIT AND SURFACE LINES

The Interborough Consolidated Corporation is a holding company. It controls approximately 97 per cent of the stock of the Interborough Rapid Transit Company; 85 per cent of the stock of the New York Railways which recently went into a temporary receivership, and 45 per cent of the stock of the New York Transportation Company, which operates the Fifth Avenue omnibuses.

The Interborough Consolidated Corporation has never received a dividend from its holdings of New York Railways stock. Up to the close of 1916 the New York Railways succeeded in keeping up interest payments on its adjustment mortgage income bonds, but it contributed no revenue to the holding company, which derived its entire income from its ownership of 339,128 shares of Interborough Rapid Transit Company stock. Dividends at the annual rate of 20 per cent were paid on the Interborough Rapid Transit stock, enabling the Interborough Consolidated Corporation to meet the interest on the $67,825,000 Interborough-Metropolitan 4½ per cent bonds and pay dividends of 6 per cent on Interborough Consolidated preferred. In July, 1918, the Interborough Rapid Transit dividend was cut to 10 per cent. This necessitated the passing of Interborough Consolidated preferred dividend. In February the dividend on Interborough Rapid Transit stock was also passed, cutting off the source of revenue from which Interborough Consolidated met the interest in the Interborough-Metropolitan bonds. A semi-annual interest instalment of $1,526,062 is due on these bonds on April 1.

It was on evidence that the interest payment just mentioned would not be met that the petitioning creditors based their right to act. The Interborough Consolidated Corporation was alleged to be liable for interest owed on these bonds as the result of the consolidation of the Interborough-Metropolitan Company and Finance & Holding Corporation. Evidence of the bankruptcy of the Interborough Consolidated Corporation was presented in the form of a transcript of the minutes of the meeting of the board of directors.

The general grounds for the petition are given as follows:

> Your petitioner is informed that the condition of the alleged bankrupt's affairs and business is such as to render it absolutely necessary that a receiver be appointed at once to take the custody and possession of the said securities, bonds and certificates of stock which are now in the possession or under the control of the alleged bankrupt pending the issue of the bankruptcy proceeding, for the reason that the semi-annual instalment of interest on the collateral trust 4½ per cent gold bonds of the Interborough-Metropolitan Company, of which $62,776,000, principal amount, are outstanding and widely distributed, will be due and payable by said alleged bankrupt on April 1, 1919, and that said alleged bankrupt, as your petitioner is informed and verily believes, will be unable to pay the same, with the result that the said bonds, securties and certificates of stock now in the possession of or under the control of said alleged bankrupt may be subjected to or in danger of efforts to levy on or attach the same by the holders of said bonds or some of them attempting to enforce the payment of said instalment of interest to the prejudice of a fair and equitable distribution of said assets pro rata among the creditors entitled to receive the same.

The following securities in the possession of the bankrupt or within its control are listed:

150,610 shares of the capital stock of the New York Railways of the aggregate par value of $15,061,058.

532 shares capital stock of the Forty-second Street & Grand Street Ferry Railroad, par value $53,200.

Six first mortgage bonds of the Bleecker Street & Fulton Ferry Railroad Company, par value $6,000.

One 5 per cent bond of the Broadway Surface Railroad, par value $1,000.

Six per cent mortgage bonds of the Jerome Park Railway, par value $100,000.

First and refunding mortgage bonds of the Twenty-eighth & Twenty-ninth Street Crosstown Railroad, par value $1,378,000.

55 shares of the capital stock of the Third Avenue Railroad, par value $5,500.

The alleged bankrupt has pledged as collateral the following securities, all of which are not now in its possession or under its control:

339,128 shares capital stock of the Interborough Rapid Transit Company, aggregate par value $33,912,000.

103,128 shares capital stock of the New York Transportation Company, aggregate value $1,035,740.

United States 4½ per cent second Liberty bonds, par value $600,000.

The petitioners assert that the bankrupt owns bills receivable and claims for accrued interest and dividends of unknown value and has cash on hand amounting to $49,000.

Job E. Hedges, who is receiver of the New York Railways, which as previously stated is controlled by the Interborough Consolidated Corporation, has issued the following statement:

> The questions involved in the receivership of the New York Railways are serious and of great importance not only to those interested as bondholders and claimants, but to the general public. I have no preconceived notion whatever in the matter, and approach the duties of the receivership with a fallow and receptive mind. My first duty is to ascertain the facts, and this will be done to the best of my ability. I shall attempt to form no opinion until I have all the facts in mind, and then they will be placed before the court.

The income of the New York Railways for the fiscal year ended June 30, 1918, fell more than $150,000 short of meeting the interest requirements on the first real estate and refunding mortgage bonds. In the six months ended Dec. 31, 1918, the corporate deficit reached $2,125,039 and all special and reserve funds were exhausted.

The New York Railways has outstanding $17,495,060 capital stock. Mortgage indebtedness of the New York Railways is as follows:

First real estate and refunding mortgage	$18,061,289
Adjustment mortgage	30,609,487
Convertible scrip	2,250

The outstanding mortgages on property of companies owned and operated by the New York Railways are as follows:

Lexington Avenue & Pavonia Ferry Ry.	$5,000,000
Columbus Avenue & Ninth Avenue R.R.	3,000,000
Broadway Railway	1,500,000
South Ferry R.R.	350,000
Central Crosstown Ry	250,000

Mortgages against lines leased by the New York Railways are:

Broadway & Seventh Avenue R.R., first consolidated mortgage	$8,150,000
Christopher & Tenth Street R.R.	210,000
Twenty-third Street Ry., improvement and refunding mortgage	1,500,000
Bleecker Street & Fulton Ferry R.R.	700,000
Thirty-fourth Street Crosstown Ry	1,000,000

The New York Railways operates more than 150 miles of trackage in the borough of Manhattan. It was incorporated at the close of 1911 as successor to the Metropolitan Street Railway, which was sold under foreclosure.

Loss of 12 Per Cent in Net Income

Statistics of Electric Railways for 1918 Show Disastrous Effect of Higher Costs—East Better Off in December

Operating returns of electric railways for 1918, as reported to the information bureau of the American Electric Railway Association, show large increases in those items which managers like to see decrease. In the accounts where an increase would mean a healthy growth in prosperity and the prevalence of normal conditions, however, there is a discouraging decrease occurring uniformly throughout the country.

NET FELL 12 PER CENT

The accompanying tables show the returns for 1918 as compared with 1917, and the returns for December, 1918, as compared with the corresponding month of 1917. Table I, giving the figures for the year, shows that for the country as a whole the revenues increased 6.45 per cent. Expenses during the same period, however, increased 15.74 per cent, producing a decrease in net earnings of 12.26 per cent. For companies reporting taxes the figures are nearly the same, the decrease in the net being 10.40 per cent. An increase in the taxes produced a decrease in operating income of 13.42 per cent.

That the progress of unfavorable conditions has not yet been arrested is indicated by the returns for December, 1918, as compared with the same month of 1917. Table II makes this comparison. Operating expenses for the country as a whole increased 22.58 per cent, while the net earnings fell off 3.90 per cent. Companies reporting taxes showed an increase in revenues of 7.57 per cent, an increase in expenses of 21.92 per cent and a decrease in net earnings of 33.46 per cent. Taxes decreased 32.67 per cent, and the net income suffered a decline of 33.96 per cent.

The operating ratio for 1918 for companies operating 5107 miles of line was 72.65 per cent as compared with a ratio of 66.82 per cent for the same companies in 1917. Companies operating 3799 miles of line report taxes, and the operating ratio of these companies in 1918 was 73.06 per cent, an increase of 5.05 per cent over 1917 for the same companies.

SIGNS OF GAIN IN EAST

The Eastern district showed the only signs of improvement, especially in the returns for December, 1918. The more favorable showing is accounted for by

TABLE I—COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR CALENDAR YEARS 1917 and 1918

Account	United States				Eastern District				Southern District				Western District			
	Amount, January-December, 1918	Per Mile of Line			Amount, January-December, 1918	Per Mile of Line			Amount, January-December, 1918	Per Mile of Line			Amount, January-December, 1918	Per Mile of Line		
		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917
Operating revenues	$111,688,563	$21,870	$20,545	6.45	$54,554,582	$19,222	$17,955	7 00	$11,407,529	$15,343	$14,136	8.54	$45,726,462	$29,977	$28,486	5.23
Operating expenses	81,192,846	15,889	13,728	15.74	39,973,194	14,084	12,155	15.87	7,665,957	10,311	8,473	21.69	33,553,695	21,997	19,215	14.48
Net earnings	30,495,317	5,981	6,817	†12.26	14,581,388	5,138	5,800	†11.41	3,741,572	5,032	5,663	†11 14	12,172,767	7,983	9,271	†13.92
Operating ratio, per cent	1918, 72.65; 1917, 66.82				1918, 73 27; 1917, 67.70				1918, 67.20; 1917, 59.94				1918, 73.38; 1917, 67.45			
Av. No. miles of line	1918, 5,107; 1917, 5,107				1918, 2,838; 1917, 2,838				1918, 743; 1917, 743				1918, 1,525; 1917, 1,525			
COMPANIES REPORTING TAXES																
Operating revenues	$100,014,301	$26,325	$24,741	6.40	$49,059,914	$24,033	$22,460	7.00	$5,346,149	$20,354	$18,401	10.61	$45,608,248	$30,505	$28,970	5.30
Operating expenses	73,074,000	19,234	16,827	14.31	36,128,085	17,698	15,611	13.37	3,536,456	13,464	10,917	23.33	33,409,459	22,346	19,525	14.44
Net earnings	26,940,301	7,091	7,914	†10.40	12,931,829	6,335	6,849	†7.50	1,809,693	6,890	7,484	†7.94	12,198,789	8,159	9,445	†13.61
Taxes	6,761,245	1,780	1,765	0.85	3,169,712	1,553	1,596	†2.69	414,567	1,578	1,470	7.34	3,177,566	2,125	2,048	3.76
Operating income	20,179,056	5,311	6,134	†13.42	9,762,117	4,782	5,253	†8.97	1,395,126	5,312	6,014	†11.67	9,021,223	6,034	7,397	†18.43
Operating ratio, per cent	1918, 73.06; 1917, 68.01				1918, 73.64; 1917, 69.50				1918, 66.15; 1917, 59.33				1918, 73.25; 1917, 67.39			
Av. No. miles of line	1918, 3,799; 1917, 3,800				1918, 2,041; 1917, 2,042				1918, 263; 1917, 263				1918, 1,495; 1917, 1,495			

† Decrease.

TABLE II—COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR DECEMBER, 1917 AND 1918

Account	United States				Eastern District				Southern District				Western District			
	Amount, December, 1918	Per Mile of Line			Amount, December, 1918	Per Mile of Line			Amount, December, 1918	Per Mile of Line			Amount, December, 1918	Per Mile of Line		
		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917		1918	1917	% Increase Over 1917
Operating revenues	8,903,746	1,825	1,695	7 67	4,805,173	1,693	1,538	10 08	1,229,030	1,653	1,470	12.45	2,869,543	2,215	2,167	2 22
Operating expenses	7,362,468	1,509	1,231	22.58	3,797,060	1,338	1,235	8 34	881,531	1,186	886	33 86	2,683,877	2,071	1,419	45 95
Net earnings	1,541,278	316	464	†31.90	1,008,113	355	303	17.16	347,499	467	584	†20.05	185,666	144	748	†80.75
Operating ratio, per cent	1918, 82.68; 1917, 72.63				1918, 79.03; 1917, 80.30				1918, 71.75; 1917, 60.27				1918, 93.50; 1917, 65.48			
Average number miles of line	1918, 4,878; 1917, 4,878				1918, 2,839; 1917, 2,839				1918, 743; 1917, 743				1918, 1,296; 1917, 1,296			
COMPANIES REPORTING TAXES																
Operating revenues	7,707,574	2,159	2,007	7 57	4,330,134	2,121	1,922	10.35	517,803	1,971	1,688	16 77	2,859,637	2,260	2,211	2 22
Operating expenses	6,472,219	1,813	1,487	21 92	3,437,317	1,684	1,576	6 85	363,409	1,384	992	39.52	2,671,493	2,111	1,445	46.09
Net earnings	1,235,355	346	520	†33 46	892,817	437	346	26.30	154,394	587	696	†15.66	188,144	149	766	†80.55
Taxes	486,798	136	202	†32.67	295,443	145	179	†18.99	26,527	101	122	†17.21	164,828	130	256	†49.22
Operating income	748,557	210	318	†33.96	597,374	292	167	74.85	127,867	486	574	†15.33	23,316	19	510	†62.75
Operating ratio, per cent	1918, 83.97; 1917, 74.09				1918, 79.40; 1917, 82.00				1918, 70.22; 1917, 58 77				1918, 93.41; 1917, 65.36			
Average number miles of line	1918, 3,569; 1917, 3,570				1918, 2,041; 1917, 2,042				1918, 263; 1917, 263				1918, 1,265; 1917, 1,265			

† Decrease.

the improved operating conditions resulting from better weather during December, 1918.

Compared with 1917, the figures show an increase in operating revenues for 1918 of 7.00 per cent and an increase in expenses of 15.87 per cent. The net earnings fell off 11.41 per cent, while the operating ratio increased from 67.70 per cent to 73.27 per cent. For companies reporting taxes the net earnings decreased 7.50 per cent. Taxes also declined 2.69 per cent, and the operating income dropped 8.97 per cent.

The improvement in the November returns for the Eastern district, noted in the ELECTRIC RAILWAY JOURNAL of March 1, showed up more strongly in the December returns. Revenues increased 10.08 per cent, while expenses increased only 8.34 per cent. As a result there was a gain in net earnings of 17.16 per cent. The operating ratio in this district also showed an improvement, declining from 80.30 per cent in December, 1917, to 79.03 per cent in December, 1918.

For companies reporting taxes the returns were still more favorable. Revenues increased 10.35 per cent while expenses were increasing 6.85 per cent, producing an increase in net earnings of 26.30 per cent. Taxes on the other hand fell off 18.99 per cent, and the result was the extraordinary increase in operating income of 74.85 per cent. This improvement was also reflected in the operating ratio, which dropped from 82.00 per cent in December, 1917, to 79.40 per cent in December, 1918.

CONDITIONS DISCOURAGING IN WEST

Compared with the figures for the East, those for the Western district present a startling contrast. The revenues increased only 5.23 per cent, the smallest increase in the country, while operating expenses increased 14.48 per cent, producing a falling off in net earnings of 13.92 per cent. The operating ratio rose from 67.45 per cent in 1917 to 73.38 per cent in 1918. For companies reporting taxes the net earnings fell off 13.61 per cent. Taxes increased 3.76 per cent, while the operating income dropped 18.43 per cent. The operating ratio for these companies increased from 67.39 per cent to 73.25 per cent.

The returns for December would seem to indicate that the worst has not yet come in this district, although the limit is fast approaching. The operating ratio climbed from 65.48 per cent in December, 1917, to 93.50 per cent in December, 1918. It is probable, however, that this extremely bad showing was caused by the influenza epidemic, which lingered longer in the West than in any other section of the country. This explanation gains strength from the fact that the operating revenues in this district increased only 2.22 per cent, while the average increase for the whole country was 7.67 per cent. Operating expenses increased 45.95 per cent, and the net earnings decreased 80.75 per cent. Owing to a decrease in taxes, the companies reporting taxes make a more favorable showing. With the same increase in revenues, expenses increased 46.09 per cent, and net earnings decreased 80.55 per cent. Taxes declined 49.22 per cent, and operating income fell off 62.75 per cent.

EXPENSES MOUNT RAPIDLY IN SOUTH

The outstanding feature in the Southern district is the increase in operating expenses. For 1918 this increase was the largest in the country, being 2.69 per cent for all companies reporting and 23.33 per cent for companies reporting taxes. The net earnings decreased 11.14 per cent for all companies, while for companies reporting taxes the decrease was 11.67 per cent. The taxes of these latter companies increased 7.34 per cent, and their operating income declined 11.67 per cent. The operating ratio in this district for all companies reporting was 67.20 per cent for 1918 as compared with 59.94 per cent for 1917.

The figures for December seem to indicate that conditions are still growing worse. Although the Southern District had the greatest increase in revenues, 12.45 per cent for all companies and 16.77 per cent for companies reporting taxes, the operating expenses were second only to the West in the amount of their increase, being 33.86 per cent for all companies reporting and 39.52 for companies reporting taxes. The net earnings for the former fell off 20.03 per cent, while for the latter the decline was 15.66 per cent. Taxes decreased 17.21 per cent, and the operating income of these companies decreased 15.33 per cent. The operating ratio for the district rose from 60.27 in December, 1917, to 71.75 per cent in December, 1918.

The returns shown in detail in the tables on page 664 have been classified as follows: Eastern District—East of the Mississippi River and north of the Ohio River. Southern District—South of the Ohio River and east of the Mississippi River. Western District—West of the Mississippi River.

Experience of Twelve Lines

Statistics for Large Surface and Rapid Transit Lines Show Effect of War-Time Conditions

Monthly reports on the earnings and expenses of electric railways throughout the country, compiled by the information bureau of the American Electric Railway Association and published from time to time in the ELECTRIC RAILWAY JOURNAL, have shown the gradual approach of many properties toward bankruptcy. To show still further the effect of wartime conditions on such companies, some figures are presented herewith summarizing the results on twelve large properties—six city surface lines, three rapid transit lines and three combined surface and rapid transit lines.

These twelve utilities in 1918 operated 4555 miles of single track, or almost one-tenth of the total electric railway mileage in the United States. They hauled 4,240,674,009 revenue passengers and, with transfer and free passengers included, a grand total of about 6,000,000,000 passengers. The following statistics do not give the full story of an entire year under the most trying circumstances, because the figures from five of the properties are for the twelve months ended June 30, 1918. It must be remembered that the new wage scales, which became a serious burden on operating expenses, were effective for only part of the calendar year. Five of the properties still have a fare of 5 cents, two have 6 cents, one has 8 cents, two have zone systems and one charges 1 cent for each transfer plus a 5-cent fare.

The gross earnings of the surface companies showed an increase of 3.5 per cent over the previous year, while the lines which include rapid transit facilities gained 3.8 per cent. In the operating expenses (including taxes) there was an increase of 11.6 per cent for the surface properties and 17 per cent for the rapid transit. The operating ratio for the former averaged 77.34 per cent, ranging from 65.79 to 85.05, while for the latter it averaged 66.78 per cent, ranging from 48.39 to 89.79 per cent. To show the difference where only subway or elevated figures are concerned, the operating ratio for three such companies was 60.74 per cent in 1918 as compared to 51.34 per cent in 1917.

SERVICE GAGED TO TRAFFIC

It was to be expected that the companies would gage their service to meet the traffic which was offered. The revenue car-miles showed a decrease of 1.7 per cent for surface lines and an increase of 0.04 per cent for rapid transit. The revenue passengers showed a decrease of 1.8 per cent for surface and an increase of 1.4 per cent for rapid transit companies. Revenue car-hours were practically in the same proportion, which meant that there was no appreciable change in the speed during the year. A more favorable showing in miles per hour is to be expected in the next annual reports, owing to more or less extended adoption of skip-stop practice late in the fiscal year.

The average fare for all the revenue passengers carried was exactly 5 cents, while in the previous year it was 4.8 cents. A still better showing may be looked for next year when the increased rates have been in force longer.

Owing to the fact that some of the companies do not keep account of transfer and free passengers, a true statement of total passengers per mile of single track cannot be presented. The available figures, however, show that there was a decrease of 2 per cent for surface lines and 1.1 per cent for rapid transit companies. The number for the former properties ranged from 739,052 to 2,251,999, while for the latter they amounted to from 1,112,870 to 1,293,439.

An index of the use of rolling stock is to be found in the item of annual miles operated per car. This, of course, is affected by the average speed. The average for surface lines was 35,299 miles and for rapid transit companies 42,045 miles, both showing an increase in the performance of cars over the previous year. In this connection it should be stated that there was a decrease of about 2 per cent in the maximum number of cars operated daily by these companies.

Some statistics of these twelve large properties are given in the following table:

STATISTICS PER CAR-MILE AND PER CAR-HOUR FOR TWELVE ELECTRIC RAILWAYS

	Six Surface Roads	Six Rapid Transit Roads
Transportation revenue per car-mile (cents)	32.2	29.2
Expenses and taxes per car-mile (cents)	21.4	20.0
Transportation revenue per car-hour (cents)	$2.76	$3.55
Expense and taxes per car-hour (cents)	$2.17	$2.42

Boston Loss $285,124

Cost Per Passenger Rises to 9.30 Cents in February with Receipts at 8.15 Cents—Labor Costs 4.19 Cents

The financial report for the month of February, just made public by the trustees of the Boston (Mass.) Elevated Railway, shows that the cost was 9.304 cents for each passenger carried. Of this total the cost of labor was 4.191 cents. The receipts per revenue passenger, who numbered 24,879,938, were 8.158 cents.

The net loss for February was $285,124 as compared to a loss of $219,629 in January and a loss of $149,903 in December. The average loss for the three months during which the 8-cent fare has been in effect is $218,219 a month. This compares with an average loss of $604,148 a month for the four months of the 7-cent fare and with a loss of $707,958 in July under the 5-cent fare.

The total receipts from all sources for February, 1919, were $2,029,734. Of this amount $1,978,313 came from the 8-cent fare. The receipts from this fare, as compared with the 5-cent fare in February, 1918, show an increase of 44.85 per cent or $613,113.

The total cost of service for February, 1919, was $2,314,858. Of this amount $1,042,695 was expended for wages—an increase over February, 1918, of $369,943. The total cost of service for February shows an average per passenger of 9.304 per cent as compared with 8.970 per cent in January and 8.914 per cent for the six months ended with December. Details of the cost for February, 1919, are given herewith:

		Cost per Passenger (cents)
Operating expenses:		
Labor	$1,042,695	4.191
Contracts, material and other items	232,990	.937
Damages and insurance	76,759	.309
Depreciation	167,000	.670
Coal	148,494	.597
Total operating expenses	$1,667,938	6 704
Taxes	77,093	.310
Interest on unpaid taxes	2,694	.011
Miscellaneous	1,492	.006
Rent for use of property:		
Subway and tunnel rents to city	123,662	.497
Leased roads rentals	215,785	.867
Interest on bonds and notes	109,198	.439
Dividends under acts of 1918	116,997	.470
Total cost of service	$2,314,859	9 304

The income statement for February, 1919, is given below:

RECEIPTS AND COST OF SERVICE OF BOSTON ELEVATED RAILWAY FOR FEBRUARY, 1919

Receipts:	
From fares	$1,978,313
From special cars, mail pouch service, express and service cars	7,510
From advertising in cars, on transfers, privileges at stations, etc	24,637
From other railways for use of tracks and facilities	3,227
From rent of buildings and other property	5,381
From sale of power and other revenue	7,433
Total receipts from direct operation	$2,026,501
Interest on deposits, income from securities, etc	3,233
Total receipts	$2,029,734
Cost of service:	
Maintaining track, line equipment and buildings	$153,423
Maintaining cars, shop equipment, etc	206,682
Power (including 24,990 tons of coal at $5.942, or $148,494)	222,635
Depreciation	167,000
Transportation expenses (including wages of car employees, carhouse expenses, etc.)	747,129
Salaries of administrative officers	6,875
Law expenses, injuries and damages, and insurance	94,175
Other general expenses	70,018
Total operating expenses (of which $1,042,695 represents wages)	$1,667,937
Taxes, proportion	77,093
Rent for leased roads (exclusive of subways)	215,785
Proportion of rent for subways and tunnels to be paid to city) exclusive of Cambridge Subway owned by company)	123,662
Interest on Boston Elevated bonds and notes	109,198
Miscellaneous items	1,492
Proportion of dividends under acts of 1918	116,997
Interest on unpaid taxes	2,694
Total cost of service	$2,314,858
Net loss	$285,124

New Jersey Tax Measure

The New Jersey House has voted to change the 1918 law by which the tax on public utility properties was assessed on the gross receipts at the average rate of taxation in lieu of all personal tax apportioned on the same basis of franchise tax, to a system of making all receipts taxable, on private rights-of-way as well as on highways, in lieu of exemption of personal property, and on bridges and viaducts, formerly taxed as real estate. The new act will increase the returns from 12 to 15 per cent.

Financial News Notes

Receiver for Tucson Company.—The Tucson (Ariz.) Rapid Transit Company has been placed in the hands of Edwin F. Jones, a Tucson attorney, as receiver on the application of the Tucson Gas, Electric Light & Power Company, a creditor holding notes against the company for $62,062.

File Your Rhode Island Claim.—The receivers of the Rhode Island Company, Providence, R. I., acting under orders of the Superior Court of Rhode Island, have announced that the period for filing all claims against the company will expire on May 1. The receivers, Frank H. Swan, Theodore Francis Green and Zenas W. Bliss, have been instructed by the court to present as soon as convenient after May 1 a complete list of all claims against the company.

May Discontinue One Louisville Line.—The Louisville (Ky.) Railway will probably discontinue its Main Street line regardless of pending argument over fare increase. Main Street business organizations are making an effort to secure steam lines and switches through Main Street. This is a progressive measure that would be a general aid to the city, and probably reduce operating expenses to a point where income would be increased, without material reduction in service.

Tacoma Municipal Line Running Behind.—City Comptroller John Roberts of Tacoma, Wash., in a recent report to the Council, gives figures to show that the tideflats municipal railway is not earning operating expenses, and that no earnings are available to pay the interest on outstanding bonds or to provide for depreciation. The total income for February from the operation of the railway was $7,580. After paying interest and caring for depreciation charges, there was a deficit of $3,591.

Approves $30,000 Stock Issue.—The Board of Public Utility Commissioners of New Jersey has dismissed the application of the Public Service Railroad, Newark, N. J., for approval of the issuance of $60,000 of its capital stock at par, but has approved of the issuance of $30,000 of stock. The company is a subsidiary of the Public Service Corporation. It operates the fast line between Newark and Perth Amboy and Trenton. The companies merged into it included the Trenton Terminal Railroad and the Elizabeth, New Brunswick & Trenton Railroad.

San Francisco Reorganization Progress.—The San Francisco *Chronicle* said recently: "The committee which has in hand the reorganization of the United Railroads is still at work, and, according to Jesse W. Lilienthal, president of the company, is making real progress.

Mr. Lilienthal said that he hoped there would soon be an announcement to make, which he felt sure would be highly gratifying to all interested in seeing the problems of the company in a fair way of settlement. There had, he said, been a disposition among those concerned to get together, and work that had been accomplished by the committee was such that a comparatively short time would bring results."

Another Rhode Island Deficit.—A deficit of $90,000 for the month of January is shown in the monthly statement of the Rhode Island Company, Providence, R. I., filed with the Public Utilities Commission. This is an increase of $30,000 over the deficit for the corresponding month of 1918. The total gross income is given as $558,711 and total expenses $654,435, causing a deficit of $95,724. Operating revenues for the month amounted to $558,078, an increase of $78,737 over the corresponding period of the year before. Operating expenses, however, increased $79,627 in the same period and totalled $478,911, leaving a net operating revenue of $79,166 or less than $1,000 below the 1918 figure.

Galveston-Houston Electric Sells Gold Notes.—Lee Higginson & Company, Boston, New York and Philadelphia, recently offered for subscription at 98½ and interest yielding 7.55 per cent $1,500,000 of Galveston-Houston Electric Company three-year 7 per cent secured gold notes dated March 1, 1919, and due March 1, 1922. The proceeds of the notes are to be used to provide for the retirement of the company's entire floating debt incurred for additions and improvements and for all necessary requirements during 1919. The notes are the direct obligation of the Galveston-Houston Electric Company and are secured by the deposit of $1,800,000 of general mortgage 7 per cent bonds of the three operating companies.

Bay State Sale Set for April 21.—At the County Court House for Essex County in the city of Salem, Mass., Channing H. Cox, special master, on April 21 will sell "all property of every character, nature, and description, and wheresoever situated, of the Bay State Street Railway and of its receiver, and all interests of every character, nature, and description of the Bay State Street Railway and of its receiver, in property, other than cash, cash assets, claims, credits, accounts and items receivable." The sale will be conducted under the final order made on March 22 by the District Court of the United States for the District of Massachusetts. The terms of the proposed reorganization of the company have been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Interurban Places Short-Term Notes.—Robert Garrett & Sons, Baltimore, Md., are offering at 97¼ and interest, to yield 7 per cent, $450,000 of three-year 6 per cent bond-secured gold notes of the Charleston (W. Va.) Interurban Railroad. The notes are dated March 15, 1919, and are due on March 15, 1922. They are in denominations of $1,000 and $500. The trustee of the issue is the Safe Deposit & Trust Company, Baltimore. Interest is payable on March 15 and Sept. 15. The notes are secured by the deposit of $500,000 of first mortgage 5 per cent bonds of the Kanawha Valley Traction Company, due on Jan. 1, 1946, part of a total authorized issue of $2,000,000, of which $1,700,000 are outstanding. For each $750 of notes, $1,000 of bonds is pledged as security.

Not to Recover B. R. T. Bonds.—A memorandum was filed on March 24 by Judge Julius M. Mayer, in the United States District Court, regarding the hearing on March 22, on the application of ex-Judge Lindley M. Garrison, receiver of the Brooklyn (N.Y.) Rapid Transit Company, for instructions as to bringing suits to recover possession of $29,000,000 of bonds pledged as collateral. The question at issue was as to whether this course should be taken where no arrangement has been made to prevent having the bonds thrown on the market regardless of any upset price. Judge Mayer holds that the transactions in question were bona fide and in accordance with business usages and should be regarded as valid, particularly because the other course would at the present time be likely to disturb public confidence. No such actions will accordingly be brought by the receiver.

Changes in American Cities Company.—According to the New Orleans *Item* the affairs of the American Cities Company are now largely in the hands of local New Orleans interests. That paper said recently: "At the meeting of the shareholders of the American Cities Company, the bondholders committee, headed by J. K. Newman, New Orleans, was placed in control of its affairs. It is understood that possibly until after plans of reorganization of the New Orleans Railway & Light Company have taken shape, the management and control of the American Cities Company will be in the hands of directors representing the bondholders, with J. K. Newman active head of the company. The new board of directors is composed of F. T. Homer, New York; J. K. Newman, Arsene Perrilliat, E. H. Bright, H. M. Walmsley, D. H. Saunders, F. B. Hayne, C. P. Ellis, L. H. Dinkins and F. B. Williams, New Orleans; Percy Warner, Nashville; J. S. Pevear, Birmingham; D. H. Cantrell, Little Rock; E. D. Parker, Houston; T. H. Tutwiler, Memphis; C. H. Harvey, Knoxville; Robert Jamison, Birmingham; J. H. Caldwell, Philadelphia.

Electric Railway Monthly Earnings

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.					
1m., Jan., '19	$82,595	*$57,690	$24,905	$20,306	$4,599
1m., Jan., '18	77,776	*50,169	27,607	19,659	7,948
12m., Jan., '19	927,891	*604,257	323,634	239,741	83,893
12m., Jan., '18	889,212	*509,310	379,902	229,376	150,526
BATON ROUGE (LA.) ELECTRIC COMPANY					
1m., Jan., '19	$31,272	*$17,157	$14,115	$3,988	$10,127
1m., Jan., '18	21,529	*11,117	10,412	3,695	6,717
12m., Jan., '19	277,551	*152,693	124,858	46,721	78,137
12m., Jan., '18	233,048	*120,553	112,495	42,866	69,629
CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.					
1m., Jan., '19	$52,190	*$36,958	$15,232	$6,727	$8,505
1m., Jan., '18	41,428	*33,257	8,171	6,535	1,636
12m., Jan., '19	523,767	*396,111	127,656	78,698	48,958
12m., Jan., '18	466,928	*308,294	158,634	78,635	79,999
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.					
1m., Jan., '19	$146,323	*$115,019	$31,304	$21,938	$9,366
1m., Jan., '18	133,002	*110,805	22,197	30,698	†8,501
12m., Jan., '19	1,853,600	*1,442,175	411,425	295,175	116,250
12m., Jan., '18	1,384,980	*1,174,262	210,718	360,510	†149,792
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.					
1m., Jan., '19	$215,722	*$157,530	$58,192	$56,689	$1,503
1m., Jan., '18	231,606	*213,338	18,268	70,882	†52,614
12m., Jan., '19	3,211,015	*2,245,307	965,708	844,929	120,778
12m., Jan., '18	3,074,814	*2,103,030	971,784	825,116	146,669

* Includes taxes. †Deficit

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.					
1m. Jan., '19	$366,418	*$298,797	$67,621	$69,013	†$1,392
1m., Jan., '18	299,688	*263,009	36,679	65,730	†29,051
12m., Jan., '19	4,282,618	*3,339,107	943,511	816,571	126,940
12m., Jan., '18	3,699,552	*2,549,728	1,149,824	787,047	362,777
EL PASO (TEX.) ELECTRIC COMPANY					
1m., Jan., '19	$127,963	*$90,427	$37,536	$7,013	$30,523
1m.., Jan., '18	114,360	*74,781	39,579	6,513	33,067
12m., Jan., '19	1,271,235	*885,956	385,279	81,582	303,698
12m., Jan., '18	1,281,542	*811,408	470,134	68,276	401,858
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.					
1m., Jan., '19	$242,487	*$181,518	$60,969	$40,525	$20,444
1m., Jan., '18	194,182	*132,913	61,269	39,282	21,987
12m., Jan., '19	2,739,636	*1,898,855	840,781	473,878	366,903
12m., Jan., '18	2,119,228	*1,404,568	714,660	453,252	261,408
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.					
1m., Jan., '19	$78,070	*$75,237	$2,833	$19,995	†$17,162
1m., Jan., '18	47,120	*73,004	†25,884	15,911	†41,795
12m., Jan., '19	925,734	*793,339	132,395	231,694	†99,299
12m., Jan., '18	883,790	*702,500	181,290	187,292	†6,002
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.					
1m., Jan., '19	$272,317	*$191,031	$81,286	$39,941	$41,345
1m., Jan., '18	204,521	*131,562	72,959	41,037	31,922
12m., Jan., '19	2,934,009	*1,956,335	977,674	480,560	497,118
12m., Jan., '18	2,452,973	*1,587,706	865,267	489,869	375,394

Traffic and Transportation

Appeals to Its Employees

Connecticut Company Asks Its Employees to Make Suggestions for Improvements

Under date of March 15 the Connecticut Company, New Haven, Conn., issued the first of a series of monthly bulletins which it intends to send to all officers and employees of the company. The first bulletin contains four pages. It is concluded with an appeal to the employees for suggestions. The last two pages are left blank except for the lines "I believe the service of the Connecticut Company on the ——— division would be improved if attention were given the following matters." The circular is signed by President L. S. Storrs. The text is as follows:

> There never was a time when the Connecticut Company stood in greater need of the utmost efficiency from its executives and employees than the present.
>
> We need the effort of every man and woman to win the good-will of the public.
>
> Public good-will pays us our wages.
>
> Without public good-will street cars cannot operate, and if the street cars do not operate we are deprived of our present means of livelihood.
>
> #### Courtesy and Efficiency
>
> Attention to business and common sense breed efficiency; efficiency brings good-will, and the most valuable component of efficiency is courtesy.
>
> We who operate the cars of the Connecticut Company, whether we be conductors, motormen, track employees, superintendents, managers, clerks or general officers, must bear in mind that our personal success and the success of the Connecticut Company depend on our individual attitude toward the people who ride on our cars.
>
> Every person who pays us a fare, or hands us a ticket or a transfer, is paying us for service, and is entitled to efficient, courteous service.
>
> There will be persons unreasonable and discourteous toward us, who may be insolent and who will try our patience, but nevertheless our duty is to keep our tempers, to listen to complaints, to correct deficiencies in service and to do everything we can to make friends for ourselves and our company.
>
> Never indulge in a noisy argument with a passenger.
>
> Courteous treatment of the public is an all-important element of good service.
>
> Discourtesy, gruffness, insolence on the part of employees will not be tolerated by the public nor by the officers of our company.
>
> Men handling the money of the Connecticut Company are under a heavy obligation to their fellow employees and to the public, as well as under the highest moral obligation to themselves.
>
> #### Fairness to All
>
> Superintendents, managers and officers are under the obligation to deal with those in their departments with absolute fairness, honor and tact, and to act on constructive criticism and helpful suggestion from the public.
>
> We are all in one big family.
>
> We must work together—we must work with our brains as well as our bodies to conserve every resource, every cent of income in order that our company may establish itself soundly, and build up a great spirit of helpfulness on the part of the public—the public good-will so vital to our success.
>
> From time to time you will receive communications from your company. You will be told how things are going with us, how we are succeeding, how we are falling down.
>
> Give our problems your best thought; give the public your best service; work your brain as well as your body.
>
> Working together we'll win public favor and personal success.
>
> P. S.—We invite you to use the next sheet to send us suggestions that probably have occurred to you for the betterment of our service. Feel free to write exactly what is in your mind—we want helpful criticism and earnest suggestions.
>
> There is an addressed envelope herewith in which you can seal your suggestions, and leave with the foreman or other person to whom you report, or, if you prefer, you are free to mail it direct.

Conference on Spokane Fares

Two conferences were held on March 14 by city officials of Spokane, Wash., and the officials of the Washington Water Power Company and the Spokane & Inland Empire Railroad in an effort to reach an agreement on the demand of the companies for an increase in fares. At the close of the conference the City Commissioners announced that they had declined to agree to the plan for an increase. In fact, Commissioners Fleming and Tilsley said that they thought further conferences useless and that the companies should now place their propositions in writing before the City Council.

In substance the modified proposals of the railways are:

> To raise the fare from 5 cents to 6 cents.
>
> Estimated increase in revenues, $160,000, for both systems.
>
> Period for which the 6-cent fare is to operate on trial, approximately one year.
>
> Added revenues to be applied to wage increases for the men, betterment of service and the elimination of present deficits in operating expenses. The wage increases for Washington Water Power Company employees alone are estimated at $50,000.

The railway officials explained that a 1-cent increase in fare, if traffic remained constant, would produce $200,000, or 20 per cent on the present basis of receipts. However, traffic is not expected to remain at its former volume, and on this account the increase in fare is expected to yield not more than $160,000. The railway officials would not agree to return to the 5-cent fare after the one year of trial. The City Commissioners declined to be committed to any policy where it is proposed permanently to abandon the 5-cent fare.

In the event that no agreement is reached, it is possible that the Public Service Commission may be asked to put into operation the fare increase to which the City Commissioners would not agree.

After three conferences with city officials and representatives of the railway companies Chairman E. F. Blaine of the State Public Service Commission announced that the interested parties had been unable to agree and that the application of the companies for an increase of fare to 7 cents and 1 cent additional for transfers in accordance with their original request for relief had been set for hearing for March 31 in Spokane.

Six-Cent Fare Compromise

Public Utilities Commission Will Decide as to Necessity of Charging Higher Fare in Vancouver

Until such time as the Public Utilities Commission decides that 6 cents is too much that fare will continue to be charged on the Vancouver lines of the British Columbia Electric Railway. Should the commission, however, find that the fare ought to be 5 cents, the extra cents collected during the period from April 9 next to the date on which the judgment becomes effective, will not go to the company's treasury but to the Vancouver General Hospital. Such in effect is the compromise reached at Victoria by the representatives of the City Council in respect of a clause in the public utilities bill.

On the occasion of the strike last July the city granted the British Columbia Electric Railway the right to levy a 6-cent fare for nine months, the understanding being that by the end of that period either the Public Utilities Commission would decide what the fare should be or the city and the company would work out a new franchise agreement good for five years. So far even the public utilities bill has not been submitted to the Legislature, while efforts to reach an agreement on the franchise were abandoned some time ago.

The Council was proposing to pass a new by-law restoring the 5-cent fare next month—the former by-law being operative after April 9 unless repealed—when it was found that the draft of the public utilities bill contained a clause which fixed fares at the rates now in operation until such time as the commission should change them. As the commission might consume many months in its inquiry before returning a finding the City Council protested against the city being saddled with the 6-cent fare all that time when, if they judge the situation correctly, the commission would find in the end that only 5 cents was justified.

Mayor Gale said that Attorney-General Farris had refused to delete the clause but proposed to modify it by providing that the amount of fares received in excess of 5 cents should be paid into a trust fund and held in escrow, to be recovered by the companies concerned should the higher fares be sustained, and to be paid into the funds of designated public institutions should it not. In the case of Vancouver the general hospital was named as the contingent beneficiary.

Fare Conference in Louisville

Several conferences have been held recently between Mayor George Smith of Louisville, Ky., and President Minary of the Louisville Railway, relative to a proposed increase in fares. No formal request has been made to the city by the company as yet, and neither the city nor the railway has made any statement.

Iowa Company Sustained

Court Upholds Des Moines Service Cut for Approval of Which Supervisor Was Dismissed

Judge Martin J. Wade of the Federal Court has decided unreservedly in favor of the Des Moines (Ia.) City Railway in its claim that a cut in service is necessary in order to meet the conditions forced by a failure to receive a rate increase. In announcing his decision Judge Wade said:

> The receivers claim that the annual deficit of the company is $216,000. It is clearly the duty of the court to stop this loss.
>
> The people of Des Moines will get every dollar's worth of service they are entitled to. Nothing could be worse than dragging these matters along. The one thing in controversy here is a matter of bookkeeping. Service must be diminished in order that the deficit be stopped. Roy Smock was railway supervisor for the city on Feb. 24 when he signed the new service schedules. The court will not attempt to take any of the power conferred upon him away from him. There is nothing before the court to indicate that the company did not act in good faith. If there is any question of this sort it is between Byers (city attorney) and Smock. If it could be shown that the proposed cuts were in excess of necessity I would not allow them. The new schedule will go into effect temporarily. This is not a final matter. There may be modifications from time to time and the court will be open to a showing at any time. The city and the company should co-operate with each other and it is the city's duty to be interested in the company. Therefore I grant the order.

Judge Wade further declined to take up the city's demands that the pavements near railway tracks be repaired.

Late in February after securing the approval of Mr. Smock, the railway supervisor for the city, the Des Moines City Railway announced a material cut in service. The City Council thereupon discharged Mr. Smock and secured an injunction from the Polk County District Court holding up the service cut. Judge Wade was then brought into the case and told the District Court to "keep its hands off." Then the railway petitioned the Federal Court for the relief desired in the service cut and the decision to which reference has just been made is the result. The service curtailment will go into effect at once.

Service Resumed

After a period of considerable electioneering activity, a new Mayor and several other members of Council were elected for Burlington, Ont., on Feb. 3, says the *Canadian Railway & Marine World*, with the result that on Feb. 5 the Hamilton Radial Electric Railway resumed service between Hamilton and Oakville, 21.46 miles. The agreement with the Burlington Council as to fares to be charged supersedes for a year the provisions in the original franchise, and provides as follows:

Workman's ticket for twelve trips, good for one week, Burlington to Hamilton terminal and return, $1.50, and to Sherman Avenue, $1.20.

Hamilton commutation tickets, to and from Hamilton, good for twenty-six trips within six weeks, $4.50 each, or a rate of 35 cents for return trip.

Transient tickets, one way 25 cents, return 45 cents.

School tickets to be sold at the same price as formerly.

Ratification of this agreement is to be made by the company, the Burlington Council and the Board of Railway Commissioners, and the proceedings in connection therewith are in progress.

A full schedule put in effect on Feb. 20 provides for an hourly car service from 6.10 a.m. to 11.10 p.m. every week day, and from 9.10 a.m. to 10.10 p.m. on Sundays; while there is a service from Burlington to Hamilton at 6 a.m. and 7 a.m., the regular hourly service starting from Oakville at 7.30 a.m. and continuing to 10.30 p.m., except on Sundays, when the last car to Hamilton leaves at 9.30 p.m. There is a car leaving Oakville for Burlington at 11.30 p.m. (daily) and another at 12.30 a.m. (daily except Sunday), and on Sundeys only a car from Oakville to Burlington is run at 10.30 p.m.

Boston Zone Trial Postponed

The trustees of the Boston (Mass.) Elevated Railway have decided to defer the trial of the zone system for the following reasons:

1. Because they believe that the 8-cent fare, collected as far as possible by the metal tokens, should be given a further trial.

2. Because there is now pending before the Legislature a bill which proposes to amend the law so that the trustees cannot adopt the zone system. This bill reads as follows:

"Sec. 2 of Chap. 159 of the special acts of 1918, providing for the management of the Boston Elevated Railway by trustees shall not be construed to confer upon the trustees the right to establish a zone system of fares, and no zone system or other system which provides for the collection of more than one fare for a continuous passage shall be put in operation upon the said railway."

3. There is also pending before the Legislature the bill proposed by Senator Walsh, which provides for a return to the 5-cent flat fare; the amount of the deficit to be raised in the general tax levy in the districts served by the company, and in connection with which bill the Supreme Court is asked to determine the constitutionality of the act under which the trustees are operating.

4. The operating changes necessary to give the zone system a trial would involve a large expenditure of money, and it is obviously improper for the trustees to spend this money while such legislation is pending.

5. If the zone system is to be tried, the test should be made under the most favorable circumstances, and the trustees are advised by Prof. A. S. Richey that a zone system can be given a fairer trial during the summer months.

It was originally proposed to start the zone system on April 1.

New Jersey Fare Ordered Reduced

The Board of Public Utility Commissioners of New Jersey on March 26 ordered the Public Service Railway, Newark, N. J., to reduce its fares from 7 cents to 6 cents on April 1. The company is permitted to charge 1 cent for transfers.

The decision was reached at a special session held in Newark to pass upon the request of the company for a zone plan of fares. Mayor Gillen of Newark attacked the company bitterly. He was called upon by the commission, following his tirade, to furnish the regulating body with facts and not opinions.

The hearing on the zoning system was postponed until March 27 to give counsel of the various municipalities time to study the plan. T. N. McCarter, president of the railway, said that with the 6-cent fare the net loss of the company for the first six months of this year would be $145,041. He also declared the recent strike had cost the company approximately $200,000.

The decision just rendered by the commission is in accordance with the ruling which it made on Sept. 27, 1918. At that time the commission in order that the company might meet the higher wages then recently ordered by the War Labor Board, authorized the railway to charge 7 cents instead of 5 cents from Oct. 15 to March 31, inclusive, and 6 cents from April until such time as the "war emergency" ceased to exist. In connection with the new rates, the company was permitted to continue to collect 1 cent for all initial transfers. The 1-cent transfer charge was originally put into effect as provided in an order issued by the commission last July. In the meantime it was proposed that an inquiry should be conducted into the question of a zone system of fares as perhaps affording a more equitable plan of meeting the financial needs of the company.

Interurban Telephone Talks

Fred C. Mayer, traffic manager of the Arkansas Valley Interurban Railway, Wichita, Kan., relates the following in explanation of "Why Interurban Railway Employees Go Crazy":

Telephone rings—

Lady—"Interurban?"

Agent—"Yes, Mam!"

Lady—"When's the last limited to Hutchinson?"

Agent—"Four klock!"

Lady—"When's that car git back?"

Agent—"No limited cars back tonight!"

Lady—"Yes, but when's the lass limited car leave here?"

Agent—"I said four klock!"

Lady—"Yes, but when's the lass limited git back?"

Agent—"I said no more limited tonight!"

Lady—"Say, when's the four klock limited come back?"

Agent—"Five thirty in the mornin!"

Lady—"Oh!"

Telephone rings again:

Voice—"When's the first car to Hutchinson?"

Agent—"Five thirty in the morning!"

Voice—"When's the nex?"

Agent—"Six forty!"

Voice—"An' the nex?"

Agent—"Every hour, twenty minits!"

Voice—"When ju say?"

Agent—"Eight aklock!"

Voice—"Every hour after?"

Agent—"NO, every hour twenty minits!"

Voice—"Why dinnu say so!"

Agent—"Oh, Hell!"

Houston Sustained in Its Fare Fight

The city of Houston, Tex., won the second point in its fight with the Houston Electric Company, which operates the railway in Houston, when the Court of Civil Appeals at Galveston sustained the decision of Judge Dannenbaum of the Sixty-first District Court. Judge Dannenbaum sitting at Houston had sustained the general demurrer of the city of Houston to the company's mandamus proceeding to compel the city to enforce the repealed ordinance passed last fall providing for a 6-cent fare in Houston, with half fares for students and children under twelve years of age.

C. R. Wharton, counsel for the Houston Electric Company, stated that the fact that Judge Pleasants dissented gave the company the privilege of applying to the Supreme Court for a writ of error. He said that would be done.

In sustaining the general demurrer of the city, Judge Dannenbaum took the ground that he could not go beyond the ordinance of Nov. 6, which repealed the ordinance of Sept. 30, granting the 6-cent fare, unless it was shown that the 5-cent fare was unreasonable and confiscatory. This, the company has not done up to the present time.

The 6-cent fare ordinance was passed upon by the City Council after application had been made by the company for a 7-cent fare. A few days before the ordinance went into effect, a petition bearing a sufficient number of signatures was presented to the City Council, asking for the matter of rates to be submitted to a referendum vote. This was granted and on Nov. 5 a majority voted against the 6-cent fare. The Council then held a meeting and repealed the 6-cent fare ordinance, restoring the 5-cent rate.

Transportation News Notes

Fare Tariff Suspended.—The proposed increase in rates for railway service in Freeport, Ill., by the Illinois Northern Utilities Company has been suspended by the Public Utilities Commission of Illinois until July 13.

Eight Cents for Carlisle.—An order permitting the Cumberland Railway Carlisle, Pa., to charge an 8-cent fare was issued on March 14 by the Public Service Commission. The 8-cent fare was announced after a 7-cent fare had been in effect for a time.

Jitney Measure in Washington Unchanged.—The measure introduced in the recent Legislature at Olympia, Wash., providing for the regulation of jitney and motor cars for hire in large communities by placing them under control of the Public Service Commission, was indefinitely postponed. The jitney law will thus remain as it is.

Oshkosh Would Rescind Paving Charge.—The city authorities of Oshkosh, Wis., have agreed to relieve the Eastern Wisconsin Electric Company of the obligation to pay for the first cost of paving, and the renewal thereof, upon the ordering by the company of fifteen new cars for the city system. Negotiations are now pending looking toward the financing of the purchase of the cars.

Fare Increase Again Suspended.—The Public Service Commission for the Second District of New York on March 20 suspended to and including May 22, proposed increased fares on the Rochester & Syracuse Railroad which are under investigation by the commission. The new fare rates were filed on Oct. 25 and they have been under suspension. The increased fares were due to establishing two 5-cent fare charges in Rochester, instead of one, and increasing all other fares on the line by 5 cents.

New Jitney Measure in Kansas City.—The City Council of Kansas City, Mo., has passed a jitney ordinance which regulates the fare to be charged—10 cents for the first twenty blocks and 5 cents for each additional twenty blocks. Yearly license is set at $12.50. No jitney will be allowed to solicit business or remain stationary on any of the distinctly business streets. The police will designate such corners in this district at which they may stop to take on and discharge passengers. An operator must be experienced before a license will be granted him. The jitney owners were in accord with the spirit of the measure.

Report of Arnold Company on Louisville.—The Louisville (Ky.) Railway expects to receive a report from the Arnold Company, Chicago, Ill., who recently made a survey of the railway at Louisville. It is intimated that the report will recommend one-man cars for some small lines and elimination of unnecessary or paralleled lines. A reduction of expenses such as the adoption of these measures would bring about, along with a possible increase to a 6-cent fare, would probably enable the company to about break even on the increases in wages ordered by the War Labor Board.

Auto and Railway in Fight for Traffic.—A keen competition has developed between the automobile stages and the lines of the Portland Railway, Light & Power Company, operating between Portland and Vancouver, Wash., in an effort to obtain patronage. The auto fare has been reduced from 35 cents and 50 cents to 25 cents. The railway fare is 15 cents, but about fifteen minutes longer time is required to make the trip by railway than by auto. During the mobilization of soldiers at Vancouver Barracks, sixty-two auto stages operated between the two cities. This number has gradually been reduced to forty.

Yonkers Agrees to Increase.—The Board of Aldermen of Yonkers, N. Y., by a vote of six to four decided on March 22 to allow the Yonkers Railroad, operating practically all the surface lines in the city, to charge an extra 5-cent fare everywhere beyond the city limits. The new rate is to become operative ten days after the signing of the formal agreement by the railroad company. The lines affected are those running to the Van Cortlandt Park terminal of the New York subway, to the Third Avenue Elevated terminal at 198th Street and to Mount Vernon, Hastings-on-the-Hudson, Tuckahoe and Jerome Avenue surface lines in the Bronx.

Recent Pennsylvania Increases.—The Williamsport (Pa.) Passenger Railway has filed notice with the Public Service Commission of Pennsylvania abolishing all tickets and placing the lines on a 5-cent basis, as well as changing the transfer plan. Notice of increase in commodity rates was filed by the Chambersburg, Green Castle & Waynesboro Street Railway; advance to 6-cent fares by the Shamokin & Edgewood Electric Railway; advance from 6 to 7 cents by the Ephrata & Lebanon Traction Company, which also raised fares in its two terminal towns to 7 cents from 5 and discontinued the sale of strip tickets in those places.

Fare Increase Refused.—In an order promulgated on March 17 the Railroad Commission of South Carolina refused the request of the Charleston-Isle of Palms Traction Company for increased rates and turned its file over to the attorney general to bring action against the corporation to compel it to put in the 3-cent rate per mile, with a minimum charge of 5 cents, ordered by the commission Oct. 2, 1918. On March 12 James Sottile, president of the company, appeared before the commission and stated that the 3-cent rate was not enough to permit the corporation to pay operating expenses and that if the company was forced to adhere to such a rate the road would have to discontinue operations.

Penn Yan Line Reduces Fare.—The Penn Yan & Lake Shore Railway, Penn Yan, N. Y., on March 19 filed with the Public Service Commission for the Second District of New York a new schedule of rates proposed as effective on April 1 by special permission of the commission. The one-way fare between any two points within the same fare zone except within an incorporated village or city, will be reduced from 7 cents to 6 cents and twenty strip tickets will be sold for $1, a reduction, and monthly school commutation ticket books, good for travel between points in two or more zones, reduced from 3.5 to 3 cents per coupon. Baggage and parcel rates and charges for transporting trunks and bicycles will be reduced.

Fare Tokens in St. Louis.—Metal tokens will replace paper car tickets on the lines of the United Railways, St. Louis, Mo., on April 1. A million of the disks will be on hand when the sale begins. The rate of fare is not stamped on the tokens and therefore they will be good if the fare is changed. They were ordered last year but their delivery was delayed because it was necessary first to change the mechanism on all the fare boxes. The readjusted fare boxes have three cyclometers, one registering small coins, another registering the small metal token, and a third to register a larger metal ticket if the use of one is adopted, as, for instance, to count the children's tickets. The fare disks will be sold by the conductors.

Fare Increase Considered Unreasonable.—The Public Service Commission for the Second District of New York on March 20 directed the Warren & Jamestown Street Railway to amend its passenger tariff by providing for round-trip tickets between Jamestown and Hillside at 12 cents each and commutation books, forty single-trip tickets, good between Stillwater, Boniwood, Sumner Street and Hillside and Jamestown will be at $2.80 per book. These tickets are to be good for sixty days only for New York State interstate travel. The commission's order was upon a complaint that fares between Jamestown and the near-by points had been increased from 5 to 10 cents and that the increase which had been made was unreasonable.

Seven Cents for Port Jervis.—Chairman Hill of the Public Service Commission for the Second District of New York on March 21 announced that he would recommend to the commission authority to increase the fare on the Port Jervis Traction Company in Port Jervis and the town of Deer Park from 5 cents to 7 cents, to remain in effect until Jan. 1, 1920. There was no opposition to the company's petition at the hearing and it was stated by J. D. Knox, general attorney for the company, that the Port Jervis and Deer Park authorities had consented to the increased fare. Mr. Knox said the road was run down and there had been an agreement that the revenues over running expenses and taxes should be applied to new equipment and otherwise bettering the service in Port Jervis.

Wants Six Cents in Evansville.—The Public Utilities Company, Evansville, Ind., has notified the Mayor of that city through a letter from B. C. Cobb, New York, N. Y., president of the company, that unless the railway is permitted to increase fares from 5 cents to 6 cents it will be necessary to place one-man cars in operation in Evansville. In his letter to the Mayor, Mr. Cobb states that between 400 and 500 cities in the United States now have 6-cent fares and some 7 and 8 cent fares. It also stated that the Evansville Company was operated last year without profit. Mayor Bosse has submitted the matter to the City Council and stated that it would be taken under consideration, as the Public Utilities Company, Evansville, had never asked anything of the Public Service Commission of Indiana without first securing the indorsement of the city administration.

Six Cents in Sheboygan.—The Railroad Commission of Wisconsin on March 11 rendered a decision on the application of the Eastern Wisconsin Electric Company to increase the railway fare at Sheboygan to 6 cents. The application of the company requested authority to increase the present 5-cent fare to 6 cents for all passengers more than five years of age. The decision of the commission authorizes an increase to 6 cents for all passengers more than seven years of age, with six tickets for 35 cents, and a fare of 3 cents for children from five to seven years of age, inclusive, with twelve tickets for 35 cents. The increases went into effect on March 23. The company ran a series of talks in the newspapers explaining the necessity for the 6-cent fare and giving to the public much general information regarding the railway situation throughout the country.

One-Man Cars Reduce Accidents.—Fewer accidents on one-man cars than on the regular cars is the experience of the Dallas (Tex.) Railway, according to Richard Meriwether, vice-president and general manager, who made public statistics covering the eight months period during which one-man cars have been in operation in Dallas. Three accidents for every 2000 miles is the average established by the one-man cars operated on the San Jacinto-Akard Street line, during the period from July 1, 1918, to March 1, 1919. During this eight-month period the twelve one-man cars on this line traveled 268,064 miles and reported 176 accidents, an average of 1½ accidents per 1000 miles. During the same period other types of cars operated in Dallas covered 4,544,123 miles and reported 2357 accidents, an average of 1.92 per 1000 miles. It was also found that the one-man cars maintain a much faster schedule than other type of cars in Dallas.

Receiver Opposed to State Court Interference.—Exception to the jurisdiction of the State courts to control him in any manner has been interposed by J. D. O'Keefe, federal receiver of the New Orleans Railway & Light Company, New Orleans, La., by means of a motion filed through counsel in the State Supreme Court. The motion was offered in the suit of Wilbert Black and others to enjoin the company and the city of New Orleans from collecting a 6-cent fare. Receiver O'Keefe took the position that he is appointed by and as an officer by the United States District Court and is subject to the authority of only that tribunal. The attorneys for Black and the other plaintiffs were ordered by the Supreme Court to show cause recently why Mr. O'Keefe's contentions should not be upheld. The motion filed by the receiver was the result of an order issued by the Supreme Court on Jan. 18, directing him to appear within twenty-five days as a party defendant in the injunction proceedings. That order had been issued on the supplemental petition of Wilbert Black and his co-plaintiffs, praying the Supreme Court to make the federal receiver a party defendant to their suit.

New Publications

1919 Income Tax Procedure

By Robert H. Montgomery. The Ronald Press Company, 20 Vesey Street, New York, N. Y. 980 pages. Leather, $6.

This book, written by a man of unassailable authority on the subject, is a compendium of invaluable instructions and comments in regard to income tax procedure. The author not only quotes the sections of the revenue law and rulings of the Treasury Department in regard thereto, but also analyzes the points involved and indicates simply and clearly the proper course of procedure. It is not too much to say that for those corporations and individuals conversant with Mr. Montgomery's book the difficulties of making correct income tax returns are reduced to a minimum. A supplement is to be issued to take care of late regulations, this being necessitated by the slowness of Congress in passing the law.

Training for the Electric Railway Business

Written under the supervision of T. E. Mitten, chairman of the executive committee of the Philadelphia (Pa.) Rapid Transit Company, by C. B. Fairchild, Jr., executive assistant of the company. Philadelphia and London, J. B. Lippincott Company, 155 pages. Price, $1.50.

This is one of a series of books issued by the publishers, descriptive of the needs, channels of advancement, and advantages and disadvantages of different pursuits, and it will give a young man who is about to choose an industry a good idea of the demands and requirements made by the electric railway industry.

It sketches the duties and necessary qualifications of the electric railway executive, transportation man, engineer, accountant, and workers in other branches of the industry. Mental poise, loyalty, cheerfulness, candor, tact, study, experience, gumption, and ability for hard work are all needed, Mr. Fairchild thinks, in this business, with the ability of meeting men in all walks of life, of differentiating between true and false economy and the possession of that idealism which enables a man to invent and develop new and better devices, improved processes and better ways of doing things. The book is an excellent treatise for the young man and also for the industry because it should attract the right kind of recruits.

Although written primarily for the young man looking forward, the book is an excellent treatise for those already engaged in the industry. Many a railway officer will get better and clearer ideas of what he should do and how he should do it by reading Mr. Fairchild's description of the duties of his position.

Personal Mention

Mr. Dozier Elected

Manager of Nahant & Lynn Street Railway Made President of New England Street Railway Club

Joseph E. Dozier, who was elected president of the New England Street Railway Club at the annual meeting on March 27, is well known in electric railway circles in the East, although he entered the traction field only fourteen years ago. He was born in Barnesville, Ga., in 1867, and was reared in Macon, Ga., graduating from Planters' Academy in 1886. In his boyhood he was employed as night operator by the Southern Bell Telephone & Telegraph Company for five years. This experience led to his appointment as an exchange manager soon after leaving school. He remained with the Southern Bell Company until 1894, when he was called to Boston by the New England Telephone & Telegraph Company. He served as manager of various exchanges until 1905 when he resigned to become associated with the Nahant & Lynn Street Railway, which he constructed and has operated ever since. Mr. Dozier has been much interested in public affairs in the Lynn district and has an unusually wide circle of friends outside as well as in the electric railway field who have been won by his genial personality and straightforward business methods.

J. E. DOZIER

Journal Appoints Cleveland Representative

This paper has appointed David Cameron to take charge of its advertising business in Ohio, eastern Indiana and eastern Michigan. His headquarters will be in the Leader-News Building, Cleveland.

Mr. Cameron has been connected with the New York office of this paper for the last five years except for about a year and a half during the war when he served as a lieutenant in the aviation division of the Army. He is a native of Pennsylvania and was graduated from the arts department of Dickinson College in 1914. The office in Cleveland was opened because of the growing importance of the district as an industrial and railway center.

Thomas Roycraft, who has been general manager of the Grand Forks (N. D.) Street Railway, for the last seven years, has resigned to return to private life. W. L. Hawkes, superintendent of the company, is now intrusted with the duties of general manager.

James R. Sheffield, who has been appointed receiver of the Interborough Consolidated Corporation, New York, N. Y., which controls the Interborough Rapid Transit Company and the New York Railways, is a lawyer and was a former Assemblyman of New York. He served two years as head of the fire department and was for a time president of the Republican Club.

F. B. Clements has been appointed secretary and auditor of the Mobile Light & Railroad Company, Mobile, Ala., succeeding M. W. Glover whose appointment as auditor of the West Penn Railways, Pittsburgh, Pa., is mentioned elsewhere in this issue. Mr. Clements, was connected with the Panama Railroad on the Isthmus of Panama for several years.

W. H. Cameron has resigned as general manager of the National Safety Council to become manager of industrial relations for the Eastman Kodak Company, Rochester, N. Y. In accepting the resignation the executive committee passed a resolution containing the statement that "the success of the National Safety Council is largely due to the splendid service Mr. Cameron has given, and his personal contribution to the safety movement has been of inestimable value to the cause."

C. W. Price has been elected general manager of the National Safety Council, succeeding W. H. Cameron. Mr. Price spent twelve years with the International Harvester Company, during the last four of which he was in charge of safety work for all of the plants. For five years he was assistant to the Wisconsin Industrial Commission, working upon standards of safety and sanitation, and conducting educational safety campaigns in the large industrial centers. In 1917 he acted as director of the safety survey made by the United States Employment Compensation Commission of all arsenals and navy yards. For two and a half years he has been field secretary of the National Safety Council.

M. W. Glover has resigned as secretary and auditor of the Mobile Light & Railroad Company, Mobile, Ala., to accept the position of auditor of the West Penn Railways, succeeding in that position John Young, resigned. Mr. Glover entered upon his new duties on March 15, and his headquarters will be at Pittsburgh, Pa. The new auditor of the West Penn Railways has had an extended experience in railroad accounting. He began railroad work at Charleston, S. C., in the local freight office of the South Carolina Railroad, then in the hands of a receiver. He was transferred later to the auditor's office and there handled freight and passenger as well as other accounts. The property was purchased by the South Carolina & Georgia Railroad, of which Mr. Glover was appointed traveling auditor. Later the road was absorbed by the Southern Railway, and he remained as traveling auditor with that company, being advanced to the position of chief traveling auditor of the Southern Railway. He gave up this work in June, 1903, to take up that of chief clerk to the auditor of the Atlanta & West Point Railroad and the Western Railway of Alabama. Mr. Glover became connected with electric railway accounting in July, 1906, when he accepted the position of auditor of the lines now comprising the Ohio Electric Railway, Cincinnati, Ohio. In January, 1910, he was appointed secretary and auditor of the Mobile Light & Railroad Company, Mobile, Ala. Mr. Glover has always taken an active interest in association affairs. He was prominent in the formation of the Central Electric Accounting Conference and was its president from 1907 to 1909. In 1912 he was elected first vice-president and in 1913 was elected president of the American Electric Railway Accountants' Association, presiding at the annual conventions of the association in 1913 and 1914.

M. W. GLOVER

A. B. Coryell has accepted the position of power superintendent of the Port Huron Gas & Electric Company, Port Huron, Mich. Mr. Coryell was formerly in business for himself in Buffalo, N. Y. He has been engaged in the electric railway and light work for more than twenty-five years. During this time he has had charge of the construction and management of properties in different parts of the country, mainly in the Southern states. He was however, for four years superintendent and purchasing agent of the Moncton Tramways, Electricity & Gas Company, Moncton, N. B.

Mrs. C. L. Stevens, for years chief clerk to T. G. Brabston, transportation manager for the Birmingham Railway, Light & Power Company, Birmingham, Ala., has been appointed assistant traffic manager, and will be in virtual charge of all freight operations of the company. Mrs. Stevens for ten years was chief clerk to Mr. Brabston. He was made transportation manager on Jan. 1, 1919, and since that time his duties have been piling up. Mrs. Stevens was appointed to relieve him of a portion of his work.

C. E. Calder, Dallas, Tex., has been elected vice-president of the four properties owned by J. F. Strickland—the Texas Electric Railway, the Dallas Railway, the Dallas Power & Light Company and the Texas Power & Light Company. For some years Mr. Calder was secretary-treasurer of the Eastern Pennsylvania Railways and the Eastern Pennsylvania Light, Heat & Power Company, Pottsville, Pa. Mr. Strickland first employed Mr. Calder as secretary and assistant treasurer of the Texas Power & Light Company. When Mr. Strickland took over the Dallas street railway properties, Mr. Calder was placed in charge of the financial matters in connection with the transfer. This work he has performed to the satisfaction of all, and now he is made vice-president of all the Strickland properties.

Job E. Hedges, who has been appointed receiver of the New York (N. Y.) Railways, was born at Elizabeth, N. J., on May 10, 1862. He was graduated from Princeton with the degree of A. B. in 1884 and received an A. M. from the same institution in 1887 and an LL. B. from Columbia Law School in 1886. He had the degrees of L.L. D. conferred upon him by St. Lawrence and the University of Pittsburgh in 1914. He was admitted to the bar in 1886 and has since practiced law in New York. He was secretary to Mayor Strong in 1895-97, city magistrate in 1897-98, and Deputy Attorney-General of New York in 1902. He was a commissioner for the the United States on the International Fisheries Commission. He was one time Republican candidate for Governor of New York State, but was defeated.

J. Willison Smith has been appointed manager of the Division of Passenger Transportation and Housing, United States Shipping Board, Emergency Fleet Corporation, to succeed A. Merritt Taylor, resigned. Mr. Smith entered the employ of the Land Title & Trust Company, Philadelphia, Pa., in April, 1895, as a clerk. He worked his way through the various departments of the company and finally in July, 1917, in recognition of his ability and his faithful service to the company he was elected a director and one of the vice-presidents. When Charles M. Schwab took charge of the Emergency Fleet Corporation Mr. Smith obtained an indefinite leave of absence from the Land Title & Trust Company and was made assistant director of housing and transportation of the fleet corporation.

Frank T. Hamilton, who has assumed the position of president of the Omaha & Council Bluffs Street Railway, Omaha, Neb., is a native of Omaha. His father, the late C. W. Hamilton, was one of the substantial pioneer businessmen of the city. The elder Hamilton was identified with the early banking house of Caldwell, Hamilton & Company, and he was the first president of the United States Bank of Omaha. The new president of Omaha's extensive traction system was reared in an atmosphere of business. He has grown with growing Omaha, and has observed Nebraska's metropolis develop from a Western town to its present population of more than 200,000. He entered the Merchants' National Bank, Omaha, thirty-two years ago as a clerk and he is now first vice-president of that institution. His election as a director of the Omaha & Council Bluffs Street Railway occurred fourteen years ago. He was elected vice-president of the company twelve years ago. His recent election to the presidency of the company came as a logical succession to G. W. Wattles, who guided the company through a period of extension and reorganization. Mr. Hamilton is also serving as president of the Omaha Gas Company, a position which he has held for fourteen years, succeeding his uncle, the late Frank Murphy. President Hamilton's intimate knowledge of the growth, business history, and general conditions of Omaha peculiarly fit him for the presidency of this large public service utility. He has an extensive acquaintance among business men of the West and it is the general opinion that his administration of the affairs of the electric railway will be approved by the public as well as by his board of directors.

F. T. HAMILTON

Obituary

George W. Wilson, secretary, treasurer and a director of the International Railway, Buffalo, N. Y., died on March 18. Mr. Wilson was born in Buffalo fifty-one years ago. He had been associated with the International Railway for six years. Death was due to heart trouble. Mr. Wilson had been sick for almost eight weeks. He is survived by his widow, Mrs. Helen Wilson, and a daughter, Mrs. Clifford W. McIntyre.

Walter F. W. Dow, roadmaster of the Southern division surface lines of the Brooklyn (N. Y.) Rapid Transit System, died on March 14, as the result of pluero-pneumonia. Mr. Dow was forty-nine years old. He had been connected with the company for more than thirty years, having commenced his training for track work under his father, the late Nelson Dow, one-time roadmaster of the old Brooklyn City Railroad. He had thus been identified with surface transit improvement since the early horse-car days, and much of the modern track in Brooklyn was installed under his supervision. Mr. Dow was of a genial, retiring disposition and accomplished his work in an unobtrusive but effective manner. He is survived by his widow and two daughters.

Thrift Put Into Practice

The Kansas City (Mo.) Railways in addition to conducting a building and loan association for its employees; insuring their lives and retiring them on a pension large enough to support them, is also conducting a savings bank for its employees.

Other savings banks pay depositors only 3 per cent and usually compound it every six months. The railway's bank pays 6 per cent and compounds monthly. Money mounts up rapidly in this manner. One man who began with an account of $1 a month two years ago now has $200 in the bank drawing interest at double what he could get in any savings bank. Another man who began on Aug. 6, 1917, with $50 a month now has $1,502 to his credit.

The company realizes that its own prosperity depends largely upon the prosperity of its employees and it is striving in every manner possible to improve the financial condition of its laborers. If a man shows himself desirous of saving, of accumulating money, securing a home—it helps him. There is a good illustration of one man —a foreigner—who entered the company's employ eight years ago, with $2 as the sum of his earthly possessions. He took advantage of every offer the company made him for bettering his condition. He now owns a home in the suburbs and has enough money deposited in the company's savings bank to pay him a substantial monthly interest.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

New Steel Prices Already Stimulate Market

Reductions Not as Great as Expected—Rails Off $10—All Railway Prices Not Yet Available

Prior to the meeting on March 20 between the steel producers and the Industrial Board, at which new prices were agreed upon for iron and steel products, a great many producers had expressed an opinion that at this time either a large reduction in prices should be made, which would interest the long-range buyer, or no reduction at all. The result of this meeting shows that a middle course has been taken. The Industrial Board announced that the public should not expect to buy below the reduced prices throughout the present year.

The ruling boils down to about the following reductions: $5 per net ton for wire products and grooved steel skelp and $7 per net ton for everything else. Some manufacturers of steel and iron products affected feel that this is not sufficient reduction to stimulate very much demand for large stocks. It will, however, open the market for many propositions which have just been holding off for such a cut in price.

Since the prices went into effect, considered as the morning of March 21, it is evident that trading in the iron and steel market has been stimulated by the price readjustments. Orders reaching the mills bear earmarks of having been practically made up before the price announcement, and held over for the expected drop.

Inquiries have resulted in locating some of the new prices which hold for electric railway equipment. Several producers have stated that they are now working on their new figures and that they will be completed the first of April. This is rather true of that class of equipment where labor costs enter to a large extent.

Standard Bessemer rails per gross ton have dropped from $55 to $45 while open hearth rails have dropped from $57 to $47 per gross ton. Light rails have been set at 2.35 cents per pound. A report has been received that spikes, tie plates, and fish plates have not changed. Steel bars have come from 2.70 cents per pound to 2.35 cents, while iron bars have come from 2.90 cents a pound to 2.35 cents, placing both iron and steel bars on the same level. Iron for castings for electrical machinery has been reported off from 1 to 1¼ cents per pound. Sheets from which tubular steel poles are made have been reduced about ½ cent per pound.

Wire rods per gross ton have dropped from $57 to $52, plain wire per cwt. from $3.25 to $3.00 and nails from $3.50 to $3.25 per cwt. One prominent wire products concern has reduced its products approximately $5 per ton, while another concern has not yet stated how much its products have been reduced, as they are from high priced stock.

Reductions in tubing are uniformly $7 per ton. Rigid iron conduit has come down 5 points and flexible metallic conductor $10 per 1000 ft. The basing discount on steel boiler tubes, 3½ to 13 inch, is 3½ per cent for less than car load lots.

Pole line hardware is easier by 5 per cent. Basic pig iron per gross ton, which previously had dropped from $33 to $30, has come down to $25.75. Black sheets, No. 28 gage, have decreased from $4.70 to $4.35 per cwt., while galvanized sheets of the same gage have decreased from $6.05 to $5.70 per cwt.

Westinghouse Air Brake Report

Unfilled Orders on Hand on Jan. 1 of This Year Amounted to $17,000,000

The annual report of the Westinghouse Air Brake Company and its subsidiaries, including twelve months of operations of the Union Switch & Signal Company, owing to a change in the fiscal period covers seventeen months of operation. Net profits aggregated $7,461,900.41.

Allowing for anticipated cancellation, the value of unfilled orders of the four constituent companies on Jan. 1, 1919, was approximately $17,000,000.

Engineering Advertisers' Association Formed

Advertising and sales managers representing manufacturers in various engineering lines in and around Chicago met in that city on March 11 and organized the Engineering Avertisers Association. The officers elected were: President, H. L. Delander, Crane Company; vice-president, H. Colin Campbell, Portland Cement Association; secretary, G. H. Eddy, Green Engineering Company; treasurer, Edward J. Pratt, Kellogg Switchboard & Supply Co. The board of directors includes: G. S. Hamilton, American Steam Conveyor Corporation; J. J. Arnsfield, Fairbanks, Morse & Company; A. P. Hauck, Allis-Chalmers Manufacturing Company; H. W. Clarke, Chicago Pneumatic Tool Company; P. A. Powers, Benjamin Electric Manufacturing Company, and J. C. Kinsley, A. M. Davis Regulator Company.

Paints Still Holding on High Levels

Easy-Flowing Paints and Special Mixtures Requiring Few Coats, However, Help to Keep Down Cost

While the cost of paints, varnishes and enamels is still holding a rather high level, due to the cost of the pigments, white lead, zinc, linseed oil, turpentine, varnish gums and other materials, there are several items entering into the cost of the finished job that tend to keep down the total cost. These are being adopted more and more as their results are noted.

Linseed oil, the vehicle in all paints, is rather high in price due to the smaller production of flaxseed. This one material plays a considerable part in the cost of paints, but it is in the correct proportioning of this oil to the character of the work to be done that determines the final result. Some traction companies in the past have made up their own formulas for the paints they thought would serve their purpose best and have found that they did not work to the best advantage. Now the practice of co-operating more closely with the paint manufacturer is becoming more general.

About 80 per cent of the cost of a painting job is labor, so that higher material costs add little to the total cost. This labor item is very noticeable in the flowing qualities of the paint, in the correct proportioning and grade of oil used. Too little oil permits the color to be brushed off after a short time.

The use of enamels is becoming more prominent, giving a very satisfactory finish.

Special paints are now employed which give a completed job from priming coat to protecting varnish in three coats, where heretofore up to fifteen coats have been employed to give this same finish. Baking processes are also used to give the hard finish desired in some cases. One rapid transit company, through the method of painting employed, by permitting cars to get back on the tracks again quickly saves 2 per cent in the rolling stock which was necessary when former methods of painting were used.

It is interesting to note the price paid for cars in England. The *Electric Railway and Tramway Journal* states that the Sheffield (England) Corporation Tramway has ordered fifty double-decked top-covered vestibule tramcar bodies and trucks for the sum of £102,500 (approximately $512,500 or $10,250 each) with 5 per cent for contingency.

Copper Wire at Low Level

Current Conditions Warrant Belief that Copper Will Go Higher and That Wire Will Follow

Copper prices are stiffening a little under somewhat heavier buying. While it is probably true that selling interests are simply feeling out the market there seem to be good reasons for believing that the low point of 14½ cents which was reached a short time ago will hold as a low mark for some time. Copper production costs are high and as a consequence producers will advance the market as long as buyers will stand for it. Current copper prices are but a cent or so higher than normal quotations. It would not be surprising therefore to find copper around 18 cents by the summer months.

Copper wire followed the metal down very closely. When copper was 26 cents rubber covered wire base was 34 cents, when copper was 14½ cents, rubber covered base was 20 cents. Now that copper is up three-quarters of a cent it would not be surprising to see a higher wire base the first part of the week.

It seems reasonable, in other words, to believe that copper wire and cable has reached its low price level and that from now on higher prices might be expected, provided always, of course, that copper advances.

Government to Dispose of Rails

According to advices received by the ELECTRIC RAILWAY JOURNAL from the office of the chief of engineers of the War Department, Washington, D. C., the government plans to sell at prevailing prices the surplus stock of 80-lb. and 25-lb. rails ordered for the American Expeditionary Force overseas, but not required due to the signing of the armistice.

There are about 50,000 tons of 80-lb. rail and about 7000 tons of 25-lb. rail. Also there are large quantities of crossings, slip switches and turnouts. The bulk of this material is at ports readily accessible for loading. All sales are being conducted through the office of the Director-General of Military Railways, Washington, D. C.

Board Formed to Assist Industry

President Wilson has authorized an Industrial Board of the Department of Commerce to call industry together group by group, and let them decide on prices to be offered to the nation as the governmentally approved judgment of assembled industry on a price scale low enough to be stable, homogeneous throughout the whole fabric, and founded so solidly on a comprehensive review of conditions as to encourage general buying, including that of the railroads and other governmental agencies, and the general resumption of normal activities.

The offices of the board will be in the Council of National Defense Building, 18 and D Streets, Washington, with George N. Peek as chairman. No control is authorized by this board, the object being solely to secure co-operation.

New Member of U. G. I.

The New Organization Will Assume Charge of Residual Sales, Engineering and Construction

The officials of the United Gas Improvement Company believe that the future holds promise of increased demand for gas and electricity and for additional plant equipment. With this in mind they have formed a new company, which they have called the U. G. I. Contracting Company. Paul Thompson, one of the U. G. I. vice-presidents, is president of the new contracting company. In a recent interview he said:

"This new organization will not only engage in engineering and construction problems, but it will include an up-to-date selling organization to take entire charge of the sale of by-products. We shall also engage in the construction and sale of water-gas apparatus, vertical retorts, waste heat boilers, and auxiliaries of various kinds. We expect also to design and erect power plants, and will have a special road division competent to construct and maintain roads and highways under contract. We shall also make paints, and it is probable that later on we shall seek contracts for industrial painting."

The other officers of the U. G. I. Contracting Company are J. P. A. Crisfield, and D. J. Collins, vice-president. The offices of the company will be for the present in the U. G. I. Building, Philadelphia.

Rolling Stock

Jackson Railway & Light Company, Jackson, Tenn., has purchased three Birney cars from the American Car Company.

St. Thomas (Ont.) Street Railway plans to renovate seven old cars into one-man pay-as-you-enter cars at a cost of $7,000, and to use $3,000 for new equipment. St. Thomas ratepayers are to be asked to vote on a by-law for the issue of debentures for $50,000.

Chattanooga Railway & Lighting Company, Chattanooga, Tenn., lost its power house supplying the Incline Railway on Lookout Mountain by fire on March 23, together with considerable machinery, sheds and several cars. One of these cars, speeding to the bottom, burned considerable part of the trestle work.

Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala., expects to purchase as soon as possible two ten-bench open cars with double-end control and one closed car, not more than 29 ft. over all. Prices are desired on second-hand cars, with Southern prices preferred on account of freight rates. The ELECTRIC RAILWAY JOURNAL of Jan. 4 gave reference to this rolling stock.

Decatur Railway & Light Company, Decatur, Ill., announces that it will at once place orders for eight modern pay-as-you-enter cars of the most improved type. The cars will seat thirty-two passengers, will have but one door for both entrance and exit and will be light in weight and construction, replacing the heavy cars which are now in use by the company. H. E. Chubbuck, vice-president executive of the Illinois Traction System, has announced that in all fifty of these cars will be purchased, the order for eight cars for the Decatur Railway & Light Company being only a part of the total purchase. Prior notice of new rolling stock was given in these columns on Feb. 15.

Track and Roadway

Pacific Electric Railway, Los Angeles, Cal.—Work has been begun by the Pacific Electric Railway improving its line through Sawtelle. New rails are being laid and the roadbed reballasted and paved the entire distance through Sawtelle. The cost is estimated at $90,000.

Public Service Railway, Newark, N. J.—The engineering department of the Public Service Railway has completed plans, which have been approved by the government, for the extension of the French Street line to the federal housing site on the Franklin Park Road. The entire project will be financed by the federal government and it is estimated that it will cost approximately $75,000. When the extension is completed it will be the property of the United States government, but under a mutual agreement between the Public Service Railway and the officials of the United States Housing Bureau, the Public Service Railway will be given a franchise to operate its cars on the extension.

Fayetteville, N. C.—It is reported that Herbert L. Jones, Richmond, Va., will construct an electric line along the principal streets of Fayetteville to the Cape Fear River and also to Camp Bragg.

Sapulpa, Okla.—A movement has been begun by citizens of Sapulpa to secure the construction of a line from Drumright to Shamrock, Okla., about 6 miles. The Board of Trade may be able to give further information.

Fort William (Ont.) Electric Railway.—It is reported that the public utilities committee of Fort William is considering an extension of the Fort William Electric Railway to Mission Park, at an estimated cost of $68,235.

Grand River Railway, Galt, Ont.—The Grand River Railway reports that it has under construction a 2-mile diversion of its Hespeler branch between Preston and Hespeler, for the purpose of getting on higher ground away from the river, and the consequent damage as a result of spring freshets, as well as to provide a straight line with a view to increasing the service.

Philadelphia, Pa.—Sealed proposals will be received until April 15, 1919, by William S. Twining, Director of Department of City Transit for the construction of the first four sections of the Frankford, Bustleton and Byberry Surface Passenger Railway from Frankford to Bustleton, about 6 miles. The contract will include the grading and the furnishing and laying of the track and the construction of a 504-ft. steel viaduct. Plans and specifications may be obtained upon deposit of $10, which will be refunded upon the return of the plans.

Montreal (Que.) Tramways.—The Montreal Tramways will extend its lines into the towns of Ville St. Michel and of Ville Montreal-Nord.

Power Houses, Shops and Buildings

Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala.—This company reports that it will build a new carhouse, 40 ft. x 100 ft., in June.

Eureka Traction Company, Eureka Springs, Ark.—A report from the Eureka Traction Company states that it expects to place contracts during the next three weeks for the construction of a new carhouse. The company also plans to enlarge its amusement park.

Helena Gas & Electric Company, Helena, Ark.—Plans are being considered by the Helena Gas & Electric Company for the construction of a new gas plant to provide for increased capacity.

Pensacola (Fla.) Electric Company.—It is reported that the Pensacola Electric Company will purchase additional equipment and make improvements to its plant.

Bangor Railway & Electric Company, Bangor, Me.—The Bangor Railway & Electric Company plans to install three water wheels of 250 hp. capacity each in its Veazie plant during the coming year.

Hagerstown & Frederick Railway, Hagerstown, Md.—Plans are being prepared by the Hagerstown & Frederick Railway for the construction of a substation, carhouse and freight station, 40 ft. x 60 ft., one story, to cost $10,000.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—About $1,000,000 will be spent by the St. Joseph Railway, Light, Heat & Power Company for improvements to its plant. All obsolete machinery will be replaced with new and modern apparatus and the capacity of the plant will be so enlarged as to remove all possibility of a recurrence of a breakdown such as occurred last winter. Additional pumps will be placed in service so that the company will not be forced to depend upon the city water plant for water.

Pacific Power & Light Company, Astoria, Ore.—It is reported that the Pacific Power & Light Company plans the early installation of an additional unit in its power station at Astoria.

Trade Notes

Robert L. Hubler has been appointed general sales manager of the Ohmer Fare Register Company, Dayton, Ohio.

C. E. Hague, formerly production engineer of the Mid-West Engine Company, Indianapolis, Ind., has been appointed sales manager of the American Steam Conveyor Corporation, Chicago.

W. A. Jones Foundry & Machine Company, Chicago, Ill., manufacturer of power transmission apparatus, special foundry and machine work, and also the Jones spur gear speed reducer, has opened an Eastern office at 30 Church Street New York City, under the direction of Lemuel C. Biglow, formely with the Morse Chain Company of Ithaca, N. Y.

Duntley-Dayton Company, it is understood, has taken over the entire output of the Dayton Pneumatic Tool Company. The Duntley-Dayton Company, which is located in the Westminster Building, Chicago, is also putting out a complete line of portable electric drills and grinders. W. O. Duntley, former president of the Chicago Pneumatic Tool Company, is president of the new company, and his son, C. A. Duntley, is vice-president.

Powdered Coal Engineering & Equipment Company, Chicago, Ill., announces that Willis B. Clemmitt and George H. Ruppert have become associated with the company as advisory engineers. Mr. Clemmitt was formerly associated with the Central Iron & Steel Company at Harrisburg, Pa., and Mr. Ruppert before his entry into the chemical warfare branch of the service, had charge of sodium-ferro-cyanide department of the Semet-Solvay Company.

United States Electric Signal Company, West Newton, Mass., announces recent orders taken as follows: During the month of February, shipment was made to the Tampa (Fla.) Electric Company of six Collins type A motor-operated track switches, and on March 20 to the same company seventeen type K 2 block signals, three type K 3 run-over signals and forty-one type 5 A trolley switches for use in operating the signals. On March 29 shipment is expected of four more type K 2 signals and eight type 5 A trolley switches.

International Register Company, Chicago, Ill., has recently received from the Boston Elevated Railways an order for 275 motor-driven coin registers to take money and metal tokens. These registers will be installed on the new surface cars ordered by the Boston Elevated Railway. The machines to be used are similar to the coin registers previously supplied to the railway by the same manufacturer but have an additional totalizer for registering metal tokens.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., through its Canadian company, has received from the Hydro Electric Power Commission of Ontario an order for two 45,000-kva. vertical water-wheel generators of 12,000 volts, three phase, 25 cycles, for the commission's Queenstown development. These are said to be the largest water-wheel generators ever constructed and indicate that the Hydro Commission Development thinks there is no time like the present for construction work.

Foreign Opportunity.—A manufacturer in Italy desires to purchase iron, steel, brass, copper, aluminum and lumber used in the construction of railway cars. Correspondence should be in Italian. Refer to No. 28776, Bureau of Foreign and Domestic Commerce, Washington, D. C., for further information.

British-Australian Machinery Company, Ltd., 50 Broad Street, New York City, desires contact with manufacturers wishing to enter and develop their trade in the Australian market. The company handles everything in connection with narrow-gage and industrial railways.

New Advertising Literature

Indianapolis Switch & Frog Company, Springfield, Ohio: A folder on "Solid Manganese Track Work."

Holden & White, Inc., Chicago, Ill.: A folder entitled "The Use of Slack Adjusters as a War-Time Economy."

British-Australian Machinery Company, Ltd., 50 Broad Street, New York City: An illustrated booklet entitled "Trade With Australia."

Page Steel & Wire Company, New York City: Booklet entitled "Armco Iron Rods and Wire for Oxy-Acetylene and Electric Welding."

Quigley Furnace Specialties Company, Inc., New York City: Bulletin No. 11 on the "Transport System" of the Quigley powdered fuel system.

Automatic Reclosing Circuit Breaker Company, Columbus, Ohio: Bulletin No. 301 describing the company's new types of breakers ARL, DRL, and CRL.

Air Reduction Sales Company, New York: Folders showing the benefits derived from the use of air-cooled products, and methods for the purpose of building up worn rail parts and for repairing damaged locomotive cylinders.

American Roller Bearing Company, Pittsburgh, Pa.: Bulletin 1004 describing type-C. roller bearings. This is a bearing designed for use under conditions of medium loads at medium speeds, such as for auxiliary devices like inspection cars, baggage trucks, work cars and similar equipment.

Ohio Brass Company, Mansfield, Ohio: Catalog No. 17—1919. This catalog contains 671 pages and is divided into the following sections: porcelain insulators, pole hardware and miscellaneous, trolley materials, catenary materials, bonds and tools, third-rail insulators, car equipment, tables and indexes. It is well illustrated and has an alphabetical, catalog number and code word index.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, April 5, 1919 Number 14

Safety Rules Produce Best Results When Few and Specific

THE very excellent efforts of the advocates of accident reduction may partly defeat their ends by too great wideness of scope. In the desire to promote general safety the propaganda may be spread out too thin. It is usually better to concentrate attention upon a few definite and considerable dangers which exist on a given property, dangers which are readily recognized by the men who have it in their power to reduce them. A good example of this is the recent poster on "wyeing" put out by the Ontario Safety League of Toronto. It says: "Mr. Motorman, when you throw on the reverse to 'Y' you cannot see plainly where your car is going. Make sure the conductor is on the job on the back platform. Mr. Conductor, when your car is backing at a 'Y' your place is on the back platform ready to give the motorman the bell. You are then the eyes of the car." This is concrete; it is simple; it has evidently been called for by some conspicuous hazards. The important thing about all safety suggestions or rules is to aim them first at the most prolific sources of accident. The emphasis can easily be shifted from time to time, and from place to place, as indeed it should be if for no other reason than that variety is the spice of safety interest as well as of life generally.

War Labor Board Deplores Public Reluctance to Aid Railways

A POINTED admonition to the public that it should not dally in doing its duty to the electric railway industry was recently given to a Denver citizens' committee by Charlton Ogburn, examiner in charge of the electric railway department of the National War Labor Board. While Mr. Ogburn's words, as abstracted elsewhere this week, simply indicate once more an attitude of concern on the part of the board for not only the economic welfare of employees but also the financial preservation of utilities, one can see in the very reiterations of this second point an impatience with public stupidity or unwillingness in hesitating to fulfill its obligations.

A large part of the public is suspicious because so many railways have broken their long silences by campaigns for "telling facts" only when their hide became pinched between a fixed fare and increased costs. On the other hand, public leaders should be intelligent enough to know, and to try to bring others to know, that no matter how backward a company's publicity policy has been in the past, the railway is still essential to public welfare and must not be allowed to go to ruin.

The responsibility of public leaders was well summarized by William H. Taft, co-chairman of the War Labor Board, when he sent to the recalcitrant City Council of Memphis a letter in part as follows:

> It is not fair that the public should take advantage of a public utility company and hold it down to an ante-war contract in this regard [to escape paying the cost of transportation in war times]. . . . We should think that the equity of the company in this matter should appeal to the fair-minded people of Memphis and to their representatives in your honorable body.

The leaders in Memphis took no heed, and a receivership resulted. But as Mr. Taft continued, courts cannot borrow money any better than the companies if they cannot give any better security. We insist, therefore, that a constructive rather than destructive means of meeting the situation is demanded. Cities such as Memphis and New York are only causing needless sufferings for themselves and their citizens by refusing to listen to the warnings of the War Labor Board.

The Labor Organization and Legal Responsibility

DISREGARD of contract obligations by organized labor, so frequently the cause of strikes on electric railways, has again directed attention to the question, "Why should not trade unions be compelled to incorporate?" John H. Walker, president of the Illinois Federation of Labor, answers this query in a recent issue of *Manufacturers' News* and some of the points which he makes are worthy of discussion.

In brief, Mr. Walker's argument is that there is no similarity between the methods by which the men who become officers and members in a corporation are selected and the methods by which men become members or officers of a labor union. The result, he says, is that members or officers of a corporation are able to protect themselves in making a choice of their associates, while the labor unions do not have the time, the facilities or money to discriminate in the selection of their members or officials. He maintains, however, that usually the trade union influences its members, as far as it can, to live up to contracts, and penalties are imposed where this is not done.

The trouble with Mr. Walker's statement is that some of the points which he makes have not been proved true by experience. It is too evident that the average labor union does not draw the line on the unfit when adding to its membership. Its object seems to be "quantity rather than quality," and the result is a heterogeneous mixture of individuals who sometimes refuse to "stay put" when the terms of an agreement are not to their liking. Mr. Walker says about this class of members: "The poor devil who is uninformed or not just normal in disposition is here and must make a living. Do you want the workers to assume all responsibility for him, or do you want him left alone to be used unjustly to his own injury and to the injury of the other workers?" How does the union president reconcile this statement with his excuse that proper discrimination is prevented by the lack of time, money and other facilities. The fact appears to be that these organizations want all the members they can get so that they may gain their point by force of numbers.

We are making no argument here against the right of workmen to organize. We do maintain our belief, however, that labor organizations should be made legally responsible so that employers will be justified in dealing with them. No sane persons will say that employers have a monopoly on honor or that a broken contract is always due to the employees. On the other hand, we contend there can be no disputing the fact that organized labor should not put itself beyond the jurisdiction of the courts when the question of liability for disregard of solemn agreement is an issue. It is assumed that persons who sign a contract do so with eyes open and they should be ready to take the consequences. The past few years have shown the desirability of maintaining harmonious relations between capital and labor, and the future will hold a better prospect if all parties to an agreement are placed in a position where they can be punished for acts or evasions which have a tendency to disturb such relations.

A Strikingly Complete Report on a Vital Subject

THE abstracts which we have been printing of the Public Service Railway on its proposed zone system of fares were completed last week. One would have to go back a great many years, possibly as far back as the historic report made by the Boston railway officials on their visit to Richmond in 1888 when they decided that electric power was feasible for a large city property, to find an electric railway report which has attracted so much attention from other companies. The reason for this interest is not far to seek. In the first place, no topic is of greater importance now than that of a schedule of fares which will appeal to the public as reasonable and yet will yield the return necessary to keep a railway company in good financial condition. In the second place, the preliminary study made by the company to solve this problem, so far as its own property was concerned, was most extensive, taking the greater part of the time of several of its major officers for some seven months and requiring the employment of outside experts as well as of an extended staff of clerks, checkers and other employees reaching a maximum number of 171. Finally, the conclusions reached as to the proper fare to be charged, though based on a scientific analysis of the cost of car operation, is entirely new in electric railway practice, and accompanying it there has been developed a most ingenious method of collecting and accounting for the fares proposed.

It is true that the company does not speak of the system as being applicable to other properties. It was developed for the conditions existing in New Jersey, which in some respects are peculiar, as explained in the report. Nevertheless, the effort put upon the undertaking by the company must be of great value to other railways. By this we do not mean that the actual rates established for the stand-by charge and for the movement charge in New Jersey would apply to other railways or that in other circumstances it might not be advisable to shift some of the theoretical stand-by charge from the short-haul to the long-haul passenger or vice versa. This would have to be determined on each property separately. Indeed, in such a radical change in electric railway practice as is involved in an abandonment of the uniform nickel fare, many plans undoubtedly will be proposed and probably will have to be tried before an ideal solution for each property will be reached. But it is safe to say that the more trained minds that can be put upon this problem and the more that the industry in general approaches it without prejudice and preconceived opinions the better. It was with this spirit that the Public Service Railway undertook the problem and it was because of this spirit that it was able to break away from old traditions. It is only in this way that the correct answer will be reached.

High Spots for Electric Railway Men in the A. R. E. A. Meeting

MANY of the reports presented at the recent meeting of the American Railway Engineering Association in Chicago have a close connection with electric railway affairs. Notable among them in this respect is the report of the committee on rail as it gives the results of important studies made during the past year on rail breakage, rail specifications, rail testing, rail joints and joint testing and frictionless rail. The section on rail joints, for instance, should be of especial interest to electric railway trackmen because the results of the committee's tests indicate that there is much virtue in the ordinary splice bar provided it is correctly designed and is subjected to proper heat treatment. It also appears that there is little if any difference in strength as between six-hole and four-hole bars of the same cross-section. While the latter point has been fairly well proved in electric railway service, it is a source of satisfaction to have the question settled authoritatively. The shorter bars naturally weigh less, cost less, have fewer bolts and require a shorter bond when the bond is outside of the splice bar. It is further stated in the report that the customary length of four-hole bars may safely be reduced from 23½ in. to 18½ in. without decreasing their efficiency. Another point made was to the effect that the ordinary bar, when redesigned, heat treated, and used with heat-treated bolts will develop greater strength than either of two otherwise stronger types of splice bars, untreated. A standard method of tests for rail joints which provides uniform laboratory testing procedure has been wanting and this lack is now supplied by the method proposed by the rail committee.

In connection with the proposed modifications in rail specifications, the hydraulic or quick bend method of testing is suggested as an alternative for the drop test because it gives more complete information, is quicker, and the breaks are nearly always normal tension breaks of the part in tension, which is very frequently not true in the drop test.

The important subject of transverse fissures in rails was under investigation in many quarters and considerable progress was made. Evidence seems to be accumulating which indicates that both mill practice and chemical composition have more to do with their formation than has generally been ascribed to these factors and that they are not fatigue fractures as has been supposed. Among other things, it has been found that high phosphorous streaks are present in certain types of transverse fissures, and such fissures have been found in rails which have never been in service.

The committee on economics of railway operation presented a report on reclamation and utilization of scrap material which is now a subject of the greatest importance. Until recently, railroads have been wasteful and indifferent with one of their largest assets—material. Meanwhile, the scrap dealers were reaping a harvest in selling reclaimed materials back to the railroads.

The electric roads are now saving thousands of dollars annually through the work of the reclamation service. The work started with straightening and rethreading bolts which are so largely used in the way and equipment departments. It has now been extended to other materials by means of electric, thermit and oxy-acetylene welding. This report should be read by electric railway managers and engineers.

The report of the committee on wooden bridges and trestles contains a classification of the uses of lumber which emphasizes the many ways in which railroads use lumber. The committee presented a tentative report covering proposed general specifications and classification and grading rules for timber and lumber which it hopes can be referred to as standard for material of this kind under all circumstances. The work is herculean but its accomplishment in the manner proposed would be of the greatest benefit to all users and manufacturers of railroad lumber and timber.

We have here briefly noted some of the more important matters which the American Railway Engineering Association has under investigation because so many of them cover subjects in which electric railway officials are greatly interested and a careful reading of the full reports will be found well worth while.

The Skip Stop Is Worth Saving

REPORTS for the full year of 1918 announced by various companies are too few in number as yet to give any adequate information on the effect of the skip-stop system as indicated by the relation of car-hours and car-miles operated. We have no doubt, however, that the properties which have made proper use of this system for an extended period will make an improved showing in the item of "miles per hour." For this reason it is to be regretted that the authorities here and there are ordering a restoration of the old system of frequent stops which can serve no good except to please interested property owners and accommodate a small percentage of the riders.

In this connection it is interesting to hear reports from some of the companies which were authorized to eliminate certain stops about the time that new rates of fare were put into effect. These companies report that the necessity of collecting fares of more than one unit slowed up the car movement to such an extent that their only salvation was in the saving of time due to the skip-stop system. Without the advantages of this system there must have been a noticeable deterioration of service due to the slower movement of cars and consequent congestion in crowded districts.

We cannot understand why the authorities in certain cities are acting so hastily to revert to the former method of operation when the reports from Detroit, Philadelphia, Toledo and other places where careful studies have been made, indicate that the elimination of unnecessary stops has distinct advantages for the public as well as for the utility. The testimony of Mr. Swartz of Toledo of the increased safety from the skip stop, published in this week's issue of the paper, is corroborative of similar testimony from Detroit and is notable evidence of one advantage gained by the public from the skip stop. It may be contended that the war is over, but this is no excuse for going back to wasteful practices. It is to be hoped that the people have taken to heart some of the lessons of recent years. Ignorance is no longer bliss.

New England Points the Way to Public Support of Electric Lines

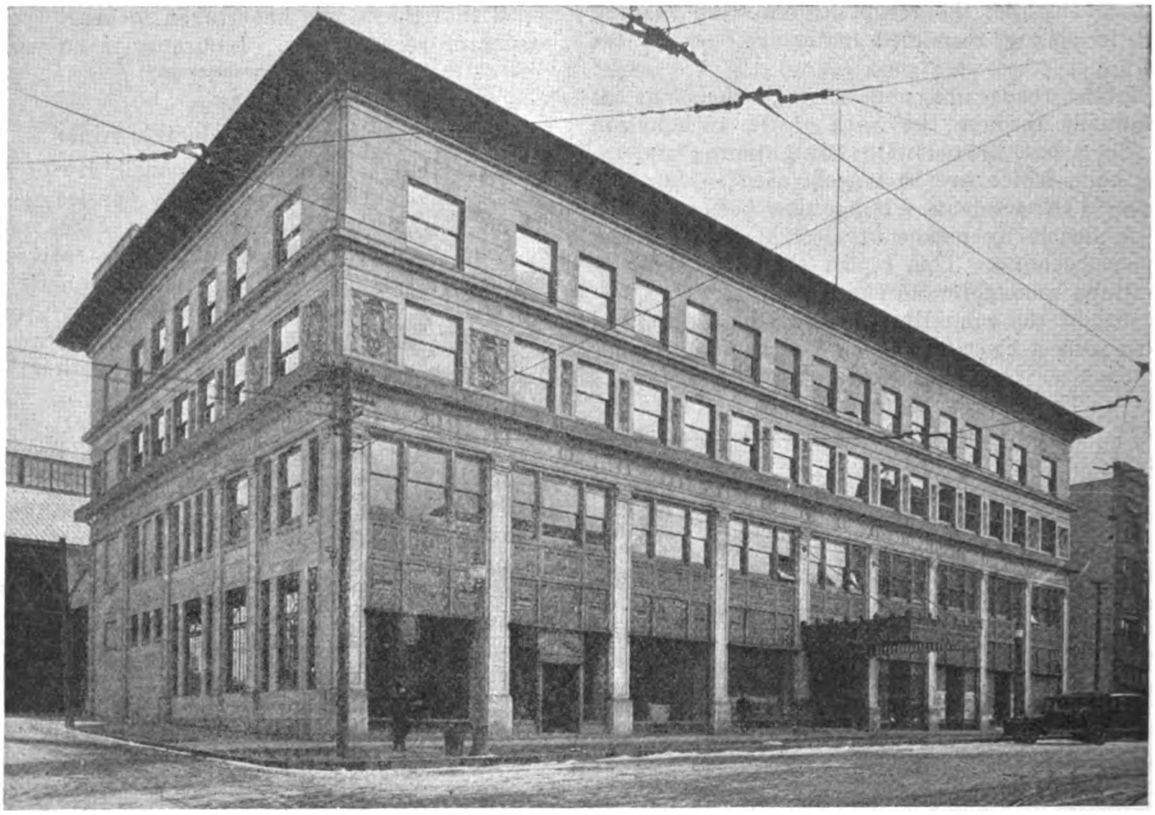
A KEENER sense of the responsibility of the State for continued electric railway service seems to be possessed by New England than by other sections of the country. This is particularly the case in Massachusetts and Connecticut, which, from an electric railway point of view, are by far the most important, possessing together about three times as many cars and miles of electric track as the four other states of New England combined.

It may be that several abandonments of electric railway properties in this section have brought close home to the public and the authorities the essential nature to the community of this kind of transportation. It may also be that a pioneer movement as regards the proper financial treatment of electric railways is beginning in New England just as that part of the country took a leading position thirty years ago as to the early electrical equipment of these same railways. Whatever the cause, the movement as well as the forms that it is taking are worthy of note.

In Massachusetts the tendency is marked toward direct aid from the State treasury to make up deficits where they occur from railway operation. The Boston Elevated contract was the pioneer in this line. In this case, the State trustees are expected, under the law, to adjust the fare to cover deficits, although the State stands back of the company, for each fiscal period of a year, to make good any loss from operation, including in operating charges both depreciation and obsolescence. During the last six months of 1918 the deficit for which the State thus became liable aggregated more than $3,000,000. In the "50-50" bill of the Bay State system, however, the State would defray half of the expense beyond 5 cents of carrying passengers on the electric lines, the car rider to pay the other half. In both of these instances, the State would collect its payments to the companies from the communities benefited. The same general plan is recommended by the Public Service Commission of Massachusetts for other parts of the State.

In Connecticut, the State authorities also recognize the seriousness of the situation, though they are hoping to relieve it without direct State aid. Hence there arise the recommendations, abstracted in this issue, of the special investigating commission for a temporary deferment of taxes, a temporary positive relief from pavement and bridge charges, and other means of bringing down the cost of service. In New Hampshire, too, solicitude is being felt for the fate of the electric lines, and remedial legislation is being urged on the State by the Public Service Commission somewhat along the lines being followed in Massachusetts and Connecticut.

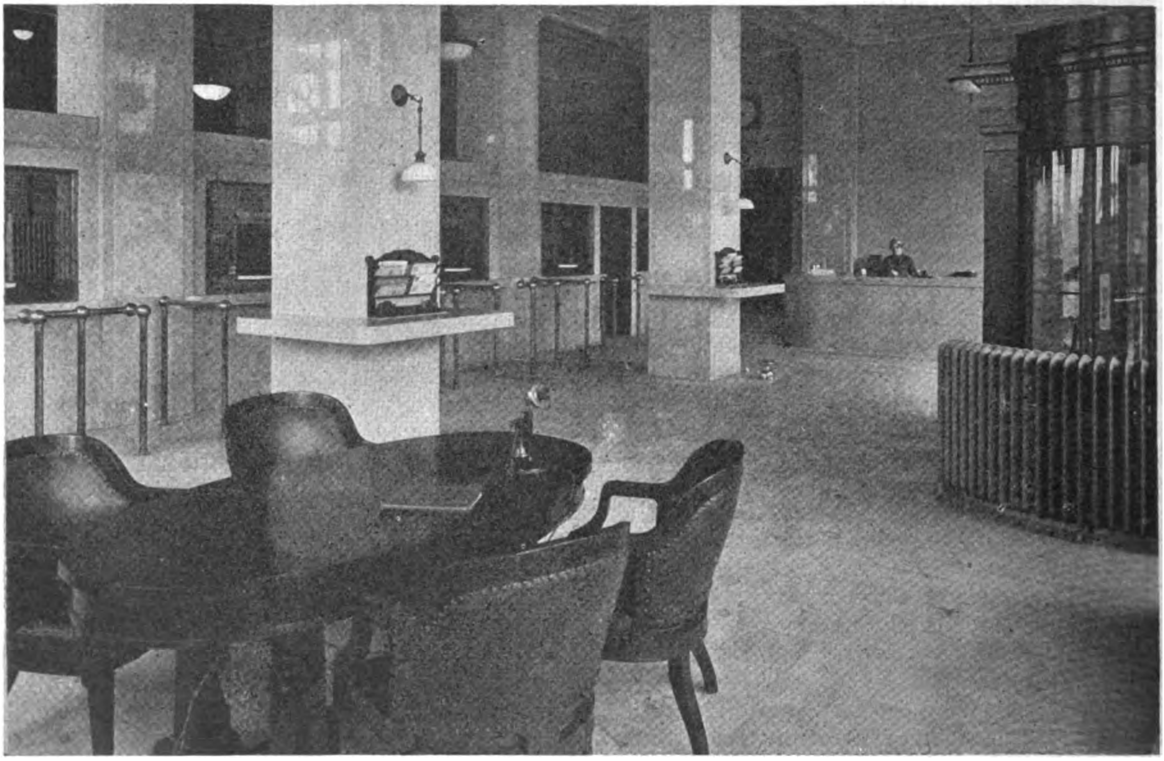
These are favorable signs of an awakened public conscience, or perhaps we should say a clear realization that electric roads constitute one of the fundamentals of public welfare. It is not every citizen that can purchase an automobile to take him about if the trolleys fail. In the interest of the entire community these essential means if transportation must be kept alive and capable of giving good service. This fact is one which other sections of the country besides New England should understand.



North Main Street Façade of the Office Building, Train Shed in Background

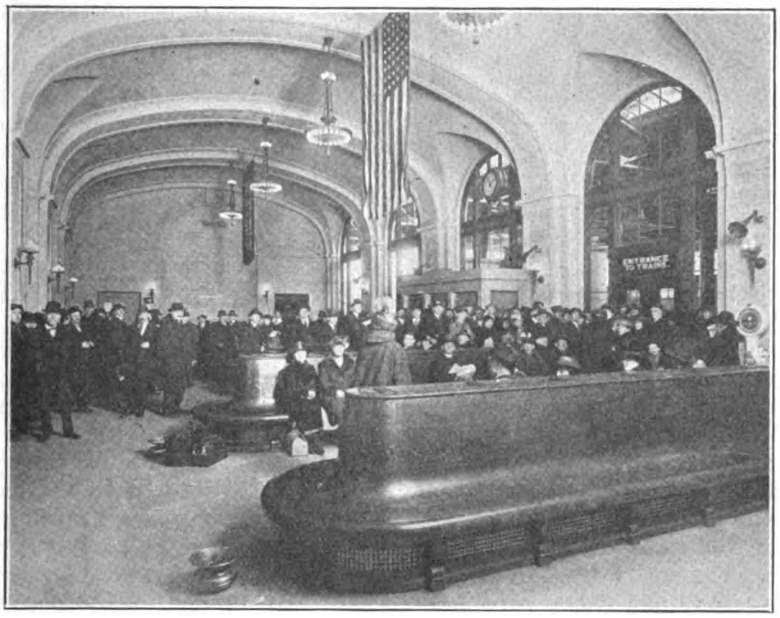
Akron's New Interurban Terminal

The Electric Light and Power Office, Designed According to Bank Standards



New Akron Terminal in Operation

The Interurban Terminal of the Northern Ohio Traction & Light Company Handles Between 10,000 and 15,000 Passengers a Day with an Average Five-Minute Train Schedule from 6 a.m. to 6 p.m.



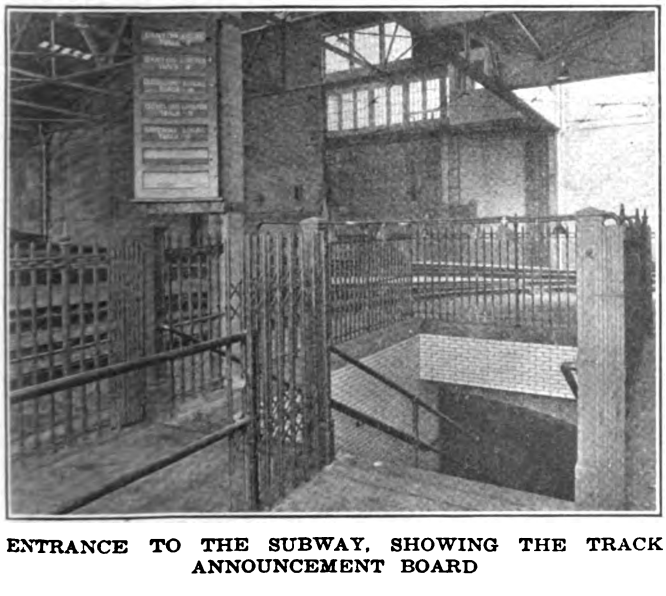
THE WAITING ROOM, WHERE PLEASING STATELINESS PREVAILS

THE recent completion of the train shed of the Northern Ohio Traction & Light Company's new terminal permits the company now to apply the latest methods in providing for the convenience and safety of patrons who furnish its large interurban business. A short description of the construction features of this building, together with several reproductions of construction drawings, appeared in the issue of this paper for March 9, 1918, page 465. The building proper was finished and the offices of the company opened on May 1, the train shed being completed about eight months later. A large business is now being handled.

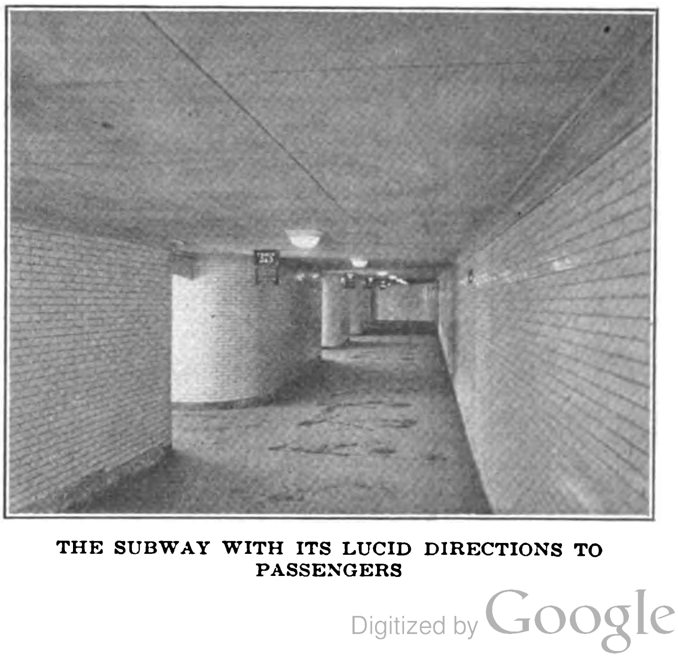
The new terminal is located in the heart of the city on Main Street from which the proposed North Hill viaduct will extend across the Cuyahoga Valley so that ultimately trains arriving and leaving the terminal will travel only on Main Street. The main transfer point of the city lines is one block away. Before the new terminal was constructed interurban cars were loaded on the street. This practically tied up a whole block on Main Street in the busiest section of the town, as part of the time the cars parked on both tracks and practically all of the time the south-bound track was occupied.

The general layout of the terminal building and train shed is shown in one of the drawings reproduced on page 682, and another gives the ground floor plan in more detail. Through the front corridor one enters a spacious waiting room, the interior finish of which is Caen stone on walls and ceilings with Tennessee marble wainscoting and floor. The seats, of which there are two groups on each side of the aisle from the corridor to the ticket office, are of old English finish. The ticket office is of marble construction throughout. Entrance to trains is at the right of the ticket office while incoming passengers enter at the left.

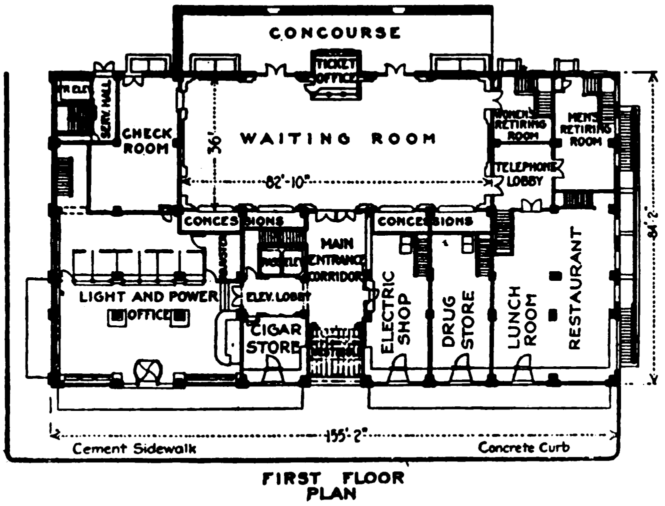
On the south side of the waiting room is a telephone lobby with five booths. From this there is direct entrance to a lunch room and a restaurant on the ground



ENTRANCE TO THE SUBWAY, SHOWING THE TRACK ANNOUNCEMENT BOARD



THE SUBWAY WITH ITS LUCID DIRECTIONS TO PASSENGERS


CONCOURSE
TICKET OFFICE
SERV. HALL
CHECK ROOM
WAITING ROOM
36'
82'-10"
WOMEN'S RETIRING ROOM
MEN'S RETIRING ROOM
TELEPHONE LOBBY
CONCESSIONS
CONCESSIONS
MAIN ENTRANCE CORRIDOR
LIGHT AND POWER OFFICE
ELEV. LOBBY
CIGAR STORE
ELECTRIC SHOP
DRUG STORE
LUNCH ROOM
RESTAURANT
84'-2"
155'-2"
Cement Sidewalk
Concrete Curb
FIRST FLOOR PLAN

PLAN OF FIRST FLOOR OF TERMINAL BUILDING

floor and to a more artistically decorated restaurant in the basement. The telephone lobby also furnishes entrance to the men's retiring room, which will contain a barber shop on the ground floor and toilet facilities in the basement. The women's retiring room is also on the south side of the waiting room. At the north end of the waiting room is a check room, for both parcels and baggage, and a lost and found department. Here on the wall is a cork bulletin board, and no papers of any sort are allowed on the walls of the room elsewhere than on this board. The entire west side of the room is occupied by news, candy and cigar stands, and accessible over a marble ledge are the wares of a drug store occupying the store space adjacent to the lunch room. The lunch room, restaurants, drug store, cigar store and all inside concessions are leased to the Union News Company.

Before boarding trains passengers are required to purchase tickets which are canceled by the gateman at the "Entrance to Trains" door. This leads directly to a stairway which gives access to an underground passageway, from which passengers come up again to concrete platforms between the tracks in the train shed.

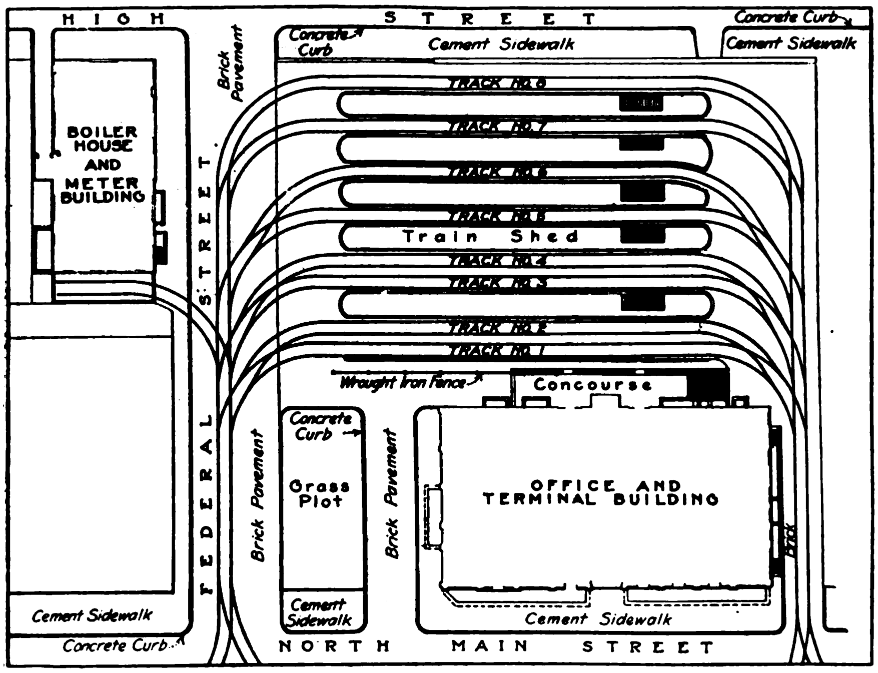
Special attention is called to the provisions made to prevent confusion of passengers. When the train is ready it is announced through annunciator horns located on the east wall of the waiting room and through similar horns located in the retiring rooms and restaurants. The announcing can be done either by the trainmaster in the signal tower, seen in the background in one of the illustrations, or by the gateman from a booth near the head of the tunnel stairs. Before a passenger enters the tunnel he sees the announcement board at the head of the stairs, and in the tunnel each track is clearly marked. In the train shed, overhead boards again signify the track upon which a desired train stands.

All trains enter the shed from the south end and as they approach the entrance the trainmaster in the signal tower throws the proper air-controlled switch at the same time setting to red a light at the north end of the track. One minute before leaving time the gateman locks the door and clears the red signal.

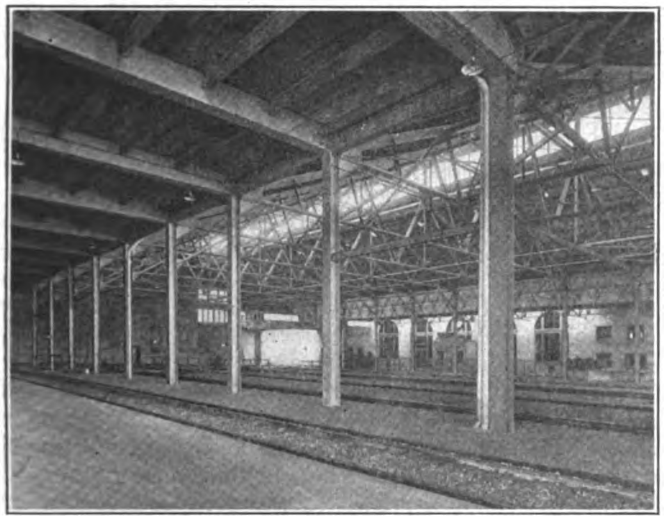
At the present time track No. 1 is used as a baggage track and baggage is unloaded direct from trucks onto a platform outside the check room. From here it is moved directly into the baggage cars, never being placed inside the building unless it is to remain over night. The Canton local uses track 2 and the Canton limited track 3. As the local leaves on the even hour and the limited on the half hour, passengers are never simultaneously boarding two trains from the same platform. This is true throughout the station. Track 4 is used by the Cleveland local, track 5 by the Cleveland limited and track 6 by the Akron-Kent-Ravenna local, each of these tracks being served by an individual platform. Track 7 is for special and private cars and track 8 is at present used for storage purposes.

It is estimated that between 10,000 and 15,000 persons are handled through the terminal every day, and 108 trains leave the terminal daily. The first cars out of the terminal north and south leave at 5 a.m. From this time on hourly local service is maintained in each direction and hourly limited service to Cleveland from 6.10 a.m. until 9.10 p.m., with the last car leaving at 12 o'clock midnight. Limited trains leave every two hours for the South from 7.30 a.m. until 5.30 p.m. with an additional limited at 11.30 p.m. A thirty-minute schedule is operated over the Kent-Ravenna branch from 4.50 a.m. until 8.20 p.m. and then hourly until 11.20 p.m. Six baggage trains a day are operated through the terminal, one a through train to Detroit daily except Sunday, and baggage is checked just as on a steam road. Between the hours of 6 a.m. and 6 p.m. a train arrives at and one leaves the terminal, on an average, every ten minutes.

The terminal employees include one station master; two gatemen; two trainmasters; two car inspectors; two train-shed janitors; one building janitor; two checkroom clerks; two porters in the men's retiring room; two matrons, and four ticket agents. The waiting room is mopped, scrubbed and disinfected every night and main-


HIGH STREET
Concrete Curb
Cement Sidewalk
Concrete Curb
Cement Sidewalk
Brick Pavement
TRACK NO. 8
TRACK NO. 7
TRACK NO. 6
TRACK NO. 5
Train Shed
TRACK NO. 4
TRACK NO. 3
TRACK NO. 2
TRACK NO. 1
BOILER HOUSE AND METER BUILDING
FEDERAL STREET
Wrought Iron Fence
Concourse
Concrete Curb
Brick Pavement
Grass Plot
Brick Pavement
OFFICE AND TERMINAL BUILDING
Cement Sidewalk
Cement Sidewalk
Cement Sidewalk
Concrete Curb
NORTH MAIN STREET

GENERAL LAYOUT OF TERMINAL BUILDING AND TRAIN SHED tained during the day like the lobby of a first-class hotel. All general offices of the company are at the new terminal and occupy the entire building with the exception of a few rooms on the fourth floor. The corridors throughout the building have Georgian and white Italian marble wainscoating and floors and the woodwork is old English. The outside of the building is terra cotta with granite finish. There is an electric globe in every cornice opening around the top, and a large electric sign will soon be erected on each side of the marquise.



INTERIOR OF THE TRAIN SHED, SHOWING THE ENTRANCE AND THE SIGNAL TOWER IN THE CENTER BACKGROUND

American Welding Society Holds First Meeting

THE first meeting of the American Welding Society for forming a permanent organization was held in the United Engineering Societies Building, New York City, on March 28. Prof. C. A. Adams called the meeting to order and gave a brief address on the temporary association which had been formed which had led to this meeting. A form of constitution and by-laws proposed by the temporary committee on welding was adopted as a whole, after which the following officers were elected: President, C. A. Adams; vice-president for one year, J. M. Moorehead; vice-president for two years, G. L. Brunner; directors for one year, W. M. Beard, M. H. Roberts, M. M. Smith, L. D. Lovekin, Alexander Churchward, W. H. Patterson, W. J. Jones and C. A. McCune; directors for two years, R. R. Browning, A. S. Kinsey, Victor Mauck, E. L. Hirt, J. F. Lincoln, H. M. Hobart, D. C. Alexander and H. R. Swartley, Jr.; directors for three years, L. H. Davis, E. L. Mills, D. B. Rushmore, James Burke, D. H. Wilson, Jr., Hermann Lemp, C. J. Nyquist and Alexander Jenkins. Prof. Elihu Thomson was elected as the first honorary member.

A resolution was adopted holding the charter of the society open for ten days so that those filing applications before April 8 can enter as charter members.

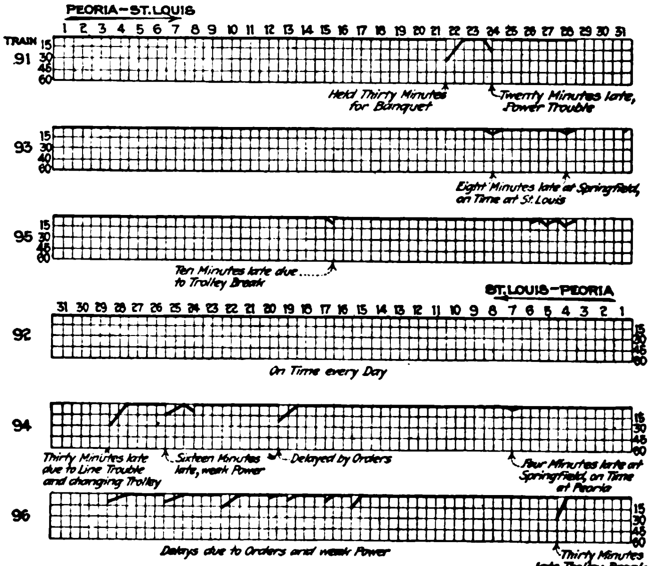
A meeting of the directors elected was held immediately after the society adjourned, at which H. C. Forbes was chosen as permanent secretary for the society and W. E. Symons as treasurer.

Graphic Record of Limited Train Operation

H. E. CHUBBUCK, vice-president executive of the Illinois Traction System has had made up and hung in his office a chart which shows graphically the daily running time of each of the six fast trains operating between Peoria and St. Louis. There are two parlor car trains and one sleeper each way per day. The chart, which covers a period of one month and is kept up each day, shows at a glance whether each train was on schedule or the number of minutes delay. If there is any considerable delay the reason is entered under the drop in the otherwise horizontal line.

The numbers at the top and center of the chart represent the days of the month. The upper three forms are for the trains running from Peoria to St. Louis and the lower three for those operating in the reverse direction. In the first three of these forms the first vertical line represents Peoria, the starting point, and is black. The second line, representing Springfield, is red, and the third, representing both St. Louis, the finishing point, and Peoria, again the starting point for the following day, is black, and so on. The horizontal lines are all red except the top one which is black. The train line is put on with heavy red crayon and shows very plainly. Each horizontal space represents a period of fifteen minutes.

Train No. 91 is a through sleeper leaving Peoria at 11.30 p.m. and arriving in St. Louis at 6.50 a. m. This train was on time at its destination during February although it left Peoria one-half hour late on Feb. 22 in order to handle returning delegates from a banquet. Train No. 93 leaves Peoria at 8 a.m. and arrives at St. Louis at 2 p.m. This train had a perfect record for the month, as also did train No. 95 which leaves Peoria at 11 a.m. and arrives at St. Louis at 3 p.m.



FEBRUARY CHART RECORD OF LIMITED TRAIN OPERATION ON THE ILLINOIS TRACTION SYSTEM

Concerning trains operating from St. Louis to Peoria, train No. 92 is the sleeper leaving at 11.45 p.m. and arriving at 7 a.m. Train No. 94, which leaves at 9 a.m. and arrives at 3 p.m., was delayed in arriving only three times, due to line trouble and orders. Train No. 96, leaving St. Louis at 8.55 p.m., was late in arrival only five times, one delay being due to a trolley break and the others to power trouble and orders.

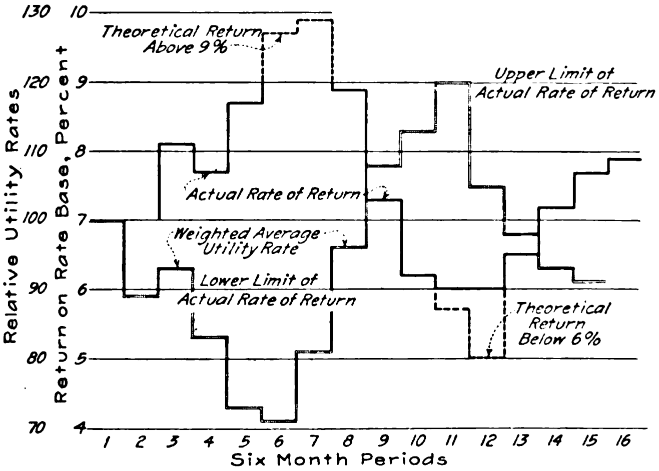
Sliding Scale of Return with Combined Services

Proposed New Brunswick Resettlement Provides for Railway, Electric and Gas Service at Cost With Reward for Efficiency

THE New Brunswick Power Company, St. John, N. B., Canada, is at present concerned in a very interesting proposal in connection with utility regulation. An investigating commission has proposed resettlement which provides a most striking combination of the service-at-cost principle with a sliding scale of return on investment, based on combined rates for railway, electric and gas service.

In 1918 the Lieutenant-Governor in Council was empowered by the Legislative Assembly of New Brunswick to appoint a commission to examine the condition of the company and make recommendations in connection therewith. The members appointed were Guy W. Currier, chairman; Henry Holgate and Prof. Albert S. Richey. This commission has now reported certain recommendations which it is believed will be of interest to electric railway operators.

It is recommended that the control of operation, maintenance, service and rates be vested in a board of seven directors, four elected by the company and three appointed by the Lieutenant-Governor in Council for three-year terms at annual salaries of not more than $1,000. Moreover, it is said that an experienced public accountant should be chosen annually by the public directors, with the approval of the company directors, to report semi-annually on financial operations.



NEW BRUNSWICK FRANCHISE—EFFECT OF WEIGHTED AVERAGE UTILITY RATE ON RATE OF RETURN

For the purpose of illustration, more violent fluctuations in the utility rates have been assumed than are likely to occur in actual operation. In the fifth and sixth six-month periods the utility rates drop 27 per cent and 29 per cent respectively, indicating theoretical rates of return on the rate base of 9.7 per cent and 9.9 per cent in the sixth and seventh six-month periods. The actual rate of return during these periods remains at the maximum of 9 per cent.

Similarly, in the tenth and eleventh periods, the utility rates increase 13 per cent and 20 per cent respectively, indicating theoretical rates of return of only 5.7 per cent and 5 per cent in the eleventh and twelfth periods, while the actual rate of return remains, during that time, at the minimum of 6 per cent. So long as the theoretical rate of return remains between 6 per cent and 9 per cent, the actual rate of return coincides with the theoretical, as indicated.

The commissioners are of the opinion that no special taxes of any kind should be assessed against the company, which should be required to pay only such property, income and other taxes as are paid by other general corporations in the Province. The company should not be required to pay for any street or road repairs, except those made necessary by the maintenance, renewal or construction of its own way and structures, or for the removal of snow from any street or road or for any part of the cost of construction of new pavement or change in the pavement. The company should not be required to pay rental for the use of any street or bridge beyond the expense of maintenance of tracks. The reason given is that such tax payments would be reflected in the cost of service and thus result in higher rates.

The board of directors would fix from time to time such rates for railway, electricity and gas services as would meet but not exceed the cost of service, which should include operating expenses, taxes, maintenance, depreciation allowance, return on investment, and any other expenditures properly chargeable against income. An annual allowance of $75,000 should be set aside out of earnings for depreciation (to be increased as the investment increased) until the fund amounted to at least $200,000 and in no case less than 7 per cent of the rate base, after which time such an amount should be added annually as would keep the fund intact at this sum. The directors should charge to the annual cost of service, as a return on the rate base of Jan. 1, 1919, 7 per cent of such base, plus or minus additional percentages according to the fares and service charges in force.

RATE OF RETURN TO BE BETWEEN 6 AND 9 PER CENT

At the time of the semi-annual audit, the accountant should determine the average fare received per passenger, the average rate per kilowatt-hour and the average rate per thousand feet of gas, and calculate such average rates as percentages of similarly calculated average rates during the six-month period from Jan. 1 to June 30, 1919. By giving due weight to these three percentages, based on the proportionate amount of gross revenue received from the different services, he should then calculate the weighted average percentage by which the rates during the preceding six months had been increased or reduced compared to those in effect during the period from Jan. 1 to June 30, 1919.

The theoretical rate of return on the rate base for the following six-month period should then be 7 per cent plus one-tenth of 1 per cent for each 1 per cent by which such weighted average rate for service had been so reduced. Similarly, the theoretical rate of return should be 7 per cent minus one-tenth of 1 per cent for each 1 per cent by which such weighted average rate had been so increased. The actual rate of return, however, should be not less than 6 per cent or greater than 9 per cent, notwithstanding the fact that the theoretical rate of return might be greater than 9 or less than 6 per cent. The accompanying diagram shows the changes in return which would follow varying the weighted average rates assumed for the purpose of illustration.

The commissioners recommended that legislation providing for the above features be passed and that the acceptance of the new legislation shall be made to constitute an agreement on the part of the company to sell at any time to the Province or any of its political subdivisions all the property included in the rate fare for cash equal to the rate base as then determined plus 10 per cent and any premium required to retire bonds. The company should then be protected from competition on the part of private or municipal plants.

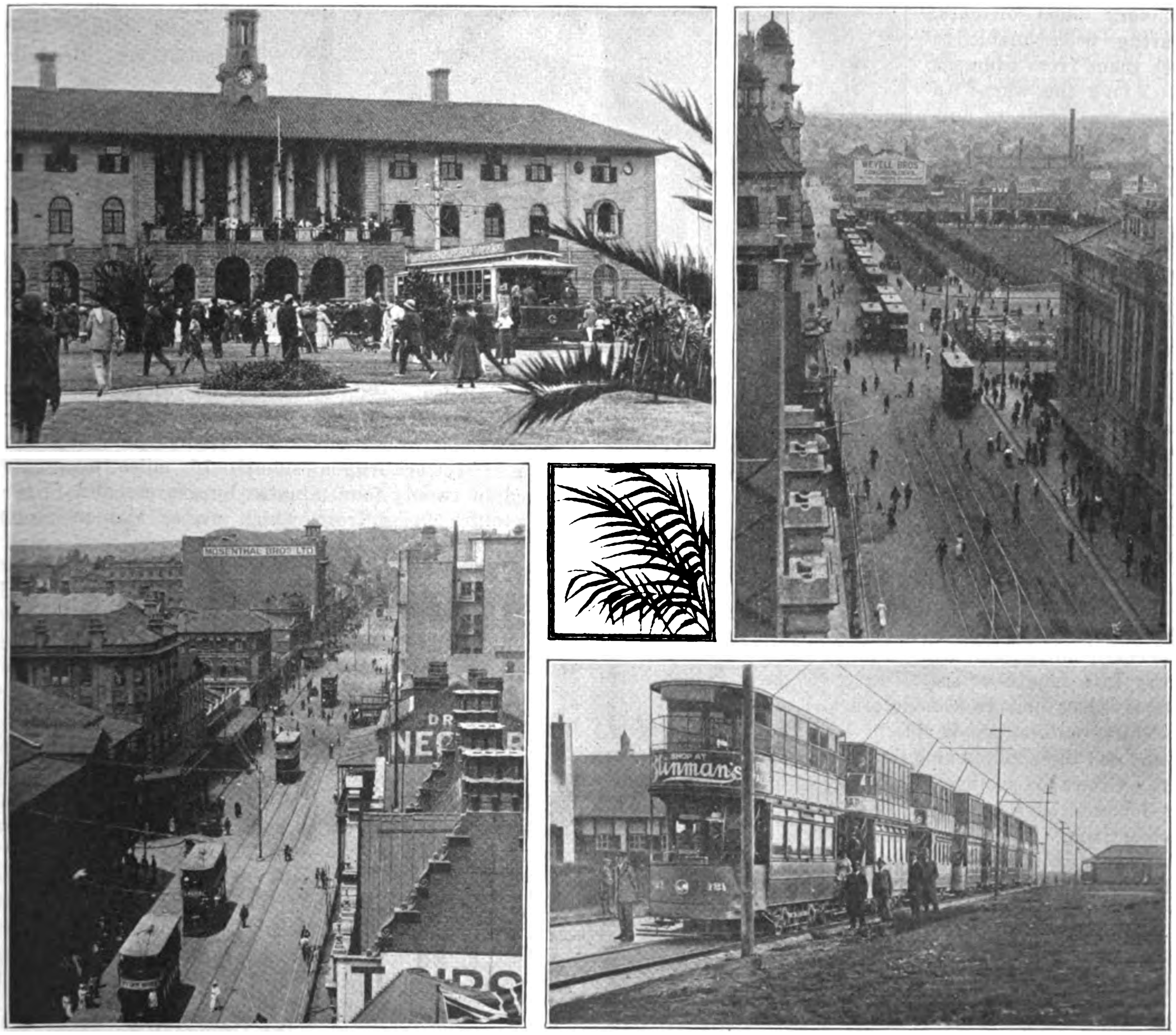
Electric Railways in South Africa

Development in South Africa During the War Has Been Hampered as Elsewhere by Lack of Ability to Secure Equipment—Municipal Operation on Most Lines

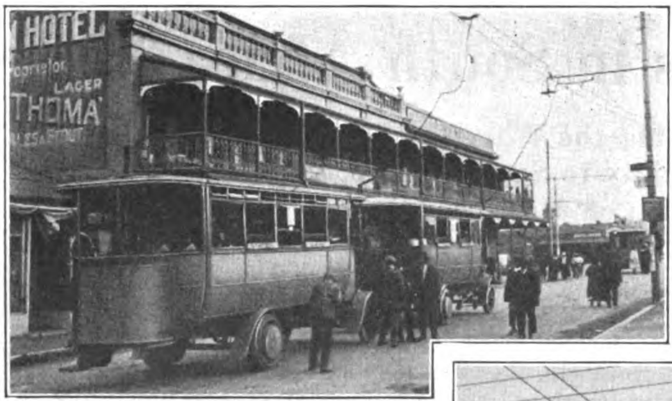
By M. EDWARD
Johannesburg, S. A.

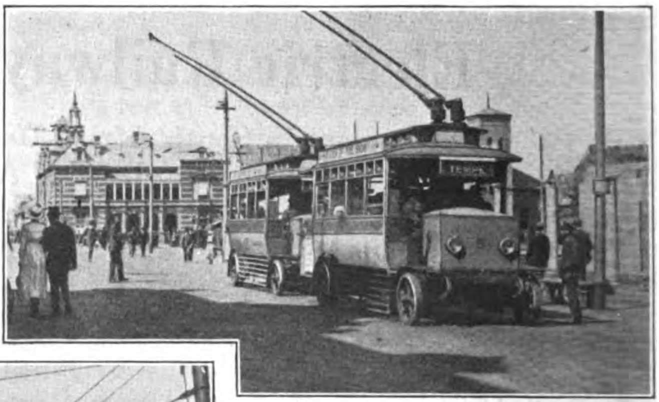
THERE are a number of efficient and up-to-date electric railway systems in that part of British South Africa known as the Union of South Africa. Horse cars have completely disappeared, but nearly every town with more than 10,000 white inhabitants has an electric railway line of some kind. Nearly all of the South African lines are run partly or wholly by the municipalities or town councils. Cape Town and Port Elizabeth have private companies, but it is expected that the two electric railway companies in Cape Town will soon be municipalized.

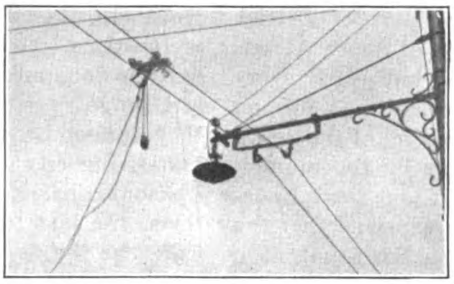
Johannesburg, Cape Town, Durban, Pretoria, Port Elizabeth, East London and Pietermaritzburg have trolley systems. Germiston and Boksburg, practically suburbs of Johannesburg, and Bloemfontein, the chief city of Orange Free State, operate trackless trolley cars, but they cannot be said to be a great success. Benoni, a fast-rising city on the Gold Reef near Germiston and Boksburg, has Edison storage-battery motor-buses. Pretoria, the last town in South Africa to give up horse cars, has the best-laid track and the best cars in South Africa. All the Pretoria cars are single-deckers and

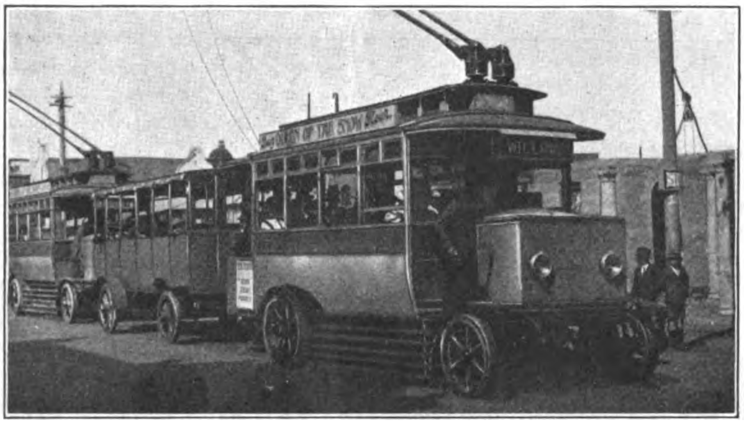


THE FIRST VIEW SHOWS A CAR AT PRETORIA—THE JOHANNESBURG SYSTEM, ILLUSTRATED IN THE OTHER VIEWS, USES DOUBLE-DECK CARS









THE OVERRUNNING COLLECTOR IS USED WITH THE TRACKLESS TROLLEY IN GERMISTON, THE UNDERRUNNING COLLECTOR AT BLOEMFONTEIN

most of them are double-truck. But the system in Pretoria is small compared with that of Johannesburg. In Johannesburg all the cars are double-deckers of the English type. The Johannesburg Municipality owns 135 cars and 70 miles of track. The city is very short of cars, having been unable to get them from overseas during the war. An effort was made to purchase some from other municipalities but only Pretoria had any to supply, and these were too long for the curves on the Johannesburg system. The traffic in Johannesburg has increased more than 50 per cent during the last year and scarcity of cars has become such a serious question that the municipality rebuilt some sprinkler cars, no longer necessary because all the roads are tarred now, into passenger cars. The first of these cars was completed in the summer of 1918 and is a credit to the municipal shops.

Tenders are being asked for the building of other cars at the same shops, and twenty double-truck car bodies are on order from America. They will be shipped "knocked down" and will be put together in Johannesburg in a month or so. Nearly 500 men (white) are employed as drivers, conductors and mechanics.

Thirty million people ride in Johannesburg cars every year, and the receipts amount to about $2,000,000. Fares are on the zone system. One reason for the large traffic in Johannesburg is because there is practically no steam competition. Suburban trains are run by the South African Government Railways but do not serve the thickly populated city areas. They are for the accommodation primarily of the goldmining towns along the 60-mile stretch of reef known as the Witwatersrand.

And this is where some sort of interurban car system is needed. About 250,000 white people and 400,000 natives, mostly mine workers, live along this 60-mile strip of gold mine in many prosperous little cities. At present the only means of getting in from the suburban towns to Johannesburg is by suburban steam trains that run every half or three-quarter hour. This train service is about as efficient as a steam one could be, but owing to stops every mile no speed can be maintained. The South African Railways management had a scheme for electrifying this railway, but the war knocked it on the head. In the meantime there is urgent need for some kind of rapid transit service between the various towns. Cape Town has the second largest system in South Africa, but greater competition is met there from the South African Railways which runs a remarkably good steam suburban system. Muizenburg, a suburb 16 miles away, is reached in twenty-four minutes by express and forty-five minutes by a train which makes sixteen stops during the run.

Cape Town uses single and double-deck cars, and one company, the Camps Bay Company, runs very powerful single-decker cars fitted with air and magnetic brakes on a line that climbs over part of the famous Table Mountain. With the exception of these cars, and a few at Port Elizabeth, there are no electric cars using air brakes in South Africa.

The views on this page show the trackless trolley cars in Germiston and Bloemfontein, to which reference has already been made. In Germiston the over-running trolley is used with flexible cable. In Bloemfontein the underrunning trolley is employed into double trolley poles. Trackless trolley cars are hard on the roads and are not nearly so comfortable for the passenger as cars running on rails. Besides, the ordinary citizen does not understand the reason for a system between the street car and the motor bus. Germiston started the idea, then Boksburg, an adjoining city, and Bloemfontein, the chief city of the Orange Free State, installed these cars.

Safety Car in Practice

Wisconsin Electrical Association at Milwaukee Meeting Discusses This and Other Live Topics—Raymond H. Smith Elected President

As LAST WEEK'S issue of this paper went to press the Wisconsin Electrical Association convention was in session at Milwaukee. A partial account of the meeting was given in that issue. The account is completed this week, including abstracts of the presidential address of John St. John, Milwaukee Northern Railway, and the address of Hon. John S. Allen, Wisconsin Railway Commission, both delivered on March 26. On Wednesday evening a joint banquet of the electrical and gas associations was held in the Hotel Pfister, attended by more than 250 members and guests. A number of instructive exhibits were held in connection with the meeting.

At the Thursday session one of the first matters considered was a report by J. B. Sanborne of Milwaukee concerning the activities of the State Legislature with reference to public utilities. He said that a bill to make the Railroad Commission elective rather than appointive had been twice defeated. A bill which has been introduced to abolish the commission and the public utility law must be watched carefully, he said, for if this carries it will leave absolutely nothing to replace the commission form of regulation. A bill has passed the Wisconsin House and Senate to make the fiscal year of all utilities coincident with the calendar year and, to accomplish this, to permit a report covering a period of six months for those utilities whose fiscal year now ends in June.

The first paper read on Thursday was on "The Proper Loading of Distributing Transformers" by Frank A. Robbins, electrical engineer Superior Water, Light & Power Company, Superior, Wis. In it he recommended the use of self-registering thermometers to measure maximum safe temperature of transformers. This was followed by "A Review of Policies of Service Extensions as Laid Down by State Commissions," by A. J. Goedjen, statistician Wisconsin Public Service Company, Milwaukee.

Alfred Alsaker, chief engineer Delta-Star Electric Company, presented an illustrated paper on "High-Tension Outdoor Substations and Switching Equipment." This will be abstracted in a later issue.

The next paper, on "Safety Cars," by H. L. Andrews of the railway traction engineering department General Electric Company, which was abstracted last week, brought out more discussion than any other paper presented at the meeting. An extended abstract of this follows:

OBJECTIONS TO SAFETY CARS AND THE ANSWERS THERETO

Raymond H. Smith, vice-president Eastern Wisconsin Electric Company, Sheboygan, expressed himself as being so favorable to the safety car that he might be called a "safety-car hound." He made several interesting comments with reference to this car. One was that the trolley stand is ugly and brings criticism from the public. Some other arrangement will be necessary. There is also some criticism of the width and general comfortableness of seats. Mr. Smith thought that it might be necessary under some conditions to strengthen the car structurally and thus to add more weight. He asked whether the motors were heavy enough to care for this condition. He said that the manufacturers should not insist too much upon acceptance by the railways of an adopted standard which may not be equally applicable in all parts of the country. In this connection be mentioned the possible necessity of double flooring and inside side sheathing in Northern climates.

In replying to Mr. Smith, W. G. Brooks, Westinghouse Electric & Manufacturing Company, said that the margin of safety in motoring with the safety car was as great as, if not greater than that with the ordinary heavier cars. Mr. Andrews followed with the statement that these same motors are used very successfully in four-motor equipment on standard heavy cars. J. B. Sanborne, Milwaukee, stated that the opposition to the safety car before the Legislature initially came as a result of the use of one man on standard two-men cars. It can be summed up under two general complaints: First, due to the fact that one man has to make change and issue transfers as well as run the car the service is slower; second, two men make for much safer operation not only as regards railroad crossings but also because the motorman on a safety car starts his car before he has completed making change, etc. To the first of these criticisms Mr. Brooks replied that a traffic check taken in Wisconsin had showed that with one man in place of two men on the same car and the same line the stops had averaged two seconds less in duration.

RAILROAD CROSSINGS OFFER NO OBSTACLE TO SAFETY CARS

As for railroad crossings, C. H. Beck, Westinghouse Traction Brake Company, said that no blanket rule by either city authorities or state commissions can cover all railroad crossings. If the same rule is applied to both a switch track in an open suburb and a two or three-track main-line crossing in town, the very purpose of the rule is defeated, for the conductor will think of each as of equal importance and apply the same degree of care (or carelessness) to each. Any railway would be willing to place a flagman at a hazardous crossing. Mr. Beck emphasized the point that any two-man car is under one-man operation while crossing railroad tracks, because the conductor is out on the street. If the safety of the car depends upon one man he will observe the crossing carefully before proceeding.

J. P. Pulliam, vice-president Wisconsin Railway Light & Power Company, Winona, Minn., said that as the "proof of the pudding is in the eating" the safety cars will prove themselves. The railways have stood still and let the automobiles take the business. Now, more and better service must be given and the Birney car offers the solution. John S. Allen, commissioner Wisconsin Railroad Commission, said that the objection the commission receives repeatedly refers to the width of door opening. The trolley tower is not objectionable and, as far as speed of service is concerned, the Madison Railways are making trips in 8 per cent less time with one man than they did formerly with two. This is due to more rapid acceleration and stopping. In referring to the door opening Mr. Beck said this is one of the main safety features of the car. The narrow door opening insures that the boarding or alighting passenger is always under the observation of the operator. Besides something for him to hold on by is always available. The narrow opening also permits speedier loading and unloading rather than the opposite, because all confusion of passengers trying to go in both directions at once is avoided and rapid fare collection is facilitated.

SPECIAL RAILWAY DIVISION OF ASSOCIATION RECOMMENDED

Before adjournment, a committee, previously appointed to consider and make recommendation concerning increased railway activity at the conventions, recommended that the railway and central station meetings be separated and that the railway branch be known as the Railway Division of the Wisconsin Electrical Association. It was further suggested that this organization be subdivided into five committees, as follows: Committee of five members on attendance and program, to include presiding officer, two railway members and two commercial representatives; committee on shops and equipment; committee on transportation; committee on ways and structures, and committee on power and distribution. Each of the last-named four committees would include three members. These committees would arrange for more constructive co-operation in their respective departments to further the interests of the Railway Division.

Continuing the committee report said: "On account of the existing conditions in the electric railway field, we feel it necessary that immediate action be taken and such arrangements made to enable the newly created division of the association to hold annually a two-day mid-year meeting on some one of the member properties, such mid-year meeting to be devoted to a study of the property, with recommendations for improved efficiency, and a complete report to be incorporated in the minutes of the parent association. We strongly recommend that the necessary steps be taken to bring about this end, and feel that the operation of this new division will stimulate interest among the men engaged in the maintenance and operation of electric railways in this State, with marked improved efficiency of all member properties." This recommendation was referred to the executive committee for action.

ELECTION OF OFFICERS

Before the convention adjourned the following officers were elected: President, Raymond H. Smith, vice-president & general manager Eastern Wisconsin Electric Company, Sheboygan; first vice-president, W. C. Lounsbury, general superintendent Superior Water, Light & Power Company; second vice-president, A. K. Ellis, superintendent Wisconsin Traction, Light, Heat & Power Company, Appleton; third vice-president, L. R. Boisen, vice-president Ashland Light, Power & Street Railway Company, Ashland; secretary and treasurer J. P. Pulliam, vice-president and general manager Wisconsin Railway, Light & Power Company, Winona, Minn.

Service Is Supremely Important*

Wisconsin Experience Proves That It Is Possible, Practicable and Profitable to Please the Public

By JOHN S. ALLEN
Member Wisconsin Railroad Commission

THE quality of the service rendered by any public utility is of supreme importance. All bargaining or trading of any kind is done by two parties: a seller and a buyer. The one characteristic in the seller, which is probably more nearly universal than any other, is that of his desire to please. In the instance of a public utility, there are two parties engaged in the business: the seller and the buyer. The seller is the utility, and buyer is the public. It is quite generally felt that public utilities as a rule do not keep before them as prominently as should be done the desire to please.

It is an axiom of business the world over that money cannot be made out of one's enemies. This is even more true in the case of a public utility than in that of the ordinary tradesman. A satisfied public is the first requisite of a successful public utility. A dissatisfied public is a liability to be seriously reckoned with. A good quality of service redounds to the credit of the utility in many ways. However insurmountable the task may appear, the public utility manager has but one major problem, and that is to please the public.

Some operators may answer that it is absolutely impossible to please the public. The files of the Wisconsin Railroad Commission show that it is possible, practicable and profitable. There are many instances in Wisconsin which show conclusively that the public can be very generally and satisfactorily pleased.

Good service can only be defined as a service of such quality that it pleases and gives satisfaction to the buyer. There comes to mind one utility in Wisconsin which conforms very closely to the mathematical concept of the standards of the commission, yet whose service, owing to one curt employee, does not please and give satisfaction to the buyer. On the other hand, numerous instances come to mind where deficiencies in the mathematical standards are more than made up by a painstaking and studious desire to please.

The quality of service is the prime factor in solving all of the problems of a utility in its relations, to the public, to its stockholders or to its employees. The quality of the service has a very important bearing on the volume of business. It has much to do with civic pride, and the resulting attitude of civic bodies very generally controls the attitude of the city attorney and of the city council. Moreover, a good quality of service has a very important bearing upon the size of the dividends and upon the value of the capital stock of a company. As far as the employees are concerned, an improvement in the quality of the service will make the work more congenial and greatly improve the tone of the organization.

The good-will of the public toward an electric railway is determined by two principal factors; namely, the historical attitude of the company toward the public—that is, the things that the company may have done in the past—and the attitude of the present organization toward the public. The attitude of the public toward the company is directly a reflection of the attitude of the company toward the public. Of this fact I am more and more convinced from day to day. The eternal vigilance of electric railway operators, wisely applied to the quality of the service rendered, will yield larger and more satisfactory returns than any other line of endeavor to which they may apply themselves.

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*Abstract of paper read before meeting of Wisconsin Electrical Association, Milwaukee, Wis., March 26 and 27, 1919.

What the Future Holds*

Cost of Living Must Decline Before Wages Drop—Operating Efficiency Must Be Preserved Despite Costs

By John St. John
Assistant General Manager Milwaukee Northern Railway, Cedarburg, Wis.

With the signing of the armistice it was generally thought that the cost of labor and materials would decline, but the result has been otherwise. Materials and living necessities have in many cases increased in price. Labor is more plentiful, but the rate of wage remains the same. Before we should expect labor to accept lower wages the high cost of living will have to go down. While it is true that high wages during the war frequently resulted in more extravagant tastes, leaving no margin of savings, yet labor will not subscribe to a plan to reduce wages until a substantial reduction is made in the cost of the things to which it has become accustomed.

Many students of the future are of the opinion that it will take all the work every man and woman in the world is capable of performing for the next twenty years to bring the world back to normal; that the basis for work in the future shall be eight hours of work, eight hours of play and eight hours of sleep, and on this basis the individual can be better maintained both physically and mentally; that homes will have to be built which will be modernly equipped and will fully satisfy the demands of comfort and provide something of luxury; and that appetizing food, good clothes and forms of amusement will have to be provided before satisfaction can be expected from the working class.

We should all like to see these aspirations satisfied. To what extent, however, they may be satisfied depends upon the ability of the employer to maintain his earnings so as to enable him to meet the increased burdens. The prosperity of the employee is essentially involved in the prosperity of the employer. I think we shall all agree that it should be the policy of utilities in the future, as in the past, to maintain, as far as possible, wage scales for the steady and industrious employee which shall be well up to that of other employers of labor for like character of work. Furthermore, I think that the utilities will not be found lacking in their desire to co-operate, in all practical ways, in those things which conduce to the welfare of their employees.

COAL SITUATION NEEDS EXAMINING

For the last three months most operators have been expecting a reduction in the price of anthracite and bituminous coal. On Feb. 1, instead of a reduction there was an increase of about 20 cents per ton for coal mined in southern Illinois. We now are advised that, beginning with May 1 and continuing for five months, there will be a monthly increase of 15 cents per ton on the domestic sizes of anthracite coal. Then we hear the talk of closing the mines to avert the danger of possible bankruptcy.

It is true that the government about a year ago urged coal operators to speed up production to supply war requirements and the operators agreed to maintain a high wage scale until such time as peace was concluded. Now with the war over and after an unusually mild winter, the bins of many of the domestic users and the stock piles of the industrial plants are such as to make the demand very small. High wages for mining and other work connected with mining continue to be effective and, with the small amout of coal produced, the cost is very high. Even when the coal is sold at the prevailing prices, which appear to be high, the coal operators advise that a loss is sustained and that in self-defense the mines may have to be closed.

We have no reason to doubt the statements made by the coal operators. We are, however, advised that there are large stocks of coal on the docks of the coal companies and of the government; that the releasing of the government coal would probably result in a reduction in price and that, if such reduction was very substantial, it would cause financial ruin to the coal companies. Since there appears to be a wide range of opinion concerning this subject, I would recommend that railway men analyze the situation very carefully before contracting for their requirements.

TAXES AND MAINTENANCE

About 14 cents out of every dollar of receipts go toward taxes, and as a good portion of the taxes is to help the government meet the expenses incurred in connection with the war, we cannot expect very much relief in federal taxes for some years to come. As to local and state taxes, I am not prepared at this time to state which method of taxation is the most equitable, but I believe that the basis for taxing one utility should be the same as that applied to another. I know that the utilities of Wisconsin desire to pay their just proportion of taxes, but such proportion is to be determined by the amount paid by the other taxpayers of the community in which they operate. If the valuation of the utilities is to be determined by the tax commission by capitalizing net earnings, then the rate of capitalization should be the same in all cases and should not be less than 8 per cent.

As regards maintenance, my recommendation is to keep plants in an efficient operating condition by proper maintenance regardless of prevailing costs. Do not put off until to-morrow that which should necessarily be taken care of to-day. The old adage of "penny-wise and pound-foolish" may sometimes be applied to the way we maintain our equipment. Of course, extraordinary maintenance may be deferred, but only so long as it does not impair operating efficiency or decrease the quality of service. The consumer is not much interested in the cost of labor and material or the efficiency gotten out of either or the technics or financial problems of the business. He wants adequate and reliable service which is standard in quality and of good regulation. at reasonable rates. Adequate service means that which is standard in quality and of good regulation. Reliable service is adequate service that may be had at any and all times—whenever it is desired. Reliable service is dependent upon adequate service, and both should be potent factors in determining reasonable rates.

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*Abstract of president's address before meeting of Wisconsin Electrical Association, Milwaukee, Wis., March 26 and 27, 1919.

Skip-Stop Results in Toledo

Automobile Accidents Decrease in Spite of Increase in Machines Registered—Other Striking Evidence of Greater Safety of Skip Stops

By A. SWARTZ
Vice-President Toledo & Western Railroad and Assistant Manager of Railways, Toledo Railways & Light Company, Toledo, Ohio

POSSIBLY one of the greatest economies that has resulted from the introduction of skip stops on the lines of the Toledo Railways & Light Company is the reduction in accidents of all classes, in which the public at large were concerned.

On Aug. 13, 1917, the skip-stop system was installed on the Cherry Street line for a tryout. On Oct. 1, 1917, it was installed on the Summit-Broadway line. The result in both cases was an immediate reduction in accidents on these lines. The company thereupon decided to install the system on the three belt lines, which was done on Oct. 13, 1917, and was attended with the same results. On Jan. 1, 1918, four more lines were added to the list, making a total of nine out of sixteen lines operating with skip stops. The result can be seen by referring to the accompanying charts. On April 1, 1918, the remainder of the lines of the system were added to the list. The actual figures are given in the table, which shows that one of the principal items in the accident list, collision with automobiles, has undergone a very remarkable and continued decrease, in spite of the increasing number of machines and reckless drivers. The figures for registered automobiles, it should be added, do not include the daily average of forty army trucks and cars being driven through Toledo during the greater part of the year

It will be seen from both the table and diagrams that there was a noticeable decrease in both total accidents and automobile accidents beginning with Jan. 1, 1918, when nine out of the fifteen lines were operating under skip stops. This is all the more notable because with the installation of skip stops there came a rearranging of schedules, the result of which was a shortening of time allowed for each trip and a layover of from three to four minutes per trip. This, of course, necessitated operating at a higher average schedule speed, amounting to a 10 per cent increase in miles per hour.

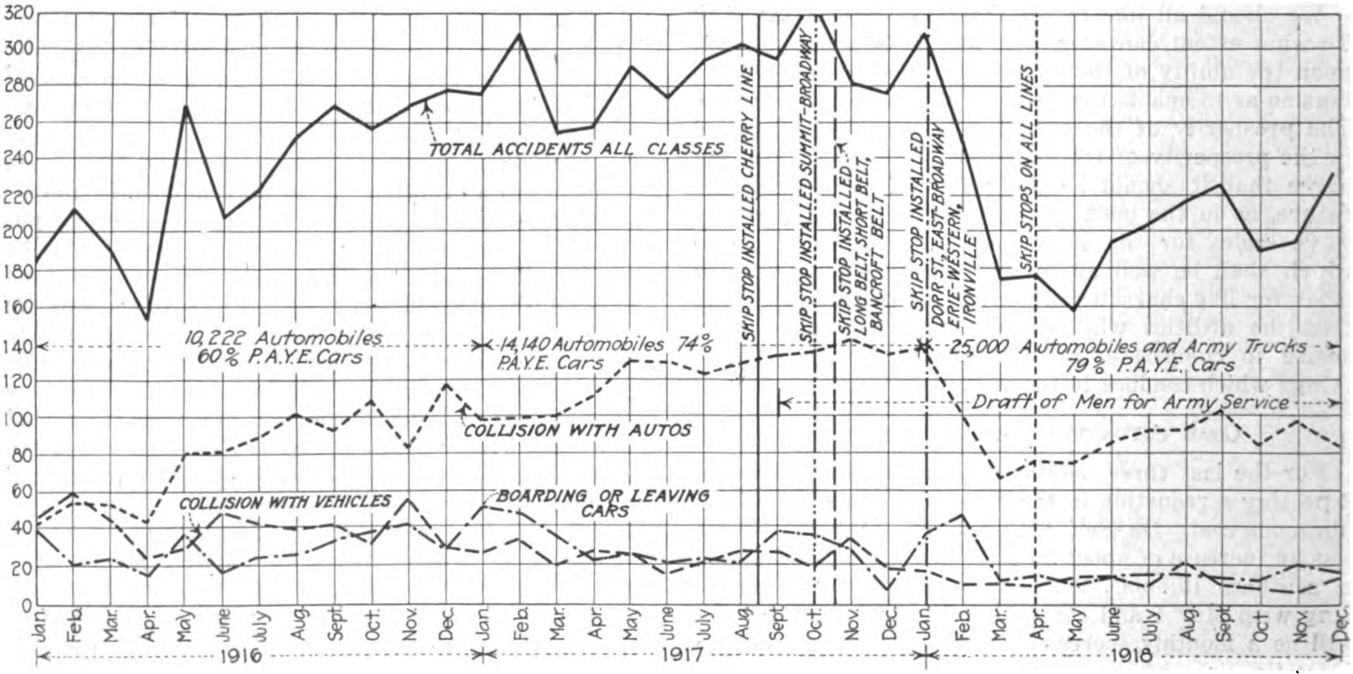
The decrease in accidents with non-motor vehicles is also considerable as will be noted by referring to the chart below. The total non-motor vehicle accidents for 1916 was 369. For 1917 it was 384, an increase of 4 per cent and for 1918 it was 245, a decrease of 36 per cent under 1917 and 34 per cent under 1916.

This decrease we do not ascribe so much to skip stops as to education, as non-motor vehicle accidents occur in nearly all cases in that part of the city where skip stops are not in vogue, namely the congested district.

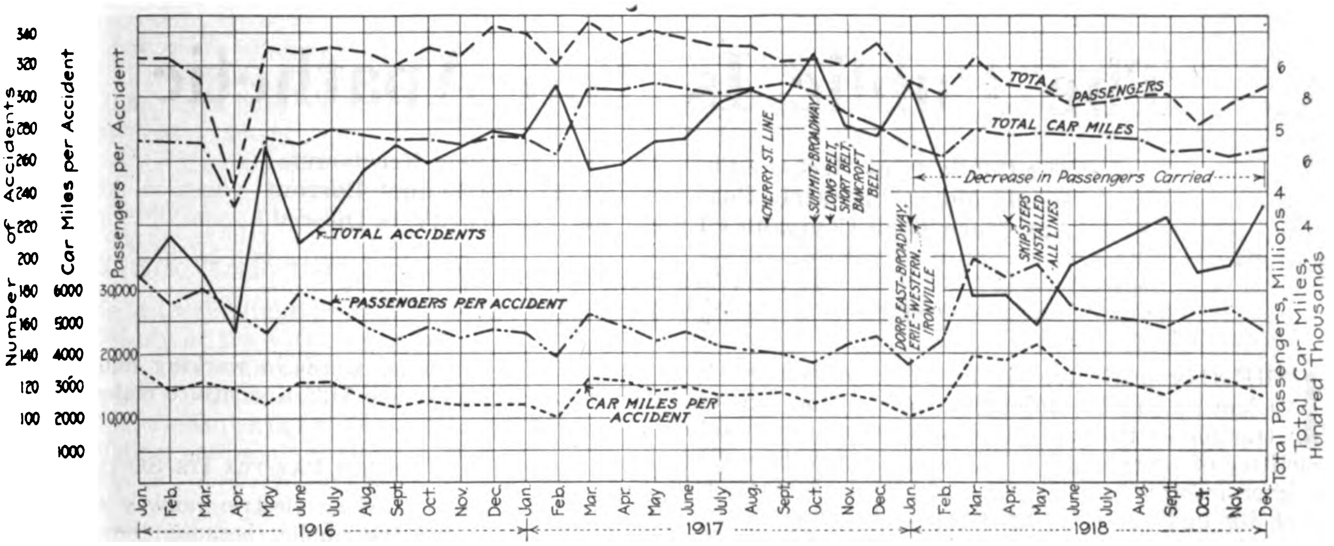
TABLE SHOWING REDUCTION OF ACCIDENTS BY SKIP STOP IN TOLEDO

	1916	1917	1918
Total number of accidents	2,779	3,442	2,540
Number of licensed automobiles	10,222	14,140	25,000
Total automobile accidents	976	1,487	1,126
Percentage automobile accidents to total	32	43	44
Increase in number of licensed automobiles over previous year, per cent	......	38	77
Increase in number of licensed automobiles over 1916, per cent	......	......	144
Increase in automobile accidents over previous year, per cent	......	52	*24
Increase in automobile accidents over 1916, per cent	......	......	15

* Decrease.



THIS CHART SHOWS TOTAL ACCIDENTS, AS WELL AS NUMBER OF AUTO-COLLISIONS, COLLISIONS WITH OTHER VEHICLES AND ACCIDENTS FROM BOARDING AND LEAVING CARS



THIS CHART SHOWS VERY CLEARLY THAT WITH THE USE OF THE SKIP STOP THERE HAS BEEN AN INCREASE IN SAFETY OF OPERATION IN TOLEDO

At the same time that skip stops were installed, a more rigid discipline system was started. All employees concerned in accidents are called in to the office and dealt with as the case demands.

A very marked rise in accidents will be noticed as beginning in June, 1918, when the effects were felt of the first draft, which necessitated the employment of younger and inexperienced men. However, no man under twenty-one years was accepted as a motorman. Still, the total accidents for the year were 26 per cent less than in 1917. For the seven months of June to December inclusive the accidents totaled 1466 as compared with 2054 during the corresponding months of 1917, a decrease of 23 per cent, thus showing that education and watchfulness of new men were effective in securing the desired results.

It may here be noted that accidents of all kinds, including those concerning the public and all employees, were reduced 26½ per cent in 1918 over 1917.

STATISTICS PER ACCIDENT QUOTED

Reference to the second chart discloses that "total passengers carried" and "car-miles operated" started to drop about May, 1917. At the same time, passengers and car-miles per accident instead of increasing also declined until the advent of the skip-stop system, when these lines show a steady rise. It also will be noticed that these last two lines show a further decline about June, 1918, at which time the effect of the first draft was felt in our ranks.

It is very gratifying to note that in no month of 1918 was the total number of accidents equal to even the lowest monthly record of 1917.

The extremely low point reached in April, 1916, was when the system was closed for thirteen days on account of a strike. This same low point was reached in May, 1918, with an increase of about 33 per cent in car-miles operated and of about 25 per cent in passengers carried. While the number of lawsuits cleared up in a year warrants only a general comparison with any other year it was very gratifying to note a saving of about 40 per cent in the claim department expenses for 1918 over 1917.

Boarding and leaving accidents during 1916 totaled 518, and during 1917 there were 320 or a reduction of 38 per cent. During 1918 there were 161, a decrease of 50 per cent under 1917 and 69 per cent under 1916. This has been due largely to the installation of pay-enter equipment, as the percentage of our cars which were pay-enter during 1916 was 60. During 1917 about 74 per cent were pay-enter, and during 1918 about 79 per cent. However, the installation of the skip-stop system, together with our accident prevention campaign, has helped materially in the reduction of this class of accidents.

It should be borne in mind that this company is very insistent in requiring accident reports for everything that happens. In the case of car collisions, if the fender of one car simply rubs or strikes another car we report it as a collision so that we may apply the proper discipline in all cases.

Motorwomen Operate During Blizzard

TELEPHONE STATION AT END OF LINE

THE biggest blizzard of the winter, which occurred on Feb. 28, was a test for the motorwomen on the Charles City (Ia.) Western Railroad car line. The girls stood the test excellently. They had a walk of 1 mile before 6 a. m., the starting time, to get to their cars, with unshoveled walks and against a high wind. Their variation from the regular time schedule was only fifteen minutes for the entire day. At one end of the line there is a deep cut that drifts badly but the snowplow was kept busy all day clearing the tracks. The girls said it was harder to run their cars during a previous heavy snow storm than during the blizzard. They said they really didn't mind the blizzard much.

Seats are soon to be installed for the girls so that they will not be obliged to stand the entire time as they do now. The cars are the safety type. At each end of the line are telephones from which the girls telephone their arriving time to the head office on every run made.

The Public Is Too Apathetic*

The Public Must Meet the Cost of Service to Avoid Receivers—Would Mean Ultimately Poor Service—Courts Cannot Borrow Any More Than Companies Unless Better Security Is Offered

BY CHARLTON OGBURN
Examiner in Charge of Electric Railway Department
National War Labor Board

THE City of Denver is to be congratulated for adopting such an intelligent plan in meeting the traction situation. Its mayor has appointed a committee of representative citizens, which will receive whatever information it can get upon this subject and report its findings. In other cities I have found a good deal of apathy toward the crisis in electric railway conditions prevailing over the entire country. It would be splendid if every city in the United States could follow the lead of Denver in this regard.

WAGE INCREASES A MATTER OF JUSTICE

The War Labor Board has increased wages generally of electric railways throughout the country. That has been done as a matter of justice. P. H. Gadsden has estimated that the War Labor Board has increased the wages of the employees by $100,000,000 per annum. Our own estimate is $25,000,000. It by no means follows that this increase, in large part, might not have come about had the War Labor Board had nothing to do with it, for wages had to increase.

The guiding principle which led the War Labor Board and similar government bodies to fix certain wages was the standard of living. Before the war the standard of living for the American working man was low; it was certainly none too high. The members of the various boards felt that during the war the standard of living should not be still further lowered. Therefore, it became necessary to determine upon a wage scale which would at least keep the standard of living up to what it had been before the war.

The facts upon which the War Labor Board based the standard of living were gathered by a series of surveys and studies made all over the United States by various agencies. The board had its own cost-of-living department, which independently made studies and surveys of what the cost of living was in various cities of the United States. The net result ascertained was that the cost of living to-day is approximately 65 or 70 per cent more than it was in the fall of 1915—that is, a wage earner in the fall of 1915, who was making 30 cents an hour, ought to-day to be making at least 50 cents an hour in order that he might make just as much as he had been making in the fall of 1915.

The War Labor Board figured out that there are certain things a working man's family must have. It determined the annual budget needed for a family of five persons, husband and wife and three children. It provides, for instance, only $76 for the man's clothing, only $55 for the woman's clothing and only $180 for rent. A total of $50 is provided for recreation. There are certain other small items—*e.g.*, laundry, $4 and paper and books, $9. The total comes to $1500 for the year. In other words, a working man with a family of five must make $125 a month to make a living wage.

THE PUBLIC SHOULD PAY FOR ITS SERVICE

All of the earnings of an electric railway of course have to come from the public, because the company sells its product to the public. We felt in doing the justice we were doing to the men, we should not do an injustice to companies. We therefore incorporated in the Denver and some other awards a recommendation to the public authorities, the public commissions or the municipal authorities, that the companies be allowed to charge what additional increase in fare they needed to pay the awards. What increases in fare were needed, was a matter for these authorities to determine.

The joint chairmen of the War Labor Board have felt the matter as keenly in other cities as they have in Denver. They have written letters to the municipal authorities and to public service commissions. In Memphis the board made a study of the cost of living, found it had increased 42 per cent and raised the wages 42 per cent. We then recommended to the city that the company be allowed an increased fare to meet it. Here is the letter which Mr. Taft later wrote to the City Council:

> We are advised that your honorable body has not as yet advanced the rates on the street car line of Memphis in accordance with our recommendation. We recognized the probable inability of the company to pay the increase in wages which we gave, unless the city granted an increased fare to the company. Our award was a balanced one, in the sense that had we had the power, we would have ordered an increase in the rates of fare at the same time that we ordered an increase in the rates of wages.
>
> The people of Memphis should pay war prices for transportation just as well as for coal and for food. They cannot hope to escape this burden that we all had to bear by reason of the war. It is not fair that the public should take advantage of a public utility company and hold it down to an anti-war contract in that regard. We should think that the equity of the company in this matter should appeal to the fairminded people of Memphis and to their representatives in your honorable body.
>
> The company has applied the award as to wages, but if as we are advised, it is likely to go into the hands of a receiver, you will find ultimately poor service. The theory that a court can run an electric railway by issuing receivers' certificates, when the company will not pay its operating expenses or much more than that, is likely to be exploded by the results of any such experiment. Courts can not borrow money any better than companies, if they cannot give better security, and public utilities securities in the present juncture are worth nothing as collateral.

The City Council of Memphis declined to take the advice offered by Mr. Taft. The company now is in the hands of a receiver.

Now, in a nutshell, the requirements of this company, and any company, to meet the wages awarded during the war is simply this: The 5-cent fare which the company in 1915 charged amounts only to 3 cents now in its purchasing power. This company cannot take

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*Abstract of address delivered before recent meeting of citizens' adjustment committee, Denver, Col.

5 cents and buy more than 3 cents worth of goods based on the 1915 prices. Therefore, if this company is to charge the same fare that it charged in 1915, it must be allowed to charge an 8-cent fare, because 8 cents now, in its purchasing power, equals 5 cents in 1915. This company, I understood, is not asking for 8 cents but for only 7 cents.

WILL THE PUBLIC MEET THE TEST?

This electric railway situation affords an interesting psychological study of the public as to how it will meet the test, which it must face, as to whether it will be fair to these public utilities. I have heard the cases of the men and the companies for more than eighty electric railways, including nearly all of the important lines in the United States. I know the situation that faces them.

The electric railway industry of the United States is very nearly bankrupt. Here is a calamitous situation facing this country as a whole, less important possibly than the steam railroad situation, but presenting an absolutely vital problem. Electric railways are going into the hands of receivers, but they are absolutely essential. If it had not been for their work in carrying war workers to and fro, the work turned out by the factories would have been greatly hampered. Electric railways are essential to the growth, to the health and to the progress of any community.

A suggestion which has forced itself on my mind in my study of the electric railways is that the present basis of fare is not just. The railways, regardless of their past history, are giving too much for the money. We do not like to say that anybody is giving us too much for our money, but that is the case. The other day I was in a city where one could ride 18 miles for a nickel. It might be said there are lots of short hauls that would make up. That may be true, but probably the best method of remedying the situation is by some system of zone fares. That is being given a good deal of study.

Another thing has impressed itself on my mind, *i.e.*, that the electric railways themselves want their franchises adjusted, and they want this adjustment in cooperation with the public. That is the only way it ought to be, in co-operation with the public utility bodies, in co-operation with the city councils. It ought not to be done in any spirit of antagonism to the public and these councils, but previously for what is best for the community.

I hope the Denver committee will study in all of its aspects what has been adopted lately in several cities—the service-at-cost plan. I have had occasion to see its workings in several cities. I know how well it works. The plan is fair to the public and fair to the company, because it is based on a certain appraised valuation of the property of the company made by the public and the company. There is no over-appraisal or under-appraisal. The plan allows the company to charge a fare that will pay the actual cost of operation, including a fair return on the investment. I think that Denver could wisely study the results of such a plan.

Smoking has been customary in suburban cars in Japan although prohibited in city cars. On Feb. 1, 1919, however, the Imperial Government Railways inaugurated new regulations prohibiting smoking in suburban cars.

Making Casual Riders Pay

Manager Proposes Sale of Annual and Monthly Pass Cards Permitting Daily Riders to Ride at 5 Instead of 10 Cents

THE application of the commutation principle to electric railway fares, so as to lessen the rate as the rides per month or per year increase, is discussed in an article contributed to the *Wall Street Journal* by R. Schaddelee, vice-president and general manager United Light & Railways Company, Grand Rapids, Mich. He believes that the public, when it understands the fairness of the system proposed, will welcome it as a very desirable improvement.

Under Mr. Schaddelee's plan the regular cash fare would be 10 cents, but anyone could pay $6 for an annual card entitling him to ride for 5 cents per ride as often as he desired. The pass card for 1919, for instance, would be of a distinctive color and have the figures 1919 prominently printed over its face. It would be sold at $6 during January, $5.50 during February, $5 during March, etc. Similar pass cards could be sold at 50 cents each and would be good for only one month. The passes would be non-transferable.

Anyone using the street cars not more than ten times a month would have no object in purchasing either a yearly or a monthly pass card. The following table shows how the average cost per passenger would be reduced as the number of rides taken per month increased:

COST OF RIDE TO PASSENGERS UNDER PASS-CARD SYSTEM

Number of Rides per Month	Cost of Monthly Pass Card	Cost of Cash Fare (10 Cents per Ride)	Cost of Cash Fare (5 Cents per Ride)	Total Cost	Average Cost per Fare in (Cents)
5	....	$0.50	....	$0.50	10
10	....	1.00	....	1.00	10
15	$0.50	....	$0.75	1.25	8 1/3
20	.50	....	1.00	1.50	7 1/2
25	.50	....	1.25	1.75	7
30	.50	....	1.50	2.00	6 2/3
35	.50	....	1.75	2.25	6 3/7
40	.50	....	2.00	2.50	6 1/4
45	.50	....	2.25	2.75	6 1/9
50	.50	....	2.50	3.00	6
60	.50	....	3.00	3.50	5 5/6
70	.50	....	3.50	4.00	5 5/7
80	.50	....	4.00	4.50	5 5/8
90	.50	....	4.50	5.00	5 5/9
100	.50	....	5.00	5.50	5 1/2

Some of the advantages of this pass-card system, according to Mr. Schaddelee, are as follows:

When this system supersedes a flat 5-cent fare, the occasional rider pays an increase of 100 per cent; the passenger who rides twenty-five times a month, an increase of 40 per cent; one who rides fifty times a month, an increase of 20 per cent, and one who rides 100 times a month, an increase of 10 per cent. This system would do away with the handling of pennies altogether. A passenger would either pay a nickel fare or a dime fare. Every passenger not showing a pass card to the conductor would pay a 10-cent fare.

Every passenger would be entitled to the usual transfer, although this system could easily be adapted to a separate charge for transfers by charging 25 or 50 cents a month extra to passengers desiring a monthly pass card entitling them to nickel fares with free transfers. In that case these cards would have a different color and have "Transfer" printed prominently on their face.

There would undoubtedly be some misuse by owners losing their cards or allowing other people to use them, but this would be negligible. Every system of fare collection has some loopholes, and this scheme would have fewer than any other scheme.

Passengers should deposit their own fares in the fare box, the conductor merely seeing to it that every passenger not having a card should deposit a dime. The conductor would handle no fares or money except to make change. He would have no punching to do.

This scheme would also work out well with one-man car operation. One glance at the card is all that would be necessary to determine whether it was genuine.

The passenger, once having paid his 50 cents for the monthly pass or his $6 for the yearly pass, would undoubtedly be more likely to ride and reduce his average cost. The riding would thus be stimulated, and the cost of the service would be more equitably distributed than under any straight-fare system.

In Mr. Schaddelee's opinion, it is the large number of working people, and medium and small-salaried people, who depend upon the street car system entirely as their daily mode of local transportation, that make it possible for the automobile owners and other classes of people, who use the street car service only as a matter of occasional convenience to themselves, to have street car facilities available at all. This is the defect of any straight-fare system. The annual pass-card system is designed to remedy this defect by placing more of the cost of operation upon the casual rider and less upon the daily rider.

Traffic Characteristics

A Simple Graph Designed to Visualize The Relationship of the Supply and Demand of Service

BY JOHN A. DEWHURST

THE charts presented herewith illustrate a method of visualizing graphically the relation of the service furnished on a car line or route to the demand for service.

The charts are prepared from data observed at definite points on the line and represent the adequacy of service at that point. In the case of the charts accompanying this article, the points of observation are maximum-load points previously determined, and hence represent the adequacy of service for the entire line, assuming, of course, that the short-line possibilities are satisfactory.

To prepare a graph as represented, the line to be studied should be checked for several days (not necessarily consecutive days) in order to obtain a typical condition for that particular season of the year. The average number of passengers riding per day in fifteen-minute periods should be calculated from the traffic data thus obtained and plotted on the chart. In the illustrations accompanying this article this passenger record is represented by the solid line.

Likewise, the average number of seats offered during the same periods should be calculated in a similar manner (number of cars passing the point of observation times the average seating capacity). These average daily fifteen-minute totals are then plotted as shown by the dotted lines.

The areas shaded depend upon the relationship of these two lines with respect to each other. When the passenger "Service Demand" curve is in excess of the seats furnished or the "Service Supply" curve, the area is shaded with double cross hatching, indicating passengers standing. In portions of the chart where the supply of seats is greater than the passenger demand, the area is shaded with dotted-line hatching indicating empty seats. Then the area shaded in single solid-line hatching would indicate passengers accommodated with seats.

Chart 1

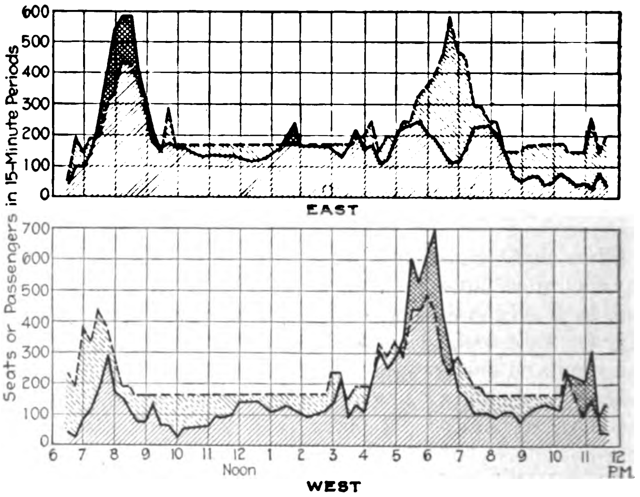
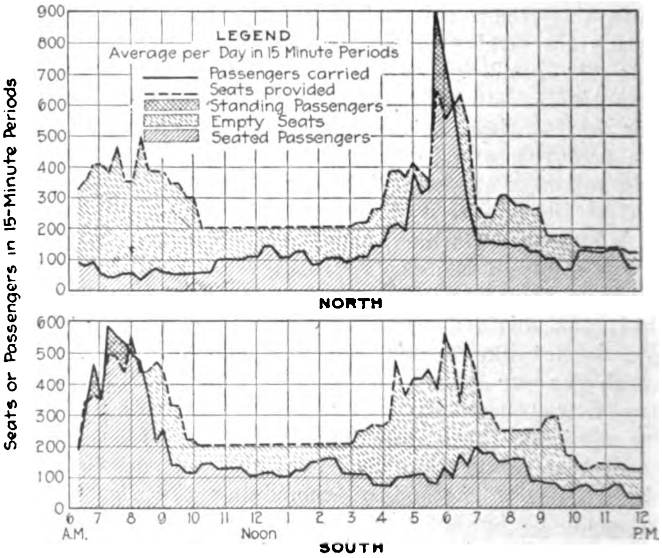


Chart 2



CONVENIENT METHOD OF CHARTING SERVICE—THE UPPER CHART SHOWS BETTER PLANNING THAN THE LOWER ONE

Under ideal conditions of a seat for every passenger and a passenger for every seat, the solid lines and the dotted lines would coincide, and the entire area would be shaded with only solid-line hatching. Unfortunately, such conditions do not prevail.

By means of a series of such charts the management can, however, endeavor to keep down the area representing empty seats, especially during portions of the day at which more than the basic service is provided. At the same time the area representing standing passengers can often be regulated so as better to serve the requirements, ofttimes without additional expense.

THE CHARTS SHOW ACTUAL CASES

Both of the charts presented illustrate the actual conditions existing on lines of large properties in the United States. The first one is selected as typical of well applied service. The peaks in service correspond to the peaks of travel demand and show a minimum of wasted service.

The second chart illustrates poorly applied service. For instance, during the morning rush hour southbound the peaks in seats furnished actually occur three quarters of an hour after the peak in travel, and the travel is even so low that sixty empty seats are operated during fifteen minutes of the peak, a service, which, of course is most costly to provide. The entire tapering off of the rush hour is from thirty to sixty minutes later than it should be. Likewise, at night the tripper service northbound starts at 3.45 o'clock, whereas the passengers riding would not occupy all of the base headway seats until an hour later, or at 4.45. There also occurs at 6.30 a minor peak of seats that are empty. Even after the tripper service is off at 7 p.m., up to 9 p.m. there are 25 per cent to 50 per cent more seats operated than during the middle of the day, whereas the travel would not even occupy the seats that would be provided by the base headway alone.

OTHER USES OF THE CHARTS

If the charts are analyzed still further it will be observed that the area under the dotted line (service furnished) is "Seat-Hours" which, with the introduction of a constant, can be converted directly into car-miles. In other words, the area outlined by the dotted line bears a direct relation to car-miles operated or the entire expense of operating the line.

To illustrate the application of this point, if a company desires to obtain approximately the relative cost of operating a new schedule, the proposed seats to be furnished passing the maximum-load point should be plotted on the graph and the respective areas measured with a planimeter. The ratio of the respective areas multiplied by the car-miles of the existing schedule would give an approximate indication of the mileage of the proposed schedule, providing no pronounced change were made in routes or short-line cars, as this scheme assumes the same average length of trip.

Graphs of this nature are simple to construct from data that should be collected continuously. Where records of this kind are kept different colors are used for the different areas instead of shading, the shading having been substituted in this article only on account of the difficulty in reproducing colors.

It is suggested that the line representing passengers be drawn in black, the line representing seats in red and the areas colored in red for standing passengers, in green for empty seats and in blue for passengers accommodated with seats. The charts then stand out in a very striking manner and not only illustrate very characteristically to those familiar with such data the conditions of a line, but also serve to illustrate to a layman facts that otherwise are hard to present. For instance, it is very apparent that the numbers of passengers required to stand during the rush hours are remarkably small in the average case compared to the number of empty seats that are operated on nearly every line during the off-peak hours. Charts of this kind have been found to be of great help in presenting the traffic problem to regulating bodies that often are not familiar in detail with the usual operating conditions.

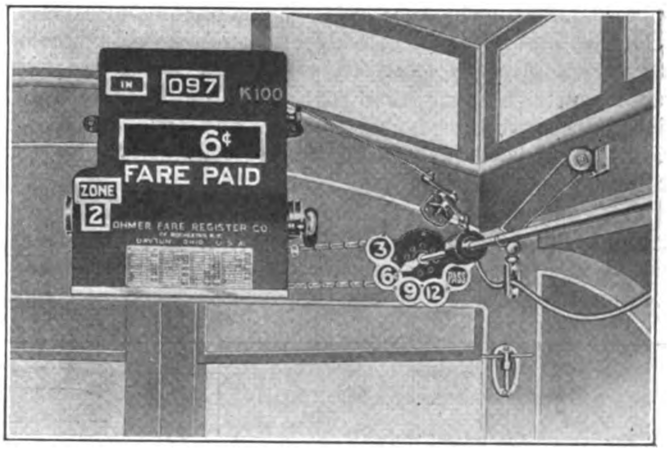
It is not advocated that all traffic records should be worked up as extensively as outlined in this article, but it is of great help to build up such a picture of the traffic characteristics of all lines, say at least once or twice a year, at the times when they represent typical conditions.

Zone Fare Registering Machines

Recording Fare Register and Identification Check Issuing Machine Recently Developed

THE Ohmer Fare Register Company has recently developed a register for zone fare collections. In one form for small properties, the register is largely an adaptation of the company's standard form, the principal difference being that it carries a zone indicator. One of these registers, designed for five rates of fare, is shown in the accompanying illustration. The records made by this register are as follows: The zone number, the trip number, the direction, the division or line number, five columns showing the registration of each kind of fare, the register number, the total number of passengers carried, the date and the conductor's identification number. The distinctive difference between this register and the company's latest city register, as already explained, is the indication on the front of the register of the zone number and its record on the printed report.

To take care of the collection of zone fares on large city and interurban properties a modification of this register has been developed together with a zone check printing and issuing machine where identification checks are given on the front platform, as with the proposed Public Service Railway zone system. In the register the fare indicator is set rapidly and accurately by setting a lever to the desired fare on a dial on the side of the machine. The fare is then registered by a treadle. The capacity of the machine is from 1 cent to 99 cents. As the end of each zone is reached and a new zone entered, the conductor takes a print and thus makes a record of all fares collected in the previous zone. At the same time, the visible zone indicator in the register advances progressively to show the number of the zone just entered. This movement is automatic and the zone indicator cannot be turned back until the complete number of zones on the line has been reached. The records made cover, besides the usual ones, the total number of free tickets, total number of purchased tickets and total number of transfers. This record is made for each zone.



ZONE FARE REGISTER FOR FOUR ZONES

The register is mounted on a pedestal and can be carried easily from one end of the car to the other. Its weight is 65 lb.

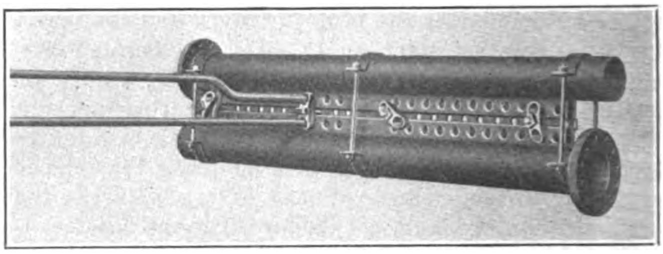
The identification check-issuing machine will print and issue, one at a time, a check showing the number of the zone in which the passenger boarded the car, the direction in which the car is moving, the serial number, the date, month and year, the motorman's identification number, the serial number of the machine and other information. The machine cannot be operated until the motorman's identification key is inserted. The zone number is set by a lever which simultaneously rings a tell-tale bell and also sets the visible zone indicator. The ticket is printed and issued by the motorman pressing his foot on a pedal, or it can be operated by a hand lever. Tickets can be issued at the rate of 60 or 70 to the minute. The weight of this machine is 35 lb.

Superheater that Can Be Applied to Existing Boilers

The Connection Between the Tubes and the Heater Is Made by Means of a Ball and Socket Joint

THE following points have been kept in mind by the engineers of the Locomotive Superheater Company, New York City, in designing a new type of superheater for use in stationary power plants: (1) Safety; (2) accessibility for inspection and repairs; (3) protection against overheating; (4) high superheating efficiency; (5) improved efficiency of combined boiler and superheater; (6) consideration of steam velocities and areas to provide minimum drop in steam pressure; (7) uniformity of superheating and ease of regulation; (8) provision for expansion and contraction; (9) provision for cleaning; (10) minimum possibility for leaks; (11) flexibility and adaptation to different designs of boilers.

The general plan of the superheater is shown in the accompanying illustrations. It consists of two headers, one of which is the distributor for the saturated steam coming from the boiler and the other acts as the collector of the superheated steam. The headers are of steel and are located outside of the hot gas path, usually outside the boiler setting proper.

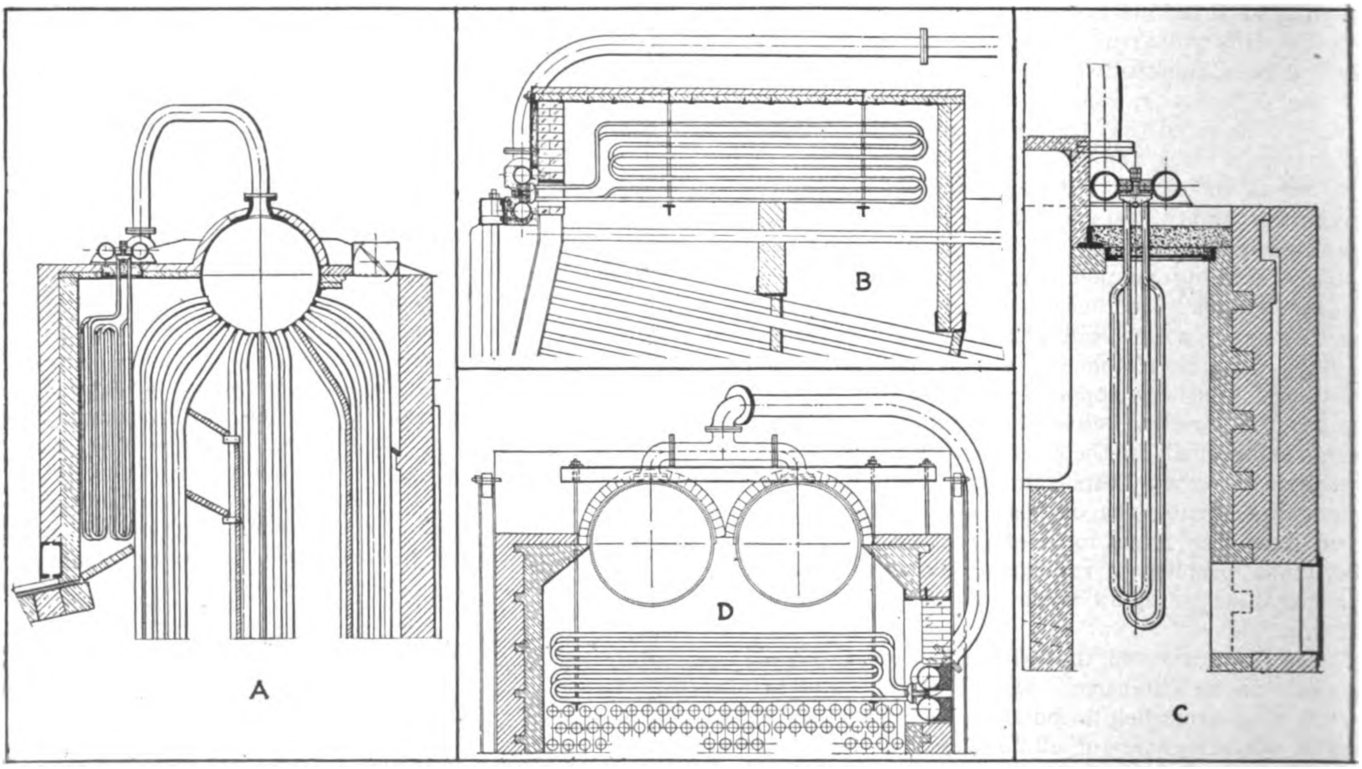


SUPERHEATER HEADER SHOWING METHOD OF ATTACHING UNITS

The superheating units are of heavy cold-drawn seamless steel tubing, bent in such form as to provide freedom for expansion and contraction. They are connected to the headers by means of ball-and-socket joints with ground surfaces. The ball of the joint is forged on the end of the tube, and it is faced and ground. It fits into a ground seat in the header made at an angle of 45 deg. The ball and seat are held in close contact by means of clamps, bolts and washers.

The drawings reproduced below show not only the general construction of the superheater but also illustrate some typical plans for installing it in boilers of usual forms.

A recent bulletin of the National Safety Council calls attention to the danger of accidents from incorrect handling of wrenches, evidently a prolific source of injuries to men in shops. The bulletin contains this trenchant statement: "Pulling away from the open end of a monkeywrench or an 'S' wrench is like attempting to hold your weight on a bar with one finger. You can hold on if you have the strength; so can the wrench if it has the strength."



SUPERHEATERS INSTALLED IN BOILERS OF SEVERAL TYPES: (A) VERTICAL WATER-TUBE BOILER; (B) CROSS-DRUM TYPE BOILER; (C) HORIZONTAL RETURN TUBULAR BOILER; (D) HORIZONTAL WATER-TUBE BOILER

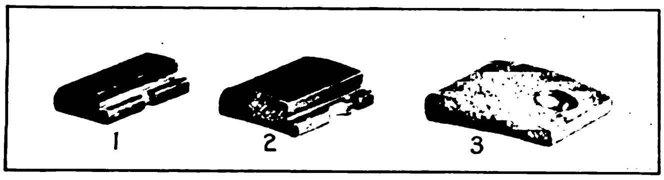
Getting More Life from "K" Controller Segments and Contact Fingers

Renewable Arcing Tips for Contact Segments Reduce the Expense of Replacement, and Careful Adjustment of Fingers Increases the Life of Contact Parts

BY R. S. BEERS
General Electric Company, Schenectady, N. Y.

WITH a "K" controller the most severe duty is on the contact fingers and segments, and for this reason they require the most attention. It is essential for satisfactory operation that the contact surfaces of the fingers and segments be smooth. This means frequent inspection, as the arcs broken in the controller burn the lubricant and roughen the segments and fingers. The burning takes place when the finger and segment break contact and is more pronounced at the end of the segment. On account of this it is often necessary to replace a segment that shows wear only at the end. To reduce the expense of such renewals, railway controllers designed in recent years have a removable "burning tip" as part of the segment. These tips are used only with the segments subjected to burning.

Figs. 1, 2 and 3 show three general types of burning tips. That shown in Fig. 3 has proved the most satisfactory. Burning tips of this type, with a suitable segment, may be put on a controller cylinder in place of those of the Fig. 2 type without change in the drilling of the segment screwholes in the controller cylinder. If the controller has the short Fig. 1 type of burning tip it is necessary to drill and tap new segment screwholes before a Fig. 3 type of burning tip can be used. The older types of railway controllers, as the K-6, K-10, K-11, K-12 and K-28, have never been provided with burning tips. To use them would require a considerable relocating of the segment screwholes and a possible modifying of the body casting in order to provide sufficient material for tapping the segment screwholes.



FIGS. 1, 2 AND 3—ARCING TIPS FOR DRUM TYPE CONTROLLERS

When a new burning tip is put on a controller cylinder with an old segment, the surfaces of each should be made nearly the same height, so that the finger will slide easily from one to the other. If the burning tip is on a segment that engages with a finger when turning from the "off" position to the first point, it is important to have it very nearly the same length as the other burning tips engaging at this time. Otherwise, when the controller is turned off, the burning will be localized on the one with the shortest segment instead of being distributed over several fingers.

The function of a "K"-controller finger is to supply a flexible connection between the segments and the finger base. With the earliest "K" controllers, when cars and motors were of small capacity, this was accomplished with a finger consisting of a copper contact piece riveted to a flat phosphor-bronze spring. The latter provides the requisite flexibility, presses the contact piece on the segments firmly enough to insure their making good contact and conducts the current from the contact piece to the finger base. As electric cars increased in size and their motors in capacity, shunts were added to the fingers to carry the increased current. Since the shunt is used to increase the current capacity of the finger it is self-evident that the contact tip should make good contact with the shunt and finger spring, otherwise heating and burning will take place where they join. Although the usual method of insuring this is to rivet the parts together, there are two other methods which are used. One is to replace the rivet with a machine screw; the other is to use spring pressure alone to hold the parts together. With these two types, the contact tips may be changed without removing the finger from the controller.

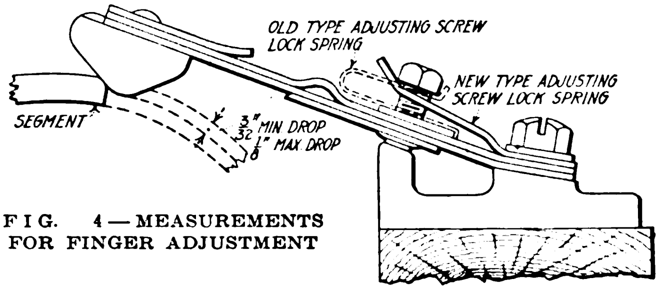

OLD TYPE ADJUSTING SCREW LOCK SPRING
NEW TYPE ADJUSTING SCREW LOCK SPRING
SEGMENT
$\frac{3}{32}$" MIN DROP
$\frac{1}{8}$" MAX DROP

FIG. 4—MEASUREMENTS FOR FINGER ADJUSTMENT

The life of finger springs is increased by the proper adjustment of the fingers. Too much "drop" causes the finger to stub, producing severe strains on the spring; while on the other hand, too little drop will reduce the pressure of the finger on the segment to such a degree that the contact surfaces will burn. "Drop" is the distance the finger falls below the surface of the segment when they are separated by turning the controller to the "off" position. It should be measured from the surface of the segment to the part of the finger that

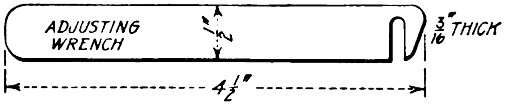
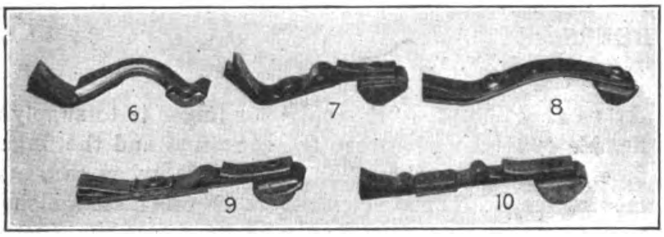


FIG. 5—FINGER ADJUSTING WRENCH

engages the segment. If the segments are worn at the ends, measurement should be made from the normal surface of the segment and not from the end, as the total movement of the finger at its point of contact with the segment should not exceed ⅛ in. When adjusting new fingers in a controller having badly worn segments particular attention should be given to this point. If the proper adjustment cannot be obtained the segment is worn out and should be replaced. An excessive drop makes the controller operation more difficult, increases the wear on the fingers and segments, and materially shortens the life of the finger spring. It frequently causes the finger to stub and buckle, and if continued will finally break the spring. Fig. 4 illustrates the method of measuring drop and gives limits of variation that have been found satisfactory, both as to contact and life of the finger spring.



FIGS. 6, 7, 8, 9 AND 10—TYPES OF FINGERS FOR DRUM CONTROLLERS

FINGERS SHOULD MAKE CONTACT ACROSS ENTIRE WIDTH

Another adjustment of controller fingers, of vital importance in securing good contact, is to twist the finger so that it touches the segment across its entire width. Frequently, when a new finger is put into a controller, no attention is given to this adjustment and the finger touches the segment at only one point.

If the fingers do not have a line of contact across the segments, overheating of the segments and fingers may take place, causing the finger spring to soften and lose tension. Twisting the fingers, particularly the reverse fingers, can best be accomplished in the K-35 and K-36 controllers by using the adjusting wrench shown in Fig. 5. This wrench fits over the finger spring and shunt and it is of sufficient width to permit adjusting one-half the fingers at a time. It should be put on the spring just back of the finger tips.

One way of preventing springs from breaking in service is to discard the spring when the tip is worn out. As a general rule the finger spring cannot be depended on to out-wear more than one tip, though in some cases a single spring will out-wear several tips. This will occur oftener with the more recent designs of fingers, where the spring is relatively longer than the contact piece, than with the older types where the spring is shorter. In designing these later types of fingers particular attention has been given to distributing the bending throughout the length of the spring, as a spring will break much more quickly with the bending localized than when distributed.

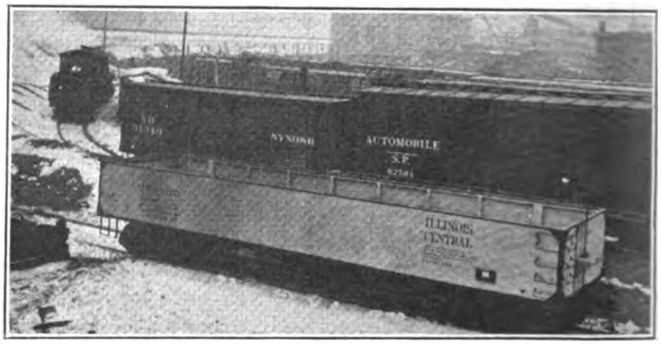
Fig. 6 shows the familiar old-type finger, while Figs. 7 and 8 show fingers of recent design having long springs and short tips that may be used in place of the old-type finger. The finger illustrated in Fig. 8 is for the K-6 controller, while Fig. 7 shows the one for the K-10, K-11, K-12 and K-28 controllers.

Fig. 10 shows the type of finger used in K-34, K-35, K-36, K-39, K-40 and K-51 controllers. Fig. 9 is a similar finger but of more recent design which embodies several improvements over the earlier finger. Among these are the use of a single grommet instead of three rivets around the adjusting screwhole, thereby leaving more metal in the finger; and the bending of the finger spring is better distributed by the long brass plate under the finger spring than with the short plate used with the old finger. The brass plate on top of the shunts, through which the adjusting screw passes, assists the lower plate in distributing the bending and also prevents turning of the locking device for the adjusting screw.

First Concrete Gondola Car

A GONDOLA CAR with concrete walls and floors on March 17 was turned over to the Illinois Central Railroad for operation. This car was invented and designed by Joseph B. Strauss, president of the Strauss Bascule Bridge Company, and was built by the R. F. Conway Company of Chicago. The construction of this car was started as a war measure when it was thought that, due to the shortage of steel, it might be possible to relieve the car shortage materially by developing concrete construction.

The fundamental feature of the design consists of a steel skeleton body forming the outer boundary of the car and mounted upon a steel underframe. The concrete walls and floors are contained within this frame, and, together with the frame and floor reinforcement, are connected to and interlocked with the underframe. The steel frame forms the finishing and protecting edges, thus entirely shielding the concrete and also serving as a complete system of stress-bearing members. The car was designed for a capacity of 100,000 lb. plus the usual 10 per cent overload. The car has an over-all length of 41 ft. 6½ in., and an over-all width of 10 ft. 2⅝ in., with sides 4 ft. 10½ in. high. The steel members of the underframe consist only of the center sill, which is of two 12-in., 35-lb. ship channels, with a ¼-in. x 20½-in. cover plate, and the body bolsters and diagonal corner braces, which conform to standard design. There are six reinforced concrete cross-bearers in the car, spaced approximately 4 ft. 6½ in. apart. The floor is 2⅜ in. thick, reinforced with longitudinal and transverse rods ¼ in. in diameter and the walls are 1½ in. thick. Arch bar type trucks fitted with M. C. B. No. 2 brake beams are used. The car weighs 53,600 lb.



FIRST REINFORCED CONCRETE CAR

Composition and Characteristics of Lining Alloys*

Cost of Lining Alloys Depends Upon Proportion of Various Metals Used — Should Not Be Judged by Prices Quoted

THERE is only one babbitt metal, and that is made to the formula originated by Isaac Babbitt about sixty years ago. It is composed of 88.9 per cent tin, 3.7 per cent copper and 7.4 per cent antimony. All other lining alloys are the result of attempts to improve the physical characteristics of the composition produced according to this formula or to reduce its price. By custom these various combinations have been called babbitt metals, even though they contained no tin or copper, but consist of lead and antimony.

A lining alloy is a soft metal interposed between two hard surfaces. One of these, which holds the metal, is usually stationary and the other revolves. The purpose of the lining is to eliminate friction as far as possible, and should lubrication be neglected it would present such a surface to the revolving shaft that should frictional heat develop the metal will wear out without damaging the shaft. In other words, the true function of a lining alloy is to wear out and if the lining alloy does not wear the shaft will.

Tin is a crystalline metal about No. 9 in the Brinell scale of hardness. It is very malleable and takes a high polish. When antimony is added the tin becomes harder and its compressive strength increases. This also increases its brittleness so that copper must be added to give toughness or tensile strength. The addition of antimony and copper, as found in genuine babbitt metal, brings the composition up to a Brinell hardness of about 28, or more than three times that of pure tin.

VARIOUS ELEMENTS HAVE DIFFERENT MELTING POINTS

The mixing of copper, antimony and tin is not an easy matter, because tin melts at 453 deg. Fahr., antimony at 786 deg., and copper at 1982 deg. In order to get the copper and antimony properly introduced to this mass of tin an understanding of how to handle these metals at their widely varying temperatures is required. Genuine babbitt, properly made, shows a matrix of tin, and all through this are crystals composed of tin and antimony, copper and antimony, and tin and copper. These crystals constitute the bearing points in genuine babbitt. All other lining alloys are of the same structure to a more or less extent. Tin and antimony are anti-frictional, but lead, an oily and greasy metal, is the best for anti-frictional purposes. Unfortunately, however, pure lead is very soft and by itself has no value as a bearing metal. It also alloys with other metals with great difficulty.

Manufacturers of alloys have recognized the value of lead as an anti-friction metal and have tried to use as much of it as possible. This has resulted in a series of alloys ranging from 92 per cent of tin and no lead, down to 95 per cent of lead and no tin. There are hundreds of branded alloys varying from each other a few points in tin, lead, antimony and copper, which have been brought into being in an attempt to conserve price. A purchasing agent can always buy a lining metal at his own price. This will be readily understood when it is taken into consideration that with tin selling at 75 cents a pound and lead at 5 cents a pound, it is only necessary to take out 2 per cent of tin and add 2 per cent of lead to make a difference of 1¼ cents per pound in the price. The proper way to buy lining metals is for each purchasing agent to specify his requirements by giving sufficient data as to the maximum revolutions per minute, the pressure per square inch which will have to be withstood, together with the method and character of lubrication and the condition of the service. This information should be furnished the lining alloy manufacturers so that they can recommend the proper alloy to be used.

CHARACTERISTICS NECESSARY IN LINING ALLOYS

There are four fundamental requisites in a lining alloy: compressive strength, tensile strength, heat resistance and anti-frictional qualities. These are enumerated in the order which seems to be the order of their importance. A lining alloy to be of value must have, first, sufficient compressive strength so that it will be able to hold up the maximum load per square inch that is liable to be put on the bearings without squashing out. Second, it must have sufficient tensile strength so that if the bearings are subjected to vibration or pounding it will not break apart. Third, it must have sufficient heat resistance so that should the bearings become hot the alloy will stand the highest possible temperature before it begins to flow. Without these three qualities any anti-friction metal has no great value. Under ideal conditions there is supposed to be a film of oil between the lining metal and the shaft at all times. It is only when the oil film is not maintained that the anti-frictional qualities of the metal become of real importance.

Another matter of interest is the relation of the above four points to the characteristic of the four metals used in the manufacture of bearing alloys, namely, tin, lead, antimony and copper. If compressive strength was all that was needed, an alloy could be made of 80 per cent lead and 20 per cent antimony, which would be of 32 Brinell hardness, or harder than genuine babbitt. As far as holding up the load is concerned, this metal would answer every purpose. While antimony will harden lead, when a certain percentage is passed the antimony and lead become very brittle, so that with 80 per cent lead and 20 per cent antimony the alloy is almost like glass and the slightest vibration will break it to pieces. Therefore, to combine the qualities of compressive strength with tensile strength tin must be added to the lead and antimony. Tin has an affinity for lead and together they give a quality of hardness, that is, compressive or tensile strength and elasticity. It is not sufficient to get this elasticity alone, but the metal must be tough in its elasticity. Copper must then be added, which, having an affinity for tin, will toughen the tin. The amount of each element that is put into the alloy has a definite relation to the necessary characteristics.

The question has often been asked as to whether lining alloys can as satisfactorily be made from scrap metals as from new metals. A good lining alloy can be made from scrap metals and may do the work satisfactorily because of the unusual factor of safety that is used. But although alloys made of scrap metals are sold at a lower price they are really not cheaper than alloys made of new metals. Every time that metals are melted a certain amount of oxidation takes place. If scrap metals are used the oxides are present, and in the ordinary shop practice they cannot all be eliminated. These oxides come to the top when the metals are melted and are skimmed off in the form of dross. Thus there are not as many pounds of metal in the bearings from the same formula as when new metal is used. Again, the physical structure of the alloy is weakened when scrap metals are used, as for example when old lead pipe is employed. This is usually obtained from buildings where it has become corroded or rotted due to the fluid that has passed through it. It may contain lime, potash, sulphuric acid, or a number of other things. The impurities cannot be removed simply by melting the lead. A chemical reaction has taken place in the lead and it has lost its original characteristics. Where scrap tin is used there is liable to be a small percentage of iron left in the metal from the detinning process, which will destroy the lining alloy. In genuine babbitt the presence of less than one-fourth of 1 per cent of arsenic or sulphur effects the metal so that it will not stick to iron or brass boxes, and the mass will be filled with little holes which tend to weaken the physical structure of the metal. New copper is soft and tough and it is the toughness that is wanted in the bearing metal. Where scrap trolley wire is used it is often found that it has become brittle in use due to having lost some of its tensile strength. This condition cannot be changed by simply putting the copper into a pot and melting it over again.

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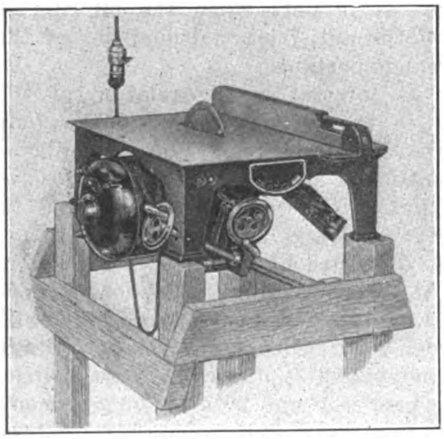
*Abstract of an address made by Alfred A. Greene of the National Lead Company, before the Purchasing Agents' Association of St. Louis at the meeting held on Feb. 18, 1919.

New Bench Saw for Woodworking Shop



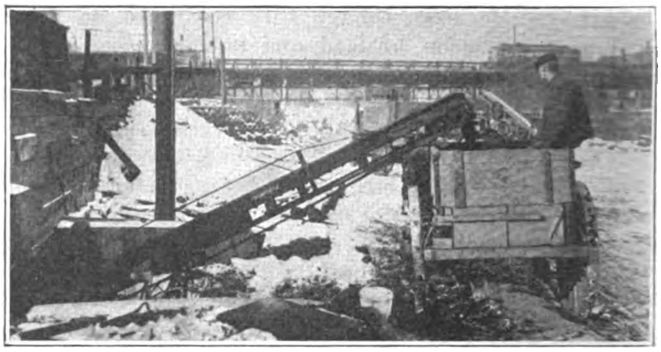
NEW TYPE PORTABLE BENCH SAW

A BENCH tool, portable, and designed to operate on the electric lighting circuit, has been placed on the market by J. D. Wallace & Company, of Chicago. Several new features are incorporated in the design. To cut at an angle, the saw is tilted instead of cocking up the table. This makes it possible to cut long stock without fear of breaking the angle by the stock coming in contact with the floor. The table is always in a horizontal and safe position, and the exact angle of the cut can be set by turning a hand wheel until the angle desired is registered on a dial in the front of the machine. This tilting mechanism swings the cradle in which the motor-driving mechanism and saw are mounted.

The saw can be raised and lowered so as to cut or groove the stock to any depth up to 2 in. The raising and lowering mechanism is similar to the tilting mechanism and is controlled by the hand wheel in the front of the machine. The bench saw is provided with a Wallace shutter saw guard. This is built into the machine and slips back as the stock goes through, so that it never interferes with the efficient operation of the saw.

New Type of Conveyor Reduces Cost of Handling Material

A NEW TYPE of portable scoop conveyor shown in the accompanying illustration has been placed on the market by the Portable Machinery Company, Inc., of Passaic, N. J. The most distinctive feature of this, as compared with other similar types of machines, is the scoop on the digging end, which can be pushed or completely buried in the materials to be conveyed. This makes it possible simply to scrape the material into the carrying belt instead of lifting it up by shovelfuls and putting it into hoppers, as is ordinarily the practice with conveyors. The sides or skirt plates of this conveyor form a trough, which increases the carrying capacity of the belt to a considerable extent. These sides hold the material together, thus making the whole width of the belt available for carrying.



LOADING A WAGON WITH COAL BY MEANS OF A SCOOP CONVEYOR

The carrying capacity of the scoop conveyor based on handling coal is 1 ton per minute, provided a sufficient amount of coal is maintained at the receiving end of the machine. With a storage pile of sufficient height, one man can easily feed 1 ton in one and one-half minutes, or if the pile is low he may require from two to four minutes. This scoop conveyor may be used for storing, reclaiming and loading bulk material and light articles such as coal, ashes, sand, earth, crushed stone, salt bags or light packages. It may be used singly or in tandem as required.

The steel frame holding the rollers of the conveying belt is mounted on wheels. The whole is perfectly balanced so that one man, by inserting the pipe handles into the ends of the horizontal members, can easily lift or move the machine around. An electric motor or gasoline engine mounted under the frame transmits power to the conveyor by means of a chain and sprocket connection to a shaft extending beneath the conveyor. From a sprocket on the other end of this shaft the power in turn is transmitted to the driving sprocket located at the upper end of the conveyor. The carrying belt is of fine grade duck and rubber, with duck cross-strips. These transverse cleats are provided to prevent the material from slipping back down the incline. The conveyor is made in three different sizes—with lengths of 13 ft. 8 in., 19 ft. 8 in. and 24 ft. The width of the conveying belt on any of these sizes may be either 12 in. or 16 in., as desired. Size 13 ft. 8 in. elevates its load to a total height from the ground of 5 ft. 9 in.

In the accompanying illustration the conveyor is shown handling coal on the property of the Haverhill (Mass.) Electric Company.

LETTERS TO THE EDITORS

Is Pipe Drainage a Cure for Electrolysis?

165 BROADWAY
NEW YORK, N. Y., March 16, 1919.

To the Editors:

My attention has recently been called to an article by D. W. Roper in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 7, 1918, entitled "Drainage if Necessary vs. Negative Feeder Electrolysis Protection." In this article Mr. Roper essays the role of a champion of pipe drainage as a solution of the electrolysis problem. Lest Mr. Roper's enthusiasm for pipe drainage may perhaps lead some who have not closely followed this subject to think that a cure for all electrolysis troubles has now been found, it seems well to point out that no such interpretation should be placed on what Mr. Roper says. On the contrary, it should be understood that: (1) It is an open question whether pipe drainage ought to be used at all; (2) assuming that there is a field for pipe drainage, no one knows to what extent its use is justified, and (3) neither of the foregoing questions can be answered rationally and conclusively until a great deal of additional data have been secured, properly analyzed and thoroughly studied and digested. No one questions the effectiveness of drainage for cable sheaths, but lead cable systems and piping systems are fundamentally different, and Mr. Roper's argument that because drainage will protect lead cable sheaths it should also protect gas and water piping systems is merely begging the question.

As to the comparison between a drainage installation and an insulated return feeder installation in Chicago the results obtained from these two throw little or no light on their relative merits as electrolysis protective systems, nor do they permit of generalizing as to costs because the conditions are so different in the two cases. In the Illinois Street substation district, where pipe drainage was installed, the area under test is relatively small, the rail network is congested and the feeding distances are short. In the Crawford Avenue substation district, where the insulated return feeder system was installed, the area involved is extensive, paralleling and inter-connecting tracks are relatively few, and feeding distances are long. It is obvious that the cost of reducing stray currents in pipes to a given value is much greater under the conditions prevailing in the Crawford Avenue district than under the conditions in the Illinois Street district. So much for the relative costs. As to the relative performance of these two installations in reducing electrolysis damage, little or nothing has been made known. The figures given by Mr. Roper showing current flow on pipes in the Illinois Street district, with and without drainage, have no direct bearing on this question.

If the matter of efficacy in preventing electrolysis damage is ignored, there is no rational basis for making comparisons between costs of pipe drainage and costs of insulated return feeders.

Extensive investigation is required to determine how much electrolysis protection is afforded by either the pipe drainage system or the insulated track feeder system. However, it is known that the insulated feeder system, by reducing stray currents, gives *some* electrolysis protection. Whether pipe drainage affords *any* protection against electrolysis as a net result is not definitely known.

The writer cannot agree at all with Mr. Roper's argument of conclusion respecting so-called "joint electrolysis." This phenomenon has frequently been pictured as localized right at the pipe joints, the current being supposed to leave the pipe and enter it again within a few inches of the joint. On this supposition, corrosion would be expected in the immediate proximity of the joints on the positive side. Now the writer has seen instances of corroded joints, but anyone who will consider the stray current paths and their electrical characteristics will readily see that the effects due to joints are usually of quite a different character. A joint which has a resistance markedly different from normal tends to cause a shunting of current through by-paths or to other structures, at points which may be near to or may be remote from the joint in question. Bearing this in mind it is not surprising that certain efforts, to which Mr. Roper refers, to find corroded joints proved unavailing.

Mr. Roper makes reference to the insulated return feeder system installed in the Ann Avenue substation district in St. Louis, and gives curves showing potential differences between rails and pipes in this district and in the two Chicago installations. In this Mr. Roper makes the serious error of comparing such potential differences in a district where the pipes are drained with the potential differences in districts where pipe drainage is not employed. Whatever significance as to the electrolytic condition of the pipes such potential differences may have in an undrained district—and at best they do not afford a dependable criterion—they have no comparable significance in a district where pipe drainage is employed. Such comparisons are, therefore, fallacious. This error may possibly be related to Mr. Roper's misinterpretation of the passage which he quotes from a report on the Ann Avenue installation in St. Louis, of which the present writer was a joint author, as follows:

> Values which experience has shown afford a substantial measure of protection from injury by electrolysis to underground structures.

Mr. Roper takes these "values" to refer to potential differences between rails and pipes. This is not correct as is apparent on reading the entire sentence in the report from which he quotes, which reads as follows:

> The tests above detailed show that it is feasible by means of a small number of insulated return feeders to bring about an approximately constant potential condition over a large area, and to reduce the drop in the tracks and, therefore, in the earth, to values which experience has shown afford a substantial measure of protection from injury by electrolysis to underground structures.

The statement, therefore, did not refer to potential differences between rails and pipes but to potential drop in the tracks, which is quite a different matter, and consequently the conclusion drawn by Mr. Roper from this reference is unsound.

The writer does not despair of the ultimate establishment of some procedure which will effectually prevent damage from electrolysis, but he wishes to enter a plea for caution in drawing conclusions on a subject which is so little understood and so fraught with speculation, prejudice and misinformation. Though ultimately it may possibly be found that pipe drainage has a field of justifiable use, sufficient evidence is not yet available either to justify it or condemn it, but in the writer's opinion such evidence as we now have tends much more strongly to its condemnation than to its justification as a primary means of electrolysis protection. However, considerable scientific work has been done and much more is under way or under consideration, and it is the writer's plea that final judgment be withheld as to the efficacy of any sytem of mitigation until sufficient facts are available to permit conclusions of real value to be drawn. ELAM MILLER.

[EDITOR'S NOTE—Mr. Miller's letter was submitted for comment to Mr. Roper who replied as below.]

COMMONWEALTH EDISON COMPANY
CHICAGO, ILL., March 30, 1919.

To the Editors:

I have read with considerable interest Elam Miller's comments on your abstract of my paper presented before the St. Louis section of the A. I. E. E. The paper was an attempt to present the technical data and the results of tests of a carefully designed drainage system installed in Chicago, together with similar information regarding an insulated negative feeder system installed in another district in Chicago, and also to compare these results with such published information as was available regarding similar systems installed in St. Louis. The insinuation that I think that "a cure for all electrolysis trouble has *now* been found" is hardly warranted by any statement in the text; and as far as the word "now" is concerned, the abstract includes a reference to the published description of a drainage system by Mr. Farnham nearly twenty-five years ago.

Mr. Miller endeavors to prove that he has been misquoted and alleges that the writer in error misrepresented the intent of his statement so that potential drop in the tracks was made to appear as potential differences between rails and pipes. Another quotation from the same report, of which Mr. Miller was a joint author, may serve to illuminate this point:

> In the article contributed by the Bureau of Standards to the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, to which reference has already been made, the cost of this insulated return feeder installation is shown to be comparatively small.
>
> The same article gives results of tests which show that the currents and potentials on underground piping systems in this district have been rendered so small that the structures are considered comparatively safe from injury by electrolysis.

It will also be noted that Mr. Miller uses the measurements of current and potential to prove the effectiveness of the installation in the Ann Avenue district, but he seriously objects to having exactly similar figures exhibited as an argument in favor of the drainage system as applied in the Illinois Street substation district.

Mr. Miller's statements and arguments appear to say that if the currents in the pipes in a district where the insulated negative feeder system is employed are no greater than the currents in the pipes where the drainage system is employed, then the two systems are equally effective; but in making it so appear, he overlooks the fact that with the insulated negative feeder system, currents traveling along the pipe must leave the pipe somewhere and have no place to leave except through moist earth where damage by electrolysis will be caused; but in the case of the pipes where the drainage system is used, the currents traveling along the pipes leave the pipes over a metallic connection through the drainage cable so that their departure occurs without damage to the pipes.

Mr. Miller presents a carefully devised description of "joint electrolysis" which is quite different from the phenomenon that has heretofore been known by that name, but it is somewhat difficult to understand how electrolysis could occur in the manner which he describes with certain differences of potential between pipes or between pipes and rails, which are plainly set forth, when the same potential differences in the Ann Avenue installation in St. Louis are declared to be "comparatively safe."

The generalizing as to costs specifically referred to the systems under discussion and was largely an arithmetical deduction from the data presented. It would hardly have been given, however, had not the figures been verified by similar calculations in other districts.

The writer shares with Mr. Miller the desire to see the ultimate establishment of some procedure which will effectively prevent damage from electrolysis, but if the advocates of any one system of electrolysis mitigation or prevention will thrust aside as having no direct bearing on the situation all information which tends to favor some other system, then the final conclusions regarding the merits of the several systems may be deferred until judgment day.

It is the writer's opinion that in the determination of the best system of electrolysis prevention, no better way can be found than to publish all information that will add to our knowledge regarding the merits of the several systems, and wherever possible, to make a careful comparison of the several systems on the same basis. It is hoped that you will continue to publish such information when it is available, and in doing so to express your own comments on the data presented as freely as you did in the present instance, by substituting for the author's title, "Electrolysis, A Comparison of Conditions in St. Louis and Chicago," your own title, "Drainage If Necessary versus Negative Feeder Electrolysis Prevention," and by inserting a number of paragraph headings which were not in the original paper, as for example, "Drainage Cables Better Than Negative Feeders." It is suggested, however, that the editorial comments might preferably be separated in some manner from the contributed matter. Apparently these editorial comments were considered by Mr. Miller as portions of the original paper and evoked a large part of his criticism.

D. W. ROPER,
Superintendent of Street Department.

Is Electrolytic Joint Corrosion Serious?

AMERICAN GAS ASSOCIATION
PHILADELPHIA, PA., March 20, 1919.

To the Editors:

An article has recently appeared in the ELECTRIC RAILWAY JOURNAL entitled "Drainage or Negative-Feeder Electrolysis Protection." D. W. Roper, the author of this article, proposes electrical drainage of gas and water pipes as a cure for all electrolysis troubles. It is true that this would be an easy solution of this difficult problem if the gas and water pipes were continuous conductors, such as are the lead cable sheaths. Mr. Roper's conclusions are all based on the supposition that gas and water-piping systems do not have high-resistance joints, and that current flowing along a pipe encountering a high-resistance joint does not cause corrosion of the joint where the current flows around the joint through the surrounding soil.

Joint corrosion is by no means the most serious objection to electrical drainage of piping systems. High-resistance joints such as are always present in gas and water-piping systems with lead or cement joints will cause the stray currents carried by these piping systems to leave the pipes, to flow to other sub-surface metallic structures, causing electrolytic corrosion of the pipes at locations other than directly at the joints. This trouble is generally more serious than electrolytic corrosion directly at the joint.

However, let us discuss the question of joint corrosion. Mr. Roper states that "an earnest endeavor was made to find an actual case of joint electrolysis in Chicago. No such case has ever been found." This statement is quite sweeping in character and misleading to those not familiar with conditions in Chicago and throughout the country. The Palmer report, covering the electrolysis investigation in Chicago, shows a photograph of a serious case of joint corrosion where the fittings in the pipe were on the spigot end of the pipe. Such authorities as the late Prof. A. F. Ganz, D. H. Maury, chairman of the electrolysis committee of the American Waterworks Association, Professor Blake who reported on electrolytic conditions in Kansas City and Richmond, and A. A. Knudson who reported on the electrolysis situation in New Bedford, all agree that joint corrosion may be serious.

Mr. Von Maur, chairman of the electrolysis committee of the American Gas Association, reports a number of cases of serious joint corrosion in St. Louis where holes were eaten entirely through the gas mains, all of the trouble being confined to the 18 in. near the joint. The writer has seen a number of serious cases of joint corrosion in locations where the gas and water mains are negative to all adjacent structures, where electrical measurements were taken to establish this beyond doubt. I question whether electrical drainage of piping systems should be permitted at all.

It should be further pointed out that the electrical drainage system which was installed in the Illinois substation district in Chicago was in operation less than ten days. No conclusion can therefore be drawn from this installation. H. C. SUTTON.

Coasting Saves Power in Twin Cities

Even Fractional Installation Indicates that Substantial Savings Are Being Made

AS OF JUNE 15, 1918, the Twin City Rapid Transit Company had already installed 340 out of the 1100 Rico coasting recorders purchased to outfit its system completely. Part of these 340 were on four fully-equipped lines out of Nicollet station as follows: Marquette and Grand; Fourth Avenue south and Sixth Avenue north; Monroe and Bryant; Fifty-fourth Street and Columbia Heights. Other lines are in process of being equipped and while the installation is still not complete the company is well pleased with the results obtained.

Records were taken from the time the first recorders were put out, but the first comparative statement for the information of the men at Nicolett station was not issued until April 1. This was accompanied by a bulletin from General Superintendent Caufield, who explained why men on the extra list would be grouped by themselves for the sake of fairness. Mr. Caufield also pointed out that a man's coasting record was in direct proportion to the amount of his willingness and earnestness to "Save and Serve."

At the very beginning of the year 1918 the company issued to the trainmen a booklet entitled "Doing Our Bit—Coasting and Its Relation to the War." At the opening was this quotation from Bulletin 183 of the United States Fuel Administration: "An investigation convinces us that electric railways offer a chance for large savings." The relationship between coasting and fuel saving was succinctly portrayed thus:

MORE COASTING ⟶ LESS POWER
LESS POWER ⟶ LESS COAL

An informal coasting campaign had indicated to the company that with the co-operation of the trainmen the total amount of coasting then being done could be increased by not less than 10 to 15 per cent. This estimate, as will appear later, already was very greatly exceeded—a compliment to the management, the men and the coasting recorder.

The remainder of the pamphlet gave the men good suggestions on how to operate more efficiently through increased coasting and how to key the coasting recorder and turn in the printed record therefrom. The conclusion said: "The more you *coast*, the more coal you will save, the easier will be your work, the less will be the wear and tear on the car equipment, and the safer and more comfortable will be the ride of passengers, the customers who pay your wages.

"In the interest of safety and economy, and on behalf of the nation at large, the management asks the hearty co-operation of each trainman toward the successful carrying out of this cmpaign."

That the men responded heartily from the start to this appeal to save power is clear from the following results secured during the first half of last year:

COASTING PERCENTAGES ON TWIN CITY LINES OUT OF NICOLLET STATION

	January	May	June
Marquette and Grand	25.6	31.2	30.2
Fourth Avenue South and Sixth Avenue North	21.5	25.7	24.9
Monroe and Bryant	22.0	28.7	28.1
Fifty-fourth and Columbia Heights	22.2	27.8	26.8
Extra list	23.9	25.5	25.4

It is hardly necessary to point out that from the very beginning the men showed a big advance over the ordinary unchecked motorman. The slight drop in June did not indicate a decrease in efficiency, because some of the lines were speeded up at the same time that increased travel increased the number of stops per mile. Nor is any attempt being made to drive the men. The management is satisfied that if the men are thoroughly imbued with the importance of coasting they will continue to improve steadily and permanently. It is much more to the point to have a good general average than a few very high ones and a mass of low ones.

On the basis of only 30 per cent equipment of the Twin City lines with coasting recorders, Chief Engineer Scofield found an energy saving of 5 per cent for the whole system, which would indicate a saving of at least 16 to 17 per cent for complete installation. Mr. Scofield has kept careful records of energy consumption per car-mile over many years. With due allowance for weather and temperature conditions, the saving can be accounted for only through the correct use of the coasting recorders.

AMERICAN ASSOCIATION NEWS

Current Association Questionnaires

THE committee on power generation has just sent out data sheet No. 187 to secure statistics on the cost of producing electrical energy. The questions are such as to permit the character of the load to be considered, and the operating expenses are to be segregated under these accounts: Superintendence of power, buildings, fixtures and grounds, power plant equipment, power plant employees, fuel for power, water for power, lubricant for power, miscellaneous power plant supplies and expenses.

The committee on one-man car operation is asking for very comprehensive information on this subject. Among the important items are the following: Number of one-man cars of Birney and other safety types operated; number converted from former types; safety devices installed; average car weight on system and of one-man cars; length of time one-man cars have been operated; average energy distributed per car-mile on system and on lines equipped with Birney cars; hourly wages paid to operators of one-man cars and other cars; popularity of one-man cars; type of employee most suitable for one-man car operation; relations with trainmen in connection with one-man car service; attitude of the public toward one-man cars; relation of one-man cars to increases in services, schedule speed, headway, track capacity, etc.; effects on earnings; effects on jitney competition; effects on accident hazards; effects on car and track maintenance.

Way Committee Starts Work

THE Engineering Association committee on way matters met at association headquarters on March 28. A digest was presented showing the work which had been done by the committee just previous to the suspension of activities. The executive committee assignments were then considered and divided among the members. Those who attended the meeting were C. H. Clark, Cleveland, Ohio, chairman; W. R. Dunham, Jr., New Haven, Conn.; H. Fort Flowers, New York; C. G. Keen, Philadelphia, Pa.; E. M. T. Ryder, New York, and N. B. Trist, Pittsburgh, Pa.

Optimism Prevailed at Waterbury Meeting

AS A RESULT of an unusually energetic publicity campaign on the part of the local committee the Waterbury meeting of the Connecticut Company section, held on March 27, was attended by a large number of members and guests, namely 312. As usual an informal dinner preceded the meeting. Special cars were run from Hartford, New Haven and Bridgeport to the meeting. C. H. Chapman, local manager, presided and aroused enthusiasm by the statement that the safety cars for Waterbury will begin to arrive on April 7 and will be received at the rate of three per week until fourteen are delivered.

Corporation Counsel Hugh G. Church represented the Mayor in welcoming the visitors and he was followed by John H. Goss, general superintendent Scovill Manufacturing Company, who spoke on industrial relations. Mr. Goss criticised the basis on which the War Labor Board was founded, the work of the board being of a curative rather than a preventive nature. Mr. Goss attributed the freedom of Waterbury from labor disturbances to the fact that the industries are home owned and that mutual understanding exists between the managements and the employees. J. F. Berry, attorney for the Connecticut Company, touched upon legislation affecting the local trolley lines and explained the investigations regarding which a report was to be made on April 1. It was understood that the investigating committee is ready to grant relief necessary to keep the roads going for the next two years, but payment of dividends is not yet in sight.

Another legal speaker was Benjamin I. Spock, formerly attorney for the railway company. He told of the co-operation which had been necessary between the Chase interests, which he represents, and the railway company, which had worked together to keep up the service between Waterbury and Waterville in order to keep the mills going on necessary war work. John J. Cassidy, attorney and general manager Waterbury-Milldale Tramway, paid a powerful tribute to the loyalty of the Connecticut Company employees. In conclusion Chairman Chapman spoke briefly regarding the trials and tribulations of the electric railway business but said that he considered the future to be promising.

The evening was enlivened with music, and a clever sketch showing the operation of the one-man car was staged by the local committee.

War Reminiscences at Chicago Meeting

AT THE MARCH 25 meeting of the Elevated Railways company section several speakers told of their personal experiences at the front. Sergeant E. A. Schaaf of the First Gas Engineers described his work, Captain H. E. Fisher took up the Army medical work and Ensign W. G. Woods spoke of his training and work in the Navy. J. A. Jarvis emphasized the importance of loyalty on the part of employees toward the company and the value of co-operation between departments. J. M. Feldhake urged that each employee in traveling over the system constitute himself a committee to observe and report any feature in connection with train operation that might call for improvement. R. N. Griffin also gave a humorous outline of his work as superintendent of the "Loop."

Activities of the London Safety-First Council

A VERY active organization for accident reduction is the London (England) Safety-First Council which was organized about two and a half years ago. It comprises representatives of thirty-eight local authorities, six of which are also tramway authorities, seven railways, three tramways, five omnibus companies, two vehicle workers' associations, sixteen technical research societies, professional associations, etc., thirteen commercial firms and a few others. The detail work is assigned to the drivers' educational committee, the street safety committee, the railway safety committee, the schools propaganda committee, the industrial safety-first committee, the publicity committee and the general purposes committee. That the work of the council is effective is indicated by the fact that during two years the decrease in fatal accidents was about 24 per cent and in the total of accidents 36 per cent.

Recent Happenings in Great Britain

Labor Unrest Continues—Need for Higher Fares More and More Apparent—Plans Developing for Reconstruction and New Work

(From Our Regular Correspondent)

Great Britain, no less than the United States, has been troubled with labor unrest and strike upheavals. The Bolshevist element among the shipbuilding and engineering workmen on the Clyde brought about strikes and riots in Glasgow in the beginning of February. Belfast industries were brought to a standstill through strikes. Local railway transportation in London was paralyzed. The trade unions concerned backed the London strikers, but elsewhere stoppages were "unauthorized." Outside of London there is a special tendency for the workmen to break away from their trade union leaders and to go on strike in defiance of agreements. The spirit of unrest and impatient desire for improved conditions everywhere leads to demands which are often impracticable. Among the pretences for asking for shorter working hours without reduction of pay is that unemployment will thus be prevented. Unemployment does exist to some extent, but it can only be temporary, and there is an elaborate state organization for getting into employment the men discharged from the army.

GLASGOW STRIKE A FAILURE

So far as the tramway services were concerned, the strike in Glasgow was a failure. The men refused to come out, and though a number of cars were damaged on the streets by the rioters the service was not interrupted. In Belfast the tramway service was suspended because the employees in the municipal power station stopped work. The service was restored on military protection being given. The strike on the underground railways of London was dealt with in a special article in the ELECTRIC RAILWAY JOURNAL for March 8, page 478.

At the end of February the British public was in a state of suspense over the result of negotiations between the government and the allied federations of coal miners, railwaymen and transport workers. The demands were extortionate and yet, if refused or no compromise reached, national paralysis was threatened.

FAVORABLE YEAR FOR UNDERGROUND

The reports presented to the annual meetings of the London underground electric railway companies in February show that in spite of adverse war conditions last year was the most favorable in their history. Labor and materials were scarce and dear, but in spite of that the companies carried more passengers than they did in any previous year. Dividends to shareholders have improved, but they are still low, as the capitalization of such lines is necessarily very heavy. That being so, and considering also the present congestion of traffic, it is unlikely that any great improvement in the perecentage return on the par value of the stock can be looked for unless there is considerable increase of fares. The 50 per cent increase imposed by government order on the railways of the country generally does not apply to the London "tube" railways, which up till now have increased their fares only slightly. Further increases were foreshadowed at the annual meetings in February and also additional capital expenditure for developments and improvements now much in arrears owing to the war.

LONDON SUBURBAN TRAFFIC DEVELOPING

The chairman of the London & South Western Railway, Brigadier-General Drummond, gave some interesting particulars at the annual meeting of the company on Feb. 21 on the development of traffic on the London suburban lines of the company since they were changed from steam to electric traction. He said that the improvement had exceeded all expectations. In the year 1913 the number of local passengers carried in the suburban district was 25,000,000; in 1915, before electrification, the number had increased to 29,000,000; in 1917 the number was 33,000,000 and last year the total number of local passengers carried was 40,000,000, or an increase of not less than 17,000,000 compared with the year 1915, or about 75 per cent.

Two of the biggest municipal extension schemes at present specified are those of Liverpool and Coventry. The former city wishes to borrow an additional sum of £550,000, to be expended as follows: Generating plant, £200,000; electric mains, £190,000; new cars, £70,000; motor garage and equipment, £15,000; new car shed, £10,000. Coventry proposals are estimated to cost £333,000 for reconstruction and doubling of certain tracks, reconstruction and extension of other lines, new cars, new car shed, etc. The Corporation of Manchester intends to build 100 new car bodies itself and ask tenders for others. In regard to motor omnibuses, the Associated Equipment Company, sole builder for the London General Omnibus Company, seems in a fair way to getting much of the business.

Prices are, of course, very high, but arrears accumulated during the war are so heavy that tramway authorities must have the stuff, now that it is beginning to be obtainable. In regard to rails, during the war when none could be obtained in this country Middlesex County Council ordered a small quantity from the United States which included freight and insurance cost £30 a ton, compared with £7 10s. before the war. The maximum price in this country is now £17 10s. a ton. Major Fred Coutts, manager of the Paisley Tramways, and secretary of the Scottish Tramway Officials' Association, has issued an appeal to tramway authorities to support a movement in favor of their getting authority speedily to increase fares in order to meet higher working expenses and the great cost of materials. In connection with the latter he has put forward a very interesting tabular comparison of prices which is included in the review of electric railway trade conditions in Great Britain in the Manufactures and Markets Department elsewhere in this issue of the ELECTRIC RAILWAY JOURNAL.

PLEA FOR FARE INCREASE

Major Coutts makes a very strong case for authority to raise fares immediately above the present statutory maxima instead of having to wait as at present until after a loss on working has been shown. As an additional reason for such power, he points to the present extortionate demands of tramway employees for a forty-four-hour week and other concessions. Such demands if conceded will spell bankruptcy for many tramway undertakings unless they can largely increase their revenue. The position seems to be quite as acute as the corresponding one in the United States.

In this connection it may be noted that during February the Glasgow Town Council granted to all its employees a forty-eight-hour working week without reduction of pay and with increases in the war bonus raising it to a maximum of 30s. per week. It was stated that the change would mean in the tramway department an annual deficit of £40,000. This is in spite of the fact that the undertaking in the past has been so successful that it is in the unique position of having paid off all its capital liabilities, so that there are no payments for interest and sinking fund. The Glasgow fares are, however, so low at present that there is ample margin for raising them without difficulty.

FORTY-FOUR HOUR WEEK

The Town Council of Newcastle has granted a forty-four-hour week to all its employees, including the tramway men. These two cases are rather a break-away so far as tramways are concerned, because in the end of February negotiations were still going on between the two tramway associations of the country and the men's unions on the question of hours, and something like a deadlock had been reached.

The English Electric Company has gone to allotment. It consolidated under one direction and management the Coventry Ordnance Works, Dick-Kerr & Company, the Phoenix Dynamo Manufacturing Company, the United Electric Car Company and Willans & Robinson. About 90 per cent of the Dick-Kerr shareholders have accepted the offer to exchange their shares for shares in the new company. The authorized capital is £5,000,000 and the issued capital on allotment is just under £2,000,000.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE · PERSONAL MENTION · CONSTRUCTION NEWS

Voting on City Ownership

Review of Terms Under Which Detroit People Are Asked to Sanction Municipal Ownership

Provided the agreement and a charter amendment accompanying it are approved by three-fifths of the electors (male and female) of Detroit, voting on the propositions on April 7, the contract for the purchase of the railway property of the Detroit United Railway will be effective, and the city will come into possession of the property on July 1, 1919.

MANY LONG CONFERENCES

The purchase agreement entered into is the result of numerous sessions of great length during which practically every phase of the railway problem which has confronted the city for more than a score of years, was carefully considered.

The three possible methods of acquiring a railway system, i.e., purchase by agreement, condemnation and piecemeal construction, were earnestly weighed, and, with the advice of street railway experts, the Board of Street Railway Commissioners of the city unanimously concluded that the purchase by agreement plan was the most practicable and feasible method of affording relief from the conditions which have prevailed in the past.

The board says that in arranging the agreement every effort was made to safeguard the interests of the people of Detroit, and it requests that the voters study the agreement carefully and then express their preference at the election.

For the sum of $31,500,000, of which $15,000,000 is to be paid down on July 1, 1919, and the remainder on or before Dec. 31, 1931, the city of Detroit will acquire the railway property of the Detroit United Railway within the city of Detroit, the city of Highland Park, the village of Hamtramck and the township of Warren, Macomb County.

WANTS APPROVAL OF $24,000,000 OF BONDS

At the election on April 7, the voters will be asked to approve bonds to the value of $24,000,000, to take care of the initial payment of $15,000,000 on July 1 and to permit of the making of extensions, betterments and improvements to the railway system as now existing.

The city is to pay interest at the rate of 6 per cent on the unpaid portion of the purchase price (which is to come out of earnings) until the balance is fully liquidated, but it has the right to stop the running of interest by retiring the outstanding bonds secured by mortgage upon the property at any time before Dec. 31, 1919, if it wishes to do so.

Upon conveyance and delivery of the railway system to the city, the Detroit United Railway is to be permitted to run its interurban cars into the city substantially as heretofore, on payment to the city of cost of the transferring of cars over the city's tracks, plus 30 per cent. At all times the entrance of these interurban cars into the city is to be under the reasonable control and regulation of the Board of Street Railway Commissioners.

The agreement between the city and the Detroit United Railway, relative to the compensation for use of the city's tracks by interurban cars, may be reviewed at five-year periods, and in case the city and company are unable to agree, the difficulties are to be submitted to the Michigan Railroad Commission for determination.

INTERURBAN LINES FOR INTERURBAN PASSENGERS

Neither the city nor the company is to issue transfers for transportation of passengers over lines or on cars of the other party, and the interurban passenger cars are to carry only passenger traffic originating in the city districts for points beyond the city limits, and passenger traffic originating outside said city limits coming into the city.

Important Power Plant Improvements

The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., managed by Henry L. Doherty & Company, New York, N. Y., will spend $1,000,000 on its plant, according to a communciation submitted to the Council of St. Joseph by J. H. Van Brunt, general manager of the company.

All obsolete machinery will be replaced with new and modern apparatus and the capacity of the plant will be so enlarged as to remove all possibility of a recurrence of a breakdown such as occurred last winter. A new power house will not be built, but much new equipment will be installed. Additional pumps will be placed in service so that the company will not be forced to depend upon the city water plant for water. The consulting engineers for the company decided that a new plant could not be built before next winter but that improvements could be made to the present plant which will place it in good shape. Last winter the power plant interruptions greatly embarrassed the management and caused much financial loss to the company.

Sliding Scale Commended

Mr. Babson Thinks Service-at-Cost Plan Needs to Include Incentive for Efficient Operation

Roger W. Babson of the information and education service of the Department of Labor, in recent articles in the Washington *Star*, suggested various possible cures for electric railway ills in the District of Columbia. The plans have been submitted to the Public Utilities Commission for consideration in connection with the application of the Washington Railway & Electric Company for financial relief.

AGAINST MUNICIPAL OWNERSHIP

The plans mentioned by Mr. Babson include municipal ownership, service-at-cost, service-at-cost with a sliding scale of return, and partnership with the city. Mr. Babson characterized the first as tending eventually to uneconomical operation.

The service-at-cost plan, in Mr. Babson's opinion, would also lead to uneconomical operation because it lacks the salient feature of the plan recently proposed for the New Brunswick Power Company, St. John, N. B., as noted elsewhere in this issue. This feature is that an incentive for efficient operation is provided by including in the cost of service a sliding scale of return on investment, changing inversely with the rate of fare.

Discussing the advisability of a partnership plan, Mr. Babson said in part:

> A loan of public funds or even the guarantee of securities seems somewhat out of the question for the present. The only other form of relief which seems practical would be to have a partnership arrangement entered into between the companies and the District of Columbia. By such an arrangement the companies would be allowed a dividend of, say 5 per cent on their stock, with the understanding that the net earnings over and above this amount would be divided fifty-fifty between the company and the district.
>
> #### IMPARTIAL ACCOUNTING NECESSARY
>
> Such a system requires impartial accounting. Companies working under such partnership tend to put so much back into the property that there is never any excess to divide. This principle is all right, provided there be an increase of stock commensurate with the excess put back into the property, and that arrangements be made for the district to receive one-half of such stock increases.
>
> Perhaps the most practical method of handling the situation at the present time would be along the lines of the national banking system. In the case of the banks, private interests are the stockholders and they are given a certain maximum and minimum leeway between which they can work. The capitalization always represents real money, and an effort is made by the government to enable the banks to make a fair rate of interest on this money and lay up a surplus besides. In return, however, the government makes a very careful examination of the banks and has a close supervision over them. This is primarily in the interests of the public, who are depositors in the bank, rather than in the interests of the stockholders.

Temporary Aid for Connecticut

Special Commission Proposes That Taxes Be Deferred for Two Years and That Jitneys Be Regulated

Eight recommendations for legislation designed to relieve electric railways in Connecticut were made to the State Legislature on April 1 by the special commission appointed to investigate the condition of the carriers. The recommendations cover, in general, a temporary deferment of taxes, a temporary positive relief from bridge and paving assessments, a regulation of jitneys and a grant for motor vehicle operation by railways.

The report was signed by Senator John B. Dillon, co-chairman; Senator C. E. Hough, Representative O. H. Beckwith, Representative J. T. McKnight, W. M. Waitt, I. M. Ornburn and F. R. Cooley. A supplementary report was filed by Messrs. Beckwith, Dillon and McKnight, in favor of a loan from the State. Dissenting reports were made by Representative S. C. Shaw, co-chairman; Senator W. C. Fox and Representative J. S. McCarthy.

CONTRIBUTING CAUSES

According to the majority report, 98 per cent of the 828 miles of electric railways in Connecticut are either in receivership or insolvency and must be partially or completely suspended or abandoned unless substantial temporary relief is given by the 1919 Legislature. Only the Bristol & Plainville Tramway is paying.

The vital causes contributing to this situation are said to be these:

1. War conditions.
2. Abnormal increase in wages.
3. Abnormal increase in cost of material.
4. Abnormal increase in cost of coal.
5. Taxation requirements of the State.
6. Paving assessments required by State laws.
7. Bridge assessments required by State laws.
8. Rapid development of unregulated jitney competition.
9. Operation of non-paying lines.
10. Depreciated purchasing power of the former unit of electric railway fare, the nickel.
11. Improved facilities required of companies.
12. Great increase in use of private automobiles.

The commission believes that some of the above named causes will adjust themselves within the next two years after the return to peace conditions, such causes as No. 1, No. 3 and No. 4. Within two years there may be a reduction in cost of material, and equitable means may be found for a decrease in percentage of cost of labor to the gross revenue. As to items No. 5 to No. 11 inclusive, however, the commission sees no hope for relief from the pressure and hindrance of these causes, except by means of definite and adequate legislation.

REMEDIES SUGGESTED

In the commission's opinion, the situation is so critical that it is a serious question whether the lines can be saved intact or not. It is necessary, therefore, at once to take steps along these recommended lines:

> 1. The suspension of any call or demand for the payment of taxes due to the State at the present time or which may become due up to the time of the rising of the General Assembly of 1921. A uniform rate of 5 per cent per annum [instead of 9 per cent] should accrue upon any unpaid taxes up to that time.
>
> 2. Complete relief, until the rising of the General Assembly of 1921, from all charges and the payment of all costs on bridge construction as assessed under the present State laws, except cost of maintaining the track and other railway equipment required by them for operation.
>
> 3. Complete relief, until the rising of the General Assembly of 1921, from all paving charges as called for by the present laws of the State, except the maintenance for 8 in. beyond the rails and except the replacement in a proper manner of any paving which the railways may remove or injure.
>
> JITNEYS
>
> 4. The so-called jitney should be declared a common carrier and thereby be placed under the same control and supervision as the electric railways, so far as schedules, routes and rates are concerned; and under the commissioner of motor vehicles so far as licensing and providing security against damage to persons are concerned.
>
> PERMISSION TO OPERATE MOTOR VEHICLES
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> 5. Permission should be granted to the electric railways to operate a motor-vehicle service, and to abandon non-paying portions of their lines provided other adequate means for conveying the traveling public is furnished, all subject to the approval of the Public Utilities Commission.
>
> 6. Construction at the expense of the State, and under the supervision and approval of the highway commissioner, of the electric railway approaches to the New London bridge, the railway concerned to maintain the property and pay a rental of 10 per cent of the cost of construction to cover use and depreciation.
>
> 7. Permission should be granted to the Hartford & Springfield Street Railway to operate its cars over certain tracks of the New York, New Haven & Hartford Railroad.
>
> 8. Appointment by the Governor of an electric railway commission of three members to continue study and to report to the General Assembly of 1921 on conditions at the close of 1920, together with recommendations and necessary legislation required to place the railways upon a safe, fair and efficient operating basis. The commission should, if deemed desirable, have authority to engage a competent expert to make a careful appraisal of properties after July, 1920.

Bills have been submitted carrying out all the recommendations stated above, together with an additional one, providing that the State may lend not more than $2,000,000 to electric railways, if necessary, and further providing for bond issues to raise the money, with the stipulation that the railways pay one-half of 1 per cent more interest to the State than the State would pay on the bonds. This last mentioned bill was drawn up by Messrs. Beckwith, Dillon and McKnight.

URGES PUBLIC CO-OPERATION

In closing its report the commission says:

> We believe at present that in spite of many causes for criticism and complaint it is now the earnest effort and endeavor of the officials of electric railways to give the best service possible to the public, and we further believe that the operating officers, together with the Public Utilities Commission, will gladly endeavor to correct abuses and lacks in efficient service if the public will co-operate by bringing the just causes for complaint to their attention. We are not justified in expecting perfection in railway companies any more than in individuals, but by kindly co-operation much can be done by the public to help the operating officers in giving more satisfactory service.

The dissenting reports in the main favored merely a suspension of the bridge or paving assessments or both for two years, or until the rising of the next General Assembly, with a 5 per cent charge on unpaid assessments and a preferred lien in favor of the State on the companies' properties for the assessments.

To Stimulate Business

Utilities Committee Co-operates in National Campaign to Stabilize Trade at Present Prices

In an effort to stabilize prices, lower the cost of living and stimulate business reconstruction a "National Prosperity Campaign," under the chairmanship of Philip H. Gadsden, vice-president United Gas & Improvement Company and chairman of the National Public Utilities Committee, began on April 4. The object is to bring business men to the belief that it is within the power of industry to resuscitate itself.

According to a statement issued at the headquarters of the campaign, Room 700, Commodore Hotel, New York City, the stabilization of business at present price levels rests within the power of industry itself, is the belief of the National Federation of Building Industries. This is the message that is being forwarded to members of the War Service Committees and the Chambers of Commerce of the United States, as well as by leaders of business, by the "National Prosperity Campaign." The statement continues:

> Regardless of government attitudes toward the present price situation, there is a realization of the necessity for the upkeep of production and the absorption of the unemployed, and the distribution of such propaganda as will stimulate confidence as well as activity in business projects. Several hundred firms throughout the country have wired their approval and co-operation.
>
> It being granted that general retail buying by the ultimate consumer is still enjoying its usual boom even at present prices, the fact remains that industry has been waiting and is waiting for basic prices to strike a permanent level that would justify industry in going ahead and still be protected against loss by a drop in prices. Present prices are here to stay, so far as price levels are concerned; we cannot await the industrial adjustment of the entire world. Factory fires must be kept burning and wheels turning, and labor must be employed at a scale of wages commensurate with the prices of commodities.

Appeals have been sent to the Governors of the States and mayors of principal cities, requesting conferences with their business interests that are now awaiting building and highway construction.

The organizing committee of sponsors of the "National Prosperity Campaign" include the following: P. H. Gadsden, chairman; Milton E. Ailes, vice-president Riggs National Bank, Washington, D. C.; E. P. Albrecht, president Philadelphia Bourse; Joseph E. Davies, former chairman Federal Trade Commission; James H. McGraw, president McGraw-Hill Company, Inc., New York; Franklin T. Miller, president F. W. Dodge Company, New York; John Hays Hammond, Washington, D. C.; Cardinal Gibbons; Julius Rosenwald, president Sears Roebuck & Company.

City Takes Over Railway

Seattle on April 1 Formally Came Into Possession of Railway Lines of Puget Sound Company

Formal transfer of the railway lines of the Puget Sound Traction, Light & Power Company at Seattle, Wash., to the city took place on March 31. Superintendent of Public Utilities T. F. Murphine states that plans for operation by the city provide first for a physical connection between the already existing municipal lines and the traction lines, thus eliminating duplication of service, and also contemplate express or limited service from the outlying districts to the industrial districts, the adoption of traffic regulations, the elimination of present congestion on downtown streets due materially to parking of automobiles, and the installation of the skip-stop system.

PRELIMINARY OPERATING PLANS

The type of one-man cars now in use will be continued wherever practicable, with the installation of a larger type of one-man cars, and a campaign of power saving and the speeding up of the service. Car tickets will be done away with and the nickel made the standard and only fare, except for school children, All free riding will be abolished. Safety zones will be established, with the end in view of loading and unloading passengers more rapidly.

The sum involved in the transfer is $15,000,000. The company accepts utility bonds against the property transferred in payment, and under the agreement with the city the Supreme Court has passed upon the validity of the securities to be taken in lieu of cash. A forty-five-day period was permitted in which the company was to clear the title of all incumbrances, this period to date from the day the Superior Court received the *remittitur* from the Supreme Court. When that is done the title of the property passes to the city and the $15,000,000 of utility bonds are turned over to the company.

The purchase of the properties by the municipality was primarily the result of war emergency conditions. The company was confronted with the problem of meeting greatly increased costs of operation, increased interest rates for money needed for maturing bonds and notes and to keep pace with community growth and development and of meeting the competition of war industries for all labor required. Involved with this was the immediate future problem of expiring franchises.

EXPIRING FRANCHISE A PROBLEM

One of these problems might have been solved in part by increased rates of fare, but no fare within reasonable limits could have solved the other—the problem presented by the franchise tenure. It was impossible, as it proved, to solve even the problem of increased costs by any adequate proportionate increase in revenues, or such increases as would be possible only under proper increase in rates of fare being charged.

A State statute, since amended, provided that no railway could charge a fare in excess of 5 cents for a continuous ride within the city limits of any city of the State, and continuous ride had been construed to mean and include any transfer to which the rider is entitled.

SUSPENSION NOT POSSIBLE

The company's first thought and effort was to have the City Council permit such temporary suspension of franchise requirements, by agreement between the city authorities and the company, as would allow the company to increase its rates of fare, but it was not possible to overcome all objections to that arrangement. In the meantime the labor problem was particularly pressing. Men were leaving the company's employ to work in the shipyards. Costs were mounting higher day by day and revenues were not increasing in any like proportion. The company could not increase fares, but the city as owner of the properties would not be bound by this rigid fare statute. It was at this juncture that the first suggestion was made that the city could solve the transportation problem by acquiring the railway lines. That suggestion came from Councilman R. H. Thomson as early as May 14, several months before it was considered seriously by the city, the company or the public.

On Aug. 13, after returning from Washington, where he had been in conference with the Capital Issues Committee and officials of the government's transportation and housing bureau, Mayor Hansen came out in a public statement declaring that the only solution of the transportation problem was for the city to acquire all of the railway lines in the city, consolidate them and operate them as a single publicly-owned, publicly-operated system.

PUBLIC SENTIMENT TESTED

On Sept. 6, after an all-day session of city officials and railway officials and representatives of the United States Shipping Board, the city made an offer of $15,000,000 for all of the railway lines and railway operating property of the company within the limits of the city of Seattle. On Sept. 11 the company filed an answer accepting the offer.

The city officials, after entering into negotiations on the basis of the price offered, determined to have the authority of the people for its final consummation, and accordingly submitted the purchase question to an advisory referendum in the election of Nov. 5. The referendum carried by a vote of 29,726 to 8309. After obtaining this affirmation of the purchase by the people, the city officials felt freer to proceed with the details.

The offer made for the properties and the acceptance by the company was a general offer and a general acceptance based upon the ability of the city and the company to get together on all of the details. One by one these were agreed upon, by a process largely of give and take, and by both sides remaining on a common ground of mutual understanding and open and above-board dealing.

STATEMENT OF PROPERTY ACQUIRED

The city is acquiring from the company 194.08 miles of electric railway tracks and 8.60 miles of cable tracks, a total of 202.68 miles; 477 passenger cars, with twenty-seven motor-equipped freight and work cars and thirty-six freight and work cars without motors, or a total of 540 cars of all descriptions. There are thirteen other vehicles ranging from touring cars to tar wagons, and all of the railway distribution system, including trolley and span wires, poles, etc., together with the signal and interlocking apparatus used in train dispatching. There are seven carhouses and yards, three cable stations, freight sheds and freight terminals, smaller miscellaneous buildings and structures, many parcels of real estate and rights-of-way and thousands of tools of all descriptions, together with a large car repair shop and much land at Georgetown. Stores and supplies on hand go with the lines, where such stores and supplies are used exclusively for street car operation.

The city is acquiring a transportation system which carried last year about 117,500,000 passengers and with gross revenues for the year of about $4,500,000.

As noted in the department "Personal Mention" elsewhere in this issue many important changes in personnel have followed the taking over of the lines by the city.

Company Withdraws from Employees' Association

An announcement posted in the carhouses and employees' waiting rooms of the Brooklyn (N. Y.) Rapid Transit System indicates that the company is prepared to comply with the recommendation of the War Labor Board to remove all company control over the Employees' Beneficial Association.

According to the posters, the company will hereafter allow the employees to elect their own president. In the past the president of the association has been appointed by the president of the Brooklyn Rapid Transit Company subject to confirmation by the trustees, five of whom were appointed by the company and five elected by the members of the association. The company also announces a new insurance scheme. It offers $1,000 of life insurance to every employee, each employee to pay a flat rate of 25 cents a month, the company to pay the balance of his premium. It is figured the company's share of each premium will amount to from $15 to $25 a year, according to the age of the person insured.

Boston Elevated Act Declared Constitutional

At the present session of the Massachusetts Legislature several bills authorizing the State to help defray part of the cost of electric railway transportation are under consideration, and before going farther with them the legislature thought it wise to learn whether such bills, if passed, as well as the existing Boston Elevated Railway act, were constitutional. Hence, on Mar. 12, the Senate asked the justices of the Supreme Court to decide four questions of law.

The first was whether Senate Bill No. 54 would be constitutional, if enacted. This provides in substance for a maximum fare of 5 cents on the Boston Elevated Railway, but if the income thus received shall be inadequate to meet the cost of service, the deficiency is to be made up to the company from the treasury of the Commonwealth and the sums so advanced shall be assessed upon the cities and towns in which the lines of the company operate.

The second question was whether House Bill No. 722 would be constitutional, if enacted. This bill aims to reduce fares on the Boston Elevated Railway by the payment by the state to the company of an amount equal to the rental due from it for the use of subways, and the assessment of the sum so paid in the same way as in the Senate bill already mentioned.

The third question was as to the constitutionality of Chapter 159, which is the law under which the Boston Elevated Railway is now being operated.

The fourth question was whether any part or parts of this law which have a direct relation to the validity of the two bills just mentioned were unconstitutional.

The court answered the first two questions by "yes" and the second two questions by "no." In other words, it declares the present law constitutional and that the bills, if enacted, would be constitutional.

San Francisco Encroachment Case Argued

Senator Hiram Johnson of California appeared as chief counsel for the city of San Francisco when arguments were begun in the Supreme Court of the United States on March 25 on the right of the city to construct its own railway lines parallel to those of the existing lines owned and operated by the United Railroads, San Francisco. An appeal was taken by the private company from the lower federal court decrees dismissing injunction proceedings started by it to enjoin the city from constructing the proposed municipally-owned lines.

The case has aroused country-wide interest because of the important issue involved. In asking the Supreme Court to reverse the judgment of the lower courts, counsel for the company argues that the refusal of the lower courts to enjoin the city impaired the company's contract and deprived it of its property without due process of law.

Brooklyn Men Present Demands

The demands of the unionized employees of the Brooklyn Rapid Transit Company for increases in wages, shorter hours and various improvements of working conditions have been addressed to Lindley M. Garrison, the receiver. With the demands was sent a letter requesting that the members of the committee be permitted to appear in person before the receiver.

It is stated unofficially that motormen and conductors on the surface lines are asking 60 cents an hour for a nine-hour working day and time and a half for overtime. They also ask some sort of payment for time consumed in "swings" between working hours. Shop workers are asking for an eight-hour day at 45 cents an hour, with time and a half for overtime. Structural workers and blacksmiths want 53 cents an hour for a nine-hour day and time and a half for overtime.

No date has been set by the men for a reply to their request.

News Notes

City Will Take Over Railway.—The Common Council of Niagara Falls, Ont., has notified the Niagara, St. Catharines & Toronto Railway that upon the expiration of the latter's franchise a year from now the city will take over the railway and operate it as a public utility.

Ford Promises a "Flivver" Street Car.—Announcement was made on April 3 by C. E. Sorenson, general manager of the Henry Ford & Son Tractor Company, that Henry Ford and other members of his tractor organization are now working on plans for a street car driven by an internal combustion motor which will demonstrate in Detroit this summer.

Commission Control in North Dakota.—Public utilities, including electric railways, have been placed under control and supervision of the State Railroad Commission in a bill passed by the Legislature and signed by the Governor. Publicly owned utilities are exempt. No rate for service fixed by legislation may be increased by the commission.

Wage Increase Asked in Pittsburgh.—The motormen and conductors of the Pittsburgh (Pa.) Railways have presented a new wage scale to the receivers, effective on May 1. A substantial increase in pay is asked, although neither the receivers nor the men have announced the details. The present wages of the men are 42, 45 and 48 cents an hour.

Wage Request Refused.—F. R. Coates, president of the Toledo Railways & Light Company, Toledo, Ohio, at a conference on March 28 told the men the public would not stand a fare increase sufficient to meet the wage demand. He offered two counter propositions, both declared unsatisfactory by the unions. The employees demand a scale of from 50 cents to 60 cents an hour, and the electricians from 50 cents to 75 cents.

Women Incident Closed.—The Cleveland (Ohio) Railway considers the conductorette issue closed, John J. Stanley, president, announced on March 28. He is reported to have said: "We propose to take no action in the matter of reinstating the women, regardless of the action of the War Labor Board and the inquiries of the women. I said as much in my reply, dated Thursday, to an inquiry from Miss Rose Moriority, who has been championing the conductorette cause."

Indeterminate Franchise Measure Defeated.—After a bitter fight in which there were many hearings in the Twin Cities and before the Minnesota Legislature the Warner street railway bill was defeated in the House eighty-six to forty votes. The bill proposed dual control of the railways in the major cities. It was defeated because it appeared that control of the railways was removed to the State Railroad & Warehouse Commission, thus defeating operation of the home rule idea. The bill made it possible for a company to surrender its franchise and operate under a State license.

M. O. Bill for Minneapolis.—A bill has been introduced in the Legislature, authorizing Minneapolis to take over its railway lines and other property necessary to operate them under the right of eminent domain, as provided in the statutes through condemnation. It may assume outstanding debts and agree to pay those debts as part of the compensation to the company which created them. Provisions limiting a city's debt may be ignored in pledging the credit of the city and issuing bonds to buy the railway. Fares are to be fixed at a sum that will operate the property efficiently and pay interest on the indebtedness.

Reports Against Purchase by Municipality.—Thomas Bradshaw, financial expert of Toronto, Ont., engaged by the city of Ottawa, Ont., to inquire into the reasonableness or unreasonableness of the offer of the Ottawa Electric Railway to sell to the city at a price approximating $6,500,000, has submitted his report. In his opinion, the company's offer is too high; the best interests of the city would be served by waiting until 1923 to acquire the enterprise. Mr. Bradshaw advises against proceeding with any valuation of the physical assets of the railway at the present time. Prices of both material and labor, he contends, will be cheaper several years hence.

Financial and Corporate

Chicago Loss Heavy

Lower Earnings and Higher Expenses Cause 25 Per Cent Loss in Residue of Surface Lines

The gross earnings of the Chicago (Ill.) Surface Lines in the fiscal year ended Jan. 31, 1919, suffered a decline of $404,535 or 1.1 per cent, $380,023 of this loss being in regular passenger earnings. This showing was made worse by the accompanying advance in operating expenses.

TABLE I—REVENUES AND EXPENSES OF CHICAGO SURFACE LINES FOR YEARS ENDED JAN. 31, 1918 AND 1919

	1919		1918	
	Amount	Per Cent	Amount	Per Cent
Earnings:				
Passenger cars (including mail carriers)	$34,186,578	98.50	$34,566,601	98.44
Other sources	523,520	1.50	548,032	1.56
Gross earnings	$34,710,098	100.00	$35,114,633	100.00
Expenses:				
Maintenance	$3,810,266	10.98	$3,214,948	9.16
Renewals	2,776,808	8.00	2,835,636	8.08
Power—operation	2,841,211	8.18	2,558,192	7.28
Conducting transportation	12,477,148	35.95	10,802,009	30.76
General and miscellaneous, including Board of Supervising Engineers	2,366,504	6.82	2,197,908	6.26
Taxes	1,460,000	4.20	1,493,000	4.25
Total expenses of operation	$25,731,937	74.13	$23,101,695	65.79
Residue receipts	$8,978,161	25.87	$12,012,938	34.21
Divided:				
Chicago Railways, 60 per cent	$5,386,897	15.52	$7,207,762	20.52
South Side Lines, 40 per cent	3,591,264	10.35	4,805,175	13.69

Owing to wage increases and higher material costs, the operating expenses rose $2,630,242 or 11.3 per cent during the last year. The largest item of increased expense was "conducting transportation," which jumped $1,675,139 or 15.5 per cent.

Effective Aug. 1, 1918, the National War Labor Board awarded a wage increase amounting to $3,700,000 a year. This was in addition to the wage increase of more than $1,000,000 a year given the employees under the contract dated June 1, 1917, which ran for a three-year period, or until June 1, 1920. These two wage increases, within a period of fourteen months, made an aggregate wage increase of more than $4,700,000 a year.

TABLE II—INCOME STATEMENT OF CHICAGO CITY RAILWAY FOR YEARS ENDED JAN. 31, 1918 AND 1919

40 per cent of the residue receipts of Chicago Surface Lines	$3,591,264	$4,805,175
Deduct joint account expenses, interest on capital investment of the Chicago City Railway, Calumet & South Chicago Railway and Southern Street Railway	3,580,613	3,661,805
Divisible income of Chicago City Railway	$10,650	$1,143,369
City's proportion, 55 per cent	5,857	628,853
Company's proportion, 45 per cent	$4,792	$514,516
Add interest on capital investment	2,668,657	2,623,510
Income from operation	$2,673,450	$3,138,026
Other income—deficit	7,046	58,358
	$2,601,403	$3,196,384
Interest on bonds and notes outstanding	1,755,217	1,695,000
Net income	$846,186	$1,501,384

The residue receipts of the combined surface lines, as a result of the adverse showing in both gross earnings and expenses, fell off $3,034,777 or 25.2 per cent. The balance of $8,978,161, was divided 60 per cent or $5,368,897 to the Chicago Railways and 40 per cent or $3,591,264 to the south side lines; namely — The Chicago City Railway, the Southern Street Railway and the Calumet & South Chicago Railway.

The comparative figures of the Chicago City Railway for the last two fiscal years are given in Table II. A sign of the year's decline is shown in the fact that the city's 55 per cent share of the divisible income of this company amounted to only $5,857 in the year ended Jan. 31, 1919, as compared to $628,853 the year before.

After the payment of operating expenses and bond interest, the net income of the Chicago City Railway was reduced from $1,501,384 to $846,186. The item of other income last year, amounting to $58,358, was more than balanced this year by the loss of $82,625 in the ordinance 15 per cent on new construction, decrease in bank interest and other miscellaneous income. Three quarterly dividends were paid during the year, 2 per cent in March, 2 per cent in June and 1 per cent in September, the one due in December being passed.

At the present time the company is not earning the 5 per cent interest rate fixed by ordinance on its purchase price. In the last year the percentage of net income to capital stock at par was 4.7 per cent. The foregoing figure does not reflect the full result of the second wage increase, which was effective only during the last six months of the year.

Public Service Losses

Operation in 1918 Resulted in Deficit of $4,800 with Reduced Depreciation and No Stock Return

During the calendar year 1918 the Public Service Railway, Newark, N. J., without earning a dollar upon its nearly $50,000,000 of capital stock, showed a loss of $4,822. During this period, too, the company set up only $333,000 for depreciation instead of the $800,000 desired. For seven months of the period a 5-cent fare was in effect; for five months, 1 cent for a transfer, and from Oct. 15 to Dec. 31, a 7-cent fare. Detailed results for the year are shown in Table I.

TABLE I—INCOME STATEMENT OF THE PUBLIC SERVICE RAILWAY FOR 1918, WITH ADJUSTMENTS FOR ACCIDENTS AND DEPRECIATION

	Seven Months Ended July 31, 1918	Five Months Ended Dec. 31, 1918	Year 1918
Operating revenue	$10,683,258	$8,977,471	$19,660,730
Maintenance (excluding power)	1,525,684	1,385,008	2,910,692
Other operating expenses	5,103,085	4,729,725	9,832,811
Depreciation	....	333,333	333,333
Taxes	927,281	644,741	1,572,022
Total	$7,556,050	$7,092,807	$14,648,858
Net operating revenue	$3,127,208	$1,884,664	$5,011,872
Other operating income	6,337	3,071	9,408
Operating income	$3,133,545	$1,887,735	$5,021,280
Non-operating income	95,585	88,669	184,255
Gross income	$3,229,130	$1,976,405	$5,205,535
Income deductions	3,029,989	2,180,368	5,210,357
Net income	$199,141	*$203,963	*$4,822

* Deficit.

In January, 1919, the company, without setting up one dollar for deprecia-

TABLE II—OPERATING RESULTS OF THE PUBLIC SERVICE RAILWAY FOR FIRST TWO MONTHS OF CALENDAR YEAR 1919

	January	February	Total
Revenue from transportation	$1,896,226	$1,737,875	$3,634,102
Revenue from other railway operations	40,446	40,059	80,504
Operating revenue	$1,936,672	$1,777,934	$3,714,606
Operating revenue deductions	1,578,141	1,464,916	3,043,057
Railway operating income	$358,531	$313,018	$671,549
Auxiliary operating income	405	433	839
Total operating income	$358,936	$313,451	$672,388
Non-operating income	4,406	4,935	9,341
Gross income	$363,342	$318,386	$681,729
Income deductions	429,333	434,842	864,175
Net income	*$65,991	*$116,456	*$182,446
Car-miles	4,833,378	4,471,005	9,304,383
Car-hours	509,746	471,569	981,315
Federal income and profits taxes included above	$5,402	$11,322	$16,724

* Deficit.

NOTE—In the above figures no allowance is made for depreciation.

tion, lost $65,990. In February the company lost $116,455. Detailed figures are given in Table II. These losses were incurred in an "open" winter, when the company was not troubled with snow removal and similar items.

The foregoing data were presented to the Board of Public Utility Commissioners of New Jersey by President T. N. McCarter at a hearing on March 26 in regard to the proposed zone system of the Public Service Railway. It will be recalled that the commission had granted a 7-cent fare effective until April 1, 1919, to pay fixed charges and make up back losses, with a 6-cent fare after this date to keep the company going.

The commission ordered the company, however, to investigate the possibility of a zone system and file a report by Jan. 1. The company was not able to complete its report and received two months' additional time. In filing its report it asked for an extension of the 7-cent fare period in case the new zone rates should not be allowed to go into effect on April 1 (the 6-cent fare has since been ordered restored).

At the hearing Mr. McCarter stated that if the new zone rates were suspended for the maximum period up to July 1, the loss for the first six months of 1919 would be $145,580 with a 7-cent fare in operation for the whole period and $334,041 with a 6-cent fare in effect between April 1 and July 1. These figures include $400,000 or half of the current depreciation set-up for 1919 but not a $200,000 loss from the recent strike.

Expenses Continue High

Higher Costs of Operation Cause London Street Railway to Suffer Small Loss in Net for 1918

The net income of the London (Ont.) Street Railway for the year ended Dec. 31, 1918, showed a loss of $2,978 as compared to that for the preceding year. This loss was the direct result of the higher operating costs imposed upon the company during the year. The wage increase in May imposed an additional burden on the basis of $37,500 a year. The operating cost per car-mile increased from 17.12 cents in 1917 to 20.37 cents in 1918, or an advance of 19 per cent. The operating cost per car-mile in 1915 was only 14.13 cents.

The gross earnings of the company for 1918 amounted to $456,356, an increase of $38,493 or 9.21 per cent. This gain, however, was more than counterbalanced by the heavier operating expenses. These totaled $373,124, an advance of $42,029 or 12.70 per cent. The net earnings from operation at $83,232, therefore, showed a decrease of $3,535, which was only partly affected by the decrease of $557 in interest on bonds and floating debts, taxes, etc. Net income before providing for depreciation amounted to $44,499, a decrease of $2,978. The sum of $29,208 was charged against net income for depreciation, and the balance of $15,290 was transferred to surplus account.

Revenue passengers carried in 1918 were 12,322,170 as compared to 11,374,396 for the preceding year, and the average fare per revenue passenger was 3.65 cents as compared to 3.63 cents. Car-miles operated decreased from 1,933,557 in 1917 to 1,832,208 in 1918. Gross earnings per car-mile were 21.61 cents in 1917 and 24.91 cents in 1918. The gross earnings per mile of track were $11,575 in 1917 and $12,641 in 1918.

Milwaukee Costs Up

Operating Revenues Gained $987,402, But Operating Expenses Rose $1,309,088

The operating revenues of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for the year ended Dec. 31, 1918, showed a gain of $987,402, or 12.4 per cent., as compared to those of 1917. The operating revenues of the railway department amounted to $5,365,805, an increase of $412,449, or 8.3 per cent. Those of the electric and heating department amounted to $3,589,789, an increase of $574,953, or 19.1 per cent.

On the other hand, the high costs of material and labor referred to in the preceding year's annual report reached higher levels during 1918. While operating revenues increased $987,402, operating expenses rose $1,309,088. No detailed operating expense figures are presented in the 1918 report.

STATISTICAL DATA OF MILWAUKEE COMPANY FOR 1917 AND 1918

	1918	1917
Receipts per mile of track operated	$29,753	$27,460
Revenue passengers carried	114,149,000	115,626,143
Transfer passengers carried	45,709,197	47,232,242
Per cent transfer to revenue passengers	40.04	40.85
Receipts per revenue passenger	$0.0466	$0.0425
Revenue car hour operated	1,847,403	1,862,456
Receipts per revenue car hour	$2.90	$2.66
Revenue car miles operated	16,591,121	16,670,189
Receipts per revenue car mile	$0 3234	$0 2971

The appropriations for maintenance and depreciation of physical property in percentages of the operating revenues of the various utilities were as follows: Railway, 20.12 per cent; electric light and power, 15.11 per cent, and heating, 13.09 per cent. The appropriations for maintenance and depreciation were maintained at a subnormal level during 1918 in order to stabilize net earnings pending the receipt of adequate fare relief from the Railroad Commission of Wisconsin.

The gross income available for the payment of interest and dividends was $1,942,060, a decrease of 13 per cent compared with the corresponding amount in the previous year. Interest charges were increased because of the larger amounts of bonds and notes outstanding.

The expenditures during the year for additions, extensions and betterments to the plants and systems aggregated $984,454. This amount does not include any additions through the purchase of the Commonwealth Power Company. Of this total $452,607 is chargeable to the railway department.

In connection with the question of operating costs, James D. Mortimer, president of the company, says: "So long as the cost of living remains at its present level there appears to be no tendency for wage rates to recede. The company looks for no reduction in the cost of labor except that which will come from higher efficiency of utilization."

COMPARATIVE INCOME STATEMENT OF MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Operating revenues	$8,955,595	100 0	$7,968,192	100 0
Operating expenses	7,147,827	79 8	5,838,738	73.3
Net operating revenues	$1,807,768	20 2	$2,129,454	26.7
Non-operating revenues	134,292	1 5	108,127	1.3
Gross income	$1,942,060	21.7	$2,237,581	28.0
Interest charges	1,224,258	13.7	931,361	11.7
Net income	$717,802	8 0	$1,306,200	16.3
Credits to surplus	192,709	2.1	....	....
Total	$910,511	10 1	$1,306,200	16.3
Dividends on preferred stock	270,000	3 0	270,000	3.4
Dividends on common stock	620,550	6.9	1,034,250	12.9
Surplus for year	$19,961	0.2	$1,970	0.0

Newspaper Favors Customer-Ownership Plan

In the March "Investors' Guide" column the Chicago *Tribune* said:

> A study of the list of several hundred cities where traction and other utility companies have obtained increased rates in the last year tends to confirm the opinion that people should invest their money at home.
>
> Companies whose securities are held largely by residents of their respective localities have fared better than others. The reason for this is plain. If a considerable number of citizens of a town own stock and bonds of its railway the rate-making board cannot help seeing that to refuse a necessary increase will be merely to take the property of part of the citizens and gradually distribute it to the others until bankruptcy stops the process. The people whose property is imperiled are on the ground where they can and do use their influence in protecting their interests.
>
> Rate-making boards, of course, should act as courts of justice and treat both sides fairly. It seems, however, that in practice they often follow the line of least political resistance and sacrifice the just claims of unknown owners in order to grant unjust demands of insistent patrons.
>
> The investor who owns bonds of a company in a distant state is negligible, but the man whose money is invested in home companies must be considered.

Reorganization Bill

Incorporation Act for Successor to Rhode Island Company Is Now Before State Legislature

A bill has been presented in the House of Representatives of the General Assembly of Rhode Island by Mr. Mitchell, Providence, which provides for the creation of a new corporation, designated the United Electric Railways, designed to take over all the property and privileges of the subsidiary companies which now lease their lines to the Rhode Island Company.

The bill, which is in tentative form so far as the incorporators are concerned, was presented at this time as the General Assembly adjourns in May for two years and it was regarded as essential to secure the necessary authority to form a new corporation, the details to be worked out as soon as possible by the general committee appointed by the receivers of the Rhode Island Company for the purpose.

The three incorporators named are Governor R. Livingston Beeckman, Tax Commissioner Zenas W. Bliss, who is also one of the receivers, and Bank Commissioner George H. Newhall. The capital stock is stated as $500,000. The receivers of the Rhode Island Company are authorized to accept securities of the new company in payment. The act specifically contains the proviso that one of the directors shall be appointed by the Governor of the State. The presentation of the bill in its present form, with State officials named as incorporators, delegates to the State the title to the charter and thus a measure of supervision of the proposed reorganization is obtained.

The first step in the reorganization will consist in determining the values of the property of the several lessor companies and the proper compensation which will be paid to each for the surrender of its holdings. When the reorganization is completed to the satisfaction of the Governor and State authorities, the charter of the new corporation will be turned over. The charter was drawn by Attorney-General Herbert W. Rice and it is regarded as certain that the measure will be passed by the Legislature without material changes in form. The new company is required to take over all or none of the subsidiary properties, subject to the approval of the Attorney-General.

Jacksonville Bondholders Organize

The Jacksonville (Fla.) Traction Company is face to face with the matter of a heavy increase in expenses. In the interval of four years from 1914 to 1918, the gross earnings have increased $230,314 or 32 per cent, but the balance remaining after fixed charges has decreased $57,723 or 61 per cent. It is estimated that if the present rate of wages and present prices of coal and materials continue the company in 1919 with gross earnings of about $1,000,000 will fail by about $40,000 to earn the interest on its outstanding bonds and notes.

Every effort has been made to secure an increase in fare, but several more months may be required to bring about this result. In the meantime the company is clearly in no position to refinance its maturing notes. To protect the notes a committee composed of Boston bankers has been formed and to the members so far selected will probably be added a fifth member to represent banks in Jacksonville which hold notes of the company.

The deposit agreement covers a period of six months, after which time the depositor may at his option withdraw his notes unless a plan has been submitted and approved. The tentative agreement provides that no settlement or adjustment of the fare situation shall be made which does not result in the payment of all notes at par and interest thereon without first giving notice to the noteholder and submitting to them the plan proposed so that they may withdraw should they disapprove of the plan.

The company is now charging a 5-cent fare in accordance with the specific provisions of its city franchise. The city charter requires all franchises or amendments thereto, secured by city ordinance, to be ratified by popular referendum.

Terms of Paducah Reorganization Announced

The committee representing the bondholders of the Paducah Traction & Light Company, Paducah, Ky., have worked out a tentative plan for the reorganization of that company. It is proposed to incorporate the Paducah Electric Company, Inc., probably under the laws of Kentucky, to acquire the electric light and power properties, the gas properties, steam mains, etc., in Paducah, and all the stock, bonds, etc., of the Paducah Railway, Inc., a new company, which in turn will own in fee the railway property and the stock, etc., of the Paducah Realty Company.

The Paducah Electric Company, Inc., will issue the following securities: $536,000 of first mortgage bonds, $576,000 of 6 per cent twenty-year convertible debentures and $605,000 of capital stock, of a par value of $25 for each share. The holders of securities of the Paducah Traction & Light Company will receive (1) for each $1,000 Paducah Traction & Light Company bond, $600 of Paducah Electric Company, Inc., 6 per cent debentures and $500 of Paducah Electric Company, Inc., capital stock, being twenty shares at the par value of $25; (2) for each share of preferred stock of the Paducah Traction & Light Company one share of the capital stock of the Paducah Electric Company, Inc., par value $25.

The bondholders and stockholders of the Paducah Traction & Light Company who desire to secure the benefit of this plan are asked to notify Stone & Webster, Boston, the deposit managers.

Consolidation Announcement

Reorganization Plan at Scranton and Binghamton Provides for New Company to Take Over Existing Lines

The plan adopted by the protective committee representing the bondholders of the Scranton & Binghamton Railroad, Scranton, Pa., is said to provide for the consolidation of the Scranton & Binghamton Traction Company, the Northern Electric Street Railway and the Binghamton Railway, all controlled by the former company.

FORECLOSURE FIRST

It is proposed as a first step to foreclose the mortgage, sell the property and incorporate a new company with $5,000,000 of first-mortgage 6 per cent thirty-year coupon bonds, with a sinking fund provision beginning on April 1, 1930. These bonds will be dated April 1, 1919, and subject to the existing Northern Electric mortgage, covering the property from Providence Square to Lake Winola and Montrose and 26 miles to be built from Tiffany Junction to Binghamton.

The committee announces that it will reserve the right to change capitalization to such extent as may seem wise in its judgment, without affecting the proportions to bondholders of the Scranton & Binghamton Railroad Company and stockholders of the Northern Electric Company.

It is further advised by the committee in order to cover the immediate financial requirements of the company, that the bondholders shall take and pay for 20 per cent of the par value of their present holdings of bonds in the proposed new bond issue of the successor company.

In the plans it is specified that the mortgage shall contain a provision for the issuance of additional bonds under proper restrictions and safeguards as may be necessary and advisable for further development, extensions and improvements and for the acquisition of property, and for the issuance of $400,000 of income bonds and $3,000,000 of common stock.

$989,000 NEEDED

The committee believes that the earnings will more than provide the interest charges on the first mortgage bonds issued when all of the improvements have been completed and that the returns will also be sufficient to care for a sinking fund, assure the payment of interest on the income bonds and dividends of 6 per cent on preferred stock and leave the balance of net earnings to the common stock. The immediate requirements under this plan are approximately $989,000.

The chief engineer's estimate of the cost of extending the railroad from Tiffany Junction to the New York State line, 16 miles, is $494,494. Preliminary surveys have been made of the proposed route for this extension on options taken on much of the necessary right-of-way.

Receiver Made Permanent

Federal Judge Julius M. Mayer on March 31 issued an order appointing Job E. Hedges permanent receiver of the New York (N. Y.) Railways. William P. Burr, the City Corporation Counsel, did not oppose the order, but appeared to urge that the financial difficulties of the company be met by reducing the rentals it pays to the companies from which it leases railway lines and not by abolishing transfers or raising fares.

Judge Mayer said that the question of fares, transfers and rentals would be determined in accordance with the facts developed under the receivership. If it were found that the elimination of transfers or the increase of fares was necessary to keep transportation systems in New York alive, the court said that the people of the city would favor this remedy. Judge Mayer is quoted as follows:

> In respect to the financial situation, I have been extremely careful to say nothing on the much-mooted question as to the increase of fares. When all the facts are clearly understood, then it will be found out what is the right thing to do. If increases of fare are unnecessary, all will understand it. If increases of fare prove to be necessary after full and fair discussion, I am convinced that the public of New York is so fair and reasonable that it will not hesitate in making it known that it desires the remedy of increased fares to be adopted.

Financial News Notes

Would Issue $200,000 of Bonds.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has asked the Board of Public Utility Commissioners for permission to issue $200,000 of bonds to pay back taxes and to provide funds for several improvements requested by the board.

Receivers File Inventory.—The fixed capital of the plant and equipment of the Memphis (Tenn.) Street Railway is given at $15,803,469 in an inventory of the company's property which T. H. Tutwiler and Frank S. Elgin, receivers, have filed in the Federal Court. The report comprises 292 typewritten pages. Funds turned over to the receivers on Jan. 20 are given as $105,475, including $92,265 on deposit at the Union & Planters Bank.

Fare Bill Reported Favorably.—The Martin bill has been reported out by the judiciary committee of the New York Assembly. This measure is designed to amend the public service commission law by extending the jurisdiction of the commissions over the rates on electric railways fixed by agreement with local authorities, notwithstanding fare limitations in the franchises. The hearing on this bill was reported at length in the ELECTRIC RAILWAY JOURNAL for March 15, page 542.

Slow Progress on Cleveland Fund.—The report of the Cleveland (Ohio) Railway for the month of February showed the interest fund total was $136,246 on March 1. When this fund reaches $700,000 the fare is automatically reduced. The report also showed that during February 28,848,038 passengers were carried on cars covering 2,675,061 car miles. This is a decrease of 3 per cent from the passengers carried in February, 1918, but only 0.13 of 1 per cent in service.

Receiver at Pascagoula.—Judge E. R. Holmes of the Sixth United States District Court of Mississippi has appointed L. J. Fohr receiver of the Pascagoula Street Railway & Power Company, Pascagoula, Miss. The receiver was formerly general superintendent of the company. The receivership followed a petition filed on March 25 by the Columbia Finance & Trust Company, Louisville, Ky., representing as trustee the holders of $350,000 of the company's bonds on which interest is in default.

Will Abandon Rather Than Pave.—Rather than stand the cost of paving between tracks under the contemplated improvement campaign this year, the Utah Light & Traction Company, Salt Lake City, Utah, will abandon some of the lines, according to a notice served upon the City Commission. In a letter sent to the commission, the company declares its intention of asking the Public Utilities Commission for permission to abandon and tear up the lines where the expenditure of the proposed paving cost would be unwarranted.

Bond Extension Arranged.—Arrangements have been completed whereby the $500,000 of first mortgage bonds of the Cleveland, Painesville & Eastern Railway, Willoughby, Ohio, and the $1,131,000 of first consolidated mortgage 5 per cent bonds maturing on Oct. 1, 1918, have been extended for five years to Oct. 1, 1923, at 7 per cent interest As explained in the ELECTRIC RAILWAY JOURNAL for Sept. 28, 1918, the company found that it was practically impossible to refund the indebtedness at that time and the only course possible was to provide for an extension to Oct. 1, 1923.

Kansas Road Suspends.—Acting on directions of the general office in St. Louis, L. E. Lanigan, superintendent of the Iola (Kan.) Electric Railroad, on March 21 ordered the suspension of the city and interurban lines connecting Iola with Gas City, La Harpe and Bassett. Rising cost of operation, coupled with the failure of the company's gas field, depriving it of cheap power, are given as the cause of the shutdown. The Kansas Public Utilities Commission has announced that the railway acted illegally in suspending the operation without first seeking permission of the commission.

Another Six-Cent Fare in Lockport.—The Public Service Commission for the Second District of New York has passed an order authorizing on April 1 a 6-cent fare on Buffalo, Lockport & Rochester Railway cars and its successor in Lockport, to remain in effect for one year and thereafter until further order of the commission. Transfers are not affected by the order. There was no opposition at a hearing before Chairman Hill at Buffalo to the complaint of the company that a 5-cent fare did not yield sufficient compensation for the service rendered. The company operates in Lockport on the International Railway's tracks. The latter is now charging a 6-cent fare.

Must Restore Streets After Dismantlement.—The Illinois Public Utilities Commission has issued an order that the Alton & Jacksonville Railway, which operated between Alton and Jerseyville, cannot completely dismantle its lines until it has restored streets in the city of Alton and has paid $338 due for taxes. The company was authorized in 1917 to abandon operation. It recently asked for an order from the commission to remove additional equipment. Objections were made and a hearing was held, showing that taxes had not been paid and that portions of streets in Alton which had been torn up by employees of the company had not been replaced. The company has ninety days in which to comply with the order of the Public Utilities Commission.

B. R. T. Interest Payment Postponed.—Judge Julius M. Mayer, in the Federal District Court at New York, has set May 5 for further hearing on the recommendation of the referee in the Brooklyn (N.Y.) Rapid Transit Company receivership for payment of interest on the $7,000,000 of Brooklyn Rapid Transit first gold 5 per cent bonds due on April 1. Ex-Judge E. Henry Lacombe, special master in the case, recommended to Lindley M. Garrison, receiver of the railway, that payment on these bonds be deferred for ninety days and added that the postponement of the paying of interest did not constitute a default. Judge Mayer, in extending the hearing, remarked that it would give those most concerned ample time to consider the matter and that it would not result in working any hardships to anyone.

Chicago City Dividend Resumed.—According to the *Wall Street Journal* there has been much comment over the resumption of dividend payments by the Chicago City Railway. That paper says: "It is understood that the only reason the company recently declared a dividend distribution was that failure to pay a dividend would mean default on the interest on the Chicago City & Connecting Railways 5 per cent collateral trust bonds and foreclosure on the collateral. These bonds are secured by deposit of a large part of the Chicago City Railway stock. The dividend declaration is regarded as a temporary expedient to avoid default on the collateral trust bonds as long as there remains a chance of the company obtaining an increase in fare. The next interest payment on the bonds is due April 1."

Damages Claimed Under Lease.—A suit for $100,000 against the Rhode Island Company, Providence, R. I., has been filed in the Superior Court of Rhode Island by the Narragansett Pier Railroad. The basis of the suit is the claim of the plaintiff company that its property leased to the Rhode Island Company had deteriorated to the extent of $64,000, this being represented by damage to roadbed of $30,000, to rolling stock $24,000 and to bridges, sidings and stations $10,000. In addition to the damage alleged to have resulted during the lessee's tenancy, the declaration recites that taxes amounting to more than $6,000 remain unpaid by the Rhode Island Company, although subject to accrued interest at the rate of 10 per cent. The writ bears the date of Jan. 27, three days prior to the filing of a petition for the appointment for a receiver to take charge of the Rhode Island Company.

Valuation Hearings Resumed.—The hearing that is to fix the valuation of the Capital Traction Company's property for rate-making purposes was resumed on March 25 before the Public Utilities Commission of the District of Columbia at the point where it was discontinued before the war. The company introduced evidence as to increased costs due to the war and arguments were commenced by G. Thomas Dunlop, counsel for the company. When he concludes, the commission is expected to take the case under advisement. Reproduction cost of the physical plant had been agreed upon before the war by the commission and company experts as $10,966,214. Evidence on March 25 was to the effect that the cost of reproduction at present prices would be 100 per cent above this figure. Company experts contended that at least 40 per cent of this increase would be permanent.

Equipment Trust Certificates Offered.—The $1,000,000 of equipment trust certificates for the Cincinnati (Ohio) Traction Company, which was referred to in the ELECTRIC RAILWAY JOURNAL for March 22, page 621, are being offered for subscription by the bond department of the Fifth-Third National Bank, Cincinnati, the prices ranging from $100 to $98.16 and interest, yielding from 5 per cent to 6.25 per per cent, according to maturity. The certificates are dated April 1, 1919, and mature at the rate of $50,000 each April and October from Oct. 1, 1919, to April 1, 1929. The total issue is $1,000,000, known as series G-1. The certificates are in the denomination of $1,000. The principal and interest are unconditionally guaranteed by the Cincinnati Traction Company. The equipment by which they will be secured will include 105 44-ft. pay-within, double-truck closed motor cars, costing about $1,250,000. The title of these cars will be vested with the trustee until the entire issue of equipment notes has been paid.

Receiver Asks State Aid.— Reference was made recently in the ELECTRIC RAILWAY JOURNAL to the conditions of competition from jitneys under which the Danbury & Bethel Street Railway, Danbury, Conn., is operated. At the recent general hearing at Hartford to inquire into electric railway conditions throughout the State Judge J. Moss Ives, receiver of the company, summarized the situation confronting the Danbury & Bethel Street Railway as follows: "We practiced economy in every way but the State wants $26,000 taxes, and I don't know how I can pay the money and I don't see how I can go on operating the road. I have asked to have the taxes abated. We need money to repair our roadbed and rolling stock. It is sound public policy to grant us this relief. I think the State tax should be based on net earnings, not gross earnings. Certainly it isn't fair to impose $26,000 tax on a road which is barely paying operating expenses. If the State insists on the tax being paid the road will have to be sold. We also have got to have relief from jitney competition."

Asks Permission to Abandon.—Declaring that the traffic and freight handled on the Hamilton branch of the Sacramento (Cal.) Northern Railroad does not justify its maintenance, the company has asked the California Railroad Commission to make permanent the order issued by the commission in 1913, temporarily suspending the operation of the branch. The company would except from the provision of the order approximately 2 miles of trackage running out of the city of Chico, which it would use during July, August, September and October, as a spur track for freight. The branch from Chico to Hamilton is 11.1 miles in length. The company contends that to operate the line successfully it will require the construction of a drawbridge over the Sacramento River at a cost of $400,000, an expense not justified by the business in sight. When the line was in operation the river was crossed by means of a trestle with a pontoon span, which the company had to remove every year (in December) because of high water. In the winter of 1914 more than 1 mile of track on the west side of the river and three quarters of a mile on the east side were washed out.

Conference on Reorganization. — There was a conference before the Public Service Commission for the Second District of New York on March 27 upon the proposed reorganization of the Buffalo, Lockport & Rochester Railway, which was sold at mortgage foreclosure on March 12. The conference was in anticipation of a formal application to be made to the commission by the reorganization committee and, as Chairman Hill expressed it, to save time. It was stated among other things that there is $4,000,000 in preferred and common stock of the old company holders of which as noted recently in the ELECTRIC RAILWAY JOURNAL will not participate in the reorganization. Mr. Ingham and Mr. Steele, who have joined the reorganization agreement and deposited their stock, objected to the plan on which it is proposed to proceed. They claimed that the new company should put a mortgage on the property and issue bonds as at present, or that the contemplated preferred stock issue should contain the privilege to holders to convert their stock into bonds. Objection was also made as to the expense of the reorganization. The commission still has the matter under consideration.

Electric Railway Monthly Earnings

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
COLUMBUS (GA.) ELECTRIC COMPANY					
1m., Jan., '19	$121,784	*$59,006	$62,778	$34,944	$27,839
1m., Jan., '18	108,978	*41,606	67,372	31,893	35,474
12m., Jan., '19	1,194,219	*584,714	609,505	400,236	209,269
12m., Jan., '18	1,115,436	*428,885	686,551	362,475	324,076
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., Jan., '19	$110,965	*$67,920	$43,045	$14,041	‡$29,128
1m., Jan., '18	84,459	*47,767	36,692	13,029	‡26,767
12m., Jan., '19	1,158,258	*682,312	475,946	164,711	‡316,031
12m., Jan., '18	943,181	*524,581	418,600	140,522	‡300,998
FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.					
1m., Dec., '18	$337,559	*$215,967	$121,592	$40,404	$81,188
1m., Dec., '17	307,865	*212,254	95,611	50,970	44,641
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.					
1m., Jan., '19	$3,813,648	*$2,660,656	$1,152,992	$1,540,218	†‡$341,557
1m., Jan., '18	3,569,021	*1,964,320	1,604,701	1,170,105	‡476,420
7m., Jan., '19	23,766,807	*16,668,380	7,098,427	10,280,084	†‡2,832,689
7m., Jan., '18	23,238,037	*13,059,033	10,179,004	7,652,190	‡2,829,540

* Includes taxes. † Deficit. ‡ Includes non-operating income.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
JACKSONVILLE (FLA.) TRACTION COMPANY					
1m., Jan., '19	$85,867	*$77,984	$7,883	$17,074	†$9,191
1m., Jan., '18	65,556	*47,060	18,496	15,866	2,630
12m., Jan., '19	965,879	*740,590	225,289	200,276	25,013
12m., Jan., '18	704,519	*478,449	226,070	189,214	36,856
NEW YORK (N. Y.) RAILWAYS					
1m., Dec., '18	$979,862	*$876,675	$103,187	$276,725	†‡$130,325
6m., Dec., '17	918,775	*762,955	155,820	282,419	†‡66,918
6m., Dec., '18	5,598,834	*4,932,233	666,601	1,667,306	†‡738,127
6m., Dec., '17	6,306,105	*4,698,063	1,608,042	1,691,167	†‡225,567
NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.					
1m., Jan., '19	$44,489	*$161,773	$82,716	27,967	‡$64,731
1m., Jan., '18	250,311	*149,492	100,819	28,790	‡81,617
12m., Jan., '19	2,923,937	*1,896,114	1,027,823	336,965	‡805,859
12m., Jan., '18	2,661,325	*1,489,941	1,171,384	348,303	‡861,414
PENSACOLA (FLA.) ELECTRIC COMPANY					
1m., Jan., '19	$50,495	*$39,943	$10,552	$9,137	$1,415
1m., Jan., '18	37,143	*25,421	11,722	7,960	3,763
12m., Jan., '19	519,402	*374,904	144,498	101,100	43,392
12m., Jan., '18	360,555	*213,448	147,107	93,824	53,288

Traffic and Transportation

Atlanta Fares Again

Company Renews Its Appeal for Relief Following Court Decision Establishing Authority of Commission

On account of the recent fare decision by the Supreme Court of Georgia affecting the Georgia Railway & Power Co., Atlanta, Ga., to which reference was made in the ELECTRIC RAILWAY JOURNAL for March 22, page 622, the fare matter in Atlanta has again come before the Railroad Commission of Georgia. A petition from the representatives of the city sets forth that the plea of a war emergency argued before the commission by representatives of the Georgia Railway & Power Company at the first hearing of the case no longer applies, and the company is not entitled to the increase. The city asks the commission to have an expert appraisal and inventory made of all the company's properties, including those of the Georgia Railway & Electric Company and the Atlanta Gas Light Company, and likewise an expert audit of the books of the companies by the Railroad Commission.

COMPANY REOPENS CASE

The appeal by the city for an appraisal and audit is based on the petition now pending before the commission by the company to increase fares in Atlanta and vicinity. This petition by the company reopening the case follows the recent ruling by the Supreme Court to the effect that in the absence of a valid contract and ordinance on the subject of fares it was the duty of the Railroad Commission to fix and determine rates on appeal to it.

On Aug. 14, 1918, the commission ruled that it had no jurisdiction on account of certain contracts between the petitioner and the cities of Atlanta, Colege Park and Decatur, but it recommended that the company be permitted to charge a 6-cent fare.

SOUGHT TO COMPEL ACTION

The Georgia Railway & Power Company instituted mandamus proceedings against the commission with the object of compelling the commission to assume jurisdiction of its petition and decide the case. The contention of the petitioner was that no contract existed between it and the city of Atlanta fixing fares therein, and that in any event such a contract would be invalid just as, in the cases of College Park and Decatur, it contended no valid contracts could be made by such municipalities pertaining to the rates of fare to be charged by railways serving them.

The Superior Court of Fulton County, to which the application for a writ of mandamus was made, refused the issuance of the writ, holding that a contract fixing fares existed in the case of Atlanta as well as in the case of College Park and Decatur, and that all of such contracts were valid.

On March 15, 1919, the Supreme Court of Georgia reversed in part the conclusions of the Superior Court of Fulton County, and held that there was no contract between the city of Atlanta and the power company fixing fares within Atlanta, while there was as to transfers, but that there were contracts between the company and the towns of College Park and Decatur and that such contracts are valid. The commission was accordingly held to be without jurisdiction over the rates of fare prescribed in such contracts with College Park and Decatur, but was held to have jurisdiction over the rates of fare within the city of Atlanta, but not as to transfers.

At the time the decision of the Supreme Court was handed down P. S. Arkwright, president of the company, said that although the war was over, labor and material costs showed no decrease. It was his opinion that the commission would, therefore, follow its original recommendation with an order for higher fares.

Zone Fare and Service Studies in Boston

Pending a decision by the Supreme Court of Massachusetts as to the constitutionality of the Boston Elevated Railway public control act, no further steps are being taken toward the installation of the zone-fare system lately described in these columns. The trustees of the company, however, are giving considerable thought to the zone system and have determined that to install it would cost the company considerably more than $100,000.

There is no immediate probability of an increase in fare unit above the present 8-cent charge, although it is reported that the wages committee of the employees' union has formulated a demand for a maximum of 73 cents an hour and an eight-hour day in place of the existing maximum of 48 cents for surface line motormen and 50 cents for rapid transit motormen. The wage agreement between the company and the union expires on May 1.

Two bills are pending in the Legislature which are also tending to hold back the trustees from inaugurating a zone-fare system. One of these, sponsored by Senator Walsh, establishes a 5-cent fare unit for the system, leaving the deficit to be supplied through community taxation, and the other, fathered by Representative Hays, prohibits the institution of any zone system of fares. In legal circles it is expected that the constitutionality of the Boston public control act will be affirmed.

Higher Fares in 378 Cities

More than 53 Per Cent of Urban Population Is Now Paying More for Car Rides

Recently granted increases in fares, according to the information bureau of the American Electric Railway Association, bring the total number of cities which are paying increased fares to 378, representing more than 53 per cent of the urban population of the United States. Additions to published lists previously compiled are as follows:

City	Population
Ten-cent Fare Granted:	
Albany, Ga.	10,979
Seven-cent Fare Granted:	
Oil City, Pa.	20,162
Northampton, Mass.	20,006
Temple, Tex.	13,904
Portsmouth, N. H.	11,730
Franklin, Pa.	11,555
Merrill, Wis.	8,798
Belton, Tex.	4,164
Six-cent Fare Granted:	
Springfield, Ohio	52,296
Springfield, Mo.	41,169
Hazleton, Pa.	28,981
Lockport, N. Y.	20,028
Eau Claire, Wis.	18,887
Athens, Ga.	18,319
Rome, Ga.	15,607
Manitowac, Wis.	13,931
Chippewa Falls, Wis.	9,476
Valdosta, Ga.	7,656
Houghton, Mich.	5,113
Five-cent Fare; Reduced Rate Tickets Abolished:	
Dayton, Ohio	268,439
Richmond, Va.	158,702
Roanoke, Va.	46,282
Lorain, Ohio	38,266
Wausau, Wis.	19,666
Grand Rapids, Wis.	6,521

To date twenty-eight cities are paying a 10-cent fare, and eighteen an 8-cent fare. Ninety-six cities pay a 7-cent fare, seventeen of which also pay an extra 1-cent for each transfer issued. One hundred and sixty-two cities pay a 6-cent fare. The remaining cities are paying increased fares either through a zone system, an additional charge for transfers or the abolition of reduced rate tickets.

I. R. T. Breaks Traffic Records

According to figures furnished to the Public Service Commission for the First District of New York, the traffic on the lines of the Interborough Rapid Transit Company on March 24 and March 25 were the greatest in the history of that corporation. The date second named was the day of the parade and review of the Twenty-seventh Division, New York's own returning national guard units. There was also very heavy traffic on many of the Manhattan surface lines, particularly on the parade day. On March 24, which was the day of another important military parade and review in the Borough of Brooklyn, the subway carried 1,824,735 passengers, and the Interborough elevated lines 1,332,607 passengers; while on the following day the subway carried 1,753,772 passengers, and the elevated lines 1,122,394 passengers. On both days, according to reports furnished to the commission, the Brooklyn Rapid Transit Company carried an extremely large number of passengers, on March 24 the traffic records being broken for several of its lines.

Houston Must Have Increase

At the End of Its Financial Rope, Company Appeals to District Court for Relief

The Houston (Tex.) Electric Company on March 28 filed a suit in United States District Court in Houston asking the court to grant a temporary injunction restraining the city of Houston from enforcing the present 5-cent fare ordinance on the ground that the fixing of the fare at 5 cents is resulting in the confiscation of the company's property.

THE END REACHED

"The end has been reached and we might as well realize it and face the facts," said Luke Bradley, district manager for Stone & Webster, in discussing the situation. Mr. Bradley said that patrons who now ride on a 5-cent fare are getting the ride at less than cost, and this cannot continue.

The petition filed by the attorneys for the company refers to a 7-cent fare as one that would allow the company to pay operating expenses, care for depreciation and realize a return on the investment. The suit just filed is, however, for the primary purpose of having the 5-cent fare declared confiscatory. In order for the court to do that a valuation of the railway would have to be made, and officials of the company assert that is what they desire. Sometime since the company sought to have the city go into the valuation of its property, but when the people by referendum vote turned down the 6-cent fare, the city dropped the matter.

The suit just filed before Federal Judge J. C. Hutcheson, Jr., is of an entirely different nature from that filed several months ago before Judge H. J. Dannenbaum in the District Court. That suit merely challenged the right of the people, by a popular vote, to fix the rate for a public utility, and contended that this power was vested only in the City Commission.

In the suit filed in federal court the company goes directly to the issue it raises and contends that the refusal of the city to allow the company to charge more than a 5-cent fare is confiscating the property of the company.

CASE IN REVIEW

The petition reviews the steps the company has taken before the City Council to obtain a higher fare. It declares that the Mayor and the City Commissioners granted some relief once by passing a 6-cent fare ordinance, and tells how that ordinance was knocked out by a referendum election.

Mr. Bradley made the following statement of the company's position:

> Conditions over which we have had no manner of control have forced us to go into the United States Court in order to protect the company from being rapidly destroyed through the refusal of the city of Houston to permit it to earn sufficient revenues to maintain itself.
>
> In June of last year, having foreseen the fact that we could not continue to operate the system, keep up the property and meet the growing needs of Houston without an increase in fare, we went before the City Council and sought relief which we knew to be absolutely necessary to the very existence of the company.
>
> We went fully into the condition which confronted us, showed conclusively that costs of operation had progressed to the point where relief was essential if we would escape disaster, ruinous alike to those who had invested in the property, as well as to the property itself, and asked the privilege of putting into effect in Houston a 6-cent fare.
>
> While this application was pending and under discussion, it became necessary to increase wages, due to high cost of living and general war conditions, which by the way, still obtain, to the amount of $160,000 per annum.
>
> The relief granted by the city was turned down by the referendum, which was held, wherein about one-fourth of the voters participated.
>
> Since that time the condition of the company has grown steadily worse instead of better. A summary of its operations for the five months ended Feb. 28, 1919, will make this clear to anyone who will study these figures, which are taken from the bill we have filed in the United States Court.

Gross earnings	$693,423
Operating expenses	547,502
Balance	$145,921
Taxes	47,624
Balance	$ 98,296

> The bill also sets out that the company should have had depreciation during that time, $83,333; for supplementary maintenance, $30,000; for return on the investment, $166,666, or a total of $280,000, leaving a deficit for five months' operation of $181,703.
>
> What does this mean and what is the answer? It means that there can be no development of railway transportation in Houston until some satisfactory understanding of the present problems is reached with the public.

Decision Again Diverting Traffic

Removal of tracks from Main Street, between Ervay and Austin Streets, in Dallas, Tex., is again being considered. Richard Meriwether, general manager of the Dallas Railway, said that the removal was a matter for the merchants on Main Street to decide. He said that the company was not averse to the removal of the tracks from Main Street, and the diversion of the traffic to Elm and Commerce, which parallel Main Street one block distant on either side, if the removal could be effected without offense to any of the merchants on Main Street. The company is now laying new railways on Main Street and Mr. Meriwether asked that a decision in the matter be reached at once, before the new rails were put down.

The merchants on Main Street seem to be equally divided on the removal plan. In connection with this matter it has been recalled that the proposal was laid before John A. Beeler, New York, traffic engineer, at the time Mr. Beeler made a survey of the railway properties in Dallas. Mr. Beeler then opposed the removal. It could be effected now, however, without causing inconvenience, and according to Mr. Beeler it might prove of advantage. Dallas will, however, grow too much in the near future for the plan to be feasible, Mr. Beeler told the city in his report. In time, it would become absolutely essential that cars be operated on this thoroughfare to care for the traffic originating in the down-town section of the city.

In view of this opposition and Mr. Beeler's report, it is not likely that the tracks will be removed, and with this belief, the railway is going ahead with the work of laying heavy steel.

Zone Charge Modified by Shore Line

On April 1 the Shore Line Electric Railway, Norwich, Conn., changed its old 3-cent zone to a 2½-cent zone. The system of fares in force heretofore has covered a 5-cent minimum fare in two zones, this charge making a 5-cent fare within the cities of New London and Norwich, with free transfer at the center of the city, and the interurban lines divided in short zones of 3 cents each. The company has reduced the interurban rate to 2½ cents a zone, so that for a ride wholly within the city the rate is 5 cents and for a ride wholly within the city and one zone outside 7½ cents; two zones outside, 10 cents; three zones outside, 12½ cents, and for two zones on any of the interurban lines, 5 cents; three zones, 7½ cents, with a minimum charge of 5 cents for a ride in one or two zones.

Briefly, the only effect of the modification is a slight reduction in the interurban rate which in some instances was higher than the steam roads that parallel the electric railway, although the rate per mile on the electric railway was about 2.8 cents. The company is collecting everything up to 10 cents with the Rooke register, the 2½ cents being paid by use of a token collected through the register. The use of the token is not permitted for any other purpose than the payment of the odd change. In other words, the company does not allow the use of two 2½ cent tokens for a 5-cent fare.

Six Cents Being Charged in New Jersey

A 6-cent fare on the lines of the Public Service Railway in New Jersey went into effect on April 1. This is a reduction of 1 cent from the fare which patrons have been paying since an order of the Board of Public Utility Commissioners last fall, but in addition passengers have to pay 1 cent for initial transfers.

During the week ended March 29 the company applied to the commission for permission to continue the 7-cent fare pending a decision of the zoning system which the company hopes to establish next July. Representatives of the municipalities affected opposed the application, and the commission ordered the 6-cent fare in effect on April 1, in accordance with the original ruling, pending a hearing on the matter. This hearing will be held on April 7.

A hearing will also be held on the zoning system, which would give the company the right to charge 5 cents for the first zone and additional charges for other zones. This hearing will be held on April 14. The plans for the zone system have been reviewed at length in the ELECTRIC RAILWAY JOURNAL.

Transportation News Notes

Toronto Issues Weekly Bulletin.—In order to present the facts of its case before its patrons, the Toronto (Ont.) Railway recently began to distribute in its cars. a weekly bulletin called *Public Service Topics*.

I. C. C. Approves Seven-Cent Fares.—The Interstate Commerce Commission has granted the applications of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company for permission to file schedules increasing the fares for the transportation of passengers between Louisville, Ky., and Jeffersonville, Ind., and New Albany, Ind., respectively, to the extent that the fares therein established do not exceed 7 cents.

Skip-Stop System Modified.—The Northern Texas Traction Company, Fort Worth, Tex., has modified the skip-stop system as employed on its lines. This action was taken after a committee had been appointed by the Chamber of Commerce to investigate the system and make recommendation for improving service. Under the modified plan, cars will stop at all churches and schools, and additional stops will be made on unpaved streets. The skip-stop plan. will be continued on paved streets.

Rainier Valley Line Wants More.—The Seattle & Rainier Valley Railway, Seattle, Wash., has filed a new tariff with the Public Service Commission at Olympia, asking for an increase of fares to 6 cents. The company contends that it costs 40 per cent more to operate than the company is receiving for service. A charge of 1 cent is proposed in the tariff for all transfers from the company lines to city lines, and 2 cents for transfers accepted from the municipal lines. Policemen and firemen will not be allowed to ride free.

Wants Ten Cents Now in Yakima.—N. C. Richards, president of the Yakima Valley Transportation Company, North Yakima, Wash., announced on March 23 that he would file a new schedule of rates for city passenger fares—10 cents for cash fares, 8 cents for tickets and 4 cents for school children. Mr. Richards previously filed a schedule asking for an 8-cent fare on the city passenger system. This was noted in the ELECTRIC RAILWAY JOURNAL for March 22. E. D. Ridley, accountant for the Public Service Commision holds this rate is not high enough to make operating costs. North Yakima has a population of about 15,000.

Would Discontinue Transfers.—Following notification by the Warren & Jamestown Street Railway, Jamestown, N. Y., that on April 15 it will stop transfer privileges with the Jamestown Street Railway, Mayor Samuel A. Carlson of Jamestown on March 28 asked the Public Service Commission, Second District, to issue an order directing the two roads to continue transfer privileges to patrons. It is claimed termination of transfers will be a source of continuing vexation and expense to residents. The commission will serve the complaint upon the railroads for answer. A hearing by the commission will follow.

A Christening in Dallas.—*Trolleygrams* is the name selected for the little folder to be "published every now and then" by the Dallas (Tex.) Railway's Service Department in charge of Dan Fisher. This is part of the company's campaign to create a feeling of good fellowship for the company and eliminate complaints against the service. The name *Trolleygrams* was selected after a contest in which a first prize of $15, a second of $5, a third of $3 and a fourth of $2 were offered for the best names submitted. The committee reported that it received more than 1,500 letters in which more than 5,000 names were submitted.

May Boost Westerville Fares.—The Columbus Railway, Power & Light Company, Columbus, Ohio, is considering the necessity of increasing fares on the Westerville Division. Under the franchise by which this line operates the company has had the right to increase the Westerville line rates since Feb 1, when the working capital had been reduced to $14,507. By March 1 the capital was reduced to $12,454. The franchise provides for an increase of one-third of a cent a zone, which adds 3 cents to the round trip, when the working capital is reduced to $15,000. The terms of the franchise have been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Traffic Survey for Minneapolis.—John A. Beeler, New York, N. Y., has been engaged to make a preliminary traffic survey at Minneapolis, Minn., with the understanding that expenses up to $2,500 will be paid by the Minneapolis Street Railway. The Council has abolished skip stops on all blocks of the city more than 400 ft. long. This rule affects a large part of the residence district and parts of the central system outside the loop district where stops are made every block. The Council has ordered 101 more street trips daily for the North Side to improve service, based on a survey by the city inspector and Council Committee on the traffic needs. This will restore service to pre-war conditions.

Curbing the Auto in Kansas City.—The police of Kansas City, Mo., have issued an order forbidding motor car parking on the three chief business streets downtown between the hours of 8 a.m. and 6 p.m., but the order has been suspended until its legality may be ascertained. The order is of interest to the railway as, with lines of parked cars along the business streets, there was not sufficient room between the cars so parked and the railway tracks for the regular traffic. In preparing the order the police had in mind more particularly the menace in case of fire. By an ordinance passed on March 21 no jitney is allowed to remain stationary on any of the business streets and may stop to discharge or take on passengers only at such corners as the police may designate. Jitney fares have also been regulated—10 cents for the first twenty blocks and 5 cents for each additional twenty blocks.

Six Cents in Gadsden.—The Alabama City, Gadsden & Attalla Railway, Gadsden, Ala., has been granted a 6-cent fare on all its lines by the Public Service Commission of Alabama in its decision on the petition of the company for increased rates. At the same time, the company is requested to issue universal transfers on all of its lines without additional charge. Books of fifty tickets for $2.50 must be offered for sale, usable only by the purchaser. The company failed to receive the full increase asked and the city gained a point when the commission ordered the universal transfer system placed in operation in this city. The company had asked for a 15-cent rate to Attalla, but had not asked any increase on its other lines. The city had asked that the company place the universal transfer system in effect. The change in fares was scheduled to go into effect on April 1.

Conference on Interurban Fares in City.—At a conference of the Board of Public Works of Indianapolis, Ind., representatives of the Interstate Public Service Company, the Indianapolis Traction & Terminal Company and citizens living in the Shelby Street district between Southern Avenue and Martin Street, the proposal was made that if the Interstate Company would charge a 10-cent fare within the city limits an arrangement might be made between it and the local company whereby the latter would use the traction company's tracks between Southern Avenue and Martin Street. The proposal raises the question whether the Interstate Company can be relieved of its franchise obligation to charge only 5 cents within the city limits and whether or not the granting of this privilege to one company would not open the way for all companies to charge 10 cents within the city limits. The Public Utilities Commission will have to pass on the matter finally. The Interstate Public Service Company recently filed a petition with the commission asking for a 10-cent fare in Indianapolis.

Bus Competition Permitted.—The Railroad Commission of California has authorized the De Luxe Transportation Company to establish an auto passenger service between Oakland and Hayward in connection with its present service between Hayward and San Jose. The commission forbids, however, the carrying of passengers locally between Hayward and Oakland, or intermediate points, the authorization being confined to the transportation of passengers between Oakland and points between Hayward and San Jose. The San Francisco-Oakland Terminal Railways and the Peerless Auto Stage Association protested against the granting of the application. The railway has increased its service between Oakland and Hayward, and testified it could not continue the new service should the local traffic between Oakland and Hayward be divided and some carried by other methods of transportation. The railroad company did not object, however, to the certificate provided no local passengers were carried between Hayward, San Leandro and Oakland.

Seven-Cent Zones for New Jersey Lines.—The Board of Public Utility Commissioners of New Jersey has made an order granting the application of the Millville Traction Company to increase the fare in each of the zones from 5 cents to 7 cents and to withdraw from sale commutation tickets, excepting those sold to school children. The company operates in Millville, Landis Township and the Borough of Vineland. There are only two fare zones in its territory. The commission found that the company during the past three years has not been able to earn its operating expenses, taxes and bond interest and may go into the hands of a receiver. In its report the commission said: "It is calculated that if the same number of passengers continues to ride under the 7-cent fare, the increased revenue to the company would be approximately $24,400, but experience has demonstrated a large falling off in travel. Should the company lose 10 per cent of its passengers—and this is not unlikely—the actual increase in revenue would be about $12,000 and the most favorable returns to the company from the increase, it is anticipated, will not provide sufficient revenue to pay the operating expenses, taxes and interest on the company's bonds."

Fare Modification Ordered.—The Public Service Commission for the Second District of New York has directed the Elmira Water, Light & Railroad Company, Elmira, N. Y., to amend its passenger tariff now in force by substituting Center Mills for the present designation, Elmira Heights, between Fourteenth and Lake Streets, and to change the zone designation to read Zone B on the Horseheads line, including all points intermediate between McCann's Boulevard and Center Mills. The order followed the investigation of a complaint by Commissioner Fennell that under the present tariffs the fare charged between Elmira and Center Mills, a point intermediate between Fourteenth and Lake Streets and Horseheads, was 11 cents, an increase of 6 cents over the fare charged prior to Oct. 1, 1918. The company formerly operated between Elmira and Horseheads with a two-zone fare in force and charged a 5-cent fare in each zone. The tariff which went into effect on Oct. 1, 1918, increased the fare to passengers between Center Mills and Elmira in excess of the increase to other passengers. The commission held that the 11-cent fare between Center Mills and Elmira was unjust.

Personal Mention

Raymond H. Smith Elected

Vice-President of Eastern Wisconsin Electric Company Becomes President of Wisconsin Electrical Association

Raymond H. Smith, vice-president and general manager of the Eastern Wisconsin Electric Company, with headquarters at Sheboygan, Wis., has been elected president of the Wisconsin Electrical Association and the Wisconsin Gas Association.

Mr. Smith entered the utility field with the Waterbury (Conn.) Traction Company, in 1897, and held various positions in the electric and the railway departments of the Connecticut Railway & Lighting Company until 1900, at which time he became assistant superintendent of railways. In 1900 he was transferred to the headquarters of the Connecticut Railway & Lighting Company at Bridgeport, Conn., as purchasing agent and secretary to the general manager. In 1903 Mr. Smith was made superintendent of the company at Bridgeport and held this position until 1907 at which time he became general manager of the Albany & Hudson Railroad, Albany, N. Y. This company, two years later, passed through a receivership, and Mr. Smith was made receiver, and later was made general manager of the reorganized company, the Albany Southern Railway.

R. H. SMITH

In 1912 Mr. Smith left Albany and became general manager of the Jackson Light & Traction Company, Jackson, Miss., which position he held until 1916. In November of that year he was made vice-president and general manager of the Sheboygan (Wis.) Electric Company. Mr Smith was the first president of the Rotary Club at Jackson, Miss., and at the time of leaving that city was vice-president of the Board of Trade and also of the Country Club.

In March, 1918, the Sheboygan Electric Company was consolidated with the Wisconsin Electric Railway, Oshkosh, Wis., and the Eastern Wisconsin Railway & Light Company of Fond du Lac, Wis., and Mr. Smith was made vice-president and general manager of the consolidated company, the Eastern Wisconsin Electric Company.

Walter Jackson Returns from Great Britain

After four months' absence, Walter Jackson of the ELECTRIC RAILWAY JOURNAL has returned from the United Kingdom, which he visited to secure first-hand data on the zone or graduated fare. His first studies, covering the famous system of Glasgow, appeared in the issues of Feb. 22, March 8 and March 29, but the amount of information acquired is so extensive that it will be a matter of months before the series is concluded. The articles cover the widest possible range of conditions, bringing out, among other facts, that the zone fare is not only used on cars of large capacity, operated on very short headways, but that it offers many opportunities for developing traffic to an extent undreamed of with a universal fare. The managers of both the private and municipal undertakings showed Mr. Jackson every possible courtesy, making it plain that they were only too glad to assist their American cousins with any experience at their command. They indicated by their comments and questions that they were well informed concerning operating practices and tendencies of the electric railways in the United States and Canada.

In addition to the studies of the graduated fare, Mr. Jackson also went into other topics such as the development of parcels and freight handling and the use of car-checking instruments. In the latter, particularly, British operators have been very progressive as a class, the proportion of properties using power-saving devices being much greater than in the United States.

Changes in Personnel at Seattle

With the single exception of D. W. Henderson, superintendent of transportation of the Puget Sound Traction, Light & Power Company, Seattle, Wash., it is not expected that any of the old organization chiefs or heads of department will remain now that the city of Seattle has assumed jurisdiction over the railway lines under the purchase agreement. A. L. Kempster, manager, remains with Stone & Webster at Seattle; G. A. Richardson, superintendent of the railway department, will become connected with the Philadelphia Rapid Transit Company; A. D. Campbell, superintendent of rolling stock and shops, has been loaned by Stone & Webster to report on shop practice and shop facilities of the Brooklyn Rapid Transit Company; E. D. Merrill, traffic manager, has become connected with the Milwaukee Electric Railway & Light Company at Milwaukee; E. J. McIlraith, superintendent of way and structures, is making a report on the Chicago Surface Lines; F. M. Hamilton, superintendent of the "accident prevention department," will not remain with the properties under city management. Accident claims will hereafter be handled by the city attorney's office, engineering by the city engineer's office, paving by the department of streets, etc.

New Electrification Official

W. C. Ennis, formerly superintendent of the Musselshell Division of the Chicago, Milwaukee & St. Paul Railway, has been appointed assistant superintendent of the Coast Division, the Tacoma Eastern and the main line west of Othello. Mr. Ennis will work in conjunction with the electrical forces of the system, and will make an effort to hasten the electrification of the line from Othello to Seattle, so that it may be completed during the summer. The work of completing the substations is well under way; poles are set and wires are being strung. It is stated that the only obstacle to the operation of the line early in the fall will be a possible delay in delivery of the electric locomotives. Orders for the locomotives were placed some time ago.

G. A. Richardson will shortly assume the office of superintendent of transportation for the Philadelphia (Pa.) Rapid Transit Company and thus fill the vacancy made by the elevation of H. G. Tulley, who was some months ago made vice-president in charge of welfare and public relations.

Capt. F. D. Burpee, who has not been actively connected with the Ottawa (Ont.) Electric Railway for the past three years, has returned from France and has resumed his former position of superintendent. During his absence he has been engaged in the construction of narrow and standard gage railways in France with the fifth Battalion, Canadian Railway Troops.

Charles H. Smith, assistant general manager in charge of the Troy division of the United Traction Company, Albany, N. Y., has been granted an indefinite leave of absence on account of ill health. Mr. Smith has been in the employ of the company since he was a boy. He began work for the Troy and Lansingburg line in the Lansingburg carhouse, filling and cleaning the oil lamps that were used in the horse-car days for illumination. In the course of years he received promotions, and at the time of the formation of the United Traction Company on Jan. 1, 1900, was placed in charge of the Troy division.

George A. Murch, who for three years has been manager of the Public Electric Light Company and superintendent of the St. Albans & Swanton Traction Company, St. Albans, Vt., has resigned. He has made no definite statement as to his future plans. Previous to his connection with the companies at St. Albans Mr. Murch was manager of the Maynard & South Acton Railway, at South Acton, Mass. He has supervised the building of many railway systems, among them roads at Toledo, Waterville, North Attleboro, Worcester and Bangor.

W. J. Henderson, chief of the division of capitalization of the Public Service Commission for the Second District of New York, which division has had charge of all accounting and financial investigations for the up-state Public Service Commission since its inception, has severed his connection with the commission to become associated with the organization of H. C. Hopson, New York, N. Y., which is specializing on matters relating to rates, capitalization, taxes, etc. Mr. Henderson, prior to his connection with the Public Service Commission, was for many years in the accounting and latterly the statistical department of the New York Central & Hudson River Railroad.

D. J. McGrath, formerly special assistant to President M. C. Brush of the Boston (Mass.) Elevated Railway, has resigned his commission as first lieutenant in the Sanitary Corps, U. S. Reserves, and has become assistant to the president of the Mobile Light & Railroad Company. Prior to his connection with the Boston Elevated Railway Mr. McGrath was research assistant in the electrical engineering department of the Massachusetts Institute of Technology and was joint author with Prof. D. C. Jackson of that institution of a book summing up the fare investigations made by that department. Mr. McGrath has also contributed a number of articles to this paper on transportation matters.

Ernest A. Murphy, superintendent of equipment of the United Traction Company, Albany, N. Y., at North Albany, has taken over the duties relinquished by Charles H. Smith, who as noted elsewhere in this department has been serving as assistant general manager in charge of the Troy division. Mr. Murphy went to Albany two years ago from the Interborough Rapid Transit Company, New York. He has had charge of the company's car shops in the northern section of the city. Under Mr. Murphy's direction the company last year started to build a number of new cars of large type. About eight of these cars are now running between Albany and Troy, and others to run between Albany and Cohoes will be put on in April. Mr. Murphy has also introduced many improvements in shop methods.

Obituary

Emil C. Braun, for fifteen years connected with H. M. Byllesby & Company, Chicago, Ill., as an electrical engineer and valuation expert, died suddenly on March 23, as the result of a fall which caused a hemorrhage. Mr. Braun was born in Germany in 1868 and came to this country in 1893 in charge of the German electrical exhibit at the World's Columbian Exposition, Chicago. He was educated at the Universities of Frankfort and Berlin.

August Belmont, Jr., son of Major August Belmont, the banker, who was a member of his father's firm and connected with other important enterprises, died on March 29, following an operation for intestinal trouble. He began his business career as a clerk in the banking firm of his father, and on Jan. 1, 1910, was admitted as a member of the firm. Other enterprises with which he was identified at the time of his death were the Degnon Realty & Terminal Improvement Company, Degnon Terminal Railroad Corporation and Interborough Consolidated Corporation.

Major James Alfred Roosevelt, who had been in command of the 302d Ammunition Train of the Seventy-seventh Division in France, died on March 26 on the naval transport Great Northern while the vessel was 400 miles east of Sandy Hook. Major Roosevelt was a member of the advance guard of the Seventy-seventh Division, returning to make arrangements for the reception of the division, which is expected to arrive in New York during the first week in May. He was born in New York in 1885 and was graduated from Harvard University in the class of 1905. He was connected with Stone & Webster, Boston, Mass., for two years and for four years prior to 1911 was with the Third Avenue Railroad, New York, N. Y., first as assistant to the general manager and then as general superintendent. He next became superintendent of transportation of the British Columbia Electric Railway, Vancouver, B. C. Subsequently he became a member of the engineering firm of Roosevelt & Thompson, specializing in railway engineering work. Major Roosevelt attended the first Plattsburg Training Camp in the summer of 1917, and on completing the course he was commissioned a captain of infantry. He was assigned to the 308th Infantry, then being formed at Camp Upton, Long Island, and went overseas with that regiment last April. After taking part in a number of engagements with the Seventy-seventh Division he was promoted to major and given command of the divisional ammunition train. Major Roosevelt had been cited for displaying exceptional bravery and courage under heavy fire, while the Seventy-seventh Division was fighting for the possession of the Vesle River.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Great Britain to Resume Traction Work

Delay Due to Lack of Men and Raw Materials—Linking Together of Lines Sought

In England the revival of business for manufacturers of railway supplies grows almost from day to day. Moreover, a number of the more important municipalities are arranging to raise large loans for extensive developments. Immediate expansion on a very large scale is somewhat delayed by the manufacturers requiring time to get their men back from military work, to get raw materials and to reconvert their works from military to civilian uses. The full demands of some of the railway authorities also cannot come into active operation until they get legislative sanction for their schemes and authority to raise the additional capital. There is, however, a good deal of work free from any factor of delay, of the kind which only awaits the manufacturer undertaking it.

New cars and omnibuses are wanted by many muncipalities and fresh invitations to tender are steadily being issued. A new development is promised by the London County Council. They propose immediately to apply for Parliamentary authority to own and work motor omnibuses for the purpose of linking up electric railway dead ends and for suburban prolongation of railway routes. In this way they hope partially at least to meet requirements until their traction system can be extended. Many municipal traction authorities in England have powers to work omnibus services, and there is no reason why London also should not have them. London also proposes to ask authority to construct a number of short electric lines as extensions and to link together existing lines, at a cost of over $2,000,000. A proposal that the County Council should offer to contribute ¾ of a cent per omnibus mile to the road authorities for road maintenance raises an important question of principle, and is still undecided. In a few places in England an arrangement of the kind is now in operation.

The new call for additional rolling stock was in the first place for omnibuses, the reason being that much earlier delivery of these could be promised than in the case of cars. That stage appears already to be over, and tenders for cars are now being freely invited. It is no new development for traction companies to seek omnibuses in order to supplement their railway services, but it is more prominent at present because of the urgent necessity for additional means of transportation.

There are great arrears to make up both in cars and track work. Prices must, for some time at least, continue high, but renewals, additions and extensions are urgent. Hundreds of miles of new rails will have to be laid down it is said, no matter what the cost, as soon as plenty of labor is available. What traction companies require is a continuance of heavy traffic and of increased fares, together with some more or less permanent settlement of the labor trouble which has for some time been so menacing.

In regard to rails, during the war when none could be obtained in England, Middlesex County Council ordered a small quantity from the United States which, including freight and insurance, cost £30 a ton, compared with £7 10s. before the war. The maximum price in England is now £17 10s. a ton.

Material	Prices, 1914	Price Dec., 1918	Percentage
Rails	£6 per ton	£17 10/ per mile	197
Setts, Whin	18/ per ton	26/ per ton	44
Setts, Granite	25/6 per ton	42/6 per ton	67
Cement	34/ per ton	129/ per ton	279
Trolley wire, phosphor bronze	£102 4/ per mile	£189 per mile	85
Strand wire	16/6 per cwt.	49/ per cwt.	200
Gear wheels	£3 2/ each	£13 18/ each	348
Pinions	10/ each	£2 15/6 each	450
Tires	28/ each	£4 8/6 each	216
Armature coils	£5 per set	£17 5/ per set	245
Lamps	5d. each	1/3 each	200
Trolley heads	26/3 each	56/3 each	114
Trolley wheels	3/2 each	4/3 each	34
Oils	1/ per gallon	3/ per gallon	200
Tickets	3d. per 1000	1/3 per 1000	400
Timber			500

In connection with applications for higher zone rates in Great Britain, it may be interesting to note the above increases in electric railway materials from 1914 to December, 1918.

Foreign Opportunity

A man in the Azores desires to secure an agency and possibly purchase all articles and supplies connected with the construction and installation of a hydroelectric plant of 3000 hp. and the construction and equipment of an electric railway system of approximately 50 miles. Correspondence may be in English. Communicate with No. 28784, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Further Price Reductions in Steel Equipment

Transformers, Turbines, Brakeshoes and Track Hardware Affected—Track Equipment Not Yet Released

Following the cut in steel prices expected by the steel producers, there have been further reductions applied by manufacturers to commodities entering into electric railway equipment. These reductions, although not radical in any respect, are capable of giving some incentive to buying in a field which previous to the time of the reduction had been devoted more to maintenance than new construction.

In the issue for last week of the ELECTRIC RAILWAY JOURNAL were given a number of items of electric railway materials which had just been subjected to price reductions. These readjustments comprised general prices on rails, steel and iron bars, certain steel sheets used, among other things, for tubular poles for railway and lighting work, tubing, rigid and flexible metallic conduit, sheets, wire products and pole line hardware.

Recent inquiries have resulted in locating further lines of material which have been affected by the general reduction of steel prices. Outlet boxes, covers, brushings and nuts have decreased 20 per cent, while stamped steel boxes are easier by approximately 18 per cent. This latter item, however, went into effect before the steel prices were accepted and merely shows one instance of the downward trend before assistance by the Industrial Board.

TRANSFORMERS SHOW REDUCTION

Transformers of 200-kva. capacity and above were subjected to a reduction of 10 to 15 per cent in price about the middle of February, and in the distribution type up to 200-kva. capacity, there has just been a reduction of 10 per cent. Steam turbines for both electric generation and mechanical drive have also decreased in price to the extent of 5 per cent.

The reduction in price of brakeshoes is 10 to 12 per cent. This takes into account the different qualities of shoes for the various classes of service. Bolts, nuts and rivets have suffered a cut of from 20 per cent to 40 per cent from war prices. Reductions have also taken place in other railway materials, but to date manufacturers have not made available the new prices. As soon as the schedules are made up further information will be given on such materials as car wheels and axles, brake beams, trucks, etc.

1300 Power-Saving Recorders Ordered

Will Be Used in Baltimore, Md., in Campaign Which Is Soon to Be Inaugurated

The United Railways & Electric Company, Baltimore, Md., has ordered 1300 of the Arthur power-saving recorders. Delivery on these is to begin within thirty days and to be completed within two months. These recorders are of the single-dial type, applicable to either hand-brake or air-brake cars, there being no connection with the brakes. The amount of money involved in this order is between $50,000 and $60,000. The purchaser has not specified any unusual features in the instrument with the exception of a particular type of lead seal. The expected coal and power saving with the recorders is from 10 to 15 per cent at the start, and 20 to 25 per cent ultimately.

Mr. Arthur will act in a consulting and organizing capacity in the inauguration of the power-saving campaign. He will give a series of talks to the motormen, special talks to the chief motormen and other instructors, using large diagrams that have been developed for the purpose. Another member of the Arthur organization, formerly chief power-saving inspector on a large property, will probably be stationed at Baltimore for some time.

Before the United Railways decided to install power-saving recorders its engineers and transportation officials visited a number of properties for the purpose of studying the matter from all angles.

Steel Prices Rejected by Director General Hines

Director General Hines, of the Railroad Administration, has refused definitely to agree to buy steel at the prices fixed recently at a conference of the Industrial Board and representatives of the steel industry. The price of steel rails offered particular concern. This somewhat disorganizes the plans of the Industrial Board for adherence by government departments to the price fixing agreements now being arranged for the great staples, such as coal and steel.

The Director General took the position that the agreements between the operators and the board amounted to actual price fixing. He cited the possible hazards of the Sherman law and insisted that the agreements would really constitute a violation of the statutes.

Rolling Stock

Central Illinois Public Service Company, Mattoon, Ill., has contracted for ten new steel cars to be placed in city service in Charleston, Mattoon, Paris, Taylorville and Anna. The cars will be of the safety type for one-man operation. Delivery is expected within ninety days.

Kansas City (Mo.) Railways has ordered twenty-five one-man cars for delivery early in April. They are furnished by the American Car Company of St. Louis, Mo., and the Cincinnati (Ohio) Car Company. The length of the cars will be 27 ft. 9½ in. Eleven will be equipped with two Westinghouse No. 506—AH—2 motors and fourteen cars with two General Electric No. 258 motors. All cars will have K-10 control. Fifteen are to have Westinghouse air compressors, and ten will have General Electric air compressors, all using Safety Car Devices Company's equipment. The seating capacity will be thirty-five passengers and the cars will weigh approximately 14,000 lb.

Track and Roadway

Birmingham Railway, Light & Power Company, Birmingham, Ala.—An order for 1,500 tons of steel rails has been placed by the Birmingham Railway, Light & Power Company with the Tennessee Coal, Iron & Railway Company. The first lot of 1000 tons of rails has been ordered for immediate delivery and the remaining 500 tons is to be delivered in sixty days. The rails are ordered for the purpose of retracking 13 miles of the company's lines in Birmingham. The new rails are of a heavier type than those at present in use. The work will be started at once. The retracking work will include portions of the Twentieth Street and Avenue B Loop line, the Gate City, North Ensley, Avondale, and some of the crosstown lines.

Mobile, Ala.—The organization of the Baldwin County branch of the Gulf Coast Municipal Interurban League was recently perfected at a mass meeting held at Foley, Ala., the purpose being to have the proposed municipally-

NEW YORK METAL MARKET PRICES

	Mar. 13	Apr. 3
Copper, ingots, cents per lb	14.75	15.50
Copper wire base, cents per lb	17.25 to 18.00	17.25 to 18.00
Lead, cents per lb	5.25	5.25
Nickel, cents per lb	40	40.00
Spelter, cents per lb	6.50	6.62½
Tin, cents per lb	†72.50	†72.50
Aluminum, 98 to 99 per cent., cents per lb	30.00	30.00

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† Government price in 25-ton lots or more f.o.b. plant.

OLD METAL PRICES—NEW YORK

	Mar. 13	Apr. 3
Heavy copper, cents per lb	12.75 to 13.25	13.00 to 13.25
Light copper, cents per lb	10.75 to 11.00	10.50 to 11.00
Heavy brass, cents per lb	7.25 to 7.50	7.25 to 7.50
Zinc, cents per lb	5.25 to 5.50	5.25 to 5.50
Yellow brass, cents per lb	6.00 to 6.25	6.00 to 6.50
Lead, heavy, cents per lb	4.75 to 4.87	4.25 to 4.50
Steel car axles, Chicago, per net ton	$28.00 to $30.00	$26.00 to $28.00
Old carwheels, Chicago, per gross ton	$22.00 to $23.00	$22.00 to $23.00
Steel rails (scrap), Chicago, per gross ton	$16.50 to $17.00	$17.00 to $17.50
Steel rails (relaying), Chicago, gross ton.	$15.50 to $16.00	$16.50 to $17.00
Machine shop turnings, Chicago, net ton	$5.50 to $6.00	$6.50 to $7.00

ELECTRIC RAILWAY MATERIAL PRICES

	Mar. 13	Apr. 3
Rubber-covered wire base, New York, cents per lb	21	20
Weatherproof wire (100 lb. lots), cents per lb., New York	25.75 to 33.75	24.25
Weatherproof wire (100 lb. lots), cents per lb., Chicago	30.75 to 37.35	23.75 to 37.35
T rails (A. S. C. E. standard), per gross ton	$60.00 to $65.00	49.00 to 51.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	$57.00 to $60.00	47.00 to 49.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$55.00 to $60.00	45.00 to 47.00
T rail, high (Shanghai), cents per lb	3½	?
Rails, girder (grooved), cents per lb	4½	?
Wire nails, Pittsburgh, cents per lb	3½	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3.65	3.25
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	3	2.75
Tie plates (brace type), cents per lb	3	.....
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb	3	3
Angle plates, cents per lb	3	2.75
Angle bars, cents per lb	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb	4.90	4.35
Steel bars, Pittsburgh, cents per lb	2.70	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.55	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.60	5.25
Galvanized barbed wire, Pittsburgh, cents per lb	4.35	4.10

	Mar. 13	Apr. 3
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount †	77%	80%
Car window glass (single strength, first three brackets, B quality), New York, discount	77%	80%
Car window glass (double strength, all sizes AA quality), New York discount	79%	81%
Waste, wool (according to grade), cents per lb	13 to 20	14 to 17
Waste cotton (100 lb. bale) cents per lb.	11 to 13	8 to 13½
Asphalt, hot (150 tons minimum) per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	.....	.....
Asphalt filler, per ton	$30.00	.....
Cement (carload lots), New York, per bbl	$3.20	$2.90
Cement (carload lots), Chicago, per bbl.	$3.34	$3.05
Cement (carload lots), Seattle, per bbl.	$3.68	$3.13
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.53	$1.53
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.60	$1.60
White lead (100 lb. keg), New York, cents per lb	13	13
Turpentine (bbl. lots), New York, cents per gal	69½	75

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† These prices are f. o. b. works, with boxing charges extra.

owned electric interurban railway from New Orleans to Mobile extended from Mobile through Baldwin County, Pensacola, Fla. The Legislatures of Louisiana and Mississippi having passed identical laws authorizing municipalities to own, construct and operate interurban railways, a duplicate of this law is now before the Alabama Legislature and a similar bill will be introduced in the Florida Legislature as soon as it convenes.

Somers Electric Company, Hartford, Conn.—The House at Hartford recently rejected the bill authorizing the Somers Electric Company to buy the property of the Hartford & Springfield Street Railway and conduct the railway in the towns of South Windsor, East Windsor, Windsor Locks, Enfield and Somers. The Hartford & Springfield Street Railway is now in the hands of a receiver.

St. Petersburg-Tampa Railway, St. Petersburg, Fla.—The entire right-of-way has been secured for the proposed line of the St. Petersburg-Tampa Railway between St. Petersburg and Tampa and it is expected that construction of the line will be begun shortly. George S. Gandy, Sr., St. Petersburg, president. [Apr. 13, '18.]

St. Louis & East St. Louis Interurban Railway, East St. Louis, Ill.—The St. Louis & East St. Louis Interurban Railway, a company formed by officials of the East St. Louis & Suburban Railway for the purpose of operating cars between St. Louis and East St. Louis via the free bridge, has been granted a dissolution and returned its charter to the Secretary of State. The charter allowed the company to operate cars into St. Louis if the consent of the officials of the city of St. Louis was obtained. This consent was never sought and all efforts to complete the work of operating cars over the free bridge was dropped soon after the charter was obtained.

Mexico Tramways, Mexico City, Mex.—It is announced that if the British syndicate which owns the Mexico Tramways system is successful in its efforts to obtain the return of that property from the Carranza government, extensive plans for extensions and improvements will be carried out.

Trenton & Mercer County Traction Company, Trenton, N. J.—The Trenton & Mercer County Traction Corporation has asked the City Commission of Trenton for permission to relocate its track on a number of streets in Trenton. The company wants to abandon a part of the line on Bridge Street and extend its line to the new municipal dock along the Delaware River, using 70-lb. T-rail.

Jersey Central Traction Company, Keyport, N. J.—A report from the Jersey Central Traction Company states that it will rebuild the trestle approaches to the county bridge.

Dallas (Tex.) Railway.—The City Commissioners of Dallas are expected to issue an order to compel the Dallas Railway to build an extension through the Mount Auburn addition to the city. M. N. Baker, supervisor of public utilities, has directed a letter to the Dallas Standard Traction Company, which now operates a short line in Mount Auburn, asking authority to examine its books with a view to determining the receipts of the company as well as to place a valuation on the property. The residents of Mount Auburn have made repeated efforts to have the Dallas Railway take over the line. It is probable the Dallas Railway will be ordered to extend its Elm Street line through Mount Auburn.

Power Houses, Shops and Buildings

Miami Beach Electric Company, Miami, Fla.—The Miami Beach Electric Company, which proposes to construct an electric railway at Miami Beach, also plans to erect an electric light system and ice plant.

Ironwood & Bessemer Railway & Light Company, Ironwood, Mich.—This company reports that during the next seven weeks it expects to place contracts for the construction of a new brick carhouse, 110 ft. x 50 ft., at Ironwood.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—A new building for handling freight will be constructed by the Kansas City, Clay County & St. Joseph Railway at South St. Joseph, Mo. The company will also purchase a complete armature for a 1500-volt rotary converter.

Jersey Central Traction Company, Keyport, N. J.—A report from the Jersey Central Traction Company states that the Monmouth Lighting Company, which leases the former company's power plant, is constructing an addition to the station and will install a 502-hp. B. and W. Sterling boiler. The work will be completed May 1.

Trenton & Mercer County Traction Company, Trenton, N. J.—A new engine is being installed at the power house of the Trenton & Mercer County Traction Company on Lincoln Avenue.

Northern States Power Company, Sioux Falls, S. D.—Work, it is understood, will soon be started on the erection of a 60,000-volt electric transmission line to connect the Sioux Falls division of the Northern States Power Company with the company's transmission system in southwestern Minnesota, between Pipestone and Dell Rapids, a distance of 35 miles. A new 3500-kw. steam turbine will be installed at the Sioux Falls power house to take care of the increased loads, which will be secured over the new line.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—The powerhouse of the Chattanooga Railway & Light Company, which supplied energy for the operation of the Lookout Mountain Railway, was recently destroyed by fire, together with considerable machinery, sheds and several cars.

Trade Notes

C. E. Hague, formerly production engineer of the Mid-West Engine Company, Indianapolis, Ind., has been appointed sales manager of the American Steam Conveyor Corporation, Chicago, Ill., manufacturers of American Steam Ash Conveyor and other ash-handling equipment.

Chicago Pneumatic Tool Company, Chicago, Ill., announces the discontinuance of its office at Wichita, Kan., and the transfer of stock to Eldorado, Kan., where an office and warehouse have been established. The company also announces the opening of a new office and warehouse at Tulsa, Okla.

H. G. Lewis, sales manager of the Electric Service Supplies Company, Philadelphia, Pa., has recently been made vice-president. Mr. Lewis has acted in this former capacity for many years and is well known in the electric railway, mining and power fields. He will continue his work as sales manager of the company.

C. B. Finnell, formerly traveling secretary to the general superintendent of the C., B. & Q. Railroad, and later private secretary to the president of the Commonwealth Steel Company, has just been appointed private secretary to Walter A. Zelnicker, president of the Walter A. Zelnicker Supply Company. Mr. Finnell is president of the Junior Chamber of Commerce of St. Louis, an organization of 1000 members of the younger business men of that city.

Arthur F. Braid has been appointed sales manager of the metal and alloy department of the Metal & Thermit Corporation. Mr. Braid came to the company seven years ago as a traveling salesman, but after a few years of most successful service in this capacity he was appointed assistant superintendent of the Jersey City plant, in charge of the manufacture of carbon-free metals and alloys. When the United States entered the war he assumed active charge of the metal sales at the company's New York office.

New Advertising Literature

Ohmer Fare Register Company, Dayton, Ohio: Circular containing pictures showing typical interiors at the manufacturing plant.

Locomotive Superheater Company, New York, N. Y.: Bulletin No. T1 on superheaters for stationary power plants; showing construction of superheater and methods of application to typical burden.

General Railway Signal Company, Rochester, N. Y.: Bulletin 135 on absolute permissive block system circuits. Sixteen pages. The text matter and diagrams of a paper presented at the regional meeting of the Railway Signal Association of Galveston, Tex., on July 27, 1918, by one of the representatives of the company.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, April 12, 1919 Number 15

It's Time for Some One to Start a New Company Section

THE silver trophy cup which was presented by this paper to the American Electric Railway Association last year to encourage the formation of company sections of that organization, reposes undisturbed in the offices of the Rhode Island Company at Providence. Now that the war is over, actually if not nominally, it is to be expected that challengers for the cup will appear. It was the idea of the donors that the cup would serve as a stimulus to friendly rivalry and as an aid to organizers of sections in stirring up local pride and enthusiasm. The officers of the association, in accepting it, expressed the belief that it would do so.

For a time before the United States entered the war the company section movement showed signs of suspended animation, as was natural. In the period between 1914 and 1916, inclusive, sections were being formed at a rate better than two per annum; then the rate fell off to about one. The Toledo section was formed early in 1917 and this husky youngster (a four-sided joint organization, to be sure) surprised everyone recently by passing the 1100-mark in membership, with greater expansion probably still to come. Just a year ago the Rhode Island Company section came into existence with a record-breaking initial membership. Who's next?

Make the Association Office a Storehouse of Data

ONE of the principal functions, possibly the principal function, of the American Electric Railway Association, is to collect and disseminate accurate information regarding the industry. The need for some such agency is becoming more acute every day, especially at the present crucial time. The association can afford to spend a very large sum each year for this purpose, and the money will be forthcoming to the extent needed if the association's bureau of information and statistics can demonstrate its ability to do the required work properly. Previous activities of the bureau of information have laid a foundation for the work which is now to be done, but the association must enter upon a new statistical era if it is to play its proper part in electric railway financial and physical rehabilitation.

But no statistical bureau can create data. All that it can do is to learn what information is needed, provide a mechanism for getting it, impress on those in possession of it the importance of giving it up for the common good, arrange it in convenient form for reference and send it out wherever the need for it exists. One of the difficulties in the past has been to convince the electric railways of the country that accurate data are really needed. The situation has been explained by President Pardee of the association, P. H. Gadsden, chairman of the committees on readjustment and national relations, and others. While at Washington as the representative of the association Mr. Gadsden was particularly embarrassed by his inability to put fully convincing figures before the governmental bureaus.

The executive committee of the American Association has placed in charge of the bureau of information and statistics a man who has had excellent experience and training for this particular work, namely, J. W. Welsh, formerly electrical engineer Pittsburgh Railways and later engineer with the Division of Transportation and Housing, Emergency Fleet Corporation. Mr. Welsh prepared the outline of the recent activities of the bureau published in the March 22 issue of this paper. We bespeak for him the active co-operation upon which he must depend. He will need it.

How One Association Will Help Member Companies

ELECTRIC railways in some twenty-five states maintain associations, sometimes in conjunction with electric light companies and in other instances by themselves. In certain of these joint associations, during the past three or four years, interest in railway subjects has had a tendency to lag, due partly to the fact that many railway operators have been too busy—or have thought they were too busy—to prepare papers and attend the meetings. This is to be regretted because such gatherings should have been particularly helpful during the trying period through which the railways have been passing, if for nothing more than because misery likes company. However, this belongs to the past. There are many serious problems ahead for the electric railways, and it is important for them to get together and do what they can to solve these questions.

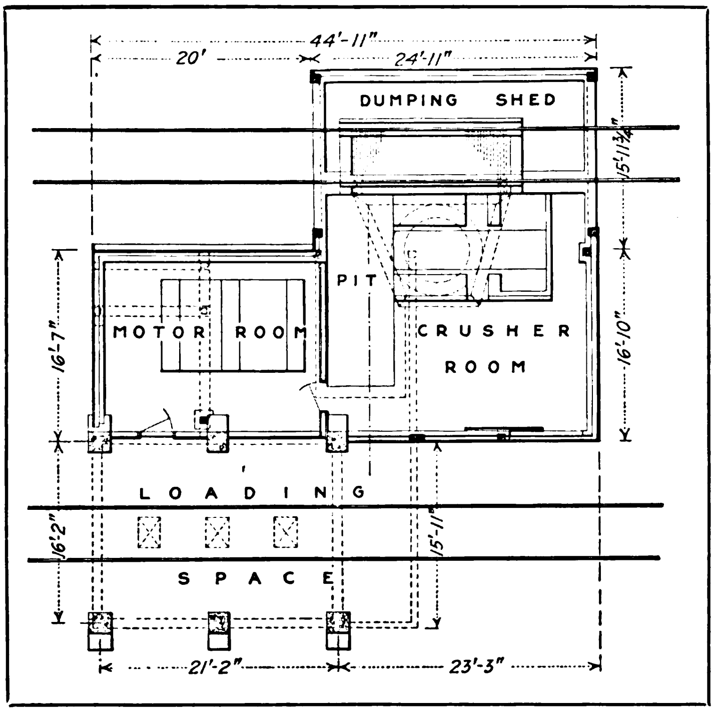
This seems to have been the idea which prompted the retiring president of the Wisconsin Electrical Association, in his address a few weeks ago, to recommend that on one day of each convention the sessions be divided so that the railway attendants may discuss, apart from the light and power section, problems which are of paramount interest to their industry. This suggestion was acted upon quickly and, as mentioned in the report of the meeting last week, a committee was appointed and before adjournment presented recommendations. These call for the organization of a separate branch of the association to be known as the Railway Division and to comprise five separate committees, one each on attendance and program, shops and equipment, transportation, way and structures, and power and distribution. It was also recommended that this division hold annually, aside from the regular convention, a two-day meeting on the property of some member company, to be devoted to a study of the property with recommendations for improved efficiency.

This suggestion should redound to the benefit of every member company, for eventually each will receive the

Detroit United Railway Builds Large Stone Crusher Plant

Crushers Taken from an Abandoned Quarry Are Used to Equip a Plant of 500 Cubic Yards Per Day Capacity in Salvaging Waste Materials for Ballasting

EVERY electric railway of any considerable size needs a stone crusher. Whether it be portable or a permanent structure depends upon the size of the property, the amount of material to be crushed per year and other local conditions. In former years much material, such as broken concrete, old brick, paving blocks, etc., has been hauled to a dump and used for filling-in purposes, sometimes thereby becoming of some use, but in many cases the disposition being considered only as a part of the necessary expense of maintenance and rehabilitation. With the advent of the necessity of every kind of economy, many railways have come to realize that this material is worth something and can be salvaged for further use. The Detroit United Railway operates 857 miles of city and interurban track. The latter, especially, requires large quantities of ballast both in maintenance work and for new construction, amounting perhaps to an average of 25,000 cu.yd. in a normal year. It is believed that 15,000 cu.yd. of this can now be furnished from salvaged waste material made available by a new crusher plant which was placed in operation in May, 1918, at the Oakwood yards of the company.



FLOOR PLAN OF DETROIT UNITED STONE CRUSHING PLANT

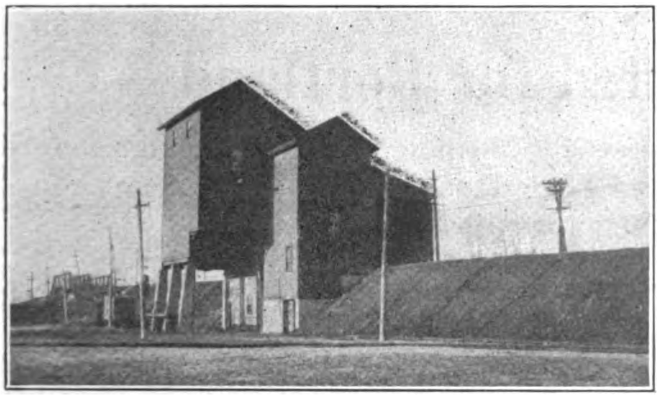
The plant is located on the southwest side of the Oakwood yard, immediately adjacent to the main line of the Detroit, Monroe & Toledo Short Line Railway, an interurban line operated by the company. This location not only has the advantage of simplifying the transportation and handling feature, but also made available a site which entailed no trestle construction and a minimum amount of fill as is indicated in accompany illustrations.

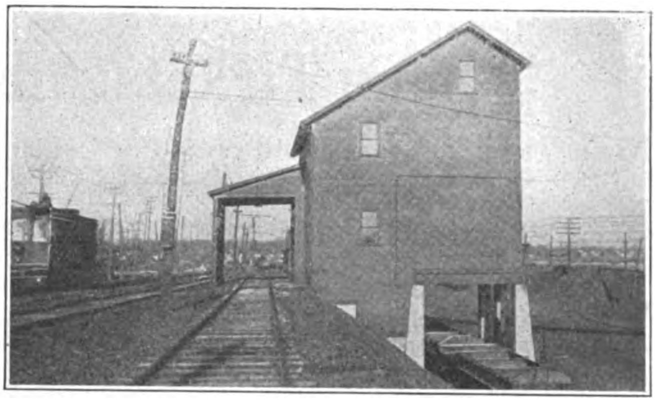
The general layout of the plant is shown in the floor plan. The foundations are of concrete carried down to a hard clay bed, the base of the foundation being reinforced with old 56-lb. rail. The superstructure of the plant is of wood heavily reinforced and braced with steel angles, channels, I-beams, tie rods and built-up sections. The roof is shingled and the building is covered with wood sheathing. The greatest height of the building, from the top of rail of the loading track to the peak of the roof, is approximately 56 ft.

A train of several side or center dump cars may be pushed by a motor car, up the dumping track incline into the dumping shed. Side dump, hopper dump or ordinary flat cars can be used. The side dump cars, air and electric operated, unload direct to the hopper of the crusher. To facilitate the use of hopper dump cars, neither floor nor ties have been placed between the track rails in the shed, the rail being laid on an oak sill on the outer side and on a built-up steel section on the crusher side. The material drops on to a slide made from inverted old rail imbedded in an 8-in. concrete slab and placed at such an angle that the material passes by gravity into the crusher hopper. If it is necessary to resort to hand unloading, the operation is, of course, longer and the motor may be withdrawn. As each car is unloaded, the brakes are released and the car passes down the incline, the next car taking its place over the hopper. The cars are then shunted into position under the storage hoppers on the loading track.

The large crusher into which the material first passes is an Austin No. 5 gyratory type removed from the Newport quarry owned by the company, but as mentioned before, now abandoned. The crushed material is discharged into a Stephens-Adamson continuous bucket elevator by means of which it is elevated to the top of the building and discharged into a standard 42-in. diameter No. 3 revolving screen made by the same company. This screen, which is 21 ft. long, is set with a slope of 1 in. to the foot and is divided into three sections, perforated to pass 1-in., 1½-in. and 2-in. sizes respectively. The screen revolves at the rate of 16 r.p.m.

The crushed stone and screenings pass into storage bins having a total capacity of 125 cu.yd. At the present time there is but a single hopper, although provision is made to separate the three sizes if de-





TWO VIEWS OF STONE CRUSHER PLANT OF DETROIT UNITED RAILWAY, SHOWING BOTH LOADING AND UNLOADING TRACKS

sirable. The storage hopper is formed of 10-in. x 10-in. Southern pine timbers braced with steel tie rods and lined with 2-in. x 12-in. Northern pine plank. The slope of the bottom is practically 1 to 1, the discharge into the cars being made through three openings each 24 in. x 32 in. These openings are closed by steel plates operated horizontally on roller bearings by rack and pinion controlled by a chain wheel at the side. Any material which is too large to pass through the screen is discharged into an open chute through which it passes by gravity to an Austin No. 2 gyratory crusher, also originally installed at the abandoned quarry. The material is discharged from this crusher down an incline to the foot of the elevator, where it passes back through the screen into the storage hopper.

The entire plant is driven by a 350-hp. Westinghouse motor, operating at 550 volts. This motor is far in excess of the needed capacity which is approximately 70 hp., but due to the introduction of individual motor drive in the Monroe shops of the company, this motor was thrown out of immediate service and its use here thus saved the purchase of a new machine. The motor is connected by belt to a shaft pulley, 11 ft. above the foundation. Connected to this shaft by belts are the No. 5 crusher, the No. 2 crusher and a second shaft. The second shaft is connected by belts to the elevator drive and to a pulley which drives the screen through a beveled gearing.

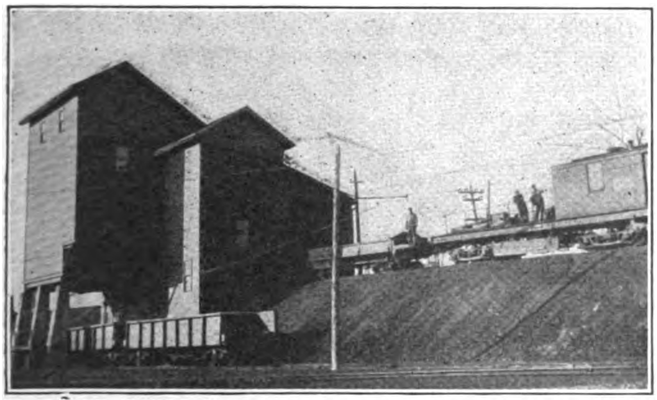
Construction work on the foundation of the plant was started in November, 1917, but no work was done during the winter months. The plant was completed and placed in operation in May, 1918, after approximately two months of construction work. Practically all the material crushed in the plant is old concrete, brick, paving blocks, etc., and this is used entirely for interurban track ballast. Since the plant was placed in operation, approximately 7000 cu.yd. of material has been crushed. One foreman and three men operate the plant, and with dump cars can handle 500 cu.yd. per ten-hour day. The plant does not operate during the winter months, as there is no refuse material for disposal from reconstructed tracks. About 150 days in the summer months would cover the period of operation. As these men spend most of their time on other work, the actual time of operation is all that is chargeable to the crushing. The total cost of the plant was $17,000. Allowing 20 per cent per year for depreciation, and 6 per cent per year on the investment, $3,000 per year for maintenance, and operating the plant 150 days ten hours per day, the cost per cubic yard may be found by the following formulæ:

$$\left(\frac{\text{Depreciation} + \text{interest on investment} + \text{maintenance}}{\text{number of operating days} \times \text{number of cu.yds. crushed per day}} + \frac{\text{number of hours worked per day} \times \text{wage per hour}}{\text{number of cubic yards crushed per day}}\right)$$

In numbers this would amount to:

$$\left(\frac{3400 + 1020 + 3000}{150 \times 500} + \frac{40 \times 0.50}{500}\right) = \text{approximately 14 cents.}$$

In a letter to the members of the Electric Railway Section, National Safety Council, Chairman H. B. Adams points out that there is one expenditure in the accounts of electric railways which brings no return, namely, the settlement of accident claims. The elimination of the causes for such claims should demand closest attention on the part of those interested in the welfare of a company, and furnishes an avenue for the active employee to make himself most valuable. Safety propaganda is one of the greatest means of saving that can be used by an electric railway company.



AT LEFT, TRAIN UNLOADING MATERIAL INTO CRUSHER WHILE OTHER CARS ARE BEING LOADED; AT RIGHT, SIDE DUMP CAR UNLOADING INTO CRUSHER opinion of every other operator in the State as to how his property can be operated more efficiently. It will be a sort of consultation of physicians, as it were, over a sick brother. And we are of the opinion that it may be a stimulant to advanced efficiency also, as each patient about to be the subject of the consultation will wish to appear to the best advantage.

It is to be hoped that all associations which have suffered a setback during the war will now draw themselves together in a similar manner for a concerted effort to put new enthusiasm into the industry.

Select Rail Sections with the Idea of Using Association Standards

"THERE are many things in the way of lack of uniformity in practices of railroads that should be corrected, and one of these is the rail section." Thus spoke C. A. Morse, president of the American Railway Engineering Association in his address at the recent annual convention. He had reference to the fact that, while his association has standardized seven rail sections between 70 and 130 lb. in weight, there are being rolled to-day some fifty different sections between those weights and twelve of them are variations of the 100-lb. rail alone. He also said that thoughtlessness and lack of knowledge of this unfortunate situation is probably the cause of such a state of affairs. Another factor is the ambition on the part of engineers to "design something."

We are inclined to agree with Mr. Morse in his analysis and think his strictures could be applied equally well to the rails used by electric railways, and those standardized by the American Electric Railway Engineering Association. For instance, we wonder how many electric railway engineers know that their own association has standardized the same sections as the American Railway Engineering Association from 80 to 100 lb. How many continue to order 80-lb. A. S. C. E. rails in preference to their own 80-lb. A. E. R. A. standard? Again, how many electric railway engineers know that the 7-in. 80-lb. and 7-in. 91-lb. plain girder rails which they order as L. S. Co. Sections 80-335 and 91-375 are really their own association standards also?

To turn to the Engineering Association's standard groove girder rails, there appears to be an opinion among many that these sections are too heavy for most roads. The 7-in. standard groove girder rail weighs 122 lb. per yard, but when it is remembered that very few substantial groove rails weigh less than 105 lb. and most reach 112 to 116 lb., it will be seen that the standard is really not unduly heavy when its merits are fully considered. We know of one road which abandoned a 105-lb. rail of this type in favor of the 122-lb. association standard, and the change has proved to be very wise. There have been fewer paving and joint troubles, while better joints and a smoother riding track have been secured.

At present prices and costs, an increase in weight of 17 lb. in the rails would probably add to the cost of relaid track, complete, between 1½ and 2 per cent, but this is more than offset by a prospective increase in head wear or rail life of from 20 to 25 per cent, to say nothing of the greater salvage value of the heavier rails. Hence, when a company is about to order rail, it should be very certain that it cannot afford to use the Engineering Association standards before choosing some non-standard rail.

What Others Think and Recommend

HOLDING the looking glass up so that we may see ourselves as others see us may not be a flattering experience, but it is sometimes a profitable one. This is the conclusion arrived at by a railway man who writes to us and whose letter touching on answers to our recent questionnaire is printed in the communications department in this issue. This gentleman, who signs himself "Manager," refers to the series of articles which appeared in three issues of this paper, giving the views of representatives of the public on the questions of increased fares, publicity, franchises and municipal ownership. We are pleased to have furnished the medium for this "analysis of public thought" and hope the electric railway industry will take to heart some of the opinions expressed.

There is no question but that there have been and still are mutual misunderstandings on these important subjects. The industry is undoubtedly suffering from sins of the past, but the leaders of these public utilities should take courage from the fact that those who speak for "the opposition" are not insisting that the doors be shut against compromise and harmony in the future. Instead they offer many a suggestion which might be used in a "get together" policy, with strong possibility that these companies may be saved from financial ruin.

Lack of frankness and open-handed dealing appear to have been the basis for misunderstanding in the past. Railway men would charge these faults mainly against "the other side," but the public brings this indictment solely against the corporations. We believe that to a certain extent both are right, and, this admitted, there appears to be a ground for future co-operation. Perhaps we might clear the atmosphere by dismissing such terms as "the opposition" and "the other side" when referring to the public, because the triumvirate of co-operation which is getting best results these days is the one which reads: "The public—the employee—and the company."

Leaders of the industry at the recent mid-winter conference of the association seem to have recognized public clamor to a considerable extent when they united on a policy of basing future appeals for popular support on an honest valuation. This policy if carried out in a proper spirit would silence the cry against "overcapitalization" and "profiteering." There is not so much dispute over the rate of return to be allowed capital in these utility corporations as there is upon the question of the valuation on which the return is to be granted. There will, of course, be a difference of opinion over methods of valuation and the items to be included therein, but if harmony is ever reached on this issue—as it will through sincerity of motive on both sides—a settlement should not be a difficult task.

Proponents of the public point of view also point out some of the deficiencies in the publicity practice of the utility corporations. We seem to have gone wide of the mark in this policy also, in spite of well intentioned methods. Here again we may profit from listening to the advice of those whom we have been seeking to convert. It has been said that publicity is a two-edged sword, and he who would use it must remember that if he expects the public to believe the facts as he relates them he must be prepared to open his books wide and reveal the whole story, good and bad alike, of his corporate stewardship.

We urge careful study of this series of articles on the men who are responsible for the well-being of our industry, and we respectfully call their attention to the old saw: "There is none so blind as they that will not see."

Utilizing Employees' Co-operation in Promoting General Good-Will

ELECTRIC railway managers have sometimes been criticized for not utilizing to a greater extent the opportunity to improve relations with the public through the good offices of the platform men. In fact, this was touched upon in an editorial in these columns recently. In justice to the managers it must be said that up to within a year or so, they have been handicapped in doing this very thing because the average platform man did not stay with any particular company long enough to become imbued with the manager's spirit. Platform work for electric railways for a long time was looked upon as of rather a transient character. It was considered by many as a makeshift, something to fall back upon when nothing really attractive offered. Obviously it was very difficult to develop a spirit of loyalty to a company and a desire to please the public under such circumstances.

Conditions, however, are different now. Without entering into a discussion of the adequacy or inadequacy of past wages in this field, we can say that electric railway wages now are, on the average, high, considering the requirements of the work. The result should be a greater average length of service on the part of employees. Not only are the wages higher in dollars and cents but they will become relatively higher as the fabulously large wages paid by manufacturers of war materials fade gradually from actuality to memories.

It is particularly desirable now that an effort be made to secure the active co-operation of the men and this, as pointed out, should be easier than heretofore. It must be done largely through the supervisory force, because good spirit can be engendered effectually only through man-to-man contact. It ought to be possible to have throughout an organization a spirit of good-will, provided the employees stay long enough to be affected by the contagion. One of the latest attempts along this line is the suggestion campaign inaugurated by The Connecticut Company a few days ago. Reference was made to this in our news columns for March 29. Briefly, the thought was to encourage two ideas. One was for all employees to offer suggestions and in other ways help to conserve the company's resources and increase its income so that it may be established in as sound a financial condition as possible. The other was to improve public relations by courteous and efficient service at all points. A report just received indicates that the men are taking a cordial and active interest in the campaign and good results are expected. The work will be followed up by means of monthly letters. Other companies have done somewhat the same thing in different ways, with varying degrees of success.

Organizations of the men can be utilized also, particularly the company sections of the American Electric Railway Asociation, which should be formed now in considerable numbers. The main hope in all this, however, is that increasing permanency of electric railway employment will permit whatever measures are used to be reasonably effective.

What a Six-Day Week Would Mean

IN AN EDITORIAL in the Feb. 15 issue of this paper we warned electric railway interests to be on their guard against the agitation for eight-hour laws in the various state legislatures. We called attention to the fact that what the unions really wanted was a "basic" eight-hour day, or time and a half or double time for all work extending over that period. In other words, this was a camouflaged attempt to add to the wage burdens which already weigh so heavily on these public utility companies.

Another bid for more wages, also under the guise of a plea for conservation of human energy, is now being pressed in certain sections of the country. This is known as the six-day labor week. Its effect, to make the employer bear all the additional expense of the proposed change, is frankly admitted in a recent issue of the official organ of the Amalgamated Association. The editor of that paper believes that employing companies are opposed to such legislation because it would mean increased payroll expense, and he says frankly that a six-day week instead of a seven-day week would mean a 16⅔ per cent increase in wages.

The writer also makes the point that the companies in arbitration cases "always endeavor to cover the injustice of the seven-day week by creating the presumption with the arbitration board that the work is of such type that men can easily endure the continuous employment that working 365 days per year requires." The fact is, as we understand it, that in the usual arbitration proceedings, it is contended that electric railway employees have steady employment, offering work every day in the year, and that with fair allowance for occasional days off duty these men are able to secure an annual income greater than that of many workmen in trades which offer a higher hourly rate of pay.

This proponent of the six-day week also argues that the "patriotic impulse" should induce these companies to adopt this method of extending employment, because "it would mean the employing of not less than 115 men where 100 are employed under the seven-day week privilege." It is well that the case of the employees is so frankly stated. There is no camouflage in this argument, but it contains a plain admission that these companies which are already so hard pressed because of the high cost of operation and inadequate fares would have to pay their present employees 16⅔ per cent more in wages and add 15 per cent to their number—probably with a guaranteed minimum wage to all the extra men.

The employing companies should be equally frank in showing what this additional weight to their wage burden under present financial conditions would mean. Briefly, it would imply bankruptcy for a large percentage of the properties, and inferior service from those that survived, on the theory that none should be required to furnish service beyond their financial ability. Of course this would react on community development and, in the end, would affect adversely the men who depend on these utilities for their livelihood. It is a plain case of a vicious circle. We would suggest to the editor of that paper that his association might better use its influence toward securing a living return for these companies before asking that they do what is now impossible.

Zone Tickets Adopted for Portland

Novel Ticket System Handles 97 Per Cent of Passenger Business—Frank Campaign Before New Schedule Became Effective Secured Understanding of New System and Appreciation of Company's Problems

A NEW fare system based upon tickets went into effect on March 2 on the lines of the Portland (Me.) Railroad, operated by the Cumberland County Power & Light Company. The system, which embodies various novel features, was designed by the railway to accord with orders issued by the Public Utilities Commission of Maine under dates of Jan. 7 and Feb. 3, 1919.

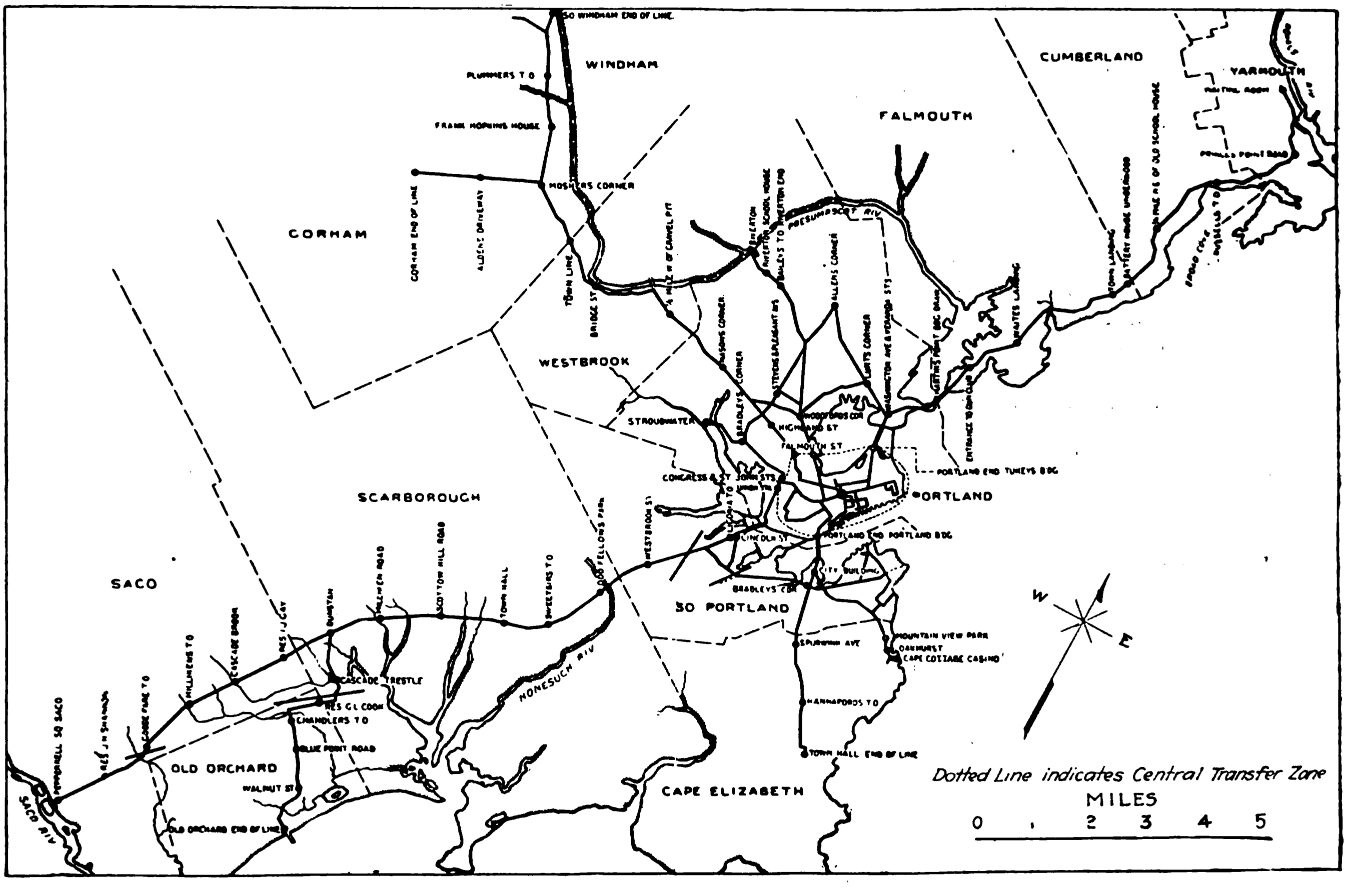
On July 25, 1918, it will be recalled, the commission authorized the establishment of a central zone from 2.5 to 4 miles in radius, and the subdivision of all exterior lines into zones of varying lengths. The fare in the central zone was 5 cents, and the fare units in the outer zones were 2, 4 and 6 cents, with a minimum fare of 6 cents and an average rate of about 2 cents per mile.

During August and September, 1918, there was an actual net revenue gain of $1,686 a month as contrasted with the sum of approximately $10,000 a month agreed to be necessary. The company therefore petitioned for 6-cent fares on its city lines. Before the hearings were completed, the War Labor Board ordered an increase in wages causing an estimated deficit of more than $20,000 a month. There being no expectation that 6-cent fares on the city lines would provide anywhere near the increased revenue required, the necessity existed for constructing an entirely new fare schedule. The one adopted on March 2 represents the outcome of an exhaustive study of local conditions by the company and the commission, with the benefit of outside expert criticism.

TICKETS HAVE REPLACED CASH FARES

The new system provides for the use of tickets in place of cash fares. The lines have been divided into a series of fare zones of as nearly equal length as possible (see accompanying map). The ticket fare for each zone is 2 cents, and the minimum fare in every case is 6 cents whether the passenger rides through one zone or three zones. The new fare limits are practically the same as the old ones, with the modification that the 6-cent central zone is subdivided into three fare zones and all 6-cent and 4-cent zones outside of the old central zone are also subdivided into three or two fare zones respectively.

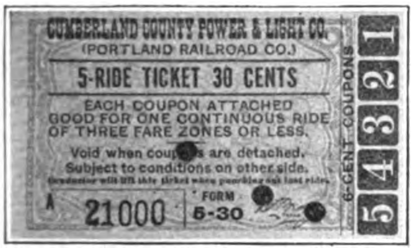
There are several kinds of tickets, as illustrated herewith, to insure maximum convenience to the public. They are all transferable. Those designated as "ordinary" tickets are for 6-cent fares. A "zone" ticket is used in conjunction with the 6-cent fare ticket to pay fares which are more than 6 cents. "Through" tickets are used to accommodate those who ride fre-


SO WINDHAM END OF LINE
WINDHAM
PLUMMERS T O
FRANK HOPKINS HOUSE
MOSHERS CORNER
GORHAM
GORHAM END OF LINE
ALDENS DRIVEWAY
TOWN LINE
BRIDGE ST
WESTBROOK
STROUDWATER
CUMBERLAND
YARMOUTH
FALMOUTH
PRESUMPSCOT RIV
ALLENS CORNER
LUNTS CORNER
WASHINGTON AVE & PRIDE STS
WOODFORDS COR
HIGHLAND ST
FALMOUTH ST
CONGRESS & ST JOHN STS
PORTLAND END TUKEYS BDG
PORTLAND
PORTLAND END PORTLAND BDG
LINCOLN ST
CITY BUILDING
BRADLEYS COR
SCARBOROUGH
SACO
OLD ORCHARD
OLD ORCHARD END OF LINE
WALNUT ST
BLUE POINT ROAD
CHANDLERS T O
RES G L COOK
CASCADE TRESTLE
CASCADE BROOK
DUNSTAN
TOWN HALL
ODD FELLOWS PARK
WESTBROOK ST
NONESUCH RIV
SACO RIV
PEPPERELL SO SACO
SO PORTLAND
SPURWINK AVE
MOUNTAIN VIEW PARK
OAKHURST
CAPE COTTAGE CASINO
HANNAFORDS T O
TOWN HALL END OF LINE
CAPE ELIZABETH
W
E
Dotted Line indicates Central Transfer Zone
MILES
0 1 2 3 4 5

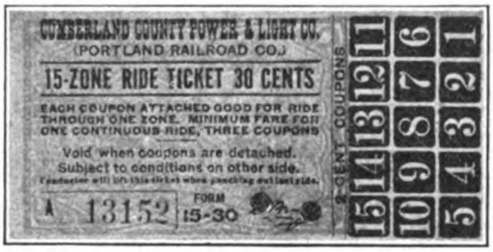
NEW TICKET ZONE SYSTEM OF PORTLAND (ME.) RAILROAD quently between points where the fare is 8, 10, 12, 18, 22 or 30 cents.

The ticket chiefly used is based on the 6-cent ride, five rides being sold in a block for 30 cents. No ticket for a single ride is sold. Each 6-cent coupon entitles the holder to ride through three fare zones. These tickets may be purchased from the conductors and at the Monument Square waiting room (the traffic center of the system).

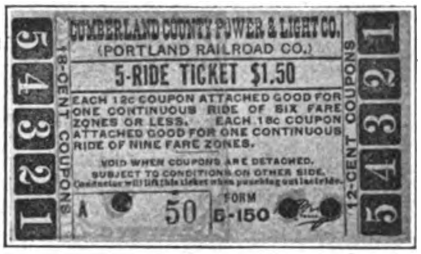
The "zone" ticket is provided for "change." It has fifteen 2-cent coupons and sells for 30 cents. It is used with the ordinary 6-cent coupon in paying fares above 6 cents where the passenger does not regularly pay such fares; or with the 6-cent fare ticket to pay a fare through an odd number of zones, such as seven, where the fare would be 14 cents. In the latter case the conductor punches one of the coupons in the 6-cent ticket, which entitles the passenger to ride through three zones, and then punches four of the 2-cent coupons on the zone ticket. The zone ticket can be used to pay a 6-cent fare, in which case three of the 2-cent coupons are punched by the conductor. It can also be used to pay any fare up to 30 cents at the option of the passenger. These tickets are sold by conductors and at the Monument Square waiting room.


CUMBERLAND COUNTY POWER & LIGHT CO.
(PORTLAND RAILROAD CO.)
5-RIDE TICKET 30 CENTS
EACH COUPON ATTACHED GOOD FOR ONE CONTINUOUS RIDE OF THREE FARE ZONES OR LESS.
Void when coupons are detached.
Subject to conditions on other side.
Conductor will lift this ticket when punching out last ride.
A 21000 FORM 5-30
6-CENT COUPONS 1 2 3 4 5

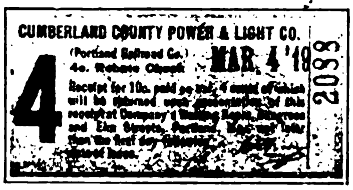
(A)


CUMBERLAND COUNTY POWER & LIGHT CO.
(PORTLAND RAILROAD CO.)
15-ZONE RIDE TICKET 30 CENTS
EACH COUPON ATTACHED GOOD FOR RIDE THROUGH ONE ZONE. MINIMUM FARE FOR ONE CONTINUOUS RIDE, THREE COUPONS
Void when coupons are detached.
Subject to conditions on other side.
Conductor will lift this ticket when punching out last ride.
A 13152 FORM 15-30
2-CENT COUPONS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

(B)


CUMBERLAND COUNTY POWER & LIGHT CO.
(PORTLAND RAILROAD CO.)
5-RIDE TICKET $1.50
EACH 12c COUPON ATTACHED GOOD FOR ONE CONTINUOUS RIDE OF SIX FARE ZONES OR LESS. EACH 18c COUPON ATTACHED GOOD FOR ONE CONTINUOUS RIDE OF NINE FARE ZONES.
VOID WHEN COUPONS ARE DETACHED.
SUBJECT TO CONDITIONS ON OTHER SIDE.
Conductor will lift this ticket when punching out last ride.
A 50 FORM 5-150
18-CENT COUPONS 1 2 3 4 5
12-CENT COUPONS 1 2 3 4 5

(C)


CUMBERLAND COUNTY POWER & LIGHT CO.
4
(Portland Railroad Co.)
4c. Rebate Check
MAR 4 '19
2093
Receipt for 10c. paid [illegible] 4 cents of which will be returned upon [illegible] of this receipt at Company's [illegible] and Elm Streets, Portland, [illegible] than the first day [illegible]

(D)

FARE TICKETS USED FOR ITS NEW ZONE SYSTEM BY THE PORTLAND RAILROAD

(a) Basic Ticket with Five 6-Cent Coupons.

(b) Supplementary Zone Ticket with Fifteen 2-cent Coupons.

(c) Specimen of Through Five-Ride Ticket.

(d) Four-cent Rebate Check Used with 10-cent Cash Fare for Three-Zone Ride or Less.

The "through" tickets are issued in the form of five rides selling for 40, 50, 60, 90 cents, $1.10 and $1.50 respectively. At present, with one exception (conductors on the Westbrook line), these tickets are sold only at Monument Square. After the plan has been in operation for awhile, if there seems to be a demand for the sale of through tickets by conductors on other lines, the company plans to make the necessary arrangements to meet that demand.

USE OF REBATE CHECKS

When a cash fare is offered by a passenger in lieu of a ticket, the fare for a three-zone or minimum ride is 10 cents. A passenger paying 10 cents receives a 4-cent rebate check, which may be redeemed before midnight of the following day at fifteen points on the system, including the company's office (waiting room), hotels, Union Station news stand, terminals, etc.

A passenger without a ticket who rides more than three zones pays 3 cents a zone in cash. For each 3-cent fare the conductor issues a 1-cent rebate check, redeemable not later than the close of the following day at one of the designated points. Thus, a passenger who boards a car without a ticket and rides through six zones pays the conductor 18 cents and receives six 1-cent rebate checks.

In all cases the passenger is entitled to receive a sufficient amount in rebate checks to reimburse him for the difference between the cash fare rate and the ticket rate. Conductors are not allowed to accept rebate checks for passage or to redeem them. The color of both kinds of rebate checks is changed daily, and each day's supply bears the date of issue.

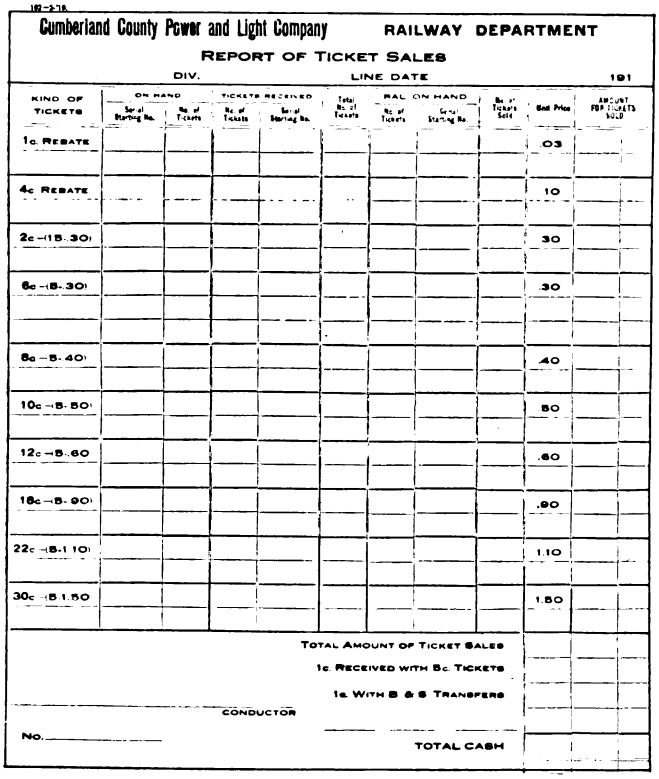
REGISTERING FARES AND HANDLING TRANSFERS

Conductors lift all tickets when punching out the last ride and register such tickets on the cash side of the register, making one registration for each ticket lifted. They register all transfers and free tickets on the transfer side of the register, lifting one employee's ticket for passage in or through each collection area. In punching coupons from tickets the conductors use a special square punch which enables them to work only from right to left, or from the first coupon to the last, in order.

The minimum fare, as before stated, is 6 cents in every case. A passenger paying 6 cents on a given line and riding only one zone, or 2 cents worth, on that line, is entitled to the balance of his 6 cents' ride on some other connecting line. This is why the old central zone was divided into three 2-cent zones. In addition the transfer feature provides for a central transfer zone (see map) with Monument Square as its central point. The limits of this central transfer zone are the outer limits of the first fare zone from Monument Square.

The transfer provides for punches of none, one, two or three zones. A passenger inbound to Monument Square who has paid 6 cents or more is entitled upon request when paying fare to a transfer permitting him to ride to any point within the central transfer zone. In the case of a passenger outbound from Monument Square who boards a car at any point within the central transfer zone, his journey is assumed to have begun at Monument Square. When paying his fare such a passenger upon request receives a transfer punched for "Zone 3." If a passenger boards a car in "Zone 1," the conductor punches out "Zone 3" on his transfer; if he boards it in "Zone 2," the transfer is punched out " one 2," and if in "Zone 3," it is punched out "Zone 1," the proper destination point being punched out in each case. If a passenger has ridden his full three zones, the conductor punches out "Zone 0."

Practically all outbound cars from Monument Square are "pay-leave" cars. When inbound to Monument Square, the passenger pays as he enters. This arrangement permits passengers to board and leave cars in Monument Square much more rapidly than formerly, and greatly reduces congestion at this important point.



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Cumberland County Power and Light Company RAILWAY DEPARTMENT

REPORT OF TICKET SALES

DIV. LINE DATE 191

KIND OF TICKETS	ON HAND		TICKETS RECEIVED		Total No. of Tickets	BAL. ON HAND		No. of Tickets Sold	Unit Price	AMOUNT FOR TICKETS SOLD
	Serial Starting No.	No. of Tickets	No. of Tickets	Serial Starting No.		No. of Tickets	Serial Starting No.			
1c. REBATE									.03	
4c REBATE									10	
2c –(15-.30)									30	
6c –(5-.30)									.30	
8c –(5-.40)									.40	
10c –(5-.50)									.50	
12c –(5-.60)									.60	
18c –(5-.90)									.90	
22c –(5-1.10)									1.10	
30c –(5-1.50)									1.50	

TOTAL AMOUNT OF TICKET SALES

1c. RECEIVED WITH 5c. TICKETS

1c. WITH 5 & 6 TRANSFERS

CONDUCTOR

No.

TOTAL CASH

CONDUCTOR'S REPORT OF TICKET SALES ON PORTLAND RAILROAD

The form used for a conductor's report of his ticket sales is reproduced herewith. The conductor's day card provides on the back for a report of tickets and transfers registered.

HUMANIZING THE PORTLAND RAILROAD

The new tickets were placed on sale eleven days in advance, but more than this was done. Before the new system was put into effect, the public was somewhat out of sympathy with the company's efforts to provide service in the face of mounting costs of operation. A. H. Ford, vice-president and general manager of the Cumberland County Power & Light Company, came to the conclusion that through direct personal contact with the public the management might make its purposes and difficulties understood. To effect this result, a series of nine district meetings was arranged in the outlying sections and the more thickly populated areas.

These meetings were held in the evening, at halls hired by the company, and were advertised in the press and by reading notices well in advance. The public was invited to offer criticism, whether destructive or constructive. The local superintendent, the general superintendent, the assistant to the vice-president and the general manager attended each meeting, and so great was the interest that every meeting lasted more than two hours.

On these occasions Mr. Ford put before the local public the essential facts as to the company's finances and explained either personally or through his staff the workings of the proposed new ticket system. The public was given an opportunity to examine the tickets at leisure and to study how each district would be served and how the fares would be altered. The local press was also utilized through advertisements to explain the new system and to set forth points brought out at the meetings, and front-page news "stories" were carried by the papers both morning and evening in connection with the meetings. These of course were of great value in reaching the larger public which could not be accommodated at the meetings. An example of the company's frankness in approaching the public is shown in the accompanying advertisement regarding the rebate checks.

At each meeting the company's representatives welcomed criticisms and suggestions bearing upon the service and in some cases were able to put the latter into effect soon afterward, to the great satisfaction of the local communities. In other cases, it was necessary to take the criticisms and suggestions under advisement, or it was possible to explain at once why various operating changes could not be made. Hostility to the company was dispelled very rapidly by these meetings, and the public now is generally convinced that the management welcomes its suggestions and will give them careful consideration.

TALK NO. 8

To the Patrons of the Portland Railroad Company:

The public meetings we have been holding, which have been well attended, have been of great value to the Portland Railroad Company. At these meetings some suggestions have been made for improving our service. We have adopted several of these suggestions and are giving careful consideration to all of them.

We have had some criticism of the ten cent fare with the four cent rebate check. It is the only feature of the new plan which the Public Utilities Commission has ordered the Railroad Company to put into effect which has been the subject of criticism. We think the people understand why this ten cent cash payment for a single ride is necessary. We have been ordered to use tickets instead of money for the payment of fares. Everyone can see that if the Company sold single trip tickets for six cents it would defeat the whole ticket plan which the Company has been ordered to put into effect.

We have obtained permission to modify the original order of the Public Utilities Commission and return a rebate check to the passenger worth four cents if presented at the redeeming points named, before the close of the day following the collection of the fare. We know this appears to be an awkward plan and will be something of an inconvenience to some of our patrons. The inconvenience can be avoided, of course, by purchasing the five ride six cent tickets for thirty cents. This is what the great majority of the people will do.

We frankly admit, however, that we are not sure that the rebate check plan is the best one that can be devised. We have another plan under consideration which would eliminate it but there are some objections to it which we are striving to overcome. We have submitted the alternate plan to experts and expect a report upon it soon. In the meantime we will go ahead with the ten cent fare, four cent rebate idea and see how it operates. Later if the alternate plan is deemed feasible we will adopt it.

Our whole idea is to serve our patrons just as well as we can and to put them to the minimum amount of inconvenience. We are much pleased with the good spirit with which the public has accepted our plans and the manner in which all are trying to help us out of our difficulties and it is our intention to show by our efforts our appreciation of the good feeling which exists.

A. H. FORD,
Vice-President and General Manager.

HOW THE PORTLAND RAILROAD TALKED FRANKLY TO THE PUBLIC

The company also took good care of the public as the new fare system was being installed. For example, an article in the newspapers directed attention to the following:

> That the campaign of education through the advertising columns of the newspapers and experience meetings held in various sections has familiarized people with practically every feature of the ticket system was shown by the readi-

ness with which they adapted themselves to the changed conditions, yesterday.

The new transfer, which was expected to provide the most difficulty, seemed to have been mastered by the great majority, and only a few mistakes in this connection were made by the conductors. People who received the wrong number of zones on their transfers applied to the office of the company to have the matter straightened out, and in an advertisement this morning the management asks all who have trouble of this sort to come to the office for adjustment. Within a very short time everything will be running smoothly so far as the transfers are concerned.

Another thing to which the management wishes to direct attention relates to the purchase of the wrong kind of tickets. It has come to the knowledge of the officials that some have bought the kind of tickets that are not best suited for the trips which they are in the habit of making, and if these people will come to the office the mistake will be adjusted.

VERY LITTLE RIDING BEING LOST

Owing to the radical departure of the new schedule from the former system, together with certain new features pertaining to it, it is not as yet possible to form any positive opinion as to its operating success. The receipts in the first nineteen days' operation show an increase of 16 per cent over 1918.

It appears that the company is losing very little riding on account of the increase in fare from 5 to 6 cents on the short-haul city lines. This is attributed in considerable measure to the good feeling engendered by the public meetings in the various communities.

The number of rebate checks issued amount in money to about 3 per cent of the total passenger business; therefore about 97 per cent is ticket business. The company estimates that nearly half of the rebate business originates on the Union Station line, the rebate check being chiefly used by transients. The "pay-leave" plan for cars outbound from Monument Square is working out most satisfactorily.

War Experience of Lyons Tramways

AT THE BEGINNING of the Great War the mobilization took about 1850 of the total of 3459 of the employees of the Compagnie des Omnibus et Tramways de Lyon, according to a recent issue of *The Electric Railway and Tramway Journal.* In the early part of 1915 the company had to engage women employees. The employment of women as conductors was tolerated, but in a general way they hardly gave satisfaction in this capacity. Recruiting of women workers had the following variations:

		Number That Became Efficient	
Calender Year	Number Recruited	Conductors	Drivers
1915	560	*1,129	..
1916	1,417	1,045	47
1917	1,627	976	61
1918 (first half)	934	...	...

*Ed's Note. Evidently includes some recruited during 1914.

The diminution in the efficients in spite of the more numerous engagements is said to prove that the new personnel was of very mediocre quality and found itself eliminated very rapidly.

In order to replace the 1850 men mobilized, the company up to Jan. 1, 1917, engaged 9230 employees, including 2312 women. Of the total 9230 there remain with the company 1950, the 7280 others being dead or out of the company's service on account of the successive mobilizations of the younger classes. With a staff so unstable, it is said to have been difficult to maintain good service.

The rolling stock suffered, on the one hand, from the heavy overloads it had to carry and, on the other hand, from the wear of the track and the running of the cars by inexperienced hands. The company suffered particularly from the deterioration of motor armatures and field magnets. The expert winders not being available, the company was forced to engage women. It had great difficulties also in getting materials for repairs, particularly during 1918, and a large part of the rolling stock must be repaired before it can be placed in operation.

Elements of a Successful Outdoor Substation[*]

In Wisconsin Electrical Association Paper the Author Outlined the Merits and Shortcomings of the Several Pieces of Equipment

BY ALFRED ALSAKER
Consulting Engineer Delta-Star Electric Company, Chicago, Ill.

OUTDOOR substation equipment was primarily developed for small substations but has later been partially adapted for large substations. For the latter the outdoor equipment is very similar to that used in indoor installations. For example, in the case of oil switches there is a difference in the bushings and a slight one in construction. Lightning arresters are correspondingly similar. For small substations, however, the equipment is entirely different in that high-tension oil switches and other costly apparatus are eliminated. In most cases the two functions that would ordinarily be performed by the oil switch, namely, manually opening the circuit and automatically opening it in case of overload or other trouble, are performed respectively by the outdoor-type air-break switch and the high-tension outdoor fuse.

Air-break switches are of two types, horizontal and vertical break. The horizontal-break switches are, in turn, of two types, one with a single break per phase and one with a double break. The vertical-break switches are all single-break up to 88,000 volts. All air-break switches are provided with arcing horns to prevent burning of the main contacts. As to relative breaking capacity of these switches, this is as yet largely a matter of opinion. Mine is that the single-break horizontal switch will not break the arc as effectively as the single-break vertical switch, but the double-break horizontal switch should naturally be able to break heavier loads than either type of single-break switch.

FUSES CAN BE MADE WITH VERY SHORT TIME ELEMENT

The most important equipment for the operation of outdoor substations is the high-tension fuse. Of these there are several types. The horn-gap fuse is an ordinary fuse wire strung between two arcing horns mounted on insulators. For small systems this is a useful device, but where there is large power capacity beyond the fuse its use is not so practicable. By its very nature of operation the horn-gap fuse has a long time element. The simplest form of inclosed fuse is a wooden stick with a fuse wire inside. Another type consists of a fiber or glass tube with ferrules on the end connected by fuse wire. The first type has now been abandoned, the other has a comparatively long time element.

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[*] Abstract of paper read at meeting of Wisconsin Electrical Association, March 27, 1919.

The expulsion type of fuse consists of a treated fiber or porcelain tube, with a fused wire inside having a reduced cross-section near the closed end of the tube. This fuse has a shorter time element than the others mentioned and has a wide application especially for small and moderate-sized systems. The carbon tetrachloride fuse consists of a glass tube with a metal ferrule at each end. A very short fuse is fastened between the upper ferrule, and a strong spiral spring is fastened to the lower and holds the fuse in tension. There is a cork around the fuse element which prevents the arc from communicating to the glass, and just below the cork is a nozzle or liquid director which is fastened to the spring. A flexible copper lead is run inside the spring to the lower ferrule and serves to conduct the current and keep it from heating the spring. The tube is filled with carbon tetrachloride, which is simply a high-grade fire extinguisher. When the fuse melts the spring pulls the nozzle away and squirts the carbon tetrachloride on the flame, thus extinguishing it. This fuse like all others has its advantages and disadvantages. The first cost is moderate but that of re-fusing is higher than for the expulsion type. It has a very small time element and will clear a circuit in as little as 0.004 second.

There are several types of high-tension lightning arresters used in outdoor substations, the simplest form being the plain horn gap. This is effective because it gives lightning an unobstructed path to ground but the dynamic current which follows is often large enough to trip the switch at the source of power. To cut down the rush of dynamic current some manufacturers use resistance in series with the ground horn, but this stops the lightning discharge as well as the dynamic current. By using a number of resistance units in series with the ground horns, it is possible to arrange them in such manner that lightning has a direct path to ground through several gaps.

The electrolytic arrester is primarily a horn-gap arrester, but instead of resistance in the ground circuit it has a series of electrolytic cells, which automatically build up a resistance or counter electromotive force as the dynamic current passes. It might be defined as a horn-gap arrester with a current-limiting device, having a definite break-down value and a definite recovery value. This type is too expensive, however, to be used on small outdoor substations; furthermore, it requires attendance, as it should be charged at least once a day. The oxide-film arrester is a new type which has the characteristics of the aluminium-cell arrester but does not require any charging.

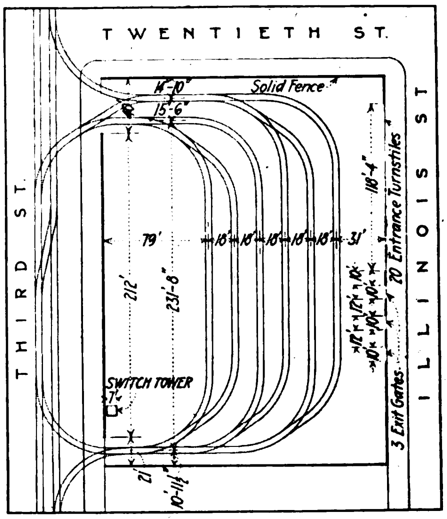
WHEN IS A FUSE MORE ECONOMICAL THAN A SWITCH?

In closing I shall discuss a little further the question of high-tenson oil switches *vs.* fuses for outdoor substations. It being assumed that it is possible by means of a fuse having an exceedingly short time element to obtain the same degree of protection as is provided by the best class of oil switches, the question then arises as to the conditions under which it is proper to use oil switches and when fuses should be used for the high-tension side of the transformers. In a very large substation containing several banks of transformers and several lines, the oil switch is undoubtedly the best thing to use. Where there is but a single bank of transformers, the question is settled by the presence or absence of an attendant. If an attendant is available, power can be restored undoubtedly more promptly when an oil switch is used. On the other hand, an oil switch opens comparatively often while the fuse blows seldom.

When no attendant is present the situation is different. It may take the operator fifteen minutes to get to the substation in case of trouble, and one minute to determine what has happened and close the high-tension switch again. If a fuse is used he will require the same time to get to the substation and may take five minutes to open up the air-break switch and replace the fuse. It is up to the engineer to decide whether the four-minute difference is worth the extra cost of the oil switch. This comparison is for interruptions caused by the blowing of high-tension fuses. In a properly designed substation the low-tension automatic switch will trip oftener than the high-tension fuse will blow, so that for most of the interruptions there are time-saving features with the oil switch. Probably for most cases the best proposition is the combination of quick-break fuse on the high-tension side and a cheap automatic oil switch on the low tension.

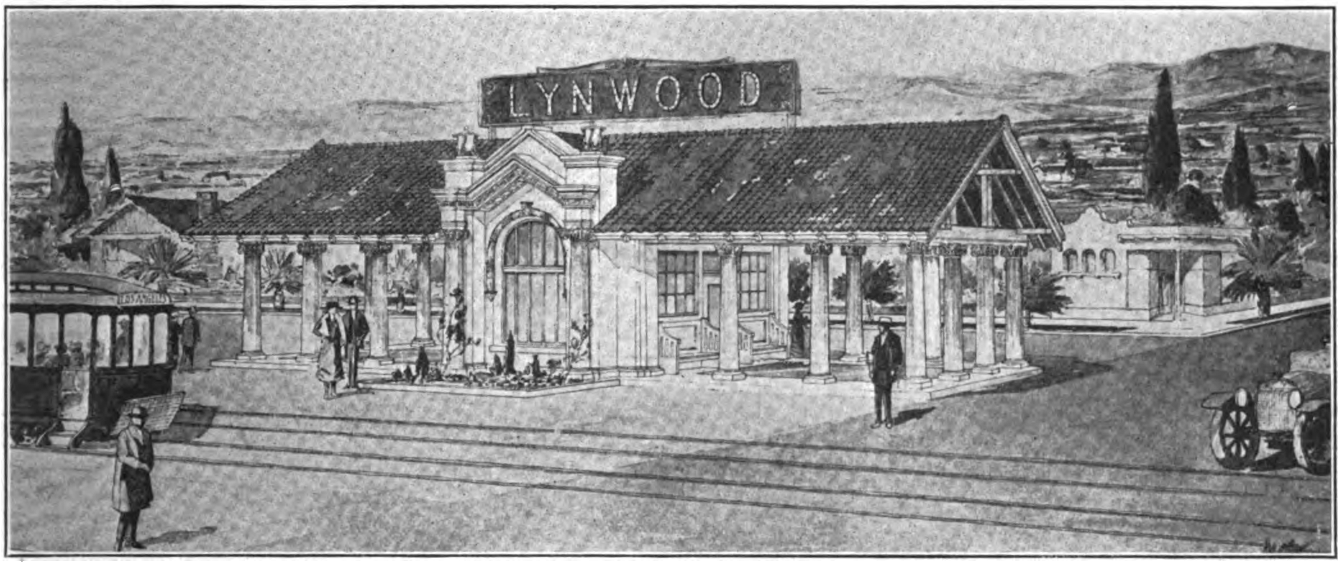
Prepayment Area in San Francisco

AN ACCOUNT was published on page 454 of the issue of this paper for March 8 of a prepayment area with six loop tracks, built by the United Railroads of San Francisco near the Union Iron Works in San Francisco to expedite the handling of the employees of that company. In the plan of the area published, however, one of the tracks on Third street was omitted, so that a corrected drawing of the prepayment area is presented herewith.



PLAN OF PREPAYMENT AREA IN SAN FRANCISCO

Briefly, the arrangement of loops is such that southbound cars move over the three inner loops while northbound cars are loaded on the three outer loops. The capacity of the loops is thirty cars, allowing lanes between cars of width sufficient to afford easy access to the inner tracks. The cars move out of the yard on a twelve-second headway. The switches leading from the incoming track to the several loops are controlled by hand operation from the tower at the corner where the tracks enter the yard. The area measures 200 ft. x 273 ft.



ELABORATE PASSENGER STATION BUILT BY REAL ESTATE PROMOTERS ON LINE OF PACIFIC ELECTRIC RAILWAY

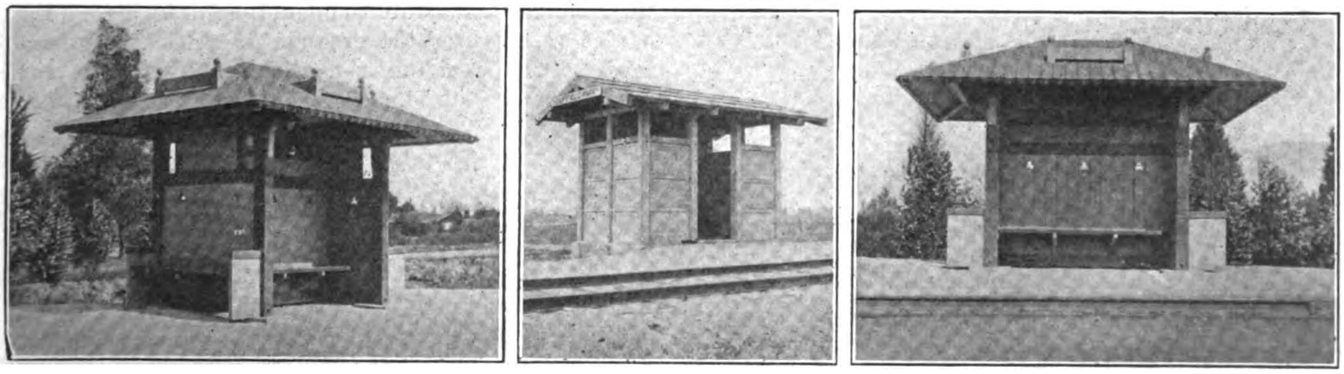
Shelters and Stations on Pacific Electric's Interurban Lines

The Author Gives Construction Details of a New Type of Shelter Used on the Pacific Coast and Tells of the Conditions Under Which Shelters and Stations Are Provided

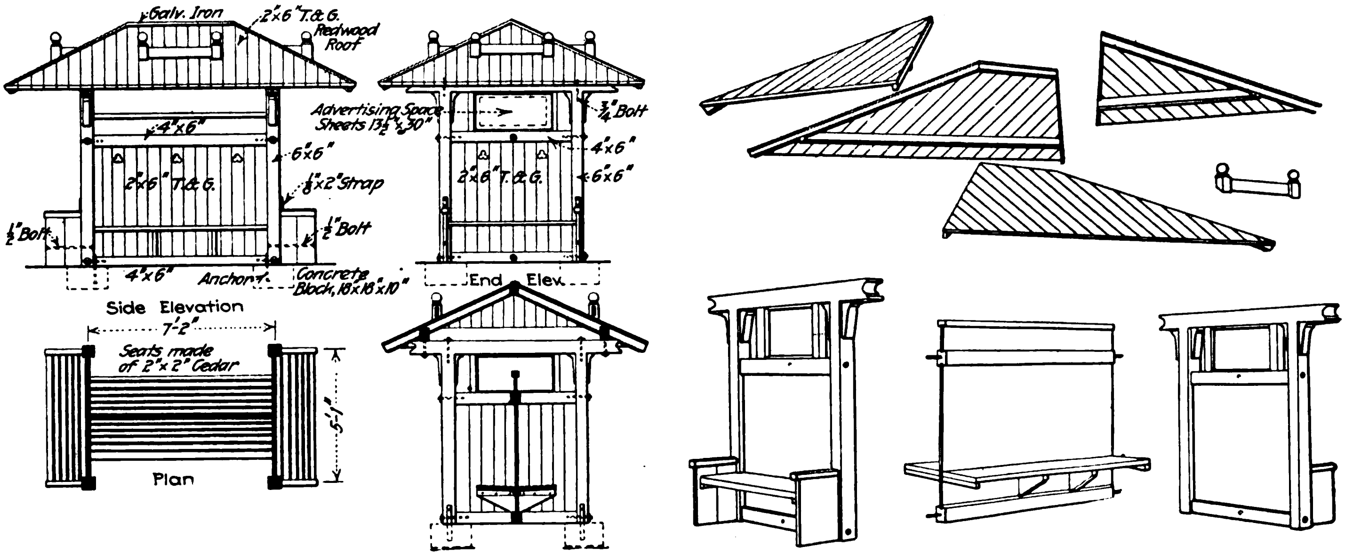
BY CLIFFORD A. ELLIOTT
Cost Engineer Maintenance of Way Department, Pacific Electric Railway, Los Angeles, Cal.

SINCE the construction of its line in 1902 the Pacific Electric Railway has placed small waiting shelters of various types at numerous stops on its interurban lines. Many of these were erected because specified in right-of-way contracts, while others were provided on account of traffic requirements. Usually the persons from whom rights-of-way were secured favored some particular type of station used by the company elsewhere on its line, or they favored a type, such as the mission type so extensively used in southern California, in keeping with the architectural style prevalent in the neighborhood.

The company has made it a policy to discharge its obligations to the traveling public by erecting commodious waiting shelters at important junction points whenever the travel warrants so doing. No contributions toward the expense of such shelters are sought from near-by residents, the company depending upon traffic checks to determine when and where shelters are needed. However, a consistent policy must be followed in this matter because, in addition to important junction stops on the line, there are more than 1000 minor stops. The company has established a fixed policy, therefore, that when patrons in the vicinity of such a stop petition for the erection of a shelter, the committee of petitioners, usually numbering from fifty to 100 patrons, is expected to contribute one-half the cost of the shelter. The committee is required to deposit this amount in advance of construction of the station. All shelters constructed at the joint expense of the patrons



TWO OUTER VIEWS, PASSENGER WAITING SHELTERS OF FRAME CONSTRUCTION TYPE ON PACIFIC ELECTRIC RAILWAY INTERURBAN LINES; CENTER VIEW, UNIT-SLAB CONCRETE WAITING STATION FORMERLY USED BY THE COMPANY



DETAILS OF NEW FRAME CONSTRUCTION PASSENGER SHELTER SHOWING CONSTRUCTION OF UNITS

and the railway company are maintained by the railway company.

Recently the company adopted a new ornamental type of small waiting shelter, as shown in an accompanying illustration. The public has been well pleased with this, and its cost is moderate. Six shelters of this type have been erected to date, in two cases the local patrons providing one-half the cost and in four the company erecting the shelters to meet right-of-way obligations or traffic requirements. These shelters are made up of units which are constructed in the shop so that they can be turned out in quantities, a procedure which results in reducing first cost and providing a stock of parts available for prompt shipping to a selected location. Such promptness is especially desirable when patrons have contributed toward the cost of the shelter. The accompanying drawings show clearly how the units are made up and assembled.

For four years prior to the adoption of the new type of station the company had been erecting its "Type E No. 10" unit-slab concrete shelters. These were constructed under royalty contract with the Unit Construction Company of San Francisco, and the sets of concrete members constituting the shelters were cast at the railway company's bridge and building shop. Several complete sets were always cast ahead to meet demands. The concrete stations cost somewhat more than those of the later frame type, which feature, of course, is objectionable to patrons who pay part of the expense of construction.

MATERIAL LIST FOR FRAME CONSTRUCTION OF PASSENGER SHELTER

Number	Size, Inches	Length, Ft. and In.	Dressed to, Inches	Location	Detail Number
1	4x6	6—10	3⅝x5⅝	Sill bottom	1
1	4x6	6—10	3⅝x5⅝	Sill top	2
4	4x6	4—8	3⅝x5⅝	Sill top and bottom	3
4	6x6	6—6	5⅝x5⅝	Posts	4
2	6x6	8—0	5⅝x5⅝	Caps	5
2	4x6	10—4	3⅝x5⅝	Plates	6
2	4x6	7—3	3⅝x5⅝	Plates	7
30	2x6	4—4	T. and G.*	Sides	8
7	2x6	4—4	T. and G.*	Sides	9
1	2x10	7—1½	1⅝x9⅝	Sign	.
1	3x3	7—1½	2⅝x2⅝	Sign	10
4	3x3	1—6	2⅝x2⅝	Seat ends	10
15	1x6	1—6	T. and G.* floor	Advertising boards	...
4	¾	10—0	Quarter round	Advertising boards	. .
8	4x4	1—2	.....	Brackets	11
32	2x6	12—0	T. and G.* redwood	Roof	12
8	2x3	8	1⅝x2⅝	Hip rafters	13
2	2x3	4	1⅝x2⅝	Ridge	13
8	4x4	1—2	Turned	Roof signs	14
4	2x6	2—6	1⅝x5⅝	Roof signs	...
4	3x3	1—6	2⅝x2⅝	Advertising signs	...
8	2x8	2—0	1⅝x7⅝	Seat ends	...
8	2x3	1—6	1⅝x2⅝	Cleats under seats	...
6	2x10	1—6	Sawed	Brackets under seats	...
12	2x3	7—0½	.....	White cedar seats	16
24	2x3	4—11½	.....	White cedar seats	16
4	½	12		Bolts	Thread and nut each end
16	½	14		Bolts	Thread and nu teach end
24	½			Cut washers	
8	Brackets as per detail				
4	½ in. x 2½ in. x 1 ft. 4 in. anchor bolts				
	Log screws, wood screws, nails, etc.				
	37 lin. ft. of No. 24 galvanized iron 4 in. wide				

*Tongued and grooved.

NO GLASS WINDOWS ARE PROVIDED

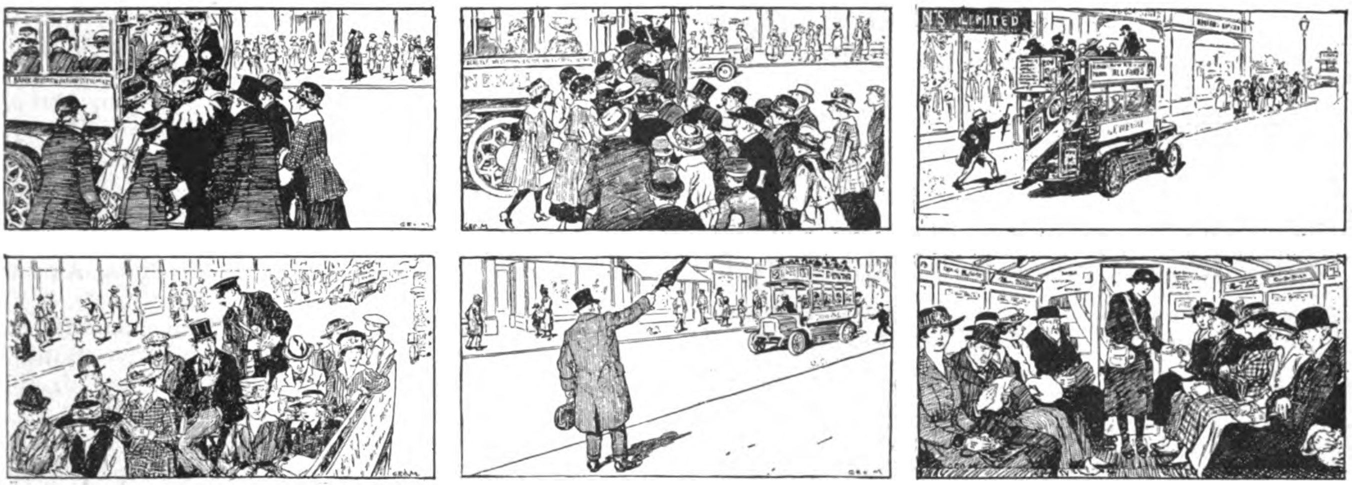
In neither type of shelter described are there any glass windows, as climatic conditions do not make them necessary. This feature eliminates the window glass maintenance problem, which is one that cannot be solved satisfactorily because tramps and mischievous small boys find window glass in small stations to be an appealing target at which to throw stones. The company installs no electric lamps in its small shelters, unless the conditions are exceptional. When electric lamps are used two are placed inside and three on a pole outside. Maintenance expense and cost of power are so great as to render this station lighting very objectionable.

While I am discussing the subject of shelters it may not be out of place to mention briefly the more pretentious stations which are used on the company's lines at a few points. At several stops on the lines, during the years when real estate subdivision activities were at their height, real estate companies secured the approval of the railway for the erection of stations in the interest of the real estate developments. In two cases very elaborate stations were erected, and in type and size they were in advance of the traffic demands at the time they were constructed and made ample provision for the growth of the territory which they served. They were, however, constructed entirely at the expense of the real estate companies. The illustration shown at the head of this article made from an architect's drawing shows an artistic passenger waiting station erected at a cost of $4,653 by the Lynwood Company, builders, owners and promoters of Lynwood townsite on the Santa Ana line of the company. This station was erected in 1917.

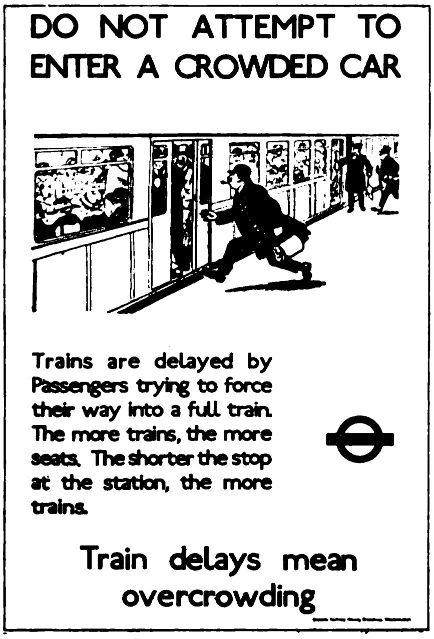
London Publicity on Rules of Conduct in Traveling

IN THE PAST the publicity of the Underground Railways and the London General Omnibus Company has been notable for its ability to create travel. During the past four years, with the shortage of men and materials, the burning question has been how to handle a greatly increased travel with more safety and dispatch. For this reason the advertising department of these companies has been giving its energies to preparing publicity that will be as effective in accelerating travel and promoting safety as the other publicity was effective in building custom.

For this work no color has been used other than tinted backgrounds for the station posters, but in accord with its policy the management has continued to employ high-class artists. Thus two of the series ema-



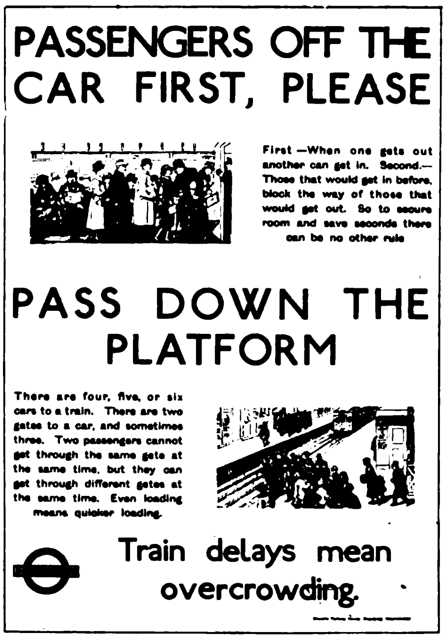
These views illustrate rules of conduct for travel on buses



DO NOT ATTEMPT TO ENTER A CROWDED CAR

Trains are delayed by Passengers trying to force their way into a full train. The more trains, the more seats. The shorter the stop at the station, the more trains.

Train delays mean overcrowding



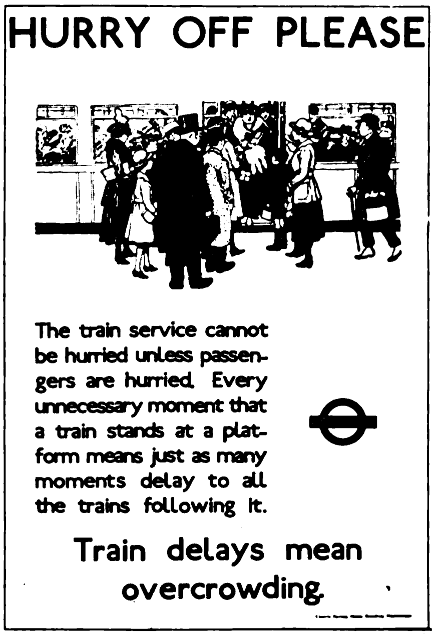
PASSENGERS OFF THE CAR FIRST, PLEASE

First.—When one gets out another can get in. Second.—Those that would get in before, block the way of those that would get out. So to secure room and save seconds there can be no other rule

PASS DOWN THE PLATFORM

There are four, five, or six cars to a train. There are two gates to a car, and sometimes three. Two passengers cannot get through the same gate at the same time, but they can get through different gates at the same time. Even loading means quicker loading.

Train delays mean overcrowding.

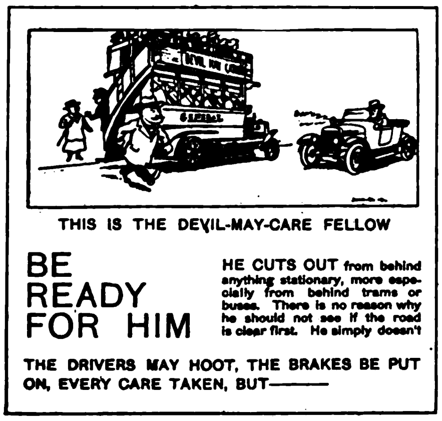


HURRY OFF PLEASE

The train service cannot be hurried unless passengers are hurried. Every unnecessary moment that a train stands at a platform means just as many moments delay to all the trains following it.

Train delays mean overcrowding.

Three posters designed to shorten station stops on the Underground Railway

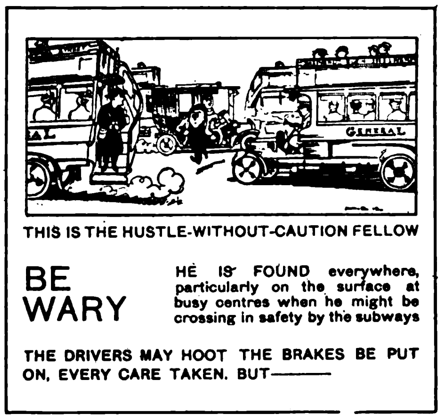


THIS IS THE DEVIL-MAY-CARE FELLOW

BE READY FOR HIM

HE CUTS OUT from behind anything stationary, more especially from behind trams or buses. There is no reason why he should not see if the road is clear first. He simply doesn't

THE DRIVERS MAY HOOT, THE BRAKES BE PUT ON, EVERY CARE TAKEN, BUT———

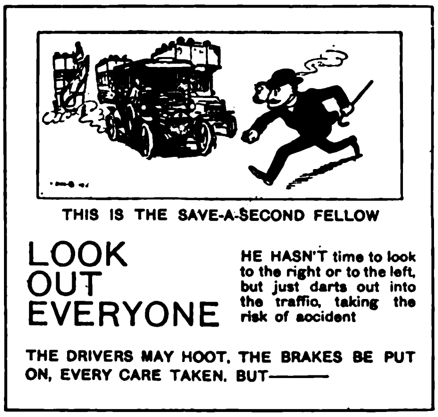


THIS IS THE HUSTLE-WITHOUT-CAUTION FELLOW

BE WARY

HE IS FOUND everywhere, particularly on the surface at busy centres when he might be crossing in safety by the subways

THE DRIVERS MAY HOOT THE BRAKES BE PUT ON, EVERY CARE TAKEN. BUT———



THIS IS THE SAVE-A-SECOND FELLOW

LOOK OUT EVERYONE

HE HASN'T time to look to the right or to the left, but just darts out into the traffic, taking the risk of accident

THE DRIVERS MAY HOOT, THE BRAKES BE PUT ON, EVERY CARE TAKEN, BUT———

Cautions to the careless pedestrian when crossing streets

RECENT PRODUCTS OF THE ADVERTISING DEPARTMENTS OF THE LONDON UNDERGROUND AND GENERAL OMNIBUS COMPANIES nate from a regular artist of *Punch*, the famous humorous weekly, and the pictures have just that element of native wit that attracts the passenger's attention without reprobation. As a matter of fact, the poster entitled "Do Not Attempt to Enter a Crowded Car" satirizes the artist himself! The other pictures in the station poster series are: "Passengers Off the Car First, Please"; "Hurry Off, Please"; and "Pass Right Down the Car, Please." The artist who drew the station posters is also responsible for the accompanying half-dozen sketches relating to rules of conduct for travel on buses. These drawings appear in newspaper advertisements.

Another ingenious series is that of the different kinds of "fellows"—the avoid-the-light, save-a-second, absent-minded, hustle-without-caution, hustle-without-aim and the devil-may-care varieties.

C. E. R. A. Committees Appointed

New "Brown Book" of Central Electric Railway Association and Allied Bodies Just Issued

"BROWN BOOK NO. 9" of the Central Electric Railway Association has just been published. It gives the officers for 1919, already noted in this paper in connection with the annual February meeting of the association; the president's address and the report of the secretary-treasury, copies of various bulletins, committee appointments and other matters of local interest. The personnel of the various committees follows:

CENTRAL ELECTRIC RAILWAY ASSOCIATION

Auditing—Walter Shroyer, Anderson, Ind., chairman; L. T. Hixson, Indianapolis, Ind., and E. O. Reed, Lima, Ohio.

Annual Transportation—H. A. Nicholl, Anderson, Ind., chairman; S. W. Greenland, Fort Wayne, Ind.; C. K. Minary, Benton Harbor, Mich.; C. J. Laney, Akron, Ohio, and C. O. Sullivan, Lima, Ohio.

Bureau of Standards—Adolph Schlesinger, Indianapolis, Ind., chairman; G. H. Kelsay, Cleveland, Ohio; L. G. Tighe, Akron, Ohio; M. J. Kehoe, Springfield, Ohio; E. J. Burdick, Detroit, Mich., and Prof. D. D. Ewing, Purdue University.

Constitution and By-laws—A. W. Brady, Anderson, Ind., chairman; C. L. Henry, Indianapolis, Ind.; E. F. Schneider, Cleveland, Ohio; J. F. Collins, Jackson, Mich., and A. C. Blinn, Akron, Ohio.

Finance—F. D. Carpenter, Lima, Ohio, chairman; W. H. Forse, Jr., Anderson, Ind.; F. R. Coates, Toledo, Ohio; Harry Reid, Indianapolis, Ind., and T. A. Ferneding, Dayton, Ohio.

Hotel and Arrangement—S. D. Hutchins, Wilmerding, Pa., chairman; H. A. Nicholl, Anderson, Ind.; L. G. Parker, Cleveland, Ohio; F. R. Coates, Toledo, Ohio; John Benham, Chicago, Ill.; James H. Drew, Indianapolis, Ind.; H. E. Rasmussen, Indianapolis, Ind.

Interurban Freight and Motor Truck Competition—A. Swartz, Toledo, Ohio; chairman. Indiana: Bert Weedon, Indianapolis, Ind., chairman; J. A. Greenland, Fort Wayne, Ind., and James H. Drew, Indianapolis, Ind. Michigan: W. S. Rodger, Detroit, Mich., chairman; F. W. Brown, Grand Rapids, Mich., and F. N. Root, Kalamazoo, Mich. Ohio: F. R. Coates, Toledo, Ohio, chairman; E. F. Schneider, Cleveland, Ohio, and S. D. Hutchins, Wilmerding, Pa.

Membership—John Witt, Cleveland, Ohio, chairman; J. M. Enright, Toledo, Ohio; S. W. Greenland, Fort Wayne, Ind.; Harry Reid, Indianapolis, Ind.; C. F. Smith, Findlay, Ohio; R. A. Crume, Dayton, Ohio; J. B. Stewart, Jr., Youngstown, Ohio, and W. H. Douglas, Willoughby, Ohio.

Program—C. L. Henry, Indianapolis, Ind., chairman; R. T. Sullivan, Youngstown, Ohio; F. D. Carpenter, Lima, Ohio; W. H. Bloss, Mansfield, Ohio; H. G. Gilpin, Springfield, Ohio; W. S. Rodger, Detroit, Mich., and W. K. Morley, Grand Rapids, Mich.

Publicity—E. R. Kelsay, Toledo, Ohio, chairman; H. F. Kenfield, Chicago, Ill., and C. J. Laney, Akron, Ohio.

Readjustment—C. L. Henry, Indianapolis, Ind., chairman; W. S. Rodger, Detroit, Mich.; A. C. Blinn, Akron, Ohio; J. A. Van Osdol, Anderson, Ind.; W. K. Morley, Grand Rapids, Mich.; W. S. Whitney, Springfield, Ohio; Harry Reid, Indianapolis, Ind.; W. H. Bloss, Mansfield, Ohio, and L. E. Gould, Chicago, Ill.

Resolutions—A. W. Brady, Anderson, Ind., chairman; F. D. Carpenter, Lima, Ohio, and A. C. Blinn, Akron, Ohio.

Rules Governing Interchange of Equipment—H. A. Nicholl, Anderson, Ind., chairman; Harry Bullen, Detroit, Mich.; A. Swartz, Toledo, Ohio, and J. W. Glendenning, Jackson, Mich.

Standardization—R. C. Taylor, Albion, Mich., chairman; H. H. Buckman, New Albany, Md.; F. J. Foote, Springfield, Ohio; Charles Sigler, Warsaw, Md.; F. Heckler, Fremont, Ohio; W. E. Ralston, Michigan City, Ind.; Terrence Scullen, Cleveland, Ohio; S. Potter, Detroit, Mich.; C. A. Brown, Toledo, Ohio, and K. A. Simmons, Pittsburgh, Pa.

Uniform Charges for Repairs to Interchanged Equipment—H. G. Gilpin, Springfield, Ohio, chairman; Irwin Fullerton, Detroit, Mich., and S. R. Dunbar, Anderson, Ind.

Supply Men—S. D. Hutchins, Wilmerding, Pa., chairman; L. G. Parker, Cleveland, Ohio; W. H. Bloss, Mansfield, Ohio; L. E. Gould, Chicago, Ill.; E. C. Price, Springfield, Ohio; J. Alexander Navarre, Minneapolis, Minn.; E. C. Folsom, Chicago, Ill.; S. W. Crawford, St. Louis, Mo.; H. C. Decamp, East Pittsburgh, Pa.; E. F. Wickwire, Mansfield, Ohio; F. N. Root, Kalamazoo, Mich., and E. J. Smith, Detroit, Mich.

Transportation—G. K. Jeffries, Indianapolis, Ind., chairman; E. Smith, Fostoria, Ohio; H. G. Gilpin, Springfield, Ohio; C. E. Morgan, Grand Rapids, Mich.; J. F. Keys, Detroit, Mich.; J. C. Schade, Warsaw, Ind.; C. C. Collins, Cleveland, Ohio; W. K. Morley, Grand Rapids, Mich., and R. R. Smith, South Bend, Ind.

Track and Roadway—T. R. H. Daniels, Indianapolis, Ind., chairman; T. H. Sundmaker, Springfield, Ohio; John Kerwin, Detroit, Mich.; L. A. Mitchell, Anderson, Ind.; A. V. Brown, Sandusky, Ohio; H. D. Sanderson, Jackson, Mich., and W. F. Carr, South Bend, Ind.

CENTRAL ELECTRIC RAILWAY TRAFFIC ASSOCIATION

Standing Auditing—Walter Shroyer, Anderson, Ind., chairman; L. T. Hixson, Indianapolis, Ind., and E. O. Reed, Lima, Ohio.

Booster—F. D. Norveil, Anderson, Ind., chairman; C. O. Sullivan, Lima, Ohio; J. H. Crall, Indianapolis, Ind.; O. H. Murlin, Dayton, Ohio, and J. H. Pound, Benton Harbor, Mich

Conference—F. D. Norveil, Anderson, Ind., chairman; C. O. Sullivan, Lima, Ohio, and J. A. Greenland, Fort Wayne, Ind.

Conference with Central Freight Association and Central Passenger Association—J. H. Pound, Benton Harbor, Mich., chairman; F. D. Norveil, Anderson, Ind.; W. S. Whitney, Springfield, Ohio; C. O. Sullivan, Lima, Ohio, and J. H. Crall, Indianapolis, Ind.

Constitution and By-Laws—C. J. Laney, Akron, Ohio, chairman; Bert Weedon, Indianapolis, Ind.; E. Hamprecht, Findlay, Ohio; James Rollins, Evansville, Ind., and J. F. Keys, Detroit, Mich.

Freight Rates—F. D. Norveil, Anderson, Ind., chairman; J. S. Moore, South Bend, Ind.; W. S. Whitney, Springfield, Ohio; C. C. Collins, Cleveland, Ohio; N. Rumney, Detroit, Mich.; Bert Weedon, Indianapolis, Ind., and C. J. Laney, Akron, Ohio.

Interchangeable Penny Coupon Ticket—W. S. Whitney, Springfield, Ohio, chairman; O. H. Murlin, Dayton, Ohio, and J. H. Crall, Indianapolis, Ind.

Interline Baggage—O. H. Murlin, Dayton, Ohio, chairman; C. O. Sullivan, Lima, Ohio; J. A. Greenland, Fort Wayne, Ind.; J. F. Keys, Detroit, Mich., and J. O. Motto, Warsaw, Ind.

Joint Passenger Tariffs—W. S. Whitney, Springfield, Ohio, chairman; F. D. Norveil, Anderson, Ind.; J. F. Starkey, Sandusky, Ohio; J. H. Crall, Indianapolis, Ind., and J. F. Keys, Detroit, Mich.

Joint Freight Tariffs—J. H. Pound, Benton Harbor, Mich., chairman; H. R. Biery, Scottsburg, Ind.; C. B. Kleinhans, Toledo, Ohio; C. C. Collins, Cleveland, Ohio, and J. O. Bradfield, Columbus. Ohio.

Military Traffic—F. D. Norveil, Anderson, Ind., chairman; W. S. Whitney, Springfield, Ohio; J. H. Pound, Benton Harbor, Mich.; C. O. Sullivan, Lima, Ohio, and J. H. Crall, Indianapolis, Ind.

Official Classification—W. S. Whitney, Springfield, Ohio, chairman; J. A. Greenland, Fort Wayne, Ind.; N. Rumney, Detroit, Mich.; F. D. Norveil, Anderson, Ind., and C. J. Laney, Akron, Ohio.

Joint Exception Tariff—G. O. Sullivan, Lima, Ohio, chairman; J. H. Crall, Indianapolis, Ind.; H. R. Biery, Scottsburg, Ind.; G. M. Patterson, Kendallville, Ind.; J. H. Pound, Benton Harbor, Mich.; W. S. Whitney, Springfield, Ohio, and F. D. Norveil, Anderson, Ind.

Joint Weight and Inspection Bureau—J. H. Crall, Indianapolis, Ind., chairman; F. D. Norveil, Anderson, Ind.; W. S. Whitney, Springfield, Ohio; O. H. Murlin, Dayton, Ohio; N. Rumney, Detroit, Mich.; C. P. Ryan, Kokomo, Ind., and F. W. Brown, Grand Rapids, Mich.

Official Interurban Map—G. M. Patterson, Kendallville, Ind., chairman; J. H. Crall, Indianapolis, Ind.; O. H. Murlin, Dayton, Ohio; W. S. Whitney, Springfield, Ohio, and J. H. Pound, Benton Harbor, Mich.

Official Interurban Guide—C. O. Sullivan, Lima, Ohio, chairman; J. H. Crall, Indianapolis, Ind.; F. D. Norveil, Anderson, Ind.; J. F. Starkey, Sandusky, Ohio, and J. A. Greenland, Fort Wayne, Ind.

Rules Governing Settlement of Freight Claims—F. D. Norveil, Anderson, Ind.; chairman; J. S. Moore, South Bend, Ind.; J. S. Clark, Bluffton, Ind.; C. B. Kleinhans, Toledo, Ohio; C. O. Sullivan, Springfield, Ohio; N. Rumney, Detroit, Mich., and C. J. Laney, Akron, Ohio.

Storage and Demurrage—C. O. Sullivan, Springfield, Ohio, chairman; J. A. Greenland, Fort Wayne, Ind.; N. Rumney, Detroit, Mich.; Bert Weedon, Indianapolis, Ind., and E. Hamprecht, Findlay, Ohio.

CENTRAL ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION

Compiling—L. T. Hixson, Indianapolis, Ind., chairman; I. E. Guthrie, Indianapolis, Ind.; H. F. McColgin, Scottsburg, Ind.; A. R. Baxter, Indianapolis, Ind., and A. L. Neereamer, Indianapolis, Ind.

Constitution and By-Laws—A. R. Baxter, Indianapolis, Ind., chairman; O. A. Small, South Bend, Ind., and J. P. Longon, Dayton, Ohio.

Freight and Excess—Walter Shroyer, Indianapolis, Ind., chairman; L. W. Van Bibber, Springfield, Ohio, and James Sweeney, Akron, Ohio.

Light and Power—H. T. Ledbetter, Toledo, Ohio, chairman; James Sweeney, Akron, Ohio; K. A. George, Kokomo, Ind.; H. E. Vordermark, Fort Wayne, Ind., and J. S. Minary, Benton Harbor, Mich.

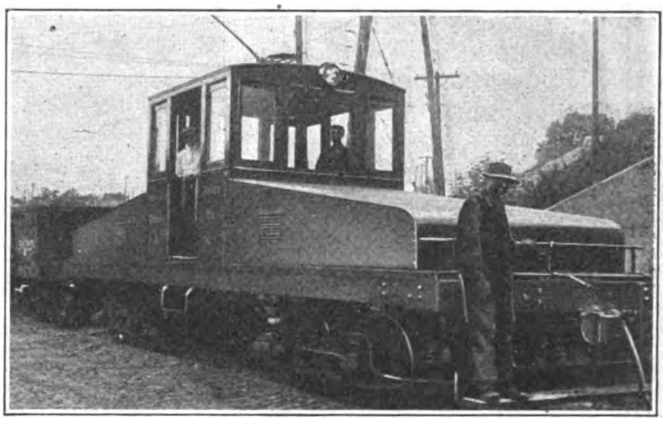
Membership—O. A. Small, South Bend, Ind., chairman; C. B. Baker, Findlay, Ohio, and J. F. Strattan, New Albany, Ind.

Program and Arrangement—E. O. Reed, Lima, Ohio, chairman; J. B. Hooper, Detroit, Mich., and G. H. Wilson, Evansville, Ind.

Readjustment—W. H. Forse, Jr., Indianapolis, Ind., chairman; J. P. Longon, Dayton, Ohio, and G. B. Dobbin, Akron, Ohio.

Steel Body Electric Locomotive Rebuilt

THE Georgia Railway & Power Company has recently built a new steel-body steeple-type locomotive in its shops to haul coal cars from the steam railroad to its Davis Street power plant. The body was rebuilt from a motor car and the electrical equipment and trucks are the same as previously used. The locomotive has four GE-1000 motors with 15:69 gear ratio mounted on Peckham trucks. One K-35-G controller is used. The air brakes are Westinghouse type AMM with a 12-in. brake cylinder. The locomotive is equipped with Janney couplers and Golden Glow headlights. The total weight is 45,000 lb. The accompanying table gives some of the principal dimensions:



LOCOMOTIVE HAULING A LOADED COAL CAR

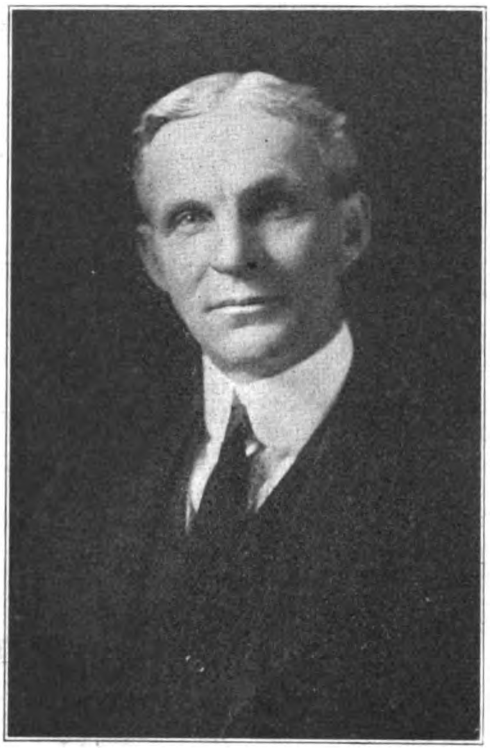
Length of body	34 ft. 0 in.
Width of body	8 ft. 2 in.
Height over all	12 ft. 8 in.
Bolster centers	17 ft. 6 in.
Wheelbase	4 ft. 0 in.
Wheels	Cast iron; 33-in. diameter; 3-in. tread; 4-in. axles.

The theory of commission regulation is well understood. Utilities, as well as the public, must be protected. The law permits them a fair return upon the value of their property. The obligation to increase a rate when it is shown to be too low is as imperative as it is to decrease a rate when it is too high.

An Optimistic Talk on Street Railways by Henry Ford

From an Interview
with an Electric Railway Journal *representative,*
April 9, 1919

ELECTRIC railway men who have been bewailing the decline and early death of their industry should be shocked into a joyous frame of mind when they are told that Henry Ford—yea, Henry Ford of all others—emphatically does not believe that the days of the railway are no more. Nay, further, he believes that the street railway, in particular, can be of greater usefulness in the immediate future than it ever was in the brightest days of the past.



HENRY FORD

But, and there is the rub — that greater usefulness cannot come, he says, until the industry flings traditional practices to the winds. The twofold absurdity of carrying five to ten times as much wood and iron as the weight of the passenger and of failing to give service and fares that would attract the vast number of pedestrians must stop. Although the railway field was not his specialty, he was going to prove at his own expense that it is possible, practicable and profitable to build a car that will hold the same relation to other street cars as the Ford for the millions does to the automobile for the thousands. This car will be so light that its fuel consumption on rails will be extremely low, and furthermore it will not require heavy expense for track construction and up-keep. Nor would this lightness be secured at the sacrifice of strength. Even automobile steel would not be good enough for him, because the steel which had been developed for the Fordson tractor was still stronger. Why use a 4-in. or 5-in. axle when 2-in. of a better steel would serve; and so with the trucks, the wheels and other parts?

A light car meant frequent service; yet frequent service alone was not enough to develop the greatest possible travel. Let the user of such a car work on the maxim "Nobody Walks" by beginning with the lowest base fare possible. From what he had seen and learned Mr. Ford ventured to prophesy that street railway traffic would be doubled at least if short headways and low graduated fares went hand in hand. It was up to the street railway men to see that the service was so good and so cheap that the owner of the automobile would use street railway service habitually instead of occasionally. Then the number of railway cars would rise from a hundred thousand to a quarter million or more.

Although the street car which Mr. Ford's staff is now developing is intended for direct gasoline drive, he saw no reason why the principle of using the strongest available materials should not be applied to cars with electric-motor drive.

The success already achieved with the one-man safety car surely bears out the sound sense of what Mr. Ford has to say on light weight and frequent service. In fact, he was amused to learn that the safety car had instinctively been nicknamed the "Ford of the Street Car Business."

Detroit Refuses to Pay the Price

Purchase of Detroit City Lines for $31,500,000 Voted Down 70,271 Against 63,883 Despite Fact that Charter Calling for Municipal Ownership of Traction Lines Was Accepted at a Seven to One Vote in June, 1918—What Mayor Couzens and Other Prominent Detroiters Have to Say on the Causes of Rejection

TO THE OUTSIDER who has watched the long-drawn-out struggle between the people and the street railway of Detroit to come to some settlement, the rejection of the latest purchase plan at the election of April 7 must have come as a great surprise. Perhaps in no other large city have so many prominent men of business forgotten their usual antagonism toward municipal ownership for the sake of ending an intolerable situation. The traction problem had been a political football so long that both sides were heartily tired of negotiation and counter-negotiation. Finally, the Detroit United Railway on the one side and the Mayor and Street Railway Commission on the other agreed on a compromise valuation of $31,500,000, whereupon the voters of Detroit were asked to vote upon its acceptance or rejection.

Despite the strong sentiment for the municipal ownership of the street railway system, the election of Monday, April 7, not only failed to get the three-fifths vote necessary, but actually failed to win one-half of the votes cast, the "Nays" numbering 70,271 and "Yeas" 63,883. In view of the importance of the election, the ELECTRIC RAILWAY JOURNAL had already sent one of its representatives to Detroit to interview Mayor Couzens and others on the meaning of the people's decision whichever way the election should turn out.

MAYOR COUZENS SOUGHT A BUSINESS MAN'S SETTLEMENT

When seen on April 8, the day following the election, Mayor Couzens did not hesitate to express disappointment at the rejection of the compromise valuation. It was true that during the past decade or more every plan offered had been negatived at the polls. Nevertheless, he had hoped that the education in working together for general social betterment, promoted by the war, would manifest itself in the desire of the people of Detroit to examine the basis of the traction settlement in a broad way regardless of politics and prejudices. There seemed to be all the more reason for this expectation because the people had accepted by the overwhelming ratio of seven to one a new charter in June of last year, by which the forty-two-member board of estimate and council and the twenty-one-member board of education had been replaced by much smaller bodies, and by which charter also so much power had been centered in the mayor that actually even the tax rates were up to him. Beyond all this, the charter made street railway ownership and operation mandatory. His Honor did not assert that the price was the very lowest that might possibly be obtained, but if he had been negotiating in private business under the same circumstances he certainly would believe that it was worth a couple million dollars to settle on a compromise basis. It surely would be worth this money to get rid of what had been for so long the stumbling block in Detroit politics—the street railway system.

One criticism that the mayor had to offer of the Detroit United Railway was that it knew very well that its franchises would expire after thirty years. Therefore, its policy toward the public should have taken this fact into consideration. The company could hardly expect to receive any high price for its property because property on leased ground certainly was not as valuable as property on land owned in fee.

In conclusion the mayor said that he was not prepared to express himself as to the next move. He wanted time to reflect as to what was the best course of action in the interests of the public.

OTTO KIRCHNER ANALYZES DIVERSITY OF OPPOSITION VOTE

Otto Kirchner, former Attorney General of the State of Michigan, who drew up the traction agreement as counsel for the city administration, pointed out that the vote against the purchase was an anti-municipal-ownership vote only in small part. The general public felt that it had not been treated right by the Detroit United Railway and its predecessors. After litigation on almost every request made by the city, they had come to the conclusion that it was useless to do anything that would make the railway under private management a permanent institution. The result was that the larger part of the company's franchises within the city limits had expired by limitation except the 3-cent lines, and even these would go in 1923. Therefore, the company had no vested rights but was simply occupying the streets on sufferance because the city had nothing apparently with which to secure the same transportation facilities quickly.

Aside from the presumably small number of people opposed to municipal ownership as a matter of principle, regardless of circumstances, the opposition had recruited many votes from people who were opposed to practically anything that gave a seeming concession to the Detroit United Railway. The average man who owned little or no property would not understand that there could be a difference of several million dollars between the valuations reached by the experts of the opposing sides. Yet the difference in so large a transaction really was comparatively so small that even the compromise figures could be considered low. Mr. Kirchner thought the Detroit commissioners had acted like business men rather than politicians. Another large element that was in evidence was composed of voters who lived along the 3-cent lines and others who were getting the eight-for-twenty-five-cent workmen's tickets. These voters feared that they would have to pay a higher fare as soon as the city took over the lines. There was also an exaggerated and erroneous idea concerning the privilege of the Detroit United Railway interurban lines to come in over the municipalized tracks. In the first place, the Michigan Railroad Commission would have had the right to compel the city to permit the interurban cars to come into town instead of dumping their passengers at the city limits. In the second place, the interurban cars ought to be welcomed into the city because they were an important source of Detroit's business prosperity. In the third place, the agreement did not permit the company to do any purely city business and it would have been obliged to pay actual cost plus 30 per cent for the privilege of running over the city tracks. Mr. Kirchner also believed that, while the measure was wholly non-partisan, many politicians had fought the purchase because they were not willing that Mr. Couzens should have the credit of having solved the street railway problem.

In view of the fact that the Detroit United Railway was now on the streets largely through sufferance, it had no vested rights such as might be claimed for a street railway with actual franchises. Therefore it was entirely proper, in his opinion, for the city to have competitive services. The idea of piecemeal construction of an opposition street railway was impracticable, but the suggestion had been made that a number of motor buses be installed on certain streets or parallel to them where traffic conditions were most in need of relief. In fact, R. W. Meade, formerly of the Fifth Avenue Coach Company of New York, was already trying to arrange for such service.

ELEMENTS OF OPPOSITION AS SET FORTH BY DAVID A. BROWN

To determine the opinions of some representative business man widely known for his civic patriotism, the ELECTRIC RAILWAY JOURNAL representative called upon David A. Brown, president General Ice Delivery Company. Mr. Brown's analysis of the opposing vote covered the five reasons following in the order of their importance.

1—Many people feared that the city was not committing itself merely to an expenditure of $31,500,000, but to an eventual outlay of double or triple that amount, which would mean heavy increases in taxes. This fear was all the more justified by the fact that the voters were also asked to (and did) approve other large expenditures for public purposes at this election.

2—Others had the impression that the city was being asked to pay too much money for worn-out or partially obsolete equipment.

3—Still others feared that municipal ownership would deprive them of exceptionally low fares.

4—Some did not want to approve an arrangement that gave the Detroit United Railway perpetual rights for the entrance of interurban cars.

5—Finally, the decision of a number of voters had been affected by Henry Ford's announcement that he was working upon a gas-drive car that would make much electrical equipment out of date.

The interview concluded with a heart-to-heart talk with one of the officials of the Detroit United Railway. This official has been with the company for many years, and like many of his co-workers he has shown his faith in Detroit by investing all his savings there. He stated that when the present administration took over the property nearly a quarter century ago it inherited a number of perplexing and trouble-breeding problems. Many efforts had been made to solve them, but it seemed simply inevitable that the Detroit United Railway was deemed to remain a "houn' dog" to be kicked around by every selfish politician looking for a sure-fire issue.

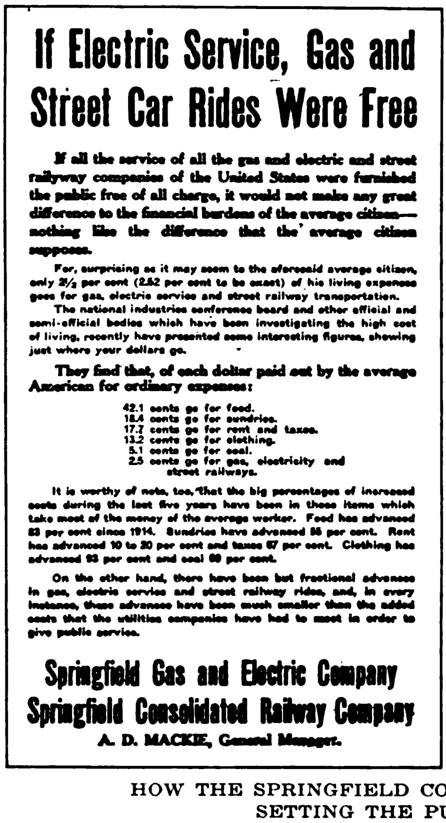
As to the election just past, no other course than patient waiting was open to the company. It had agreed to a compromise that did not allow a cent for going concern and the like. Following this there was nothing more to do than to await and abide the will of the people. He was sure that Mayor Couzens and the Board of Street Railway Commissioners had worked earnestly and sincerely, for the best interest of the city, even if he did believe that the property was worth more than they did.

There surely were many directions in which Detroit's electric railway service could be improved, especially re-routing, but what bankers would loan money in the present uncertain state of the company's future? As a Detroiter proud of his city's growth, he felt this choking down of its essential transportation facilities even more keenly than he did as a railway operator.

The Mountain or the Molehill?

IN A RECENT series of newspaper advertisements the Springfield (Ill.) Consolidated Railway has brought out in an unusually striking way the moderation of electric railway pleas for adequate revenues and the comparatively small effect the payment of a just fare would have upon the public.

According to one set of nine advertisements the public in order to get real relief from high cost burdens



If Electric Service, Gas and Street Car Rides Were Free

If all the service of all the gas and electric and street railyway companies of the United States were furnished the public free of all charge, it would not make any great difference to the financial burdens of the average citizen—nothing like the difference that the average citizen supposes.

For, surprising as it may seem to the aforesaid average citizen, only 2½ per cent (2.52 per cent to be exact) of his living expenses goes for gas, electric service and street railway transportation.

The national industries conference board and other official and semi-official bodies which have been investigating the high cost of living, recently have presented some interesting figures, showing just where your dollars go.

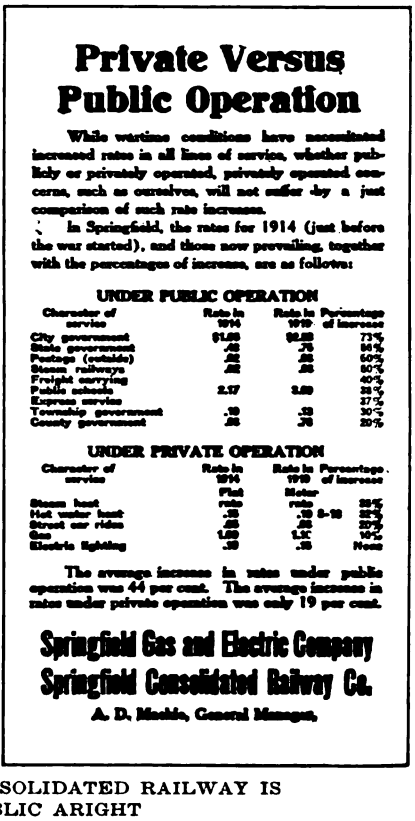
They find that, of each dollar paid out by the average American for ordinary expenses:

42.1 cents go for food.
18.4 cents go for sundries.
17.7 cents go for rent and taxes.
13.2 cents go for clothing.
5.1 cents go for coal.
2.5 cents go for gas, electricity and street railways.

It is worthy of note, too, that the big percentages of increased costs during the last five years have been in those items which take most of the money of the average worker. Food has advanced 83 per cent since 1914. Sundries have advanced 55 per cent. Rent has advanced 10 to 20 per cent and taxes 67 per cent. Clothing has advanced 93 per cent and coal 60 per cent.

On the other hand, there have been but fractional advances in gas, electric service and street railway rides, and, in every instance, these advances have been much smaller than the added costs that the utilities companies have had to meet in order to give public service.

Springfield Gas and Electric Company
Springfield Consolidated Railway Company
A. D. MACKIE, General Manager.



Private Versus Public Operation

While wartime conditions have necessitated increased rates in all lines of service, whether publicly or privately operated, privately operated concerns, such as ourselves, will not suffer by a just comparison of such rate increases.

In Springfield, the rates for 1914 (just before the war started), and those now prevailing, together with the percentages of increase, are as follows:

UNDER PUBLIC OPERATION

Character of service	Rate in 1914	Rate in 1919	Percentage of increase
City government	$1.50	$2.58	73%
State government	.48	.75	56%
Postage (outside)	.02	.03	60%
Steam railways	.02	.03	50%
Freight carrying			40%
Public schools	2.17	3.00	38%
Express service			37%
Township government	.10	.13	30%
County government	.65	.78	20%

UNDER PRIVATE OPERATION

Character of service	Rate in 1914	Rate in 1919		Percentage of increase
Steam heat	Flat rate	Meter rate		25%
Hot water heat	.15	.10	8-18	25%
Street car rides	.05	.06		20%
Gas	1.00	1.10		10%
Electric lighting	.10	.10		None

The average increase in rates under public operation was 44 per cent. The average increase in rates under private operation was only 19 per cent.

Springfield Gas and Electric Company
Springfield Consolidated Railway Co.
A. D. Mackie, General Manager.

HOW THE SPRINGFIELD CONSOLIDATED RAILWAY IS SETTING THE PUBLIC ARIGHT should seek relief from the 97.5 cents which it spends out of every dollar for food, clothing, taxes, etc., rather than from the 2.5 cents which it pays out for gas, electricity and street car fares.

Thoughtless persons, it was said, may be persuaded to mistake the molehill for the mountain. Thoughtful persons, however, will hardly permit themselves to be deceived as to the needs of the electric railways, for these carriers want no more relief than governmental divisions and publicly operated concerns have taken.

The second series of eighteen advertisements was printed in a uniform size of type, beginning "Do you know" and in most cases ending with "Suppose you check the figures by your own bills." They emphasized such points as this:

Do you know that the U. S. Government says that it now costs $16.59 to buy as much living necessities as $10.00 would buy five years ago and that, of this $6.59 increase on each $10.00 of living expeness, only 11 cents have gone for gas, electricity and street railway rides! Why not check the figures by your own bills!

Can Effect of Fare Increase Be Predicted?

Relation of Stable to Unstable Traffic Determines Limits Between Which Fare Increase Will Result in Revenue Increase

By C. E. SCHUTT

Engineer Krehbiel Company, Chicago, Ill.

REPORTS by electric railway companies of the increase in revenue derived from increased fares indicate that these companies have a difficult situation confronting them in that the increase in revenue has not been as great as expected and that there seems to be no way of telling in advance even approximately what the amount of increase in revenue will be.

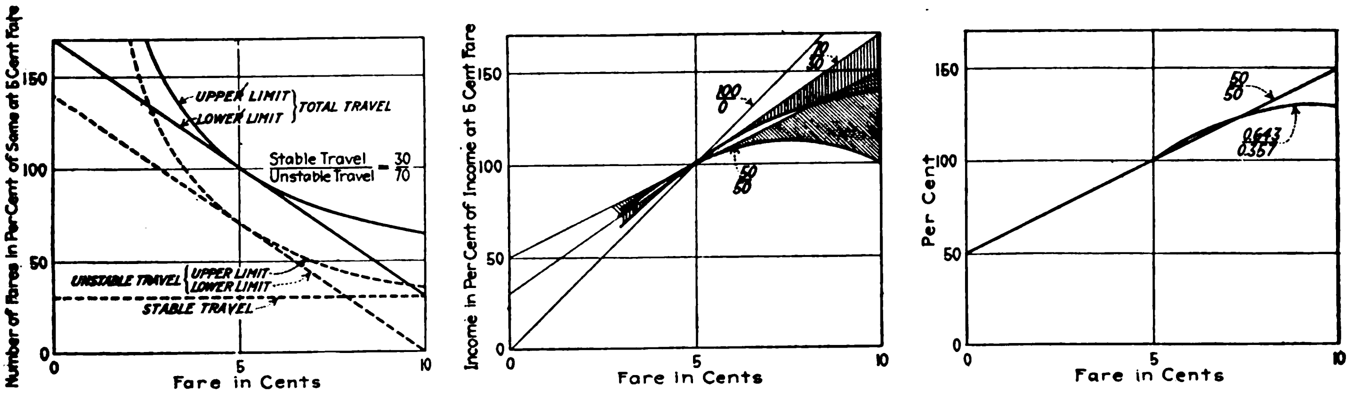


Fig. 1 Fig. 2 Fig. 3

DIAGRAMS SHOWING EFFECTS OF INCREASES IN ELECTRIC RAILWAY FARES

It is customary to speak of the theoretical or possible per cent increase in revenue as directly proportional to the increase in rate of fare. Of course such an increase in revenue cannot be considered as probable nor even within the range of expectation, since it would be based on the assumption that the number of fares would not be effected by increasing the rate of fare. It has been the general experience that the numbr of fares has been very materially decreased by an increase in fare.

This situation presents an interesting problem which unlike engineering problems is not susceptible of exact mathematical solution, but it is possible to determine certain limits between which we may expect results to fall and thereby to furnish a basis for estimates, from which adjustments can be made as experience is gained. Such a plan is outlined in this article which it is hoped may prove suggestive in furnishing a basis for calculations which will give results more nearly consistent than those heretofore obtained.

If 100 per cent of the street car travel in a given city were a necessity to the patrons, *i.e.*, if it were necessary that 100 per cent of the patrons use that means of going to and from work, a change in fare would result in an immediate proportional change in revenue. If on the other hand the car service could be used at will by the patrons, there would be an immediate decrease in travel following an increase in rates. Obviously, then, an electric railway company sells a necessity to those who must use the cars, and a convenience or a luxury to those who may or may not use the cars as they choose. It is the latter class of service that produces a portion of the income most difficult to estimate under conditions of changing fares. These two classes of traffic will be referred to hereafter as stable and unstable traffic.

The stable or necessary traffic may be assumed to produce an immediate increase in revenue in proportion to the increase in rate of fare. Ultimately, however, we should expect some reduction in the number of fares due to readjustment of industry and living if it were found necessary unduly to increase rates to meet operating expenses.

The unstable traffic cannot be expected to show increased revenue proportional to a fare increase on account of a natural decrease in travel. Optimistically we may expect that the revenue from this class of traffic will remain substantially the same within reasonable limits of fare change. This will give a basis for estimating the maximum expectation. The lower limit of expectation from unstable traffic may be estimated conservatively by assuming that doubling the fare will cut traffic practically to zero while giving free rides will double the traffic, with corresponding effects in between. This lower limit will represent more nearly the immediate expectation while the upper limit will represent the ultimate expectation for increase in revenue from unstable traffic after it has become adjusted to and accustomed to increased fares.

On the above basis some curves have been worked out and are shown here. Fig. 1 shows, in per cent of travel at a five-cent fare, the upper and the lower limits of total travel when 30: 70 is the ratio of stable to unstable traffic. Fig. 2 shows the upper and lower limits of expectancy in revenue increase (or decrease)

—At 5 Cents—		Per Cent Increase in Fare	Total Number of Fares in per Cent of Number at 5 Cents		Total Income in per Cent of Increase at 5 Cents		Per Cent Increase in Revenue	
Stable Traffic per Cent of Whole	Unstable Traffic per Cent of Whole		Upper Limit	Lower Limit	Upper Limit	Lower Limit	Upper	Lower
100	0	—40	100	100	60	60	—40	—40
		—20	100	100	80	80	—20	—20
		0	100	100	100	100	0	0
		+20	100	100	120	120	+20	+20
		+40	100	100	140	140	+40	+40
		+50	100	100	150	150	+50	+50
		+60	100	100	160	160	+60	+60
		+80	100	100	180	180	+80	+80
		+100	100	100	200	200	100	+100
70	30	—40	120	112	72	67.2	—28	—32.8
		—20	107.5	106	86	84.8	—14	—15.2
		0	100	100	100	100	....	.....
		+20	95	94	114	112.8	+14	+12.8
		+40	91.4	88	128	123.2	+28	+23.2
		+50	90	85	135	127.5	+35	+27.5
		+60	88.7	82	142	131.2	+42	+31.2
		+80	86.6	76	156	136.8	+56	+36.8
		+100	85	70	170	140	+70	+40.
50	50	—40	133.3	120	80	72	—20	—28
		—20	112.5	110	90	88	—10	—12
		0	100	100	100	100	0	0
		+20	91.7	90	110	108	10	8
		+40	85.7	80	120	112	20	12
		+50	83.3	75	125	112.5	25	12.5
		+60	81.3	70	130	112	30	12
		+80	78.5	60	140	108	40	8
		+100	75	50	150	100	50	.....
30	70	—40	146.6	128	88	76.8	—12	—23.2
		—20	117.5	114	94	91.2	—6	—8.8
		—0	100	100	100	100	....	.....
		+20	88.3	86	106	103.2	+6	+3.2
		+40	80	72	112	100.8	+12	+0.8
		+50	76.6	65	115	97.5	+15	—2.5
		+60	73.8	58	118	92.8	+18	—7.2
		+80	69	44	124	79.2	+24	—20.8
		—100	65	30	130	60	+30	—40

as the rate of fare is varied in one step in either direction from a fixed standard to which the traffic is accustomed. These curves are shown for the ratios 100: 0; 70: 30 and 50: 50 of stable to unstable traffic. The accompanying table gives further comparisons.

In applying these curves to a specific case, consider a company which collects in round numbers 240,000 fares per day, 60,000 of which or about 25 per cent, are collected between 5 a.m. and 9 a.m. If this can be taken as an indication of the amount of stable traffic, and assuming that all of these riders will again ride on the cars later in the day, a ratio of stable to unstable traffic of 50: 50 is obtained. Referring to the curves in Fig. 2 it will be seen that an increase of 40 per cent in fare would give a minimum expectation of 12 per cent increase in revenue and a maximum (probable, ultimate) of 20 per cent increase.

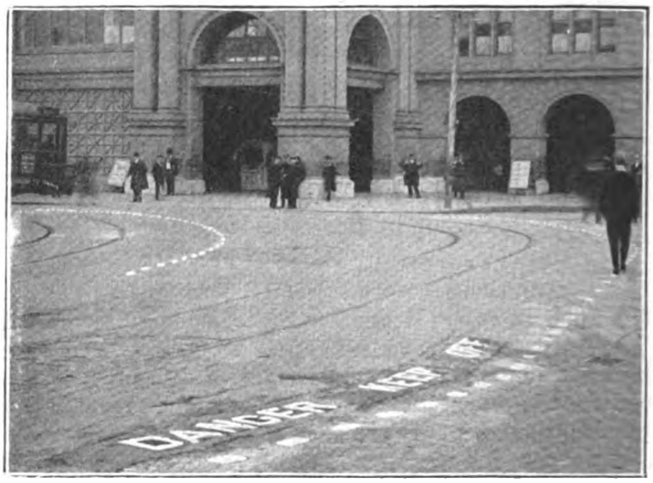
With operating companies which have experimented with fare increases and have actual data pertaining thereto a further check and closer results can be obtained. A certain operating company estimates its stable traffic, with a 5-cent fare, at 50 per cent. It finds that a 40 per cent increase in fare has produced a 20 per cent increase in revenue. This is the maximum of expectation for the above ratio; the minimum is 12 per cent. This company is now in possession of data with which to get a view of the problem from a different angle, *i.e.*, of adjusting the estimate of ratio of stable to unstable traffic in accordance with results.

Consider now the extremes of traffic which would produce the above result. The 20 per cent increase in revenue may be considered as falling on the upper limit of expectancy of traffic having a ratio of stable to unstable of 50: 50, or it may be considered as falling on the lower limit of some ratio $A:B$. Taking the two points 100: 5 (*i.e.*, 100 per cent and 5 cents) and 120: 7 (*i.e.*, 120 per cent and 7 cents) as two points on the lower-limit curve, the ratio $A:B$ is found as 64.3: 35.7. The curve extended is shown in Fig. 3 on which a fare of 8 cents shows 25.7 per cent minimum increase in revenue with 30 per cent maximum.

White Bricks Replace Painted "Danger Lines" on Pavement

WHERE the United Railroads cars round the loops at the foot of Market Street in San Francisco, there is very heavy pedestrian traffic across the tracks, particularly during the morning and evening rush hours. As the front and rear ends of the cars swing out well beyond the rails on the sharp curves it has been the custom to keep a white stripe painted on the pavement to mark the limit of the danger zone. But these lines last only a few weeks and in fact are at their maximum efficiency as markers only for the first few days because the contrast in color quickly wears off, particularly in wet weather.

A plan of making these lines permanent by inlaying in the pavement intermittent rows of white enameled bricks has recently been carried out, and as no maintenance is anticipated, it is expected that this will be cheaper in the long run than the use of paint. Holes were cut in the asphalt a trifle larger than the bricks which were then grouted in with neat cement. The use of a dotted line was considered more striking to the eye than a continuous line would have been. About 330 bricks were used for all three loops. These bricks, which cost $110 per thousand, would not be suitable under vehicular traffic, but are expected to give satisfactory service at this point where nothing but pedestrian traffic crosses the pavement.



DANGER LINES SHOWN BY WHITE BRICK

The words "Danger, Keep Off" were put in two places just inside the white brick line, set flush with the pavement surface. The letters were made 12 in. square and were cast at the company's shops, the facing material being marble dust and white cement. The letters are 2 in. thick, of which only the upper half is the white composition, the remainder being common concrete reinforced with No. 12 galvanized wire. The letters were cast face down, the marble compound being put into the forms first and on this a solid concrete base 12 in. square was cast on all letters alike.

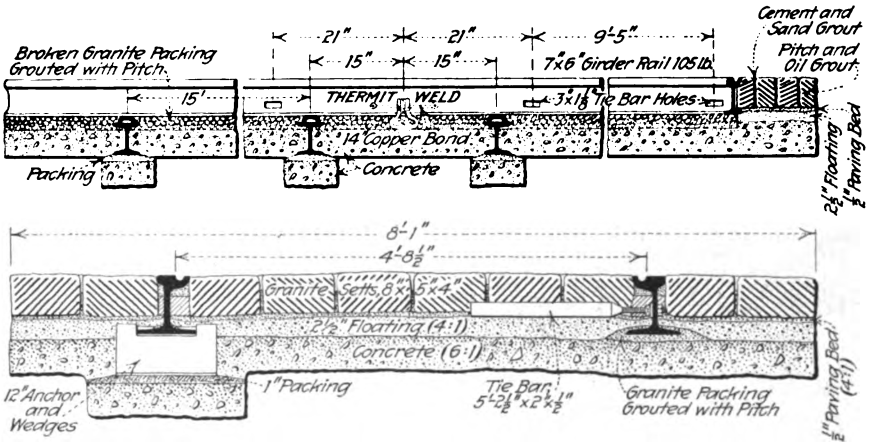
When the letters had to be put in basalt-block pavement a section of the blocks was removed and the letters were set in asphalt. Asphalt was filled in the inclosed parts of the letters before they left the casting yard. The bricks and letters were laid by the street repair crew without difficulty.

The work was done under the direction of B. P. Legare, engineer maintenance of way, United Railroads.

British Track Laid Without Ties

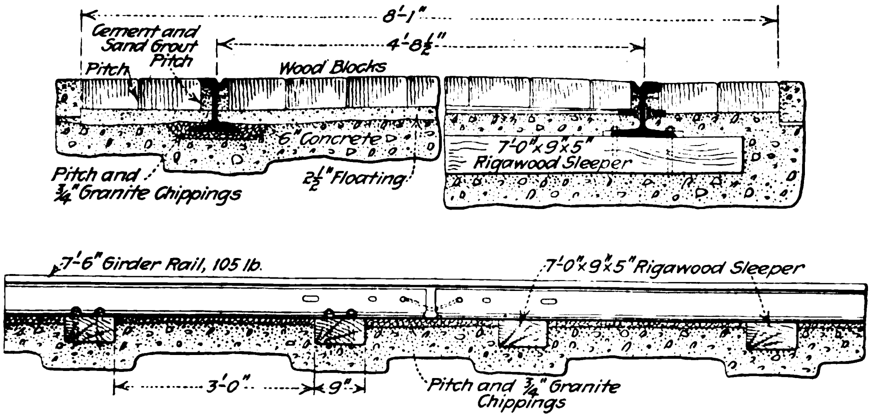
Leeds Practice Quoted as an Example—Instances of Use of Ties on High-Speed Lines or with Poor Subsoil

BOTH American way engineers and American manufacturers of way material should be interested in the following particulars of city track construction at Leeds, inasmuch as it is typical of the latest British practice which is radically different from anything done in the United States or Canada. Possibly the most fundamental difference is that cross-ties, so common with us, are the exception in the United Kingdom. Instead, the rails are laid on a concrete bed with nothing more between the base and the concrete than some pitch-grouted packing. The construction shown in an accompanying illustration was put down by R. Bickerstaffe Holt, who, until March, 1919, was highways and permanent way engineer of Leeds but is now a member of the staff of C. P. Sandberg, consulting engineer, London. Mr. Holt is the author of "Tramway Track Construction and Maintenance" (March, 1915) and a recognized authority on the subject.


Broken Granite Packing Grouted with Pitch
15'
Packing
21"
21"
15"
15"
THERMIT WELD
14 Copper Bond
Concrete
9'-5"
7"x6" Girder Rail 105 lb.
3x1½ Tie Bar Holes
Cement and Sand Grout
Pitch and Oil Grout
2½" Floating
½" Paving Bed
8'-1"
4'-8½"
Granite Setts, 8"x5"x4"
2½" Floating (4:1)
Concrete (6:1)
12" Anchor and Wedges
1" Packing
Tie Bar 5'-2½"x2"x½"
Granite Packing Grouted with Pitch
½" Paving Bed (4:1)

STANDARD TRACK CONSTRUCTION IN LEEDS

The construction in question shows concrete laid all the width of the track for situations where the subsoil is clayey and hard to drain. The mix 6 : 1 means four parts of broken stone two parts of sand and one part of cement. The depth of this base is approximately doubled at the rail anchorages, which are spaced 15 ft. centers ordinarily and 10 ft. on the higher-speed lines. Except at these anchorages the rail bases are imbedded in a granite packing grouted with pitch or some patented compound like "Fibrastic." Between the concrete subbase as a whole and the paving bed, there is used a 4: 1 mix (four parts of sand to one part of cement) which is not actually a floating mixture but a moist mixture pounded in. The ½-in. paving bed for the granite block paving is also of this moist cement. Once this has set it will tend to prevent water from surging under loosened rails or paving. In this connection, Mr. Holt points out in his book that: "It is a mistake to suppose thata sand paving bed affords any advantage in the nature of a cushion beneath the paving, after the setts (or paving blocks) have been rammed; the bed is perfectly hard and unyielding, and in any case it is undesirable to have a resilient cushion between the setts and the foundation. If resiliency is desired it should be obtained at the surface of the paving, not beneath it." Where wood blocks are used, as in front of churches and elsewhere, they are laid exactly as granite. On suburban roadways the top covering is 4½ in. tar and macadam.


8'-1"
4'-8½"
Cement and Sand Grout
Pitch
Pitch
Wood Blocks
6" Concrete
Pitch and ¾" Granite Chippings
2½" Floating
7'-0"x9"x5" Rigawood Sleeper
7'-6" Girder Rail, 105 lb.
7'-0"x9"x5" Rigawood Sleeper
3'-0"
9"
Pitch and ¾" Granite Chippings

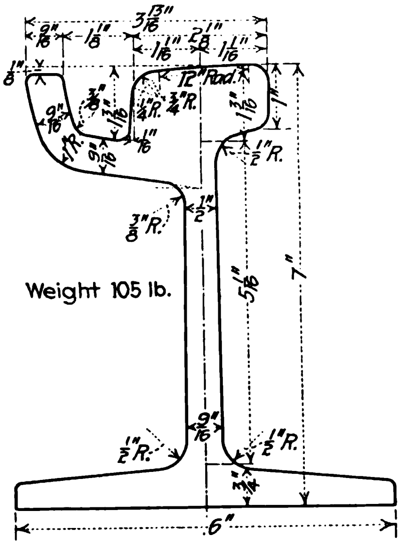
SLEEPER OR CROSS-TIE CONSTRUCTION OCCASIONALLY USED FOR PAVED STREETS IN CLAYEY SOIL AND ON HIGH SPEED LINES

The 7-in. 105-lb. rail used in Leeds is a special design registered by Mr. Holt. Its web is $\frac{1}{16}$-in. thicker than the web of the British standard rail of equal weight and is directly beneath the center of the rail tread. The tread is convex and is inclined toward the groove, the convexity and inclination arrived at being the result of hundreds of gagings of partly-worn rail and wheel tire sections. In this form of the tread, Mr. Holt anticipated the design ordered by the Brooklyn Rapid Transit Company in 1915, although his reason for wanting a coned tread is not the same. It will be recalled that the Brooklyn section was changed in order to reduce such corrugation as seemed due to over-stressing the metal in the rail tread because of insufficient areas of contact between wheel and rail. In Leeds, the change was made to insure longer life and better traction quite regardless of any one factor of destruction. It is not asserted in Leeds that the particular curvature used there should be universal, because differences in rolling stock, brake rigging and brakeshoes, characteristics of rail and wheel metal, etc., must all have some influence in the determination of the most efficient curvature or tread-to-tread contact on a given railway. More than 7000 English tons of this section have been laid since January, 1910, at Leeds. No extrusion of metal has been observed to date although as many as 2,000,000 cars averaging 11 English tons each empty and 15 loaded have passed over one route so equipped.

The rails are helped to stay to gage by means of 3-in. x 1½-in. tie bars or rods spaced 3 ft. 6 in. The standard rail connection is the thermit weld, some 20,000 welds having been made in Leeds since 1902. In fact, Leeds was the first big undertaking to apply thermit for the elimination of the joint, and it has adopted every improvement which seemed desirable in the light of its own experience or the experience of others. The welds made in recent years show a great improvement in freedom from breakage over those of earlier years. In the opinion of Mr. Holt, it is time that city rails were made of compositions and to sections more suitable for welding. It is unfair to expect perfection when the profiles are designed for fish-plate joints and the web is too thin to withstand molten metal without liability of damage. Most of the breaks that have occurred in thermit welds were in rails that had previously been weakened by being bored for mechanical joints. As a matter of precaution, a 14-in. No. 0000 copper bond is used to insure an uninterrupted return in case of breakages. In recent welding of fish-plate joints and repairs of broken thermit welds, the Leeds City Tramways has used home-made electric welds. However, for all new work the thermit process remains standard.

CROSS TIES DESIRABLE WITH BAD SUBSOIL

While cross-tie, or transverse-sleeper, construction is comparatively scarce in Great Britain, it is accepted by many engineers as desirable where the subsoil is bad. Elsewhere the only advantage of the ties is to act as anchors when the track is floated and by their resiliency to absorb some vibration. But it is thought that all of the latter advantage is lost if rails between the ties rest on a rigid foundation. Thus, in Leeds, there is a short section of track resting on ties where the foundation between the ties consisted originally of cement and granite chippings. In the course of time this foundation required attention, and it was replaced under the rails with pitch and chippings, as indicated in one of the drawings. The standard construction is also shown.



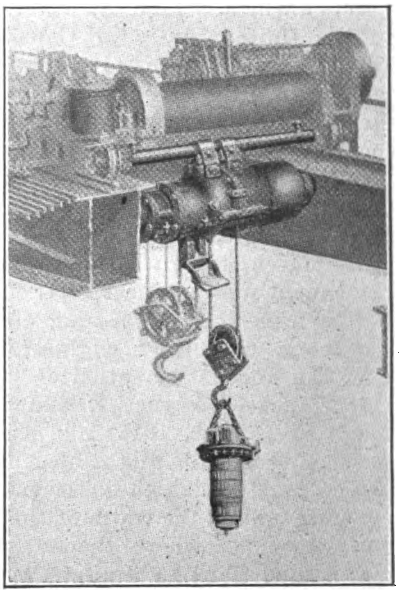
SECTION OF LEEDS SPECIAL RAIL

The Leeds system is one of the first users of the Sandberg "sorbitic" process of hardening the head of a rail in place. The pioneer installation amounts to about 2400 ft. on Park Row and elsewhere. On Park Row more than 250,000 cars have run over this hardened rail in two years, yet Mr. Holt has found no evidence of wear. Better still, the incipient corrugations in the rail at the time the hardening process was applied have since disappeared. The hardening need not extend to a depth greater than $\frac{3}{16}$ in. It is not comparable exactly with case-hardening as one molecular granulation blends into the next instead of presenting a line of cleavage.

Auxiliary Hoist for Traveling Cranes

An AUXILIARY hoist for attaching to any standard overhead electric traveling crane, as shown by the illustration, has recently been developed by N. B. Payne & Company, New York City.

The hoist does not require additional room overhead nor does it shorten the travel of the trolley on the bridge nor interfere with the accessibility of the main hoist. It is pointed out by the manufacturers that the average traveling crane in a day's work usually handles a far greater number of light loads than heavy loads. Since cranes for lifting heavy loads are slow-moving, their use results in a serious loss of time if they also handle the light loads. Thus a 20-ton crane, with a hoisting speed of 12 ft. per minute per load will handle a 3-ton load at but slightly greater speed. But with the auxiliary hoist a light load of say 3 tons may be handled at a speed of from two to ten times that of the main crane.

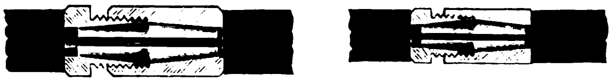


AUXILIARY HOIST APPLIED TO CRANE

Very often the hook and block of the main crane together weigh more than some loads frequently handled. The auxiliary hook and block being much lighter require less power. The labor saving with the auxiliary hoist is another important item, especially when a gang of men must wait for a small piece to be slowly moved by a large crane. By the application of this auxiliary attachment any standard single hoist electric traveling crane may be equipped with two lines for drop-bucket service. The control may be arranged from cage, floor or pulpit to suit the crane to which it is applied.

New Type of Solderless Connector

THE accompanying illustrations show a new type of solderless connector for splicing small wire which has recently been placed on the market by Dossert & Company, New York. This is designated as type "D" two-way connector and consists of male and female threaded parts acting upon a slotted tapered sleeve or bushing, making the splice by compression. This connector is supplied in two sizes—No. 8 being for use on No. 8 and No. 9 wire and No. 14 being for use to connect No. 10, No. 12 or No. 14 wire as desired.



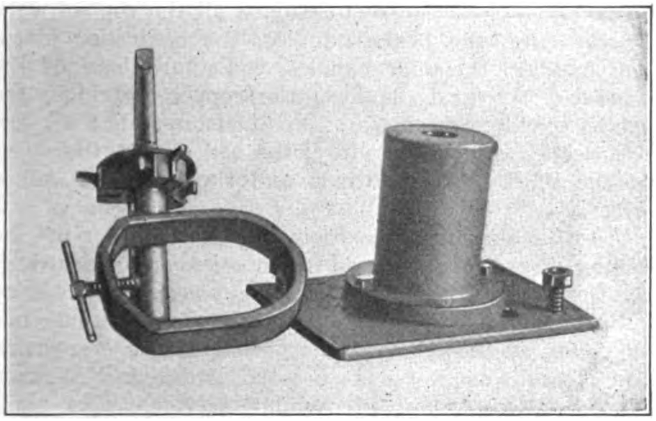
TYPE D, NO. 8 CONNECTOR; TYPE D, NO. 14 CONNECTOR

The illustrations show the actual sizes of the connectors as well as the details of their construction. Either solid or stranded wire can be connected.

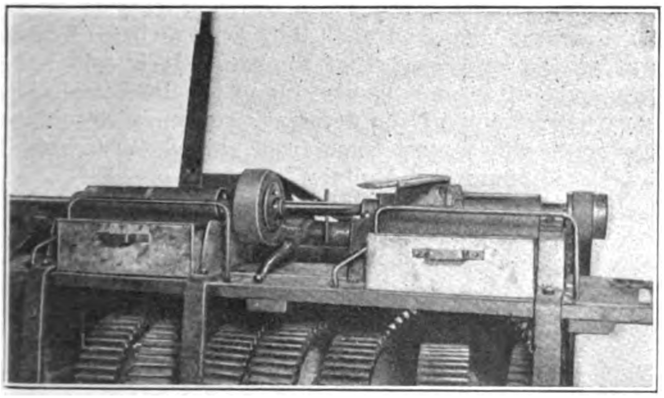
Boring Machine for Journal Brasses Made from Old Axle

Machine Used in Chicago Which Turns Out Four Brasses a Minute and Needs No Experienced Labor to Operate It

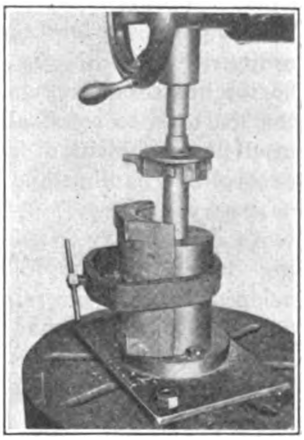
THE Chicago Elevated Railways at the Wilson Avenue shops of the Northwestern Division have made from an old axle a very effective piece of equipment for boring out journal brasses. Prior to the construction of this machine several methods were tried but as none proved either satisfactory or efficient boring out the brasses by machine was given up and the filing after babbiting was done by hand, a process which took a great deal of time. It was realized that if the proper machine could be developed not only could considerable time be saved on the post-babbiting operation but brasses could be bored out and placed back in service several times before rebabbiting was necessary, thus resulting in both an additional saving in time and a saving of babbit as well as doing away with the hand operation of filing just referred to.

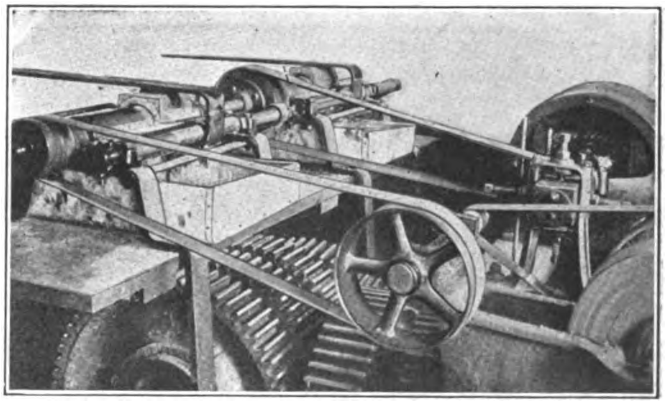

END MILLING TOOL DISASSEMBLED SHOWING VARIOUS PARTS

The machine as developed is shown in the accompanying photographs and drawing. It consists first of a piece of 4¼-in. axle 37 in. long shown on page 746. For a length of 13 in. on one end this was turned down to a diameter of 1½ in. and threaded twelve threads to the inch for 11 in., the remaining 2 in. being left for a bearing surface. For 8⅛ in. beyond this, the axle was turned down $\frac{1}{32}$ in., leaving a diameter of $4\frac{7}{32}$ in. A groove 1 in. wide and ½ in. deep was then made in the axle and a hole and keyway made for a cutting tool. The next 8⅛ in. of the axle was left at a diameter of 4¼ in. and then the last 7¾ in. was turned down to 1½ in. in diameter, 2 in. of this length being used for the second bearing surface and the remainder for attaching the driving pulley.


BORING MACHINE SHOWING HANDLE WHICH WORKS ON FEED SCREW AND DRIVES BRASS OVER CUTTING TOOL

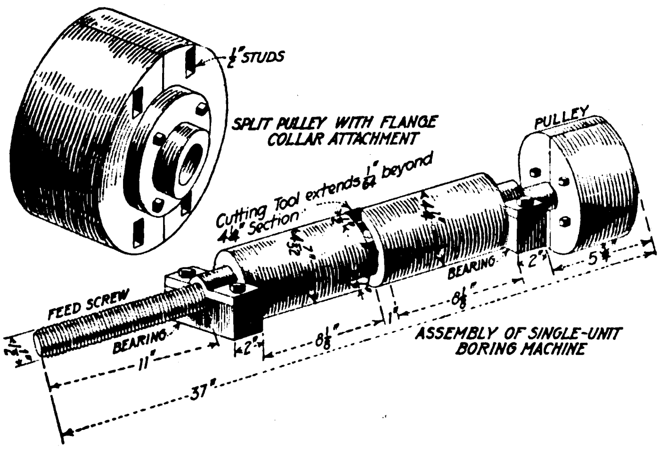
The axle in its finished form is mounted on a table built from two 11-in. x 1½-in. planks and four 2½-in. x ¾-in. strips of iron. Just back of the axle and mounted on bearings is a 1½-in. bar of iron, on one end of which is fastened a 2-in. square piece of iron 15 in. long, one end of which is formed into a handle. A groove is made in this block at the proper distance from the end and with the proper diameter so that when babbit is poured into it threads may be formed to fit the threaded end or feed screw of the axle bar. At the middle of the 1½-in. bar onto which this handle is fastened is attached a 3-in. x ½-in. strip of iron bent into such shape that when lowered it will hold the journal brass in position on the axle. The machine as built was a double one, for boring two bearings simultaneously. For this purpose a 4-in. axle was used on one side and a 4¼-in. axle on the other because these two sizes chiefly are in use on the system. It will be noted in an accompanying illustration that different holding arrangements for the brasses have been necessary. The two equipments are driven from a single pulley by means of a flange collar as shown. The large wooden pulley is split and fastened by ½-in. studs while the collar is shrunk onto the end of the second machine, the thread being turned off for a short distance, and is held to the pulley by four bolts. This boring machine is driven by an electric motor the control switch for which is placed on the wall beside the machine in a convenient location for the operator.


MILLING DEVICE FOR END FILLITING OF NEWLY BABBITED JOURNAL BRASS


DOUBLE BORING MACHINE FOR JOURNAL BRASSES AS BUILT IN CHICAGO ELEVATED RAILWAYS SHOP

The operation of the machine is so simple that experienced labor is not necessary and the individual who inspects the journal bearings and finds a worn brass bores one out and returns it to the same position without delay. The brass is laid on the section of axle which is $\frac{1}{32}$ smaller than the standard and the iron lever is brought down to hold it fast. The machine is placed in operation by throwing the switch and the iron handle is brought up into contact with the feed screw of the shaft. This starts the 1½-in. bar and iron lever, consequently the brass which it holds in position is moved horizontally and passes over the cutting tool and immediately onto the standard section of journal. Sometimes the brass needs to be run over the machine twice. The single operation takes about fifteen seconds so that ordinarily two minutes is consumed in boring or reboring brasses for an entire truck. Pans are used under the machine to catch all babbit and this is saved and used in rebabbiting. The brasses are bored on every general overhauling and also on inspection when found necessary.

As an auxiliary to this boring equipment an end milling device for end filliting of brasses has been developed for use on rebabbited 4¼-in. journal brasses. This also has been made from pieces of old axle. The bottom section is 6¼ in. in diameter for 1 in. and 4¼ in. in diameter for 6¼ in. This is fastened by two bolts to a 12-in. x 8-in plate which is held on the drill press by two additional bolts. The top section is 1½ in. in diameter for 5½ in. with the next inch 4 in. in diameter cut out and keyed as shown so as to accommodate three ¼-in. x 1-in. high-speed Novo steel cutting tools. A $\frac{3}{16}$-in. plate 4 in. in diameter is shrunk on at this point and the remaining 6 in. of the axle is turned to fit a No. 4 Morse taper shank.


½" STUDS
SPLIT PULLEY WITH FLANGE COLLAR ATTACHMENT
PULLEY
Cutting Tool extends 1/64" beyond 4¼" Section
FEED SCREW
BEARING
BEARING
11"
2"
8⅛"
1"
8⅛"
2"
5¼"
37"
ASSEMBLY OF SINGLE-UNIT BORING MACHINE

ASSEMBLY DRAWING SHOWING DIMENSIONS OF SINGLE UNIT BORING MACHINE

The journal brass is held in position by the screw clamp as shown and the babbit on both ends of the brass is milled out in about one minute. This operation was formerly done by hand and took approximately one-half hour to the brass. This double milling permits the use of either end of the brass against the fillet of the axle and prevents a mistake due to haste or ignorance which will later result in a hot journal. A sheet tin guard is placed around the drill press and the babbit is saved by catching it in pans placed under the machine. In the finishing operation enough babbit is obtained from the milling of twelve brasses to rebabbit two additional brasses.

Plundering by the Germans

INTERESTING sidelights upon the experiences of Belgian tramways in war-time are given in recent articles published by *The Electric Railway and Tramway Journal.* The three cases cited, those of Antwerp, Malines and Namur, show the harmful effects of the occupation of Belgium by the Germans.

In the case of Antwerp, the bombardment of Oct. 8 and 9, 1914, and the subsequent fires destroyed or greatly damaged the track in many places, broke or destroyed the overhead lines and damaged the carhouses and rolling stock. The Germans forced the company to suppress several lines and reduce the service considerably. They also requisitioned all the copper work on the cars, the brake handles, the controller plates and handles, the door handles, the guard bars of the windows, the grab handles, the copper bearings, the copper trolley wheels; all tin, antimony, etc.; all cotton, section and other wires; the bell straps, the wires of the lines in the stations and the telephone guard wires.

All the elements necessary for the upkeep of the rolling stock were replaced by substitutes furnished by the Germans (except when they had none!). The engine cylinder oils and engine lubricating oils were only oils in name, so that during the period of the occupation the steam sets were more worn and damaged than during fifteen years of regular service. The same applies to the bearings of the cars, the axles and the fuses of the armatures.

All the anti-friction metals were replaced by "war bronze," a composition of zinc, lead and a trace of tin. The trolley wheels were of zinc. At the maximum they gave one day of service, equal to, say, 150 km. run. The company could get no wrought iron, cast iron, sheet iron, wood, colors and paints, cotton, gasoline or scarcely anything else. The situation at Antwerp is said to be still very troublesome. The company cannot yet obtain the necessary materials to put in a proper condition the track and rolling stock. What little it is able to secure is at prices which are five or seven times those of 1913.

At Malines the service was interrupted from September, 1914, to March, 1915, and in October, 1917, it was completely stopped. The Germans carried off all the overhead copper wire, all the bronze or brass fittings and all the leather work of the cars. It is said to be impossible to resume the working of the lines at Malines until the receipt of the necessary copper wire and accessories, which must come from abroad. The rolling stock still remains at Malines.

In 1914 the Germans dismounted a part of the electric equipment of one of the Namur lines in order to reestablish a line which had been destroyed by the fires lighted by their soldiers. Later came their general requisition of copper, whereby they took 24,695 meters of overhead wire and underground cable.

These measures led to a serious drop in tension which augmented the chances of accident to the motors. This was aggravated by the dismounting of one of the two trolley wires except in the center of the town. Altogether the Germans took down 24,800 meters of trolley wire, and it was necessary to replace copper wire in the stations by iron wire. The enemy also appropriated more than 25,000 meters of wire serving as protection for telephone circuits, all the copper fittings of the cars, and the straps used for working the ticket stamps.

LETTERS TO THE EDITORS

What the Questionnaire Taught

April 5, 1919.

To the Editors:

It occurs to me that the ELECTRIC RAILWAY JOURNAL has performed a helpful service to the industry in presenting an "analysis of public thought" on important questions affecting our business. I refer to the summary of answers to your questionnaire as published in your issues of Feb. 22, March 1 and March 29, giving the views of public service commissioners, mayors, representatives of chambers of commerce and civicists on the fare and franchise situation. This was truly a case of holding the looking glass up so that we might see ourselves as others see us, and if the men who control our utilities are so blind as to see nothing in this reflection they must indeed be beyond salvation. There are probably many such individuals—men who are still living in the past, men who believe the public does not know what it is talking about, men who will persist in the old rut of their "public be damned" policy.

Assuming, however, that the great majority of leaders in the industry are honestly trying to do the right thing, the opinions elicited from "the opposition," in your experience of feeling the public pulse, must be of great assistance. Undoubtedly there have been, and still are, mutual misunderstandings on the part of the railways and the public on many of these disputed points. Your questionnaire covered a wide field, and it has helped to reveal what a certain portion of the public thinks on the question, "What is wrong with the railways?" If the public is right in some of these opinions then the railways should be prompt to set themselves in the proper course. If the public is wrong it is a duty of our railway men to undertake a campaign of education to set it right.

Touching first on the question of increased fares, it appears that some of the leaders on "the other side" believe that the companies have profiteered or made more than a reasonable return in the past. The public would hold them accountable for the sins of the past. Undoubtedly this indictment is true in some cases, and it is a hard condition to correct because the persons who were guilty of profiteering when that practice was more common may long since have passed out of control of the properties. Again, the public raises the question of overcapitalization, which undoubtedly exists on some properties. This can be remedied by submitting to a new valuation. And so on with the other complaints which are made. Some situations can be corrected and others cannot, but the honestly organized and conservatively managed company should not be made to suffer for the errors of another.

Taking up next the matter of publicity, it seems that even in this particular there is much to learn. Perhaps this was covered just as well by Ivy Lee in a talk at the 1916 convention when he said that "a man who goes into a policy of publicity must believe absolutely that he is right and that he can justify his policy upon the theory that 'truth loves open dealing,' and that he can rely absolutely upon the refining and sterling value of the truth." First of all public distrust has to be overcome. Then if the management will show by deeds that it means well, happier results may be expected.

The committee on readjustment of our association is performing a splendid service in trying to save the industry from disaster. Is it not possible that it would find a valuable guide to public opinion in the series of discussions referred to in this letter? There is much food for thought in what "the other fellow" thinks.

MANAGER.

Mr. Schaddelee's Commutation Plan

NEW YORK CITY, April, 9, 1919.

To the Editors:

I have just read the article on the fare plan proposed by Mr. Schaddelee, published in your last week's issue, by which the greater part of an electric railway fare increase will be placed on the casual rider rather than on the person who uses the service a large number of times a month. The idea is ingenious in its method of application, and is well worthy of discussion, especially in view of our disastrous past experience with fare increases made without consideration of their reaction upon the various classes of riders and, through these, upon net revenue.

Reduced to simplest terms, a successful fare increase must have two elemental qualifications; it must apply to a sufficient number of patrons to provide an appreciable gain in gross revenues despite the inevitable decreases in patronage, and it must conserve net earnings by affording a minimum of discouragement to the most profitable classes of patrons. In other words, the patrons who are driven away should be those who are carried at a loss anyway, like the long-haul and rush-hour riders. Devoid of these characteristics, any plan for increasing fares is likely to be as dangerous as a souvenir hand grenade.

The proposed plan has several outstanding advantages. One is that it increases the rate without requiring the conductor to make change with pennies. Another is that it places the greatest increase in the rate upon those who pay fares infrequently and who presumably would suffer the least hardship from higher fares. Hence, its introduction ought not to be difficult, comparatively speaking.

Its disadvantages are equally pronounced. One of these is that it perpetuates, without alteration, the wrong principles of the old flat fare which has let the industry into such evil days through its neglect of the vital factors of length of ride and failure to differentiate between rush-hour and non-rush-hour traffic.

Properly speaking, of course, the casual rider who makes only one trip a year, let us say, could be charged with the same annual readiness-to-serve cost as the man who rides twice daily. And if the cost of readiness to serve were 3 cents per trip for the latter, the book cost of the casual rider's single trip would be about $18! Actually, however, the casual riders, in the aggregate, appear to approximate a normal load on the average street railway because they seem to be pretty generally spread out over the year's business. If this condition really applies, the casual rider properly should pay no more readiness-to-serve charge than the regular patron. If charged much more, his patronage will be discouraged. Such an outcome would be desirable only if he were, in the aggregate, an unprofitable patron.

But is the casual rider always an unprofitable patron? Is he not, as a matter of fact, quite frequently found during off-peak hours and among the short-haul traffic? If so, he would be a profitable rather than an unprofitable patron, and it is a question whether he should not be encouraged by a lower fare rather than discouraged by a higher one. It is an open question, also, whether the casual riders exist in sufficient numbers to make the proposed plan conform to the first elementary requisite of a successful fare increase and really make a difference in gross revenue. Consequently, until the status of the casual rider (of whom no statistics appear, at present, to be available) has been determined, a fare increase based merely upon his ability to pay more and upon the simplicity of the plan for charging him more would be a repetition of the industry's leap in the dark when it tried out the flat-fare increase with such unsatisfactory results. TRAFFIC ENGINEER.

[EDITOR'S NOTE. Is not every fare increase largely a leap in the dark? Each change to a higher fare will undoubtedly turn away some passengers, but how many depends on the psychology of the patron affected and the state of his pocketbook. The more systems which promise a reasonable chance for success that are tried, the better. We hope that somebody will give Mr. Schaddelee's plan a fair trial.]

AMERICAN ASSOCIATION NEWS

Attendance of 1500 at Toledo Section Entertainment

ON MARCH 28 in the Coliseum Theater, the Toledo joint company section held an "open" meeting of an entertainment character, attended by 1500 members and guests. Entertainers from the local Keith Theater, from the company's ranks and elsewhere gave a vaudeville performance. One feature was music by the Raillight Orchestra, made up of employees of the Toledo Railways & Light company.

Committee on Compensation for Use of Terminals

A MEETING of the Committee of the Transportation & Traffic Association on "Proper Basis of Compensation to City Companies by Interurban Companies for Use of Terminals," which was held in Cleveland on Wednesday, April 9, at the Hotel Cleveland.

The meeting was attended by G. T. Seely, assistant general manager Metropolitan West Side Elevated Railway Company, Chicago, sponsor for the committee's activity; R. T. Sullivan, general manager Mahoning & Shenango Railway & Light Company, chairman; J. F. Collins, general manager Michigan Railway, and James W. Welsh, special engineer American Electric Railway Association.

The association had prepared a compilation of existing contracts between city and interurban companies as well as other data on this subject, including clippings from the technical press. In view of the fact that there had been no previous committee report on this subject, the committee decided to present abstracts of a number of typical existing contracts, showing the principal elements heretofore considered essential in such agreements. It is recognized, of course, that in most cases such agreements are the result of negotiations between the interested parties.

The committee spent considerable time in discussing the fundamental principles which should form the basis of such contracts. In view, however, of the general adoption of service-at-cost principles, the committee expects to work out a proposed standard form of contract embodying these elements with the view of securing equitable conditions from both the city and interurban points of view.

The Struggle Against Increasing Costs

AT A MEETING of the Windsor, Conn., Business Men's Association on Feb. 4, J. K. Punderford, explained very frankly the situation in which the Connecticut Company, of which he is general manager, finds itself at present. Among many other interesting things he showed what the company is doing to keep down maintenance costs, for example, he said: "We have established at New Haven what we call a reclamation shop for the entire property where modern devices for welding, etc., have been installed[1]. By the use of these facilities we have saved large sums of money in rendering defective equipment usable. During December, 1918, this shop rewound motor and air-compressor armatures and field coils, welded gear cases, motor shells, etc., and did work at an estimated saving of nearly $6000 over what it would otherwise have cost. In the track department[2] we have purchased electric and steam shovels by which we have excavated material at 7 cents per cubic yard instead of paying 60 cents for hand work. By the use of these shovels the time which would have been lost by teams waiting for loads was largely decreased. We have purchased various forms of rotary and reciprocating grinders by which we have saved corrugated rails. Large savings have been made by the use of welding machines. In five years we have reclaimed rail which would have cost more than $200,000 to renew and at the same time we have saved the additional cost of new ties and pavement. Broken rails have been repaired at about one-tenth the cost of replacing. Much special work also has been repaired. For example, in one case the repair cost $90 whereas under former methods the expense would have been more than $3,600. We have also purchased pneumatic tie-tamping machines by the use of which one man can do the work of six as compared with the old method of hand tamping. These machines are also available for breaking up old concrete pavement economically. Through the use of power-saving recorders and awards made to motormen large economies have been obtained in the line of power consumption. We are now putting into service a few safety cars[3] in an endeavor to lessen power and maintenance costs."

Hakone, Japan, the site of the famous hot springs of the same name, is to be connected with the capital, Tokyo, by electric line in the near future. The springs are located in the mountains, accessible only with great difficulty. The electric railway extension, although but 5½ miles long, presents great construction difficulties on account of the steep grades necessary and the twelve tunnels which must be bored through the mountains. When the extension is completed it is expected that Hakone will become Japan's greatest summer resort.

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[1] See ELECTRIC RAILWAY JOURNAL, Aug. 31, 1918, page 365.
[2] See ELECTRIC RAILWAY JOURNAL, Dec. 14, 1918, page 1053.
[3] See ELECTRIC RAILWAY JOURNAL, Feb. 15, 1919, page. 316.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Strike Threat in Brooklyn

Receiver of Brooklyn Rapid Transit Refuses to Deal Outside of His Own Organization

Organized labor is marking time with respect to the demands made recently on the management of the Brooklyn (N. Y.) Rapid Transit Company. Meanwhile the Mayor his been asked to use his good offices with Receiver Garrison. This the Mayor has promised to do, but he has warned the men that the railway is subject to federal authority through the courts and that he does not want to seem to be interfering with such authority.

Want Sixty Cents an Hour

The proposed agreement submitted to Mr. Garrison was adopted on March 28 by the unionized employees. The demands include, besides recognition of the union, 60 cents an hour for platform men during a nine-hour day, 60 cents for a nine-hour swing during rush hours, 53 cents for blacksmiths and structural workers, 45 cents for shopmen for an eight-hour day, and time and a half for overtime.

In his reply to the unionized employees Mr. Garrison directed attention to the notice of the company to all employees dated March 11 in which reference was made to the two recommendations of the War Labor Board of March 6, 1919, and Oct. 24, 1918. While the board in these recommendations said that as a matter of plain right and justice the company should give full and free permission to all its employees to organize, it held that under the principles of the board "the company, not being bound otherwise by any contract or agreement with the union, may refuse to see and deal with any committee but one of its own employees."

Will Treat With Employees Only

After directing attention to these facts Mr. Garrison in his reply to the recently-organized union accordingly expressed his willingness to meet a committee of the employees, but said that "it would not be consistent with the policy above mentioned, or with the best interests of the employees or the management to take up for consideration the agreement you have submitted, which in form is between the company and its subsidiaries and only members of a particular labor union, and does not include all the employees."

Mr. Garrison concluded his communication to the union as follows:

> The management will not deal with any outside organization, whether the same be, as mentioned in its notice of March 11, 1919, religious, patriotic, benevolent, political or labor. It will always be ready to deal with its employees directly through committees selected by the employees in respect of any matters of mutual concern to the employees and the management.

The Mayor's promise to the men was made as a result of a call upon him by a committee which urged him to intercede with Mr. Garrison in an effort to persuade the receiver to meet a delegation of union men. The committee warned the Mayor that unless the receiver greeted their demands in a more conciliatory fashion there would be a strike.

At Mr. Garrison's office on April 9 it was stated there that the receiver had made his position in the case clear in a letter to James Sheridan, chairman of the committee selected by the men, and that he would not recede from his position. In this letter Mr. Garrison declared that the Amalgamated Association was an "outside organization" when it came to situations arising between the company and its men and that he would not deal with the association of its representatives, as such.

Self-Determination for Kansas City Men

In accordance with the new policy of the Kansas City (Mo.) Railways of dealing direct with its men in the future, the employees held a meeting on April 7 and elected their committees. The representation which went into effect on April 1 provides for committees from each division of the transportation department, shops, substations and power plants. Philip J. Kealy, president of the company, will name one day in each month on which he will meet these committees and receive reports and hear complaints from them. The general manager, superintendent of transportation and the head of every other department will also appoint a day on which to meet the committee.

In any case in which a matter does not appear to have been settled in a manner satisfactory to the men they are empowered to reopen the matter direct with the president. The company promises not to open any welfare or benefit features on a compulsory basis. No employee is to hold seniority rights in more than one department. Such rights are to be based on continuous service. Employees of long standing who find that they are unable to do heavy work may be transferred to other and lighter work in a different department from the one in which they have been serving and still hold their seniority standing. The minimum wage for extra motormen and conductors is fixed at $75 a month.

Stands Its Ground on Women

Cleveland Railway to Abide by Its Agreement with Union—Incident Now Closed

The Cleveland (Ohio) Railway recently decided to abide by its agreement with the union not to employ women conductors, notwithstanding the order of the National War Labor Board of March 18 directing the company to reinstate sixty-four conductorettes. Former President William Howard Taft and Basil M. Manly, joint chairmen of the War Labor Board, signed the order for the reinstatement of the women. They concluded their decision as follows:

> The evidence discloses that the company is still short of employees and that there are places vacant to which these sixty-four women can be restored. Indeed, it was made clearly to appear, by the only evidence submitted at the hearing where all the parties were notified to appear, that the company may restore to their places in the service all men who have been absent in military service during the war and still have vacancies sufficient to give employment to these women applicants.
>
> The board feels an injustice was done to the women applicants in making the order of Dec. 3, 1918; that it was made upon the application of the Mayor of Cleveland and in the absence of the women who were affected and who had not understood the issue was before the board and on its merits. In other words, the women did not have their day in court. That requires that this board should re-establish the status which existed before the order was made.
>
> A ruling was made by the joint chairmen in Detroit that under the contract which bound the company and the men in that case, the time had arrived when the company was not justified in continuing the employment of women, because such employment was limited by the contract to the existence of the necessity for their employment, but that the women already employed and in the service should continue there until, in the ordinary course, their employment should cease either by voluntary withdrawal or by discharge for cause or other sufficient reason. We feel the principle which obtained in the Detroit street railway case should apply here.
>
> The only question before us is whether these women who were discharged on March 1, should have been discharged by reason of any contract between the company and the men. We think the terms of their employment justified them in believing that their employment would continue until normally ended by their voluntary withdrawal or the failure on their part to render proper service, or other sufficient reason. We have drafted this opinion in accordance with the resolution of the board, as follows:
>
> That the matter be referred to the joint chairmen with direction to frame an order declaring the similarity between this and the Detroit case, approving the principles held in the Detroit case, and on the basis of that case, directing that the sixty-four women heretofore discharged by the company be reinstated to their employment.
>
> For these reasons, the present order will be that the order or recommendation of Dec. 3, last, be set aside, and that the company be directed to restore these women, discharged March 1, last, to the position they had in seniority and other privileges.

The various steps in connection with the Cleveland case affecting women employees have been reviewed from time to time in the ELECTRIC RAILWAY JOURNAL and there was a summation of the matter some time ago in these pages.

Why Company Claims Damages

United Railroads of San Francisco and City File Briefs on Encroachment Case Before Supreme Court

Briefs have been filed by the United Railroads of San Francisco and the city in the damage case which was argued in the United States Supreme Court on March 25. This case, as stated in the ELECTRIC RAILWAY JOURNAL of Dec. 21, 1918, is the result of the claim of the company for $6,870,130 of damages because of the construction of parallel outside tracks on Market Street and on Church Street.

The case arose through an appeal from a district-court decision in effect dismissing the company's bill for want of equity. The Constitution of California requires payment in advance for the "taking" or "damaging" of private property for public use, and the company asked for relief by injunction from the operation of municipal railway cars until compensation for damages to the privately-owned property was paid.

THE COMPANY'S PLEA

In reiterating its assertions in the present appeal, the company in its brief adopts the following general line of argument:

1. The railway franchise is exclusive for all exceeding five blocks on any street, and it constitutes an irrevocable contract, the obligation of which is impaired by the parallel operation of the municipal cars.
2. Municipal competition deprives the United Railroads of its property without due process of law and takes it without just compensation.
3. Municipal competition damages the company's property, through loss of patronage from difficulty and danger of access to the company's cars.
4. The city has no reserved right to operate its cars so as to impair access to the company's cars and cannot under the police power justify destructive competition.
5. The civil code of California does not permit one railway to cross another's tracks without compensation.

WHAT THE CITY HOLDS

The brief of the city maintains that no explicit authority was given to the city to grant an exclusive franchise to the company, and that grants of special privileges are to be construed strictly in favor of the public. The issue may be narrowed to the question whether the operation of the city cars causes such physical interference with the company's rights as legally to entitle it to relief. The only damage the company necessarily suffers, the city brief says, will result solely from the occupation at times, by passing city cars, of a space in the public highway needed at the same time by the company for its passing cars. This damage, it is asserted, is not private but common to all the public using Market Street.

Furthermore, it is alleged that the operation of both roads is demonstrated to be not impracticable under reasonable rules. It is true that the franchises of the United Railroads would depreciate to the extent of the inconvenience and the delay occasioned, but the company cannot complain of such depreciation because its own grant was dependent upon the conditions that its tracks should be constructed and operated so as not to interfere with the public use of the street, and the city purposes by its additional tracks to subject the streets to this character of use and this alone.

It is stated that the rule governing one road occupying the same space as another road seems to rest upon clear legal foundation, but the principle cannot be extended to embrace the interference which normally and unavoidably occurs from competing operation upon outer tracks. It is a far cry, the city contends, to claim that the private railway "may assert, as against the general or the traveling public or as against those legally using the remaining portions of the street, an absolute ownership which would enable it to dictate the specific uses of the highway."

One-Man Control for Britain's Utilities

Revolutionary Changes in Britain's Transport and Power Through Proposed Ministry of Ways and Communications

(From Our Regular Correspondent)

At the end of February the British Government's radical proposals for dealing with all public means of transport were revealed to Parliament and the public. The Home Secretary, Mr. Shortt, introduced "a Bill to establish a Ministry of Ways and Communications and for purposes connected therewith," to bring under one national control and co-ordination all methods of transport in the country. At the same time no hard-and-fast scheme is put forward. The keynote is to give the new minister (who is to be Sir Eric Geddes, formerly of the North Eastern Railway) great and far-reaching powers to do whatever is necessary to bring the desired end about. The bill opens up possibilities of nationalization; on the other hand the minister will have discretion as to best course to take.

The minister is to take steps to improve the means and facilities of locomotion and transport. To him are to be transferred all powers and duties of any government department in relation to railways, light railways, tramways, canals, roads, bridges, and ferries and vehicles and traffic thereon, harbors, docks, and piers, and to supply of electricity. This does not increase present government powers of control but simply transfers them to one minister and his department, which is a valuable unification. To afford time for consideration and formulation of the policy to be pursued as to the future position of undertakings, it is provided that for two years after the passing of Bill, all railways which during the war have been in possession and under control of government may remain in and under that of the new minister. The latter is also enabled (word is "may," not "shall") to take possession of any other railway, or of any light railway, tramway, canal or harbor.

That is a transitory arrangement. The permanent one is that the King may by Order in Council authorize the minister to purchase by agreement or compulsion and work any railway, light railway, tramway, canal, harbor and dock; to authorize the Minister to establish and work any such undertakings, and to lease any such undertaking. The Order however is not to authorize purchase otherwise than by the agreement of any tramway belonging to a local authority, or purchase without consent of the local authority any tramway which a local authority is entitled to purchase under section 43 of the tramways act of 1870.

The bill also allows of other procedure, because it allows the Minister to make advances to local authorities or companies for construction, improvement or maintenance of various means of communication already mentioned. In regard to electricity supply, it is noteworthy that the only substantial provision in the first draft of the bill is that control of such supply is one of the powers that the new government departments may take. These powers are limited, and certainly some further proposals in this direction may be expected. If the bill passes a revolution in transport affairs in Britain seems likely.

In the meantime a most useful scheme promises to come to fruition for settlement of labor disputes in the British tramway field. The system of Joint Industrial Councils for each industry, recommended a year or so ago by the so-called Whitley committee, has already been referred to in these pages, and it has been adopted in a number of industries. An attempt to bring it into operation in the tramway business was for a time not successful, because London tramway employees did not agree to it. That opposition has been overcome, and it was announced in the beginning of March that a National Joint Industrial Council for the industry has been approved by the constituent associations — namely, the Tramways & Light Railways Association, Municipal Tramways Association and the National Transport Workers' Federation. The Council will consist of forty-four members, twenty-two for the employers, and twenty-two for the employees. On the former, fourteen will represent municipal undertakings and eight company undertakings.

Few New Laws in Indiana

Authority of State Commission Regarded as Check to Need for New Legislation

Very few laws of particular interest to the public utilities were enacted during the recent session of the Legislature of Indiana. The new State tax law which was enacted provides, among other features, that all public utilities shall be assessed originally by the State board of tax commissioners. An amendment in Senate enrolled act No. 316, provides that a utility that contracted to furnish "free service, or service at special rates" shall do so even though it has surrendered its franchise and has received in lieu thereof an indeterminate permit. Such service is to run until "such time as the franchise would have expired had it not been surrendered."

CHANGE IN LEASING LAW

House enrolled act No. 470 amends the law of 1913 which authorizes railroad companies to lease, sell or purchase non-competing lines of railroads subject to the approval of the Public Service Commission. Under the old law a railroad could lease or be leased by a non-competing line if both parties were organized under the laws of Indiana. And where one company held a lease of another forming a through railroad line, then either of the companies could sell or convey its railroad to the other with the approval of the stockholders owning not less than two-thirds in amount of the capital stock of the respective companies becoming parties to such purchase and sale. The old law also provided that no railroad company not organized under the laws of Indiana could purchase any line in Indiana.

The 1919 amendments to the 1913 laws provide that a railroad organized under the laws of this State "may lease its railroad in Indiana to a railroad organized under the laws of another state or states, whose railroad forms a through line, or which is connected with the railroads of the company organized as aforesaid under the laws of this State." The same consent of stockholders is required as under the old law. The leased road must be operated in this State and "shall remain liable as if it operated the road itself, and both the lessor and lessee shall be jointly liable upon all rights of action," and may be jointly or severally sued in the courts of this State.

LAW FIXING FARE LIMITS REPEALED

House enrolled act No. 238 repeals the law which limits passenger fare on steam railroads to 2 cents a mile.

Senate enrolled act No. 287 authorizes any street railway company to "increase or reduce or modify the terms and conditions of its capital stock, or any class thereof, to create, authorize and issue one or more new classes of stock and to specify the amounts thereof and the preferences and other rights granted to them, or otherwise amend its articles of association, by the amount of the holders of two-thirds of the class or classes of its outstanding capital stock affected thereby, declared at any regular or called meeting thereof held pursuant to the by-laws of the corporation." It is provided that the Public Service Commission must approve before such changes in stock may become effective.

Cleveland Franchise Renewed

The City Council of Cleveland, Ohio, with but one dissenting vote, has passed the franchise extending the Tayler grant of the Cleveland Railway for a period of ten years and causing it to expire twenty-five years from May 1.

The Council, in making the extension, passed the McGinty ordinance as a substitute for the ordinance of Mayor Davis, which provided for an extension of one year only. The McGinty ordinance was introduced a week ago.

The legislation just passed contains few changes from the original Tayler grant enacted ten years ago. The changes include the elimination of repetitions.

The new ordinance also provides for a 7-cent fare for that section of Cleveland east of Ivanhoe road. The fare now is 15 cents.

The new ordinance will not go into effect until about May 10.

Council took no action on Mayor Davis' ordinance for municipal ownership of the lines of the Cleveland Railway. Councilman John Reynolds made an effort to amend the Mayor's legislation, by calling for an election on May 28. A motion to adjourn prevented consideration of the Reynolds motion.

Ohio Association Organized

A group of electric railway executives in Ohio have organized the Electric Railways Association of Ohio whose object will be the mutual benefit and advantage of the electric railway industry of the State of Ohio, the study of transportation conditions and the devision of methods for their betterment and development and the improvement of service and enlistment of the aid and cooperation of the public in effecting such improvements. Any individual, copartnership, association or corporation which may now or hereafter own, operate or manage within the State of Ohio, for public use, a street or interurban railway is eligible for membership.

Representatives from about thirty companies attended the organization meeting at which the following officers were elected: President, F. W. Coen, Sandusky; vice-presidents, Dana Stevens, Cincinnati, and F. R. Coates, Toledo. The secretary and treasurer have not yet been elected. The executive committee consists of fifteen members, including the president and two vice-presidents, the others being selected so that all parts of the State will be adequately represented.

As a Commissioner Sees It

Mr. Whitney Finds Need for Changes in New York's Dual Contracts in Interest of City and Railways

In reply to the request from "Passenger" in the New York *Evening Sun*, Travis H. Whitney, acting chairman of the Public Service Commission for the First District of New York prepared a statement discussing the local transit situation with respect to higher fares. In this statement the commissioner said in introducing the matter:

> Any business, to continue, must be either self-sustaining or rely on contributions. If the business be transportation, the revenue must be, likewise, sufficient to pay operating and maintenance expenses sufficient to give adequate service with safe and proper equipment, to extend the service as necessities require, and to give a proper return on the investment. This revenue must come either from the fare payers or the taxpayers. At the present time and for some time past the revenue from the fare payers has not been sufficient to pay the proper expenses and to give a return upon the investment.

Declaring that all transit lines should have the same fare or so balanced as to get the maximum efficiency from each, Commissioner Whitney said that while the companies are not getting sufficient revenue to care for the proper items of expense and fixed charges on investment, thus necessitating consideration by fair-minded men of an increase in fare, yet, on the other hand, there are concessions that should be made by the companies as a part of any agreement by the city that fares may be increased. On this point the commission said:

> For example, experience has shown that there are provisions in the dual contracts that can well be modified. As it is now, the companies are entitled to their entire preferentials ahead of any return to the city. If an increase in fare were to be granted sufficient to make the dual system self-sustaining and thus without recourse to taxation, it would be fair to the city that all, or at least a part, of the preferential should be postponed until after the city has received its fixed charges. Otherwise there would be no incentive for the companies, with increased fares, to so manage their business that, after they receive their expenses and fixed charges, the city should surely secure its fixed charges. Giving the city's fixed charges priority, however, over all or a part of the companies' preferentials, would insure such management by the companies that the increased fare would make the enterprise self-sustaining both to them and to the city.
>
> Likewise, in relation to the surface companies, there should be a consolidation of the various subsidiary companies in each system so that there should be one company in the case of each system and with provisions that, after the company has obtained from the increased fare its proper expenses and return on its investment, the city should be entitled to all or a considerable percentage of the remaining revenue, to go into a rapid transit fund, usable for either rapid transit extensions or acquisitions of additional transportation lines.
>
> In order that the city may be in a proper position to enter into negotiations and agreements with the companies, I have felt that the city should be clothed with additional rights in respect to municipal ownership. Not that the city should, necessarily, enter into an extensive program of municipal ownership of all utilities, but because in negotiations involving large matters it is important that the two sides should be on an equal basis in respect to powers; because of this, I can see no serious objection to a municipal corporation having the same rights that a private corporation has in respect to activities that are clothed with a public interest to the extent that, for example, transportation is in the city of New York

Municipal Line's Plans

Seattle Road Lays Down Preliminary Rules to Govern Service and Employees

General Order No. 1 of the Seattle Municipal Railway as enlarged by the purchase on April 1 of the railway lines of the Puget Sound Traction, Light & Power Company notified the trainmen that, with the exception of the heads of departments, all employees of the Traction Company would continue to perform the same duties for the city until notified otherwise. Superintendent of Public Utilities Murphine states that no change in the schedules or routing of cars would be made for about ten days, but some improvements in service are expected.

In closing the railway deal, the Puget Sound Traction, Light & Power Company was represented by A. W. Leonard, president, and J. B. Howe, attorney. The city was represented by Thomas F. Murphine, superintendent of public utilities, and Harry W. Carroll, city comptroller. Title to the property is guaranteed the city by a title insurance policy of $1,000,000, said to be the largest policy of the kind written on the coast.

By taking over the property before April 1, the city hoped to be relieved of the payment of the 1919 general taxes. The valuation of this class of property is not fixed in the ordinary course of procedure until May 31, and although State Tax Commissioner Jackson has announced that the property has been placed on the assessment rolls at a valuation of $12,000,000 the city holds that it should not be taxed, as the property had passed to city ownership at that time. It is expected the question will have to be settled by a court order.

Express service for the outside districts night and morning is one of the improvements contemplated a little later. This service will apply to the West Side, Ballard, Fremont and Woodland Park districts. Plans have also been worked out to connect every line in the city with the elevated, enabling the operation of the express cars from every part of the city to the Harbor Island West Side industrial districts.

The question of a possible increase in fares has become a live one. Superintendent Murphine is of the opinion that the city can operate on a 5-cent fare and meet every obligation. He will make a strong effort to continue the 5-cent fare.

Buffalo Problems Acute

Negotiations are under way between E. G. Connette, president of the International Railway, Buffalo, N. Y., and representatives of the union platform employees regarding the back pay question. The employees had $300,000 in back pay due them on April 1 under a decision rendered six months ago by the War Labor Board. The company has not the funds with which to make payment. There is talk of a strike, but officials of the company hope that payment can be delayed until after the city's traction problems are settled.

The company has defaulted in the payment of city taxes amounting to almost $100,000 and is now paying interest on the taxes. The property can be advertised for sale to cover the taxes at any time.

No agreement has yet been reached as to who will be the third member of the board of arbitration to solve the differences between the city of Buffalo and the International Railway. Albert S. Richey, the city's member of the board, conferred in New York during the week ended April 5 with James E. Allison, Jr., St. Louis, the company's representative.

Sees City Ownership Ahead

United Railways Has Settled Many Problems, but City Ownership Seems Likely

In an editorial in the March number of *The Bulletin*, official publication of the United Railways, St. Louis, Mo., Richard McCulloch, president, writes that he believes that when the valuation of the company's properties has been completed, the acquisition of the company by the city will "be merely a matter of arrangement of payments." Mr. McCulloch reviews the affairs of the company in part as follows:

> The two controversies which have long existed between the city and the United Railways have been settled by agreement. The company is to pay the current mill tax quarterly, and is to pay the accrued mill tax in ten annual installments. The first of these annual installments has already been paid.
>
> The controversy as to the validity of the Jefferson Avenue franchise has also been settled, and there is now no question as to the company's rights on the streets. The former controversies have been settled and are out of the way, and the highest court in the State has sustained the authority of the Public Service Commission to determine all other matters which might, at some future time, possibly lead to controversy.
>
> A valuation of the company's property is now being made by the State Public Service Commission, and will probably be completed within a short time. The Public Service Commission is authorized by law to make such a valuation, and is the only regulating body that is so authorized. It is anticipated that this valuation, when completed, will form the basis of a reorganization of the company's finances, and will also be the determining factor in the rate of fare which will be authorized by the commission.
>
> The Public Service Commission, in its order of May 15, 1918, laid down the principle that the rate of fare should be such as will enable the company to pay operating expenses, taxes, replacements and a reasonable return on the investment. Having once determined the investment and the rate which the company should be permitted to earn on this investment, it will be a simple matter of calculation for the commission to determine, from time to time, the proper rate of fare, taking into account wages, and all other operating expenses, taxes, replacements and other variable charges.
>
> The valuation of the company's property will also simplify the purchase of the property by the city. The advantages of public ownership and operation have been pointed out frequently in these columns, and when the valuation of the property is finally established, the acquisition of the property by the city will be merely a matter of arrangement of payments.

Engineers of the Public Service Commission are now making a survey of United Railways property on which the valuation will be determined.

New Franchise Wanted

President Lowry of St. Paul Company Suggests Service-at-Cost Grant as Only Way Out

The St. Paul (Minn.) City Railway, included in the system of the Twin City Rapid Transit Company, has asked for a new franchise. The request is in a letter from President Horace Lowry. Further information will be asked from Mr. Lowry and when he is ready to confer with the City Council a full meeting will be called, including the Corporation Counsel. The petition was filed with the Council on April 2. Mr. Lowry's letter reads:

> Under date of May 31, 1918, we addressed a communication to your honorable body requesting an increase in the rate of railway fare, and again on Aug. 15, 1918, we addressed you on the same subject.
>
> Your commissioner of public utilities has asked the representatives of this company in public meetings if the company would be willing to surrender its present franchise if a new franchise based on the cost of service were duly granted to us by the city, and we have replied to such question by stating that we would do so. No steps, however, have been taken to draft such a franchise and we now take this means of making formal application for a new franchise in lieu of the franchises under which we are now operating in St. Paul.
>
> Your honorable body is fully advised as to the financial condition in which this company finds itself, the same being fully revealed in the recent report of audit made by Bishop, Brissman & Company. You are also fully informed of the demands of the city of St. Paul for extensions of lines and for new paving.
>
> Unless something is done to restore this company's financial condition it will be impossible to finance any of the expenditures which we will be called upon to make for paving and extensions, or to render to the people of the city the high standard of service which the company desires to give.
>
> We believe the only way the situation can be remedied is for the city of St. Paul to accept from the company a surrender of its present franchises and grant in lieu thereof a new contract based on the cost-of-service plan, under which fares will increase when costs are high and decrease when costs are low.
>
> If your honorable body is willing to approve this plan, and will pass the necessary resolution, requesting us to do so, we will be pleased to submit at an early date tentative draft of a cost-of-service franchise, which can serve as the basis for conducting negotiations.

M. O. Bill Passed

Acting Governor Louis F. Hart at Olympia, Wash., recently signed the bill amending the municipal ownership statute to empower cities to acquire, as well as extend, own and operate railway lines 8 miles beyond city limits instead of three as heretofore. The city of Seattle thus secures permission to acquire the Seattle, Renton & Southern Railway, which will be made a part of the municipal railway system. The extension limit was placed to 8 miles to permit Tacoma to extend its city line to American Lake.

The purchase of the Seattle-Renton System was under consideration following the closing of the deal to purchase the railway lines of the Puget Sound Traction, Light & Power Company. Although a tentative understanding between the city and owners of the Rainier Valley lines was reached, there was doubt of the city being legally able to operate the southern end of the lines which extend about 4 miles from Seattle.

News Notes

Service Resumed After Strike.—The Wichita Falls (Tex.) Traction Company resumed operation on March 26 after having been tied up for three weeks on account of a strike of motormen and conductors. The men received a part of their demands and yielded others. All the old men were taken back.

Transit Bills Reported.—Bills providing for a single commissioner of rapid transit and for a single commissioner for the regulation of public utilities were reported on April 9 by the Senate committee on public service. The separated commissions are to be substituted for the board of five Public Service Commissioners in New York city if the bills become law.

Men in Winnipeg Want More.—The employees of the Winnipeg (Man.) Street Railway demand that a new agreement shall go into effect on May 1 and ask 55 cents an hour, compared with the present wage of 47 cents an hour. In addition men ask for a minimum wage of $25 a week while learning, for the closed shop and a week's holiday at the company's expense.

Would Force Report on Municipal Ownership Measure.—Assemblyman J. E. Gill has filed a petition signed by fifteen members of the House of Assembly to force the municipal corporations committee to report House Bill 38, which would enable the city of Trenton to acquire and operate its railway system and the lines running into surrounding communities.

Melting-Pot Classes Among Railway Men.—The St. Paul (Minn.) City Railway is conducting "melting-pot" classes at employees' headquarters. Each class lasts forty-five minutes and is chiefly a lecture by a public school principal on some phase of the government. Informal discussion is a feature. A similar system is followed in Minneapolis. The members of the classes are foreign born.

Hudson Vehicular Tunnel Bill.—The Senate of New York on March 27 passed the Adler bill, providing for the construction of the vehicular tunnel from New York to Jersey City. The measure appropriates $1,000,000 for starting the work. New York State's share will be $6,000,000 and the State of New Jersey will expend the same amount. The bill goes to Governor Smith now.

Wage Readjustment Up at Springfield.—It is stated unofficially that the men in the employ of the Springfield (Mass.) Street Railway are seeking a flat rate of $5 for an eight-hour day. The company, on the other hand, proposes a reduction of the present wage schedules, which it contends are too high. The present agreement expires on June 1. Discussion is expected soon between the representatives of the men and the officers of the company.

Atlanta Company Wins Power Suit.—A verdict has been returned for the Georgia Railway & Power Company, Atlanta, Ga., in the Cobb County Superior Court, in the suit brought in behalf of the Laurel Woolen Mills Company against the power company for $152,000 damages. The plaintiff claimed damages on the ground that the building of the Bull Sluice dam at Morgan Falls, several years ago, reduced its own power supply. This contention was not sustained.

Men in St. Louis Want More.—Formal demand for 55 cents to 65 cents an hour and the basic eight-hour day has been made by members of the union, in a petition presented to the United Railways, St. Louis, Mo. The petition is to open the contract made with the men at the conclusion of the strike in February, 1918. The men ask for the opening of the contract for discussion of wages and hours only. The present wage scale is 35 cents to 42 cents an hour, on the basis of a nine-hour day.

Wage Increase in Spokane.—The employees of the Spokane & Inland Empire Railroad on the city lines in Spokane, Wash., have been awarded increases in pay of 6 cents an hour, or 60 cents a day, by the War Labor Board. The increase is retroactive to Aug. 8, 1918. The receiver for the company has until Nov. 1 to meet the back pay. The War Labor Board has also recommended that the company be allowed to charge higher fares. The present maximum wage of trainmen is 39 cents an hour.

Duluth Against Municipal Ownership.—Municipal ownership of the lines of the Duluth-Superior Traction Company in Duluth, Minn., was rejected two to one at the city election on March 31. The vote really was to ascertain the sentiment of the people with respect to the making of a valuation of the railway property with a view to acquiring the lines by negotiation and purchase. On April 1, Superior, Duluth's sister city, overwhelmingly indorsed the purchase of the local water and gas, the electric light and power plants.

New Albany Mechanics Strike.—The linemen and substation men of the United Gas & Electric Company, the Louisville & Northern Railway & Lighting Company and Louisville & Southern Indiana Traction Company, which are operated under one system, went on strike recently. The men demand back pay from last October, while the company has paid an increase only since March 4, when the War Labor Board decided the matter. The company contends that it is not responsible for back pay from the time the protest was lodged.

Cleveland Subway Report Expected.—The Rapid Transit Commission of Cleveland, Ohio, which started an investigation a year ago to find the best subway system for Cleveland, expected to meet during the week ended April 12 to make a final report. Four tentative plans for the subways include underground tracks from the Public Square to East Ninth Street on Euclid Avenue, between the same points on Superior Avenue, from the Public Square to the Central Market district on Ontario Street and an extension of the tube from the high level bridge to the Square.

Brooklyn Motorman Acquitted.—Edward Luciano, motorman of the Brooklyn (N. Y.) Rapid Transit Company train in the Malbone Street tunnel disaster, was acquitted of manslaughter on April 4 after the jury had been out nearly five hours. The prisoner was at once discharged by Justice Seeger. District Attorney Lewis did not say whether he would go on with the prosecution of Col. Timothy S. Williams, John J. Dempsey, John H. Hallock, and William S. Menden, officers of the company, who were also indicted for manslaughter and now await trial, but his attitude was taken to indicate that he considered it hopeless to proceed with these trials.

Municipal Ownership Bill Reported.—Amended in many particulars, the Fowler municipal ownership bill, sponsored by the State Conference of Mayors, was favorably reported on April 9 by the public service committee of the New York Senate. Under one of the amendments, the consent of the Public Service Commissions would not be required for the acquisition of public utilities, the commissions being given only power to assist in determining a fair valuation of the properties. It is understood that as amended the measure has the support of New York City authorities, who objected to the broad powers vested in the Public Service Commissions in the original draft.

Programs of Meetings

National Electric Light Association

The forty-second convention of the National Electric Light Association will be held at Atlantic City, N. J., on May 19-22, 1919. The meetings will be held on the Million Dollar Pier, where there will also be an exhibit of electrical apparatus and supplies, supplemented by a special exhibit under the auspices of the lamp committee illustrating the evolution and application of the tungsten lamp.

Central Electric Railway Association.

The Central Electric Railway Association will hold a boat trip this year. The steamer *South American* will leave Toledo, Ohio, on June 30 at 9 o'clock. The party will go to Detroit on Monday and up the river into Lake Huron, spending Tuesday in Georgian Bay. Mackinac Island will be reached on Wednesday morning and Benton Harbor Thursday morning. The route will thence be to Chicago which city will be reached about 4 p. m. Thursday, July 3.

Financial and Corporate

London Traffic Heavy

English Group Show 16 Per Cent Advance in Gross Revenues and 21 Per Cent in Net Revenues

For the year ended Dec. 31, 1918, the combined gross revenue of the five operating subsidiaries of the Underground Electric Railways of London, Ltd., London, England, was £7,743,451, a gain of £1,081,589 or 16.2 per cent over 1917. In spite of high prices and scarcity of labor, the companies distributed higher dividends than for a long time past, the two main reasons being an ever increasing volume of traffic and in some cases an increase in fares.

DISPOSITION OF NET INCOME OF LONDON LINES FOR CALENDAR YEAR 1918

	Metropolitan District Railway	London Electric Railway	City & South London Railway	Central London Railway	London General Omnibus Company, Ltd.
Balance forward from 1917	£29,029	£30,656	£21,266	£11,147	£38,548
Net income	583,703	650,604	152,404	227,571	595,553
	£612,732	£681,260	£173,670	£238,718	£634,101
Interest, rentals and other fixed charges	347,971	299,150	47,003	59,633	108,412
Balance	£264,761	£382,110	£126,667	£179,085	£525,689
Reserve for contingencies and renewals	35,000	35,000	25,000	20,000	285,000
Dividends	198,430	313,506	72,100	141,000	179,758
	£31,331	£33,604	£29,507	£17,185	£60,931
Further reserve for contingencies and renewals	£10,000	£10,000	£5,000	....	....
Balance carried forward to 1919	£21,331	£23,604	£24,567	£17,485	£60,931

The aggregate amount retained by the five companies for "revenue liabilities," which include working expenses, prior charges, reserves and other items of a similar nature, as outlined in the London electric railway facilities act of 1915, was £7,111,760. This was an advance of £970,234 or 15.8 per cent over 1917. The gain in revenues from more traffic and slightly higher fares, however, was sufficient to give a net balance of £631,690 for 1918 as compared to £520,336 for 1917, an advance of £111,354 or 21.4 per cent.

This net amount in each year was credited to the "common fund." This fund, in accordance with the agreement of 1915, was apportioned among the five companies as follows: City & South London Railway, 6 per cent; Central London Railway, 20 per cent; London Electric Railway, 30 per cent; Metropolitan District Railway, 12 per cent, and London General Omnibus Company, 32 per cent. The accompanying table shows briefly how the net income was used.

The traffic carried by each of the four railway companies was exceedingly heavy in 1918, and arrangements have been made to obtain delivery as soon as possible of rolling stock, some of which was ordered in 1914. The total number of passengers carried in 1918 by the five companies is estimated to have been 901,000,000, exclusive of through inward passengers to the Metropolitan District Railway from other railways controlled by the government. Owing to the Metropolitan District Railway being under such control, the average fare per passenger for the five companies is not given.

An arrangement has been made between the Central London Railway, the London Electric Railway and the City & South London Railway, whereby the London Electric Railway bears all the expense of maintaining and operating the three railways, receiving advances from time to time as necessary. At the close of each year the total expenses are allocated on an agreed statistical basis. It is thus possible to deal with the maintenance and operation of the three tube railways as if in fact they were one railway, and considerable economies in the keeping of accounts are being effected.

Many of the omnibuses of the London General Omnibus Company were taken over by the government, and the remainder require replacement. The company has in hand, in capital and reserve funds, £2,300,000 toward the reinstatement of the whole lot. During 1918 this company acquired a controlling interest in the Associated Omnibus Company, Ltd., and subsequently agreed to purchase its entire undertaking.

International Defaults Interest

Preliminaries have been started by the bondholders' committee of the International Traction Company of New Jersey, to take over the stock of the International Railway, Buffalo, N. Y. Elliott C. McDougal, president of the Bank of Buffalo and chairman of the protective committee, says that something must be done immediately by the city or State to help the International Railway to increase its gross income to prevent a multiplicity of court actions.

On April 1, the International Traction Company defaulted in the payment of interest on $16,500,000 of bonds covering the property of the International Railway. The interest was due on Jan. 1, 1919, and on April 1 the ninety days of grace expired. As collateral for the bond issue, the International Traction Company holds the capital stock of the International Railway.

The proceedings started by the bondholders of the International Traction Company do not mean receivership, according to views expressed by Mr. McDougal, but simply the sequestration of the stock of the railway company, with the present bondholders of the traction company becoming stockholders of the railway. Mr. McDougal is quoted as follows:

> Under the law we would have the right to sell the railway at public auction. We are trying to adjust matters so this will not have to be done. The bondholders do not seek a costly litigation. They simply want protection for their money and action to rehabilitate the system.

York Expenses Up

The increases in cost of operation which the York (Pa.) Railways experienced in the year ended Nov. 30, 1917, were continued during the latest fiscal year. The receipts, however, did not materially gain, and about the middle of the year the company reached the point where the traffic was on the decrease, largely on account of the number of men withdrawn for military service. Moreover, both the railway and the lighting receipts were seriously affected by the influenza epidemic.

The gross earnings for the fiscal year ended Nov. 30, 1918, at $1,091,711 showed an increase of $40,239 or 3.8 per cent over those for the preceding year. While taxes at $85,160 showed a slight decrease, the operating expenses at $598,809 and the allowance for depreciation at $74,529 took such a jump that the total expenses increased by $102,685, or 15.6 per cent, to $758,498. The net earnings at $333,213, therefore, fell off $62,445. This loss was increased by a slight rise in interest and bond discount to $252,195, so that the net income at $81,018 represented a loss of $63,000.

A 6-cent fare and a 25 per cent increase in freight rates became effective on Aug. 8, 1918, with the result that August showed a 10 per cent increase in railway gross receipts; September, an increase of 14 per cent; October (owing to the influenza), a decrease of 16 per cent, and November, an increase of 13 per cent. A change in working conditions leading to increased labor costs necessitated a further increase in fare, and a 7-cent fare with four tickets for a quarter became effective on Nov. 20.

The total cost of new construction for the latest fiscal year was $75,281. Of this amount $49,442 was for the railway department. The surplus balance on Nov. 30, 1918, after the payment of $80,000 in dividends, was $241,931.

Higher Fare Stems Tide

Rising Costs in Cleveland Stopped by Franchise Amendment—Interest Fund in Last Half of 1918 Starts Slowly Up

The outstanding point of the experiences of the Cleveland (Ohio) Railway for the calendar year 1918 was its final success in securing a fare which reversed the tendency of the interest fund to disappear in the face of higher costs of operation. The interest fund dropped below the franchise minimum of $300,000 in November, 1917, and it has since remained below that sum. The payment in July, 1918, of the increased wages from May 1 overdrew the fund nearly $250,000, but gains were gradually made under a higher fare until on Dec. 31 there was a balance of $23,700 to the good.

FARES CHANGED FREQUENTLY

On Dec. 26, 1917, rate "c" (4 cents cash fare, three tickets for 10 cents, 1-cent transfer, no rebate) was placed in effect. This was continued until April 3, 1918, when rate "b" (4 cents cash fare, seven tickets for 25 cents, 1-cent transfer, 1-cent rebate) was installed. After seven-days' trial resort was had to the final rate "a" (4 cents cash fare, seven tickets for 25 cents, 1-cent transfer, no rebate). The subsequent heavy increase in wages, however, necessitated an amendment to the Tayler grant to permit still higher fares, and on Aug. 4 rate "2" (5 cents cash fare, five tickets for 25 cents, 1-cent transfer, no rebate) became effective. This rate is still used. The fare amendment is effective until six months after the end of the war. When the interest fund exceeds $700,000, the city has the right to ask for a fare reduction.

The transportation revenue during 1918 increased $2,145,505 or 21.41 per cent, to which were added gains of $6,560 or 6.13 per cent in revenue from other railway operations and $24,655 or 30.67 per cent in non-operating income. The total income, therefore, rose $2,187,435 or 21.33 per cent.

COMPARATIVE INCOME STATEMENT OF CLEVELAND RAILWAY FOR CALENDAR YEARS 1917 AND 1918

I—Based on Ordinance Allowances

	1918 Amount	1918 Cents per Car Mile	1917 Amount	1917 Cents per Car Mile
Operating revenues:				
Revenue from transportation	$12,225,385	.....	$10,069,164	.....
Revenue from other operations	113,521	.....	106,961	.....
Total operating revenues	$12,338,906	35.17	$10,176,125	28.41
Expense allowances:				
Maintenance	$2,078,713	5.92	$1,770,074	4.94
Operating	6,438,290	18.35	5,194,275	14.50
Total	$8,517,003	24.27	$6,964,349	19.44
Balance	$3,821,903	10.90	$3,211,776	8.97
Special allowances	1,413,371	4.02	1,039,602	2.90
Net operating revenue	$2,408,532	6.87	$2,172,174	6.07
Non-operating income	105,044	.29	80,388	.22
Gross income	$2,513,576	7.16	$2,252,562	6.29
Taxes	720,413	2.05	643,107	1.80
Net income	$1,793,163	5.11	$1,609,455	4.49
Interest	1,995,500	5.69	1,928,856	5.38
Deficit	$202,337	.58	$319,401	.89

II—Based on Actual Expenses

	1918 Amount	1918 Cents per Car Mile	1917 Amount	1917 Cents per Car Mile
Operating revenues	$12,338,906	35.17	$10,176,125	28.41
Actual expenses:				
Maintenance of way and structures	$1,117,294	3.18	$1,089,883	3.04
Maintenance of equipment	1,184,517	3.38	946,604	2.64
Maintenance of power plant	60,906	.17	32,211	.09
Total maintenance	$2,362,717	6.73	$2,068,698	5.77
Power	$2,138,999	3.25	$1,094,942	3.06
Conducting transportation	3,877,569	11.05	3,120,295	8.71
Traffic	....	.....	500	.....
General and miscellaneous	1,372,530	3.91	1,277,902	3.57
Total operating	$6,389,098	18.21	$5,493,639	15.34
Total expenses	$8,751,815	24.94	$7,562,338	21.11
Balance	$3,587,091	10.23	$2,613,787	7.30
Obsolete property	744,000	2.12	524,000	1.46
Net operating revenue	$2,843,091	8.11	$2,089,787	5.84
Non-operating income	105,044	.29	80,389	.22
Gross income	$2,948,135	8.40	$2,170,176	6.06
Taxes	720,413	2.05	643,109	1.79
Net income	$2,227,722	6.35	$1,527,067	4.27
Interest	1,995,501	5.69	1,928,856	5.39
Surplus	$232,221	.66	*$401,788	1.12

* Deficit.

HIGHER COST ALLOWANCES

The increase in the expenditures for maintenance and operation, including the amount charged off for obsolete equipment, was $1,409,477 or 17.43 per cent. This was brought about mainly by increases of 25.13 per cent in maintenance of equipment, 34.26 per cent in conducting transportation and 41.98 per cent in obsolete equipment. The taxes increased 12 per cent and the interest charges 3.5 per cent.

The Council, early in 1918, increased the ordinance allowance for maintenance 1 cent and the operating-expense allowance 1½ cents per car-mile, both dating from Jan. 1. Later the operating-expense allowance was raised 3 cents more, from May 1. The special allowances of the year, to make good the insufficient allowances of earlier years for maintenance and operating expenses and to provide for the disappearance of obsolete or wornout property, amounted to $1,413,370, an increase over the previous year of $373,768 or 36 per cent.

WAR SHORTAGE CUT SERVICE

The ordinance car-miles (with trailers at 60 per cent) in 1918 totaled 35,081,583 and the actual car-miles 36,875,603. The fares numbered 273,944,346, transfers, 1,603,495 and deadheads 1,603,495—a total of 375,570,360 rides, equal to those in 1916. The service, measured in ordinance car-miles, was 2 per cent less than in 1917. It varied monthly, from an increase of 3 per cent in May to a decrease of 6 per cent in November. These decreases in service were due mainly to the company's inability to get men to run the cars. There were fewer rides, however, than in 1917 by 5.73 per cent. The monthly differences varied from an increase of 1 per cent in March to a decrease of 17 per cent in December.

CAPITAL ACCOUNT INCREASED $577,091

The Cleveland Railway in 1918 spent $577,091 on capital account. The expenditures for viaduct improvement amounted to about $125,000. New cars cost about $240,000. The company spent $40,000 for additional sub-station equipment, $4,700 for improvements at the viaduct power-station, nearly $20,000 for extensions of tracks and buildings, and $3,500 for changes in operating stations necessitated by the employment of women as conductors.

In regard to the future the annual report says in part:

> There will be some delay in bringing industry back from the abnormal conditions of the war period. There will probably be some unemployment, varying in duration and extent in different occupations. The seriousness of this period of readjustment upon the business of the company will depend, of course, upon how long a time shall elapse before the restoration of manufacturing and other businesses to the steadier conditions that prevailed in 1913 and earlier years.
>
> The cost of living will decline, but the decline will not be sudden. The return of the soldiers to their old employments, or to new employments, and the transfer of men and women from the work of producing

munitions of war to other occupations, may result in such a large increase in the number of workers in advance of the possibility of their employment during the readjustment period that a decrease in rates of wages may follow.

COST STATISTICS OF CLEVELAND RAILWAY FOR CALENDAR YEARS 1914 TO 1918

	Cents per Car-Mile					Cents per Fare				
	1914	1915	1916	1917	1918	1914	1915	1916	1917	1918
Maintenance expenses..	5.97	5.27	5.66	5.77	6.74	0.8379	0.7104	0.7039	0.7119	0.8647
Obsolete equipment....	0.37	0.64	1.13	1.46	2.12	0.0521	0.0869	0.1408	0.1803	0.2723
Total..............	6.34	5.91	6.79	7.23	8.86	0.8900	0.7973	0.8447	0.8922	1.1370
Operating expenses....	12.22	12.56	14.00	15.34	18.21	1.7168	1.6952	1.7382	1.8905	2.3383
Taxes..............	1.44	1.50	1.71	1.80	2.05	0.2029	0.2030	0.2124	0.2213	0.2636
Int. on bonds and notes.	0.95	0.88	0.91	0.87	0.84	0.1328	0.1185	0.1125	0.1075	0.1089
Interest on capital stock	4.32	4.85	4.74	4.51	4.84	0.6068	0.6538	0.5889	0.5562	0.6214
Total cost..........	25.27	25.70	28.15	29.75	34.80	3.5493	3.4678	3.6667	3.4967	4.4692
Gross income.........	23.93	26.34	28.34	28.63	35.47	3.3611	3.5535	3.5189	3.5295	4.5542
Surplus............	1.34*	0.64	0.19	1.12*	0.67	0.1882*	0.0857	0.0222	0.1382*	0.0850

*Deficit

Rhode Island Bill Hearing

At a joint public hearing held before the corporations committees of the House of Representatives and the Senate of the Rhode Island Legislature, the passage of the bill chartering the United Electric Railways, designed to become the holding company of all the electric railway properties in the State, was urged as a public necessity.

Attorney General Herbert A. Rice, who drafted the bill at the request of the receivers for the Rhode Island Company, appeared at the hearing and explained that the transportation affairs in the State have come to a crisis and that a reorganization is absolutely essential if the public is to be served. The act, he said, was merely a vehicle to permit the reorganization and the fact that the charter is to be issued to three State officials, including the Governor, indicated that the public's rights would be adequately safeguarded until such a time as an effective and satisfactory reorganization of the properties was completed. He ridiculed the idea of public ownership. The present plight of the Rhode Island Company he attributed largely to conditions arising out of the war.

The hearing was largely attended and although about a dozen expressed their opinions, there was no adverse comment. The general belief was that the time had come for some drastic action if service is to be continued and the passage of the bill, safeguarded so satisfactorily, offered the best solution of the problem.

Interest Payment Postponed

The Indianapolis Traction & Terminal Company, Indianapois, Ind., has temporarily postponed payment of the interest on its $5,000,000 of first mortgage 5 per cent bonds, which was due on April 1. In the circular issued to the bondholders under date of March 24, the company recites the difficulty it experienced in obtaining a hearing before the Public Service Commission of Indiana to obtain the discontinuance of its low rate ticket fares and the granting of a 5-cent cash fare, which was not obtained until October, 1918, after a year's delay in the courts. Contingent upon the increased fare received, large increases in wages were granted to the employees of the company. These advances absorbed the greater part of all the relief granted.

The circular states that it is not unreasonable to hope that the increase in fares granted by the commission, together with a continued improvement in the business of the company, will yield a sufficient return to permit the payment of the bond interest as soon as the large expenditures have been competed covering rebuilding of equipments, conversion of the car equipments for prepayment service, installation of fare boxes and other improvements.

St. Louis Results Still Unsatisfactory

The report of operations of the United Railways, St. Louis, Mo., for February, made by President Richard McCulloch to the Public Service Commission, points out the following:

> That in the nine months in which the 6-cent fare has been in effect, the rate increase of 20 per cent produced only 14.41 per cent more revenue, while the number of paying passengers decreased 4.40 per cent.
>
> That an estimate of twelve months' operation under the 6-cent fare, based on figures for nine months, indicates the city lines will fall short $821,560 of earning 6 per cent on an investment of $52,800,000.
>
> That the county lines, on the same basis, will fail to earn 6 per cent on an investment of $7,200,000 by $734,895.
>
> That the total by which the city and county lines will fail to earn 6 per cent on an investment of $60,000,000 is estimated at $1,556,455.

Praise for Receiver Meloon

The work of W. G. Meloon as receiver of the Portsmouth, Dover & York Street Railway, Portsmouth, N. H., is coming in for public recognition. The Portsmouth *Herald* of March 19 said:

> From a generally run-down electric railway to a full service equipment in much less than a year, has been the record of W. G. Meloon, receiver of the Portsmouth, Dover & York Street Railway Electric Lines. The service on the lines across the river has been fully restored and what was once in bad shape is now thoroughly overhauled and service at all times to meet the public demand is being rendered.
>
> The war found the line with run-down equipment and inadequate cars, but this has all been overcome. Courteous employees man all the cars and good time is maintained. The road will be constantly improved from day to day. The public has noted the steady gain and this paper is glad to say a good word for a road that means so much to this territory.
>
> The traveling public can assist in this good work by doing their part. Electric lines belong to the people and it is up to the people to help keep them as near perfect as possible.

Financial News Notes

Foreclosure Proceedings Begun.—The underlying bondholders of the Southern Traction Company, a subsidiary of the Pittsburgh (Pa.) Railways, have begun legal proceedings for the foreclosure of the $4,000,000 of first mortgage bonds of the company.

Increase in Common Stock.—The stockholders of the Charleston Consolidated Railway, Gas & Electric Company, Charleston, Ill., have voted to increase the authorized common stock by the issuance of 30,000 shares. The stockholders have until April 19 to subscribe to the new stock, par value $50, pro rata.

Wants Receiver at Chattanooga.—Application for a receiver for the Chattanooga Railway & Light Company, controlled by the Clark interests, of Philadelphia, has been filed in the United States District Court by the Commercial Trust Company, Philadelphia, Pa., representing the holders of $2,790,000 of the company's first mortgage bonds.

Wants to Refund W. F. C. Loan.—The United Railways, St. Louis, Mo., has applied to the Missouri Public Service Commission for permision to issue $2,160,000 of 7 per cent notes, the proceeds of which will apply to the payment of the $3,235,000 loan granted by the War Finance Corporation. The commission was expected to act on the matter on April 7.

Will Pay on Deferred Coupons.—Holders of the general mortgage 4½ per cent bonds of the New Orleans Railway & Light Company, New Orleans, La., have been notified that the Jan. 1 coupons will be paid upon presentation at the office of the New York Trust Company, New York. Three months' interest in addition to the amount of the coupons will be paid.

Memphis Note Holders Organize.—Owners of the two year 6 per cent collateral notes of the Memphis (Tenn.) Street Railway, which passed into the hands of a receiver in January, have formed a protective committee consisting of Mortimer N. Buckner, J. C. Neff, S. F. T. Brock, Charles Counselman, George T. Ordway and John A. Langan. Holders of the notes are urged to deposit them with the New York Trust Company under an agreement dated March 12, 1919.

Mr. Lippincott a P. S. C. Director.—At the annual meeting of the stockholders of the Public Service Corporation of New Jersey, Newark, N. J., on April 7, Heulings Lippincott, Camden, was elected a director to succeed Horatio G. Lloyd, Philadelphia, resigned. The other directors were re-elected. At the annual meetings of the subsidiary companies, the Public Service Railway, the Public Service Electric Company and the Public Service Gas Company, retiring directors were re-elected.

Income Bond Interest Passed.—As a result of the showing of the Chicago (Ill.) Railways for the fiscal year ended Jan. 31, 1919, the directors of the company on April 2, by taking no action in the matter, passed the annual interest of 4 per cent payable on May 1 on the $2,500,000 of income bonds. The meeting on April 2 was the regular date for voting this interest, but since it was not earned it will not be paid.

Short Illinois Road Leased.—The Rock Island Southern Railway, Monmouth, Ill., has leased the Galesburg & Western Railroad and will operate both lines as a single system. The Galesburg & Western Railroad was formerly the Rock Island Southern Railroad, operating from Galesburg to Monmouth. The Rock Island Southern Railway operates from Monmouth to Rock Island. In order that the different companies might not be confused the name of the Rock Island Railroad was recently changed to the Galesburg & Western Railroad. There will be no change in the personnel.

Sale of Municipal Railway Bonds Proposed.—The utilities committee of the City Council of Seattle, Wash., has recommended the sale of $150,000 of electric railway bonds, to facilitate the making of necessary improvements in the operation of the railway system recently taken over by the city from the Puget Sound Traction, Light & Power Company. The committee has recommended the construction of tracks to connect with both ends of the Eastlake Bridge, and the loan of money from the general fund to the railway construction fund to keep the work going until the bonds are sold.

Receiver for Jackson Company.—The Jackson Light & Traction Company, Jackson, Miss., a subsidiary of the American Public Utilities Company, Grand Rapids, Mich., has filed a petition in bankruptcy and E. E. Hindman, an attorney of Jackson, has been named receiver by Federal Judge Edwin Holmes. Electric railway service was discontinued temporarily, but has been resumed on order from the court. Officials of the company have been striving to increase power, light and gas rates and to raise fares to 7 cents, but the City Commission demanded that service be improved without increasing rates.

Cities Service Stock Increase Approved.—At the annual meeting of the Cities Service Company, New York, N. Y., held on April 8 in Dover, Del., all retiring directors were re-elected. The new board will meet for organization in New York on April 16, when it is expected the present officers will be re-elected. The stockholders of the company approved the increase in the authorized amount of preferred capital stock from $100,000,000 to $150,000,000. This stock will be held for future corporate requirements of the company, including the conversion of $30,000,000 principal amount of 7 per cent convertible gold debentures now outstanding.

$200,000 Note Issue Approved.—The Board of Public Utility Commissioners of New Jersey has approved the application of the Trenton & Mercer County Traction Corporation, Trenton, for the issuance of $200,000 of five year 6 per cent guaranteed gold notes in accordance with the trust agreement of March 1 last. The company needs the money for improvements, included among which are the following: Carhouse, $12,000; new unit at power house, $20,000; oil reservoir and time clock at the carhouse, $7,000; carpenter shop machine tools, $3,000; additional power house equipment, $10,000; ten air equipments for cars, $4,600; J. G. White, appraisal, $5,000; eighty-five fare boxes, $6,375.

Interborough-Metropolitan Engineering and Accounting Inquiry.—G. M.-P. Murphy, chairman of the protective committee for the holders of the Interborough-Metropolitan Company, New York, 4½ per cent bonds, has sent out a circular to holders of the bonds calling attention to the fact that interest due on April 1 has been defaulted. The circular states the position of the holders of the bonds, and adds that the committee has arranged for a thorough investigation of the property by the engineering firm of Stone & Webster and by Price, Waterhouse & Company, certified accountants. It was stated that when the reports were received the committee would endeavor to form some plan for reorganization.

Common Stock Dividend Passed.—At their meeting on April 2 the directors of the United Railways & Electric Company, Baltimore, Md., failed to declare any dividend on the common stock for the present quarter, and postponed action on the dividend until July. For the month of February the company in its report to the Public Service Commission actually shows a deficit of $50,077 in fixed charges. The item of "fixed charges" includes the interest on the 5 per cent funding bonds and on the income 4s. The interest on the income 4s, in accordance with the indenture, is payable only if earned, but it has long since come to be regarded as an actual fixed charge, and is cumulative. The report shows that for the month of February the company carried 17,540,547 cash fare passengers, and 6,125,681 transfer passengers. The report also shows that approximately 75 per cent of the gross income was distributed directly to service rendered the public and to taxation. Nelson, Cook & Company, Baltimore, bankers, in commenting on the affairs of the company in their weekly review dated April 5, said: "W do not for a moment consider that the United Railways & Electric Company is in danger of receivership; but we do think that when the experts now going over the company's books present the final results to the Public Service Commission, the necessity for prompt action will be clear cut and convincing."

Electric Railway Monthly Earnings

AURORA, ELGIN & CHICAGO RAILROAD, AURORA, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$179,364	*$152,362	$27,002	$38,822	†$11,820
1m., Feb., '18	140,915	*123,039	17,786	35,654	†17,778
2m., Feb., '19	366,018	*319,628	46,390	77,622	†31,232
2m., Feb., '18	268,587	*279,319	†732	71,305	†72,037

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$1,767,276	$58,096	$1,709,180	$150,099	$1,559,081
1m., Feb., '18	1,849,610	33,521	1,816,089	213	1,815,876
12m., Feb., '19	22,019,868	576,817	21,443,051	530,261	20,912,790
12m., Feb., '18	19,579,248	368,180	19,229,068	2,681	19,226,387

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$47,536	*$33,477	$14,059	$16,118	†$2,059
1m., Jan., '18	40,772	*27,973	92,799	11,321	1,478

FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$333,629	*$235,873	$97,756	$52,099	$45,657
1m., Jan., '18	310,344	*212,003	98,341	50,184	48,157

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$3,499,170	*$2,361,834	$1,137,336	$1,548,037	‡†$364,638
1m., Feb., '18	3,256,310	*1,812,533	1,443,777	1,171,141	‡324,159
8m., Feb., '19	27,265,978	*19,030,215	8,235,763	11,828,122	‡†3,197,327
8m., Feb., '18	26,494,347	*14,871,566	11,622,781	8,823,332	‡3,153,799

* Includes taxes. † Deficit.

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$191,454	*$152,434	$39,020	$35,840	$3,180
1m., Jan., '18	141,554	*115,307	26,247	36,025	†9,878

NEW YORK (N. Y.) RAILWAYS

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$962,263	*$878,817	$83,446	$280,028	‡†$153,155
1m., Jan., '18	865,377	*720,601	144,776	287,627	‡†92,933
7m., Jan., '19	6,561,098	*5,811,051	750,047	1,947,335	‡†891,283
7m., Jan., '18	7,171,482	*5,418,664	1,752,818	1,978,796	‡132,634

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$114,114	*$89,991	$24,123	$26,579	†$2,456
1m., Jan., '18	93,374	*63,183	30,191	25,210	4,981
12m., Jan., '19	1,203,631	*882,959	320,672	304,317	16,355
12m., Jan., '18	986,494	*657,868	328,626	291,680	36,946

TAMPA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$104,648	*$59,808	$44,840	$5,295	$39,545
1m., Jan., '18	86,449	*52,210	34,239	5,083	29,156
12m., Jan., '19	1,080,745	*627,874	452,871	61,645	391,226
12m., Jan., '18	995,445	*568,169	427,276	56,948	370,328

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$829,499	$638,641	$190,858	$147,167	$43,691
1m., Feb., '18	780,372	604,534	175,838	144,919	30,919
2m., Feb., '19	1,704,083	1,303,460	400,623	309,345	91,278
2m., Feb., '18	1,622,096	1,266,698	355,398	305,435	49,963

* Includes taxes. † Deficit. ‡ Includes non-operating income.

Traffic and Transportation

Suburban Fare Readjustment

Flat Suburban Rates Suggested in Rhode Island to Replace Commutation or Excursion Fares

A flat reduction in fares on eight of the long-haul suburban lines of the Rhode Island Company, Providence, R. I., approximating 10 cents between terminals in most instances, is suggested in a new schedule of rates filed by the company on April 1 with the Public Utilities Commission. The lines affected by the proposed rates include the Buttonwoods, Chepachet, Providence-Woonsocket, Providence-Washington, East Greenwich, Riverside, Warren & Bristol, Riverpoint-Rocky Point and the Woonsocket-Pascoag lines.

FLAT FARE CONSIDERED BETTER

The new tariffs are offered to the commission in compliance with its order that the company propose some form of excursion or commutation rate on the long-haul lines of heavy traffic. The trustees of the road believe a flat rate better for the public than the ordinary commutation or excursion rates.

The present rates will continue in effect until May 1. The proposed rates merely suggested as a basis for a readjustment of the fares on the heavily traveled suburban lines. It is suggested that they be tried for three months for the purpose of building up business, as they are lower than the company can offer on the present volume of business.

Long-haul lines upon which a fare of more than 10 cents is charged, which are not included in the changes suggested, include the Providence and Danielson, Sea View, Smithfield Avenue, Pawtucket-Crescent Park, Pawtucket-Cumberland Hill, Oaklawn and the Centerdale-Esmond, via Smith Street and Manton Avenue.

PRESIDENT POTTER EXPLAINS

A. E. Potter, president of the company in his letter of transmittal of the tariffs to the commission, says:

> A commutation rate is usually fixed by reducing the price for each zone traveled, while the rates in the accompanying tentative form of tariff effect a reduction by a lengthening of the zone.
>
> It is believed that the submission of these reduced rates in place of commutation tickets or excursion tickets is desirable on the grounds that the experience of this company and other electric railways with tickets indicates that tickets can be handled only at a large expense for printing and for proper accounting by conductors and the auditing department, and it is believed that this expense should be obviated and the passengers given the benefit of a reduced rate which includes no expense for the printing and handling of tickets.
>
> These rates are lower than the mileage rate of 3-cents on the steam lines as now operated by the United States Railway Administration, and are as low as or lower than, most electric railway rates for similar service throughout New England.
>
> These rates are lower than the company can afford to offer on the present volume of business, and are offered as an experiment for three months trial, in the hope that the lines affected will be so well patronized, on account of the low rates, that the amount derived from the business will be sufficient to cover the cost of service.

With the reduction of the fare between terminals of 10 cents on six of the eight lines, the company in its proposed rate has made a readjustment of the fares in intermediate zones by extending the length of the zones.

Inquiry Into Des Moines Service

In an effort to prove that the Des Moines (Ia.) City Railway is not compelled by financial reason to make the cut in service recently authorized by Federal Judge Martin J. Wade the city of Des Moines has a force of experts and accountants going over the books of the company. The investigation is being conducted under the direction of Prof. E. W. Bemis, who is assisted by Walter Bemis of the Chicago Rate & Utility Company, George H. Mathews of the firm of Andrew Sangster & G. H. Mathews, and Charles H. Pugh, Chicago.

Scott Goodrell, newly-chosen railway supervisor of Des Moines, has presented a demand to the City Council for drastic changes in the service now being furnished by the Des Moines City Railway. Among other complaints Mr. Goodrell protests against the skip-stop plan and states that it has done more to cause complaint from patrons than the recent reduction of service. He urges that it be abolished. He asks the City Council to establish two car-loading berths at all important near-side stops, having them marked on the pavement. No parking of cars in these berths would be allowed, according to Mr. Goodrell's plans. Mr. Goodrell also proposes additional fare collectors on cars at congested points so that both ends of the cars could be used for loading and unloading. Protection of car-riders from motorists is also urged.

The Council has as yet taken no action of Mr. Goodrell's recommendations.

Platform Labor More Plentiful

Platform men are available now in such numbers that the Portland Railway, Light & Power Company, Portland, Ore., is practically back to old standards of efficiency, but mechanics, machinists and painters are still so scarce that it is almost impossible to keep the force up to strength. So long as the promise is for fairly steady work at the shipyards the mechanics prefer such work.

Ten-Cent Fare Suggested

Professor Richey Advocates Dividing Washington Into Two Five-Cent Zones

A zone system calling for the payment of an extra fare of 5 cents by patrons riding on cars into the city from the outer sections was suggested by Prof. Albert S. Richey, an expert witness for the Washington Railway & Electric Company, Washington, D. C., in the hearing before the Public Utilities Commission of the District of Columbia on the company's application for financial relief. The extra fare would be cut down to 3 cents by commutation. The zone line would be 2½ miles from the center of traffic.

RELIEF OR RECEIVERSHIP

Professor Richey was called to the stand by the company following testimony by its officers to the effect that the financial affairs of the company were in a desperate condition, and that unless relief should be granted, the company would be obliged to cease its practice of making good the deficits of the various subsidiary companies which serve the suburbs. Such a course would mean a receivership for these lines.

Professor Richey said that a zone system of fares as outlined by him, together with a 1-cent charge for all transfers, would realize the company additional revenue of about $600,000 a year. Patrons riding wholly within either zone would pay a fare of only 5 cents. Those crossing the zone line would be charged an additional fare of 5 cents, but this would be cut down by the issuance of commutation tickets for 3 cents each. The commutation tickets would avoid the necessity of making change at the zone line and insure a rapid and easy collection of the extra fares. The witness said that such a system was working successfully at Springfield, Mass., and Holyoke, Mass., and that a similar plan had been worked out for Boston, but had not yet been put in operation in that city.

PRESIDENT HAM'S VIEWS

William F. Ham, president of the company, testified that in his opinion the only solution of the problem, provided assistance was not given the company, would be the taking over of the lines by the government and the payment of deficits out of the public purse.

When Mr. Ham completed his testimony, representatives of the citizens' associations will be heard. The latter have announced their opposition to any increase in fares and will probably suggest that the commission cannot act with fairness until after the actual valuation of the property is determined.

The commission completed the valuation hearing only a few days ago and every indication was given at the time that there would be no decision until there was a court ruling on the matter of the valuation of the Potomac Electric Power Company.

La Crosse Six-Cent Fare Order Vacated

Circuit Court Judge Holds That Failure to Earn Fair Return on Property Value Did Not Create "Emergency"

An important decision regarding emergency fares was handed down on March 21 by Judge Ray E. Stevens of the Circuit Court of Hare County in the case of the Wisconsin Railway, Light & Power Company. The Wisconsin Railroad Commission had on Sept. 12, 1918, granted a 6-cent fare for this company in La Crosse upon the ground that an emergency existed because the old rate was insufficient to cover operating expenses, taxes and a 7½ per cent return on the property value.

Judge Stevens now holds, however, that the grant of a higher fare was unlawful because no emergency existed within the meaning of the law. His general argument is that a utility has no right to an emergency rate that will maintain its normal rate of income, and that the fact that a utility has set aside a substantial surplus is one of much weight in determining whether an emergency exists.

RETURN ON INVESTMENT NOT CONSIDERED

After citing various cases (*Re* Indianapolis Water Company, P. U. R. 1919, A448,460; *re* Lincoln Traction Company, P. U. R. 1919, D168-171; *re* Public Service Railway, P. U. R. 1918, E910,915; *re* The Milwaukee Electric Railway & Light Company, 18 W. R. C. R. 681,685; State *vs.* Lewis (Ind.), P. U. R. 1918, F111,118), Judge Stevens remarks that it is not suggested in any of these cases that the failure to pay a return on the fair value of the property is an element to be considered in determining whether an emergency exists. No single fact, in his opinion, is more thoroughly established than that a utility has no right to an emergency rate that will maintain its normal rate of income. (*Re* Empire Gas & Electric Company (Mass.), P. U. R. 1918, D912; *re* Long Island Railroad (N. Y.), P. U. R. 1918, A649, 654; *re* Public Service Railway, P. U. R. 1918, E910, 915; *re* Queens Borough Gas & Electric Company, P. U. R. 1918, F672, 881.)

Judge Stevens found but one case in which returns on capital invested were considered in fixing emergency rates, and then only upon the ground that such returns were essential to "sustain its credit . . . to the end that essential capital for additional facilities to meet the public demands or needs may be secured upon reasonable terms." (*Re* Georgia Railway & Power Company, P. U. R. 1918, F624, 632.) There is no proof, he says, that capital is needed to make extensions or procure additional facilities to serve the public at La Crosse. Even under such a state of facts the most that should be considered in determining whether an emergency existed is the amount of interest payable upon the funded debt properly chargeable to the electric railway property, but not a return of 7½ per cent on the value of the property.

RAILWAY AND LIGHTING SURPLUS AFFECTS CASE

During the six years 1913-1918 the company, after deducting operating expenses, taxes and depreciation, earned an average of 7.03 per cent on the property value. On June 30, 1916, it had a surplus of $111,626, and on June 30, 1918, a depreciation reserve of $93,797 and a sinking fund reserve of $22,249. In October and November, 1918, the operating revenues under the new 6-cent fare exceeded operating expenses and taxes by only $1,129, an amount insufficient to provide for 3 per cent depreciation.

Judge Stevens believes that under such a financial record it cannot be said that an emergency existed. He adds that the setting aside of a substantial surplus is a fact of much weight in determining the existence of an emergency and that no commission has stated the rule more clearly than the Wisconsin Railroad Commission, when it said:

> Where a utility has been able to accumulate a proper surplus after meeting the charges entering into the cost of service, including a fair return on the investment, consumers may be said to have insured the utility against fluctuating conditions of a more or less temporary nature. In such cases, in order that emergency relief might reasonably be granted by the commission, there would have to be a showing that the emergency alleged was of a more serious nature and the losses incident thereto greater in relation to the total business than would be required to constitute an emergency in the case of a utility which had been operating with little or no margin above the actual cost of service.

The facts found by the commission in the La Crosse case, therefore, are considered by Judge Stevens to fail to establish an emergency which threatens "serious loss or inconvenience to the public directly, or indirectly through loss to the company involved." This is the test which the Wisconsin commission prescribed in the Manitowoc Gas Company case (19 W. R. R. 832, 835), quoted above. The 6-cent fare order is therefore vacated.

Twelve-Day Suspension in Saginaw

Peanut Politics in Fare Case Disrupts Business Life of Entire Michigan Community

Local electric railway service has been restored in Saginaw, Mich., by the Saginaw-Bay City Railway after a cessation of twelve days. To be exact the shut down lasted from midnight on March 15 to noon on March 28. The story is one in which local politics played a large part, with the railway company deciding to suspend entirely rather than submit to unreasonable demands or permit itself to be used as a buffer. It is a study in peanut politics such as has made men like Bryce doubt the efficiency of the American political system as it concerns local municipal administration.

THE STORY UNFOLDS ITSELF

Interwoven in the story is much local history. It properly has its beginning on March 12, 1918, when the railway petitioned the City Council asking for authority to increase fares to 6 cents. At that time, the cash fare in Saginaw was 5 cents, with regular tickets at six for 25 cents and school and labor tickets at eight for 25 cents. Regular tickets were good at all times, labor tickets were accepted between the hours of 5.30 a. m. and 7.30 a. m. and 5.30 p. m. and 6.30 p. m., and school tickets were accepted from children attending public schools on school days. These rates were fixed in the franchise to the company granted on Oct. 16, 1893.

On the same date that the company filed its petition with the City Council, it began a series of educational talks in the daily newspapers, setting forth in detail all facts connected with its operation and showing why the increase in fare was necessary. The City Council engaged Prof. M. E. Cooley of the University of Michigan, to appraise the railway property in Saginaw and verify the statements made by the company with reference to the costs of operation, etc. A complete report upon the situation was presented to the City Council on June 24, 1918, by Professor Cooley. This report showed conclusively that the 6-cent fare requested by the company was fully justified.

Accordingly the City Council on July 2, 1918, passed an ordinance granting the company the relief asked for and establishing a straight 6-cent fare for all passengers in place of the former rates of fare. The ordinance became effective on July 16, 1918, and, on this date, the company inaugurated the 6-cent cash fare, selling tickets at the rate of five for 30 cents merely as a matter of convenience for the public.

In the fall of 1918, a vacancy occurred in the City Council and a new commissioner was elected. This new commissioner made an effort to have the City Council revoke the 6-cent fare ordinance, but his efforts were unsuccessful. He then instigated petitions providing for the submission to the people of a measure to revoke the ordinance. The charter of the city of Saginaw provides that any ordinance shall be submitted to the people if 25 per cent of the electors petition to have the same done. The new commissioner secured the requisite number of signers to the petitions and the ordinance to repeal the 6-cent fare ordinance was submitted to the electors on March 5 and was passed, to become effective on March 16.

The company had previously stated to the City Council and also to the public through the newspapers that, if the 6-cent fare was revoked, it would be obliged to cease operation, as it was financially unable to operate at the old rates of fare. At midnight, therefore, on March 15, the cars were run into the carhouses and the operation of all city railway service in Saginaw was discontinued.

Personal Encounter in Council

The City Council then served notice on the company that, if service was not resumed, the franchise would be forfeited. Two days later, the City Council found that the franchise provided that thirty days' notice was necessary, in order to forfeit the grant and this action of the Council did not, therefore, tend to relieve the situation in any way. The company was still continuing to operate its interurban lines in and out of the city and the City Council then served notice upon the company that it would apply to the courts for an injunction to stop the interurban cars. This threat it was found impossible to carry out as the operation of the interurban cars could not be discontinued as long as the company held its franchise in the city.

Meanwhile the daily meetings of the City Council reflected much bitterness. Hostility was evinced toward the new commissioner by the other members of the City Council. One of these meetings ended in a personal encounter between the newly-elected commissioner and the city attorney. On the following morning the city attorney resigned, leaving the city without any legal advisor in the controversy.

The commercial and industrial life of the city was, of course, very seriously affected and a meeting of the directors and members of the Saginaw Board of Commerce and Saginaw Manufacturers' Association was held, in order to see if anything could be done to provide for the resumption of service. The business interests and other intelligent members of the community favored the retention of the 6-cent fare by the company, but the radical element bitterly opposed this course. The business interests, therefore, felt that a few days more without railway service would demonstrate to everyone the need of service and educate many people to the fact that they must pay a fair price for railway accommodations in case they wanted the company to continue to operate.

A proposition was then brought forth by the Saginaw Board of Commerce and the Saginaw Manufacturers' Association providing for the circulating of petitions asking the City Council to grant a temporary compromise rate of fare of 6 cents cash, with regular tickets at nine for 50 cents and school and labor tickets at five for 25 cents.

Order Again Prevails

The Saginaw County War Board, which had taken charge of the different Liberty Loan and Red Cross campaigns, was called together and started out to secure the signatures of some 15,000 or 20,000 names to these petitions. Meanwhile, several days had elapsed and the City Council had retained the services of another attorney and decided to apply to the Saginaw Circuit Court for a mandatory injunction to compel the company to resume operation at the old rates of fare. Application was made to the court for this injunction on March 28, and a temporary order was issued. Service was then resumed at noon on March 28, the old rates of fare being in effect until the case is heard and a decision has been rendered by the courts.

Columbus Withholds Relief

The railway relief ordinance introduced in the Council of Columbus, Ohio, by Councilmen A. E. Griffin on March 17, failed of approval in Council committee session on April 4 by a vote of four to two.

The two ordinances provided for six tickets for a quarter with transfers on payment of 5-cent cash fare and the Columbus Railway, Power & Light Company had agreed that if they were passed it would spend $500,000 for betterments. One of the ordinances covers the Central Market lines and the other remainder of the lines operated by the company.

In voting for the ordinance, Councilman Lamneck explained that he was against the 5-cent transfer provision, but did not wish to be a party to the wrecking of any industry. He asked why the issue was not submitted to a referendum. Councilman Weinland said that he was in favor of giving some form of relief to the railway but could not approve the terms embodied in the Griffin ordinance.

Charles L. Kurtz, president of the company, and John L. Wilson, its attorney, spoke in favor of the ordinances. President Kurtz said that unless relief was granted immediately the company would go hopelessly in debt and the service would suffer.

Pacificator Wanted for Iowa

With the end in view of bringing to a close the difficulties existing between the city of Des Moines and the Des Moines (Ia.) City Railway the Chamber of Commerce of Des Moines has petitioned the Legislature of Iowa for the appointment of a commission or other body whose duties would be to settle disputes between municipalities and their public utilities.

The petition states that a body is needed which is free from political influence to act as the judge in such cases and urges that on account of the condition now applying in Des Moines action should be taken before the adjournment of the present session of the Legislature.

The petition in part asks for a body to "fix and determine fair and reasonable rates of fare under such rules and regulations as will protect and safeguard the interests of the people and at the same time permit sufficient earnings to take care of all operating costs, reasonable depreciation and fixed charges, and insures adequate and satisfactory service unaffected by political influence."

A bill to increase the size and powers of the present Railroad Commission of Iowa was introduced early in the present session, but was fought by the municipalities. It was withdrawn several weeks ago without reaching debate before the Legislature.

Commission Regulates the Jitney

The Public Service Commission of Massachusetts has issued an order amending local rules and regulations governing the operation of jitneys in Malden, Salem, Lynn, Lawrence, Haverhill, Newburyport, Brockton, New Bedford, Nahant and Swampscott. The action was taken under the statutes which give the board the power to review, approve or amend such regulations. The order consists of 19 sections, including much detail of no general interest. The principal regulations are as follows:

> Jitneys shall be mechanically inspected before licenses are issued for their operation, and once every six months thereafter. They must be kept in a safe and sanitary condition at all times. Their operators shall be not under twenty-one years of age and shall pass an examination as to fitness for the work. Each vehicle shall carry signs telling its route, fare charged and schedule of trips.
>
> Individuals or companies operating jitneys must give bonds sufficient to meet final judgments for injury or death to persons injured in consequence of accident in which the car was involved or for damage to property. The amount of these bonds shall range from $2,500 for a vehicle seating five persons or fewer and $100 for each additional passenger seat. Carrying more than the seating capacity of a car is prohibited. Vehicles must be operated regularly for not less than twelve consecutive hours every day, and must be equipped with extra tires, with skid chains, etc. Rules are prescribed relative to the character of operators and their deportment while operating their cars.

Seattle Stops Free Riding

Several of the recommendations made by Superintendent Thomas F. Murphine for improvements in the operation of the Seattle (Wash.) Municipal Railway have met with strong opposition. The announcement that no more free rides would be furnished on the municipal railway system brought a storm of protest from the members of the police and fire departments, who state that they were assured by Mayor Ole Hanson last fall that the practice of free rides for them would be continued. In a report on traction earnings submitted in October of last year, Superintendent Murphine showed that the railway lost approximately 4,000,000 fares in 1918 on account of free rides to firemen, policemen, general city employees, etc.

The proposed new traffic ordinances recommended by Mr. Murphine are also meeting with opposition. The Chamber of Commerce Civic Bureau, in opposing the measure, states that it is too drastic and would work unnecessary hardships, and expresses the belief that a more conservative amendment may be worked out that will bring satisfactory results.

Transportation News Notes

Wants Return to Five-Cent Fare.—The Council of Ottumwa, Ia., has passed an ordinance recommending a return to a 5-cent fare. A 6-cent fare was allowed the Ottumwa Railway & Light Company on Dec. 23.

One-Man Cars Considered for Boston.—The trustees of the Boston (Mass.) Elevated Railway are making an exhaustive study of the one-man car with reference to possible use on lines of lighter traffic.

Six Cents in Lawrence.—The Public Utilities Commission of Kansas has authorized the Lawrence Railway & Light Company to charge 6 cents for a period of six months. At the end of that period the commission will decide whether the rate is to be continued.

Files Ten-Cent Fare Tariff.—The Massachusetts Northeastern Street Railway, Haverhill, Mass., has filed a tariff with the Public Service Commission proposing to increase the single cash fare from 6 cents to 10 cents, effective May 7. There will be no increase in the price of tickets.

Six Cents in Spokane.—The Public Service Commission of Washington has authorized the Spokane & Inland Empire Railroad and the Washington Water Power Company to charge a 6-cent fare. This order followed the request of the companies for an increase in fare from 5 cents to 7 cents.

Ten-Cent Fare Unprofitable.—The Tiffin, Fostoria & Eastern Electric Railway will not remove its tracks in Tiffin until the Chamber of Commerce and industrial heads hold a conference. An effort will be made to persuade the company to continue operating cars at a 10-cent fare. The company says it is losing money.

Fare Bill Passed by Assembly.—The so-called Carson-Martin fare bill has passed the New York Assembly with one vote to spare. This measure is designed to amend the Public Service Commission law by extending the jurisdiction of the Public Service Commissions over the rates, fares and charges of electric railways fixed by agreement with local authorities, notwithstanding limitations that are imposed in their franchises.

Collision on Washington Interurban.—Two interurban cars, one running from Everett and the other to Everett, met in a head-on collision at Lake Ballinger on March 24. No passengers were killed, but every one was more or less seriously injured. The impact of the two cars resulted in their being telescoped. One car was of wood, and the other of steel. The cars were the property of the Puget Sound Traction, Light & Power Company.

Ten Cents in Yakima.—After the hearing in regard to the proposed 100 per cent increase in fare on city passenger lines of the Yakima Valley Transportation Company, North Yakima, Wash., E. F. Blaine, chairman of the Public Service Commission, announced a rate of 10 cents cash fare, 8 cents for tickets and 4 cents for children would go into effect on April 1. Those fares will be in effect, unless a change appears necessary, for a period of one year thereafter.

Attractive Employment Offered in Detroit.—The Detroit (Mich.) United Railway is advertising for men available to act as motormen and conductors. The shortage is relatively as great now as it was when, owing to the scarcity of men who had joined the fighting forces or entered munition and allied plants, the way was opened for the employment of women as conductors. Since then, however, schedules have been materially increased. The opening up of other fields of endeavor has resulted in a realignment of the working forces with the result that the company has many vacancies.

I. T. S. Increases Freight Service.—The Illinois Traction System, Peoria, Ill., will add three fast freight trains to its service, these trains to operate between St. Louis and Peoria and St. Louis and Decatur. Officials of the Illinois Traction System found that increasing business necessitated greater hauling capacity and more especially rapid service. A fast freight will leave Peoria at 9 p. m. and will arrive in St. Louis at 6 a. m. and the same time will be made by a train running from St. Louis to Peoria. A fast freight will leave St. Louis at 9 p. m. and will arrive at Decatur at 7.30 o'clock the next morning.

Real Estate Owners and Railways.—P. S. Arkwright, president Georgia Railway & Power Company, Atlanta, Ga., in a recent address before the Atlanta Real Estate Board explained in detail the financial needs of his company and the reasons why home-owners should be interested in its welfare. The speech made a strong plea for the removal of the fare question from politics and for a fair settlement upon its merits. Although the Georgia Railroad Commission and the War Labor Board both emphasized the urgent need of a higher fare through a franchise modification, the City Council of Atlanta has steadily, it is said, refused to hear the company's case.

Mobile May Ask More.—The Mobile Light & Railway Company, Mobile, Ala., is advertising a meeting of the stockholders for April 28 to amend the charter of the company so as to eliminate reference to a fixed fare of 5 cents and to insert in lieu thereof the provision: "The compensation which shall be charged and received for the carriage of passengers shall be such as may from time to time be fixed by contract with the city of Mobile, or, in the absence of such contract, by the Alabama Public Service Commission. The directors of the company have already adopted a resolution declaring that such amendment is desirable. It now remains only for the stockholders to act, and the company will go before the City Commission, it is expected, asking for a fare of 6 cents or more.

Injunction in South Carolina Fare Case.—A temporary injunction has been issued restraining the Railroad Commission and the Attorney General of South Carolina from taking steps to enforce the order of the commission relative to the rates on the Charleston-Isle of Palms Traction Company's line at Mount Pleasant, Moultrieville, Atlanticville and on the Isle of Palms. In an order promulgated recently by the Railroad Commission the petition of the Charleston-Isle of Palms Traction Company for an increase in fares was refused, and the matter was turned over to the Attorney-General to force compliance with the order of the commission of Oct. 2, 1918, directing that not more than 3 cents be charged for transportation over the railway. The company considered this unreasonable and confiscatory and appealed to the courts for relief.

New York City's Belligerent Attitude.—An affidavit by Corporation Counsel William P. Burr of New York City concerning the attitude of the city toward the New York Railways, now in the hands of a receiver, and the action the city will take should the Legislature vest the Public Service Commission with authority to increase fares has just been put at the disposal of the court, the receiver, the commission, and others who may have direct interest in the matter. If the Legislature acts favorably on the pending bill providing for a fare increase it will meet with the active opposition of the city and steps will be taken to test the validity of the act in the courts. There is also a warning to the receiver with regard to the attitude of the city should it be decided by the railway interests involved to segregate the properties now leased.

Wants Increase Pending Final Determination.—The International Railway, Buffalo, N. Y., on April 4, made an application to the Public Service Commission for the Second District, for a modification of its order suspending until April 30 interurban fares and asking that it may be permitted to put the suspended fares into operation provided the company gives a bond and makes provision to refund amounts in excess of amounts finally determined as legal fares. The commission's investigation of the tariff against which complaints were filed by Lockport, Tonawanda, North Tonawanda and La Salle was interrupted on March 27 when Justice Sears' order was served upon Chairman Hill in proceedings for a writ of prohibition against the commission and the railway. This order has since been modified. The railway claims that it has operated its interurban division at a net loss of $116,000 a year and that the suspension order prevents the company from receiving increased fares of approximately $23,000 a month.

Personal Mention

New P. R. T. Operator

G. A. Richardson Is Made Superintendent of Transportation Following Call to Philadelphia on Special Assignment

G. A. Richardson, general superintendent of the Puget Sound Traction, Light & Power Company, Seattle, Wash., as announced briefly in the ELECTRIC RAILWAY JOURNAL for April 5, has accepted the position of superintendent of transportation of the Philadelphia (Pa.) Rapid Transit Company. It is expected that he will assume the duties of his new office on April 16.

Mr. Richardson has been unusually successful in his handling of transportation matters on the Pacific Coast and on other properties with which he has been connected with the result that his advice and help have been solicited in connection with the solution of problems in a number of cases arising in other cities. In some of these instances he has acted merely as consultant, while in others has fallen to him the task of supervising the whole undertaking.

G. A. RICHARDSON

More than a year ago the Emergency Fleet Corporation summoned Mr. Richardson to Philadelphia to help solve the transportation problem of the Hog Island shipyard. In September, 1917, Hog Island was an uninhabited marsh on the lower Delaware with no transportation facilities, and was in this condition when it was selected as the site for the world's largest shipyard. The system of transportation devised combined steam, electric and ferry service. Five months after Mr. Richardson's visit Hog Island had 80 miles of tracks and 18 miles of roadway within the confines of the yard.

Long before his retention in connection with this work, however, Mr. Richardson's unusual talent had received recognition outside the organization with which he was permanently connected. Thus he was asked to assist in connection with the affairs of the Rochester (N. Y.) surface lines, and in 1914 made an extensive investigation and report on the transportation facilities of the Chicago Elevated Railways. When F. P. Royce was made general manager of the Brooklyn (N. Y.) Rapid Transit Company, following the receivership, he summoned Mr. Richardson to New York to investigate and report as to the facilities of that company. He was unable to investigate anything but the elevated and subways, however, owing to other demands upon his time, but he gave more than a month to that work.

Mr. Richardson was born in Boston, Mass., in 1882. He was educated in the public schools of the cities of Newton and Boston, Mass., and was graduated from the Mechanic Arts High School in 1900. He returned there and took a post-graduate course in machine shop work and mechanical drafting until February, 1901, when he entered the employ of the Boston (Mass.) Elevated Railway at the Sullivan Square shops, working on the installation of electric equipment in the new elevated cars up to and shortly after the time the elevated division began operation. He was later transferred to the train service as a motorman, at the same time giving his spare time to working on car repairs with the mechanical department on surface cars at the North Cambridge carhouse, where he was located. During 1902 and 1903 he worked in the power stations of the company in various capacities. During the summer of 1903 he was transferred into the electrical engineering department and remained there until September, 1904, when he accepted a position with the Boston & Northern Street Railway as inspector of car repairs in charge of the Lynn Division. In May, 1905, he went to work for Stone & Webster as assistant superintendent of the Houghton County Street Railway, Houghton, Mich. On Nov. 1, 1906, he was promoted to the position of superintendent of that company and remained at Houghton until Jan. 1, 1910, when he was transferred to Seattle as assistant superintendent of transportation. On Dec. 1, 1910, he was promoted to superintendent.

Seattle Operating Heads Announced

Operating heads of the municipal street railway at Seattle, Wash., have been announced as follows:

Superintendent—Thomas F. Murphine.

Assistant superintendent — Edward D. O'Brien.

Superintendent of transportation—D. W. Henderson, formerly with the Puget Sound Traction, Light & Power Company.

Assistant superintendent of transportation—R. E. Furse.

Construction and maintenance—chief engineer—J. J. Wettrick.

Mechanical department—superintendent of rolling stock and shops—A. D. Campbell, formerly with the Puget Sound Traction, Light & Power Company.

Assistant superintendent of rolling stock and shops—A. Flanigan.

General carhouse foreman—H. J. Stith.

Georgetown general shop foreman—Albert Pohl.

Accounting department—Auditor—Allan B. Hiatt.

Clerical department—head clerk—Mrs. W. J. Biggar.

Thomas F. Murphine, superintendent of public utilities of the city of Seattle, Wash., became the active head of that city's extended municipal electric railway system, with a trackage of 224 miles, on April 1, when the city completed the purchase of the railway lines of the Puget Sound Traction, Light & Power Company. Mr. Murphine was previously superintendent of the 18-mile municipal railway line which the city had installed. He thus becomes the principal operating official of perhaps the largest city electric railway system of the Pacific Coast and by far the largest municipal electric railway property in the United States. Mr. Murphine was born in Hillsboro, Ohio, on July 7, 1878, and settled in Seattle in April, 1883. He was graduated from the University of Washington at Seattle, with the degree B. A. in 1898, and from the School of Law at the University of Washington in 1907. He was a member of the 1913 and 1915 sessions of the Washington State Legislature and was a leader of the Progressive and municipal ownership forces in these two sessions. During the 1917 session of the Legislature he was Assistant Attorney General, assigned to the bill drafting department. He continued in this capacity until April 1, 1918, when he was appointed superintendent of public utilities at Seattle, by the present Mayor, Ole Hanson.

T. F. MURPHINE

Col. Joseph Alexander, former assistant to John J. Stanley, president of the Cleveland (Ohio) Railway, and identified with the quartermaster's department at Washington during the war, expects to be mustered out of service soon and resume his former duties with the railway.

George A. King, Newark, N. J., master mechanic of the Central division, has been made division master mechanic of the Essex division of the Public Service Railway, Newark, N. J., to take the place of C. F. Bachman. John Finton, of the Newark shops, will be the successor to King on the Central division.

J. S. Pevear of the Birmingham Railway, Light & Power Company, Birmingham, Ala., will be general manager of the operating department of the American Cities Company. Headquarters of the operating department will be opened at once in Birmingham by Mr. Pevear. The American Cities Company operates public utilities in Birmingham, New Orleans, Memphis, Little Rock, and other cities. The operating headquarters have heretofore been in New Orleans.

Harry H. Hansen has been appointed general superintendent of the Middlesex & Boston Street Railway, Newtonville, Mass. Mr. Hansen's work has been previously identified with the Boston (Mass.) Elevated Railway transportation department service. He was assistant to the superintendent of rapid transit lines at the time of his departure from the Boston company, and had worked his way upward from a conductor's berth through the superintendency of various divisions on the surface system before becoming associated with the rapid transit division of the service.

David W. Henderson, for seven years head of the transportation department of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has been made superintendent of transportation of Seattle's municipal electric railway system. Next to the general superintendency, which position Mr. Murphine, the city superintendent of public utilities, will fill, the post is the most important connected with the operation of the enlarged city railway system. Mr. Henderson has been with the Puget Sound Traction, Light & Power Company, in various capacities, for seventeen years. He was born in Dumfermline, Scotland, in 1873, and came to America with his parents in 1881. He lived at Randolph, Wis., until he went to Seattle in April, 1902. His connection with the traction company began that month, when he started work as motorman. He was appointed inspector in 1908 and in May, 1912, he was promoted to division superintendent in charge of the north end district, including Ballard and Queen Anne hill. On Nov. 1, 1912, Mr. Henderson was made superintendent of transportation, which position he has held continuously since that time. Greater responsibility attaches to the place of superintendent of transportation than to any other position in the electric railway department. Upon the incumbent of this office will largely depend the success or failure of the municipal lines.

Col. Peter Junkersfeld, who received his discharge from the Army on March 4, resigned on March 31 as assistant to the vice-president of the Commonwealth Edison Company, Chicago, Ill., in charge of contract, operating, electrical and construction departments, to become engineering manager of Stone & Webster, Boston, Mass. Colonel Junkersfeld was graduated in 1895 from the School of Electrical Engineering of the University of Illinois, which in 1907 conferred upon him the post-graduate profession al degree of electrical engineer. He has been connected with the Commonwealth Edison Company, Chicago, and its predecessors for more than twenty-three years. He served the company, at first as assistant to the mechanical engineer, in charge of the drafting department. From 1906 to 1909 he was electrical engineer and from 1909 to 1917 he was for a few years assistant to the second vice-president and then to the vice-president, who is in charge of operating, contract, construction and electrical departments. In addition to this Mr. Junkersfeld was for a number of years chairman of a monthly engineering construction and operating conference of various public utilities operating in several states. Mr. Junkersfeld was one of five reserve majors called into the service in June, 1917. He was assigned to the office of the Cantonment Division. A few months later this developed into the Construction Division of the Army, which handled construction work of almost every conceivable character in the United States, amounting to approximately $800,000,000. Nine months after entering the service Mr. Junkersfeld attained the rank of colonel. During the time Mr. Junkersfeld was connected with the Commonwealth Edison Company, he organized and managed several manufacturing and other concerns. He has been active in association work in both the electric light and the railway fields and has contributed many valuable papers and reports to the literature of the electrical industry.

PETER JUNKERSFELD

James B. Dugan, Kenton, chief inspector of the State Public Utilities Commission of Ohio, will give up his official position on April 15 to become general manager of the Lima district of the Ohio Electric Company, with headquarters at Lima. Mr. Dugan has been in the inspection department of the commission since its creation more than a decade ago.

Philip F. Maguire, formerly assistant to the superintendent of maintenance of the Public Service Railway, Newark, N. J., has been appointed as superintendent of the Central Division of the company to succeed John J. Gettings, who died recently. Mr. Maguire has been holding the position of superintendent temporarily. Mr. Maguire entered the employ of the railway in 1896, as a conductor on the horse cars which were operated at that time in Plainfield. He served in that capacity for several years and was later transferred to Elizabeth, N. J.

F. A. Bailey has been appointed assistant general superintendent of the Consolidated Railway & Lighting Company, Charleston, S. C. Mr. Bailey was formerly superintendent of the Bergen and Southern Divisions of the Public Service Railway, Newark, N. J., for twelve years. He was educated at the Rushford, (N. Y.) High School and the Buffalo State Normal School and followed teaching for a time. He then laid the foundation of his future work by filling various positions in the operating department of the International Railway, Buffalo. In 1902-1905 Mr. Bailey gained experience in high-speed interurban railroading with the Columbus, Buckeye Lake & Newark Traction Company, Newark, Ohio, and the Columbus. London & Springfield Railway, Columbus, Ohio. In 1906 he was appointed superintendent of the Central Market Street Railway and the Columbus, Grove City & Southwestern Railway, Columbus, Ohio, leaving this position in May, 1907, to become connected with the Public Service Railway.

A. Jay Boardman, who soon after the outbreak of the war in 1917 resigned his position as division superintendent of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., to accept a commission as captain in the Ordnance Department, U. S. A., has just returned from France. At the time of the signing of the armistice, Captain Boardman was acting as artillery armament officer in charge of all artillery repairs of the Second United States Army at Toul, France. It was his fortune to be one of the few American army officers to be shown all the secret details of the famous 75-mm. and 155-mm. (6-in.) G. P. F. guns. Later he did considerable work on these and the other French artillery material with the fourth, first and third French armies and the First United States army at Chateau Thierry and during the St. Mihiel offensive. After a year's service overseas he received his discharge in March.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES   BUSINESS ANNOUNCEMENTS

Car Window Glass Shows Decline

Prices Back to Those of Six Months Ago—Domestic Demand Light, Export Good

For sometime past manufacturers of window glass have not been holding closely to quoted discounts, although prices and discounts have not been changed openly. It is therefore possible to quote other discounts which more nearly represent current prices. Car window glass, single strength, first three brackets, both A and B quality is now 80 per cent against the former 77 per cent, while double strength, all sizes, A quality is 81 per cent compared to the former 79 per cent. These prices are the ones which were discontinued last September.

The demand for glass from the building trade has not been very satisfactory so far. There is much promise, however, of a greatly improved demand in the near future, and the restricted production should prevent any great decline in prices. The export demand is good and shows a constant increase.

Stability of Rail Market Shaken

Refusal of Railroad Administration to Accept Prices Retards Work of Industrial Board

Following the disagreement last week of the Railroad Administration and the Industrial Board of the Department of Commerce over the price at which rails should be bought and sold, there has been an uneasy feeling in the steel market as to the immediate future of the rail market.

The Industrial Board was created by authority of the President to confer with producers of steel and other commodities and assist them in coming to some conclusion as to a fair price for their products. Regarding the steel industry, prices were considered too high to attract any considerable amount of buying. The rail market, the biggest outlet of any market for steel, was at a low ebb, and means were sought to stimulate activity in this important commodity.

If the Railroad Administration received a favorable price on rails it would undoubtedly buy. The question arises as to whether or not the Industrial Board received any intimation as to what price the Administration would consider favorable. If such intimation were received the action taken on it was such as to leave considerable discrepancy between it and the final price.

The industry sought a steel price which would stabilize the market. The government was to lead the way through its purchases, which should react upon the public to restore their confidence and assist in this stabilizing process. But co-ordination between government departments was lacking and the result is an unsettled market which some believe to be in worse condition than before, because of shaken confidence.

The prices of Bessemer T rails, open hearth T rails, high rails and girder rails were each reduced approximately $10. The Railroad Administration has refused these prices and the electric as well as the steam roads feel the effects of this action.

Steady Movement of Maintenance Equipment

Repairs to Old Apparatus and Replacements Continue—Equipment Bonds Provide Necessary Capital

Maintenance is providing a steady market for equipment and materials of all kinds; especially is there considerable activity in parts. Railway motors of an old vintage which would normally be scrapped for new are undergoing considerable repairs. The old equipment is not so easy on the coal pile as the new would be but the lack of ready money prohibits new purchases. The reboring and rebabbitting of bearings and the replacement of field and armature coils find added activity. Obsolete brushholders must be again produced to permit motors twenty years old to continue their service.

The repair of old equipment is not to be deprecated except in that its efficiency may be much below that of present day equipment. But necessity is again doing the next best thing when capital is so lacking.

Many traction companies are financing their improvements through the flotation of equipment bonds. The most recent to come to notice is for a company in New Jersey where these bonds have been authorized to provide for shop equipment to keep the properties in good running condition. This company, however, enjoys an increased fare.

Trolley wire is being bought in small lots for repair and replacement work. Weatherproof wire has a similar call, and so has signal wire.

Galvanized stranded wire and telephone wire have both declined in price about 5 per cent within the last three weeks. One line of friction tape declined about 35 per cent and another about 15 per cent, bringing the price of these two brands together.

Effects of Artificial Standard of Price

Abridging of Economic Laws by Industrial Board Leads Sooner or Later to Instability in Business

When the new and lower iron and steel prices were announced a few weeks ago, it seemed as though the signal had been given for industry to proceed. In fact, that was what was expected when the Industrial Board was asked to lend its aid to stabilize the market by establishing a fair price. Numerous manufactured products made largely of iron and steel were reduced in price almost immediately. On other products producers were figuring costs preliminary to lowering prices during the opening days of April. Orders to go ahead on a number of building projects were given, and industry generally became quickened.

Then the railroad administration and other government and buying departments came forward with the statement that they had never promised to be bound by the board's prices. In fact, the railroad administration does not purpose at the present time to pay the proposed price on rails.

As a result industry is again hesitant. The lower prices still prevail, but buyers are waiting to see if this fundamental raw-materials market is to be free and open or tied up by agreed prices to be maintained until 1920.

Each time there has been an attempt on the part of the government to abridge the laws of economics and establish false and arbitrary standards of price, business has found itself in a hesitant mood. During the war there may have been justification for such action to prevent profiteering.

Just now, however, when industry was beginning to find itself, when the retail trade was once more buying, when building was slowly opening up, when spring was starting the seasonal tide of business—in other words, after the worst is past—it is not so easy to understand why there should be this interference.

Such action might bring about confidence on the part of business in the immediate future, but what of the fall and winter months?

There are many who are calling for a free and open market in iron and steel. Such people believe in the fundamental laws of economics. They believe that industry will be strengthened if it cures its own ills. It does seem now that business generally will be on a better basis with less chance for future hesitation if such artificial standards are not utilized.

Track Specialties Lower

No General Prices Given, However, Due to Varying Characteristics of Specialization

Prices of practically all track specialties such as cross-overs, switches, frogs, plates, etc., have recently decreased in price. No general amount of decline can be given, however, because each item is as a rule made according to special characteristics. Pages of data are required to arrive at a price for most pieces of this equipment on account of the varying characteristics required by the different railways. This takes account of the conditions of traffic, the kind of service to be rendered, spacings, curves and the varying amount of manganese that may be required to fulfill certain varying conditions.

No assurance has been given by one prominent manufacturer that there will be any further drop in track specialty prices due to the refusal of the Railroad Administration to accept the steel prices which they consider now too high. For the traction companies the question of finances is uppermost. In a recent interview between the representative of a track specialties producer and a New England electric railway official, the representative asked of what service he might be. The answer was to find a means of financing the construction work necessary for that property.

Gear Manufacturers to Meet In Cleveland

President F. W. Sinram of the American Gear Manufacturers' Association announces that their annual convention will be held at the Hotel Statler, Cleveland, Ohio, April 14, 15 and 16. The organization includes in its membership representative companies engaged in making gears in the United States and Canada and promises to be of unusual interest to the manufacturing world. For some years past the American Gear Manufacturers' Association has been striving earnestly to affect an organization that would develop definite means for standardizing their products. The coming convention will center its attention on this problem.

Papers will be presented as follows: "Gear Steels," by Dr. Parker of the Carpenter Steel Company; "Proper Sizes and Materials for Gears"; "Worms and Worm Wheels," by a representative of the Timken-Detroit Axle Company.

Officers of the association are: President, F. W. Sinram, of the Van Dorn & Dutton Company, Cleveland, Ohio; vice-president, H. E. Eberhardt, of the Newark Gear Cutting Machine Company, Newark, N. J.; secretary, Frank D. Hamlin, of the Earle Gear & Machine Company, Philadelphia, Pa.; treasurer, Frank Horsburgh, of the Horsburgh and Scott Company, Cleveland, Ohio.

Rolling Stock

Middlesex & Boston Street Railway, Boston, Mass., expects to introduce safety cars of the latest type early this month. It is reported the company has purchased six of these cars.

Recent Incorporations

Miami Beach Electric Company, Miami, Fla.—Application has been made by the Miami Beach Electric Company for a charter to construct an electric line at Miami Beach. Capital stock, $250,000. Incorporators: Carl G. Fisher, C. R. Cummins, J. H. McDuffin, Arthur G. Newby and George R. Kline.

Franchises

Fort Worth, Tex.—A franchise has been granted by the County Commissioners' Court of Tarrant County to E. P. Turner and associates of Dallas to construct an electric interurban line from Fort Worth, Texas, to Mineral Wells. A franchise for the line in Palo Pinto county has also been granted by the County Commissioners of that county. The terms of the franchise set forth that the construction of the interurban line must begin within twelve months and the line completed within a reasonable length of time.

Track and Roadway

Pacific Electric Railway, Los Angeles, Cal.—An extension will be built by the Pacific Electric Railway to its La Rambla car line through the Peck tract.

Daytona, Fla.—L. Armstrong and associates contemplate the construction of a belt line street railway to connect Daytona Beach and Seabreeze.

Berkshire Street Railway, Pittsfield, Mass.—Work will soon be begun by the Berkshire Street Railway on the reconstruction of its tracks on Southworth Street, Williamstown.

Detroit (Mich.) United Railway.—It is reported that the Detroit United Railway has under consideration the construction of a line from Flint to Davison and Potter's Lake and extensions to Elba, Lapeer and Imlay.

Granite City Railway, St. Cloud, Minn.—This company expects to reconstruct 1 mile of track with 60-lb. T-rail.

St. Croix Valley Electric Railway, St. Paul, Minn.—Plans have been submitted by Robert McKnight, engineer, to business men and bankers in St. Paul for the construction of an electric line from Prescott to St. Croix Falls.

Kansas City, Mo.—The city has awarded a contract to A. S. Hecker Company, Cleveland, Ohio, for the construction of the Twenty-third Street Viaduct. The cost of the construction will be shared by five railroads. The contract price for building the viaduct and paving with wood block was $731,000, or paving with brick or bitulithic, $716,000.

Kansas City (Mo.) Railway.—An extension of the Independence cross-town line of the Kansas City Railways from the present northern terminus at Liberty and Moore Streets to Sugar Creek, about 2½ miles, is expected to be built this summer. P. J. Kealy, president of the Kansas City Railways, has accepted a proposition of the business men of Independence, headed by Mayor Christian Ott and A. J. Bundschu, to loan the company $50,000 for ten years at 6 per cent interest, the money to be used in building the new line. The new line will be called the Independence & Sugar Creek Railway, but will be operated by the Kansas City Railways.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has received bids for the erection of the elevated portion of the Pelham Bay Park branch of the Lexington Avenue subway, extending from a point near the Bronx River east through Westchester Village to the southerly end of Pelham Bay Park. This line was begun in 1916, but war conditions and the failure of the original contractor to carry out his agreement has delayed the work and required the letting of a new contract. A part of the work is already done. The lowest bidder for the erection of the steel work was the firm of Terry & Tench, New York, whose offer was $586,700.

Cumberland Railway & Power Company, Fayetteville, N. C.—The Cumberland Railway & Power Company has been organized by Herbert L. Jones of Richmond, Va., and associates, with a capital stock of $200,000, to take over and complete the old street railway system at Fayetteville, owned by the municipality, extending it to Camp Bragg and also adding to it 3 miles of line within the city. The company has authorized an issue of $500,000 of bonds, with the Bankers Trust Company of Norfolk as trustee. Construction work will be begun at once and it is expected the line will be placed in operation within six months.

Lake Shore Electric Railway, Cleveland, Ohio.—The rumored removal of the Lake Shore Electric Railway tracks from the Maumee Pike, between Fremont and Genoa, was revived when announcement was made that the company contemplates purchasing right-of-way paralleling the New York Central Railway. It would give a shorter route to Toledo. If the new road is constructed, Hessville, Gibsonburg and Woodville would be shut off from connection by Interurban with Fremont, while the new road would give connections with Lindsey and Elmore.

Philadelphia, Pa.—Bids were recently received by the Department of City Transit for the construction of 68 column foundations of concrete in Front Street from above Arch Street to Callowhill Street, for the Frankford elevated line. The lowest bidder was the Brown-King Construction Company, Philadelphia, Pa., at $32,058. Sealed proposals will be received by William S. Twining, director of the Department of City Transit, until April 22 for furnishing and erecting the steel superstructure for a continuation of the Frankford Elevated Railway in Front Street, from near Arch Street to Callowhill Street.

Power Houses, Shops and Buildings

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Arrangements are being made by the Terre Haute, Indianapolis & Eastern Traction Company for improving the electric lighting service in Brazil and vicinity. The company will erect a transmission line from the Water Street Station in Terre Haute to a point where the Clinton and Brazil high-tension lines diverge. It is also proposed to extend the high-tension line south of Terre Haute into the coal fields of Sullivan County and back through Clay City to Brazil.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—Plans are being contemplated by the Elmira Water, Light & Railroad Company for the enlargement of its power plant on East Water Street.

Richmond Light & Railroad Company, New York, N. Y.—The Richmond Light & Railroad Company has recently completed the construction of a new 6600-volt transmission line from its power plant at Livingston to Tottenville, and arrangements are now under way for the installation of transformers and auxiliary equipment. At the present time the company is installing a new booster station in the Arthur Kill Road.

Northern Ohio Traction & Light Company, Akron, Ohio.—The construction of a new substation is contemplated by the Northern Ohio Traction & Light Company, to cost about $15,000.

Lake Shore Electric Railway, Cleveland, Ohio.—The electric plant and substation of the Lake Shore Electric Railway at Berlin Heights was recently destroyed by fire, causing a loss of about $15,000.

Jackson Railway & Light Company, Jackson, Tenn.—A report from the Jackson Railway & Light Company states that the company has placed contracts for the construction of a new carhouse and repair shop.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—Plans are being made by the Puget Sound Traction, Light & Power Company for the construction of a large warehouse in which will be stored machinery and equipment owned by the company and not included in the purchase contract with the city of Seattle when the car lines are taken over. The structure will be 220 x 56 ft., costing about $15,000.

Trade Notes

Aspromet Company, Pittsburgh, Pa., has changed its name to the H. H. Robertson Company.

H. G. Lewis, sales manager of the Electric Service Supplies Company, Philadelphia, has been elected vice-president of that company. He will continue his work as vice-president and sales manager.

Charles F. Ames & Company, New York City, have been appointed to act as the New York sales department of the Platt Iron Works of Dayton, Ohio, manufacturers of pumping and power plant equipment.

The Terry Steam Turbine Company, Hartford, Conn., announces that its reduction gears are again on the market. They were not obtainable during the last year owing to the concentration of the company almost entirely on turbines for destroyers.

Okonite Company on April 1 moved its entire executive staff from 501 Fifth Avenue, New York City to the company's plant at Passaic, N. J., where the company's main office will hereafter be located. A sales office will be retained at 501 Fifth Avenue, New York.

B. A. Wagner, manager of the Electric Agencies Company, Inc., has secured the Pacific Coast agencies for the Collyer Insulated Wire Company, manufacturer of rubber-covered and weatherproof wire, and the Tubular Woven Fabric Company, manufacturer of "Duraduct."

George K. Heyer is the new assistant telephone sales manager of the Western Electric Company, having been advanced from the position of railway sales engineer. He has been with the company in New York since 1902 and will remain there with headquarters at 195 Broadway.

A. P. Green Fire Brick Company of Mexico, Mo., has opened an Eastern district sales office in New York City at 30 Church Street. Howard C. Thayer, formerly field mechanical engineer for the J. G. White Engineering Corporation at United States Nitrate Plant No. 2, is in charge.

Lieut.-Com. H. J. Elson, United States Naval Reserve, has been released to inactive status and has resumed his civilian work as secretary and treasurer of the Walter A. Zelnicker Supply Company, St. Louis, where he is in charge of internal management and manufacturing operations.

A. L. Humphrey has been elected president of the Westinghouse Air Brake Company to succeed John F. Miller, who has resigned some of his active duties. Under Mr. Humphrey's management the business of the company has increased more rapidly and its interests have expanded and developed more than ever before. Mr. Humphrey's greatest triumph as a manufacturer came through the war when he succeeded, in the completion of contracts for war material for this country and the Allies, in establishing enviable records. The following board of directors was elected: B. V. Becker, James D. Callery, E. M. Herr, A. L. Humphrey, John F. Miller, John R. McCune, John R. McGinley, Charles McKnight, M. S. Rosenwald, W. D. Uptegraff and H. H. Westinghouse.

New Advertising Literature

Penn Electrical & Manufacturing Company, Irwin, Pa.: Bulletin No. S-10 on safety panels and cabinets.

Bates Expanded Steel Truss Company, Chicago, Ill.: A mailing folder about its steel poles for various services.

Locomotive Superheater Company, New York City: Bulletin No. T-1, on superheaters for stationary power plants.

Ballman-Whitten Manufacturing Company, St. Louis, Mo.: Folder showing and describing flush and surface type direct-current ammeters.

A. F. Daum, Pittsburgh, Pa.: A folder about the refillable cartridge fuses as well as a leaflet about the Daum refillable fuse plug.

Barrett Company, New York City: Booklet entitled "Long Life for Wood at Low Cost," which tells when, where and how to use "Carbosota" creosote oil.

General Electric Company, Schenectady, N. Y.: An index dated April 1, 1919, to its descriptive bulletins and sheets and one to its supply-part bulletins.

Babcock & Wilcox Company, New York City: "Principles of Combustion in the Steam-Boiler Furnace," outlines the principles involved in the study of what happens in the combustion chamber of furnaces.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.: catalog, made up of 1264 pages of description pertaining to all electrical products of the company. There is a cross index, index to style numbers, and table of "Approximate Cost Multipliers," which enables one to figure the approximate cost of all supplies listed. There is also a vast amount of information of a technical and engineering nature. It is planned to issue this catalog annually.

American Steam Conveyor Corporation, 110 West Fortieth Street, New York City, and 326 West Madison Street, Chicago: A 160-page book entitled "Modern Methods of Ash Disposal." This is a presentation of methods of moving ashes, soot and combustion waste from boiler room to disposal station. Advantages and drawbacks of the different systems are very completely discussed in the front portion of the book, while the rest of it is devoted to photographs and information about various "American" fittings and installations of these devices. Interesting data on the coals of the United States and other tables are included in this publication.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 53 New York, Saturday, April 19, 1919 *Number* 16

Where Is the Economic Limit in Reclamation Work?

MUCH credit is due the master mechanics and engineers who have kept the electric railways going with little of new materials during the past few years. Repairing has become a real art with them, and the scrap heap has yielded many a repair part that in palmier days would have been sold to the junk man. The possibilities of this reclamation work are so great that there is danger of overlooking the economical limit to which it can be carried. Such a limit obviously exists, although it has probably not yet been approached in most cases. A few months ago it would have been useless to raise this point, for the question would have been settled at once by reference to the impossibility of obtaining any money with which to buy replacement parts or new equipment. As business returns to a more stable basis this condition should not prevail, certainly not to the same extent as during war times.

If the "powers that be," including the public utility commissions, get the notion that railways can be maintained indefinitely by reclamation work they will not feel the urgency of providing new money for betterments. The engineers should, of course, make the most of their ability to repair track, rolling stock, motors, etc., but they should analyze their costs carefully so as to be able to demonstrate the unwisdom of carrying a good principle too far. Good engineering consists in making the dollar go as far as possible in producing results in technical lines. The engineers have performed wonders recently. They cannot be expected to do the impossible.

Mr. Ford's New Car May Be a Wonder, But——

HENRY FORD'S success with the automobile that bears his name compels one to grant attention to anything new he may project, even though we may be most skeptical of his ability to produce a gas-driven car which will compete with a modern electric car in weight per seated passenger or in all-day operating cost.

This idea, of course, is not new. Indeed, the subject of displacement of the electric motor by the gasoline engine has been under vigorous discussion for five years, especially by those who are so close to the marvels of our most-recently developed prime-mover that they lose their sense of perspective. Reasons favoring the gasoline drive are, briefly, a very low first cost and a fairly low weight when compared to electric car equipment. Reasons against gasoline are a prohibitively high cost of energy and, to some extent, difficulty and expense in maintenance.

Neglecting the two minor reasons pro and con, one is impressed that there may be two possible fields for the gasoline-driven street car; on steam railroad feeder lines of light traffic and—more important—on city surface systems for use only as an adjunct to handle peak loads. The curse of a short rush hour is one of the worst burdens of the industry and almost anything would be acceptable if it would reduce fixed charges on equipment used only for two hours of the day. During the peak load, also, electric power is expensive, and this goes to offset the high cost of gasoline fuel.

During the off-peak hours, however, the exact reverse is the case. Gasoline for the average day's work of a surface car, costs about four times as much as electric power, under the most favorable circumstances. A 70-ton car making three stops per mile should run 4 miles per gallon of gas, which would make the fuel cost at least 4 cents per car-mile. The same car, electrically operated, would cost about 1 cent for power, and hence the substitution of gasoline-driven units of equivalent size would involve an increase of the order of 3 cents per car-mile. Can any surface railway operator imagine benefits from the gasoline drive sufficient to offset an increase of 3 cents per car-mile in the cost of all-day operation, and also to carry the overhead charges of the equipment discarded? In consequence we don't expect a revolution in the industry, though we acknowledge we are glad to find that Mr. Ford recognizes that city passenger traffic must be carried on rails and not on rubber tires. If he can come through with a substantial, thirty-seat car at about $2,000, it might help to solve our rush-hour problem.

For the solution of that problem and others even worse we are sure that Mr. Ford can rely upon the co-operation of the progressive safety car equipment manufacturers and operators who have done so much in recent years to accomplish electrically what Mr. Ford believes can be done with an internal combustion engine. Let Mr. Ford see what he can do provided he pays the bills for the experiment.

Securing Both Unity and Diversity in Engineering Association Work

THERE are three aspects of the work of the American Electric Railway Engineering Association which demand attention, both during the year and at the annual convention. There are, first, the details of each subdivision of the engineering field; second, the more general engineering problems in which all subdivisions are more or less concerned, and, third, the relation of the engineering departments to the whole transportation business. Engineers, like everybody else, are apt to "keep their noses too close to the grindstone," and have in many cases not proved as widely useful to their employers as they might. One function of the Engineering Association is to prevent this, to give its members a wide outlook. Obviously, if engineers are to rise to managerial positions, for which their training well fits them, it will be necessary for them constantly to be applying in their own departments and outside, where possible, the principles which make for good service to the public. Here is one place, among others, where the association fits in by suggesting how best this can be done.

Much of the committee activity of a technical society must be devoted to routine work—monotonous and boring to anyone but the specialist. Who but he cares whether a ⅝-in. or a ¾-in. stud is used in a suspension insulator (except as this affects maintenance costs), or whether two or three strands more or less are used in a copper or steel cable? These things are vastly important but they do not conduce to enthusiasm and inspiration. In the case of the Engineering Association they form only the groundwork of its activities. Much more interesting are such matters as automatic substations, wood preservation, use of hand and power tools in track construction, how the welding processes are aiding in reducing maintenance costs, etc. It is extremely important that engineers be wide awake as to developments like these because the management naturally looks to them at least to recommend every possible improvement in the service. In many cases recently the technical men have pointed out conservation possibilities that have greatly helped in keeping the wheels turning when these same wheels showed a marked tendency to stop.

At the coming convention of the American Association the engineers will have before them a great opportunity for holding a meeting unprecedented for interest and helpfulness. This can be brought about by choosing a few live, very live, topics for discussion, and getting men especially well qualified to discuss them. Let's keep detail in the background, arranging if necessary for the specialists to get together in groups to go over matters which affect only their respective selves.

Returning Soldiers and Sailors Should Make Good Railroad Men

RAILWAY companies should not overlook the opportunity now offered of recruiting their forces from the returning soldiers and sailors. Figures of the United States Employment Service show that of those mustered out about 35 per cent are without immediate prospect of positions, yet the training which they have received has been such as to fit them excellently for the semi-military duties and discipline of electric railway employment. They are used to being on time and carrying out instructions, and to be prompt in emergencies, particular in their personal appearance and deportment and conscientious in their execution of work assigned to them. Moreover, each man, before entering government service, had to pass a rigorous physical and mental test. All of these qualifications apply equally well to military and to railway employment. Even for many of the disabled men, railway service affords many openings, as for street inspection, in the shops and substations and sometimes, perhaps, on the platform. The Federal Board of Vocational Training looks out particularly for the disabled men and can explain what provision the government makes for them, while the general subject of securing employment for the returning soldiers and sailors is in charge of the United States Employment Service. Each of these organizations has branch offices in the principal cities in this country. In addition, many of the returning divisions have appointed committees to help the men from their own division and locality to get back into industry. As a matter of patriotic duty as well as of self-interest the subject should appeal to electric railway companies.

Rising Costs in Conducting Transportation Offset by Real Engineering

WE HAVE more than once referred to the necessity for railway management to see to it that their engineering staffs are adequately paid. The columns of this paper are almost constantly reporting ways and means devised by engineers, which have resulted in exceptionally large savings in maintenance costs. Such accomplishments are not and cannot be wholly the result of extraordinary talent so much as they are the result of a combination of ability and long training in what is now a rather highly specialized field. It is no longer true that almost any man can successfully maintain the equipment, power houses, overhead work and track of an electric railway. Neither the ability nor the length of service for the training so requisite can be had unless the salaries and inducements for advancement are sufficient to secure and hold competent men.

We may be asked why we are referring to this subject at a time when wages in general are soaring. It is because engineering salaries in the electric railway field have not kept pace with wages in other departments of railway service or in other branches of engineering, and because we feel that there is need for careful consideration of the matter by the managements if really competent engineers are to be retained.

The recent presentation of a proposed new salary scale for railway engineers to the government railroad administration by the American Association of Engineers plainly shows that something must be done to provide engineers with salaries at least commensurate with the wages received by mere brawn, if we are not to have wholesale desertions from the railroad engineering ranks in favor of jobs in more lucrative fields. The railway engineer may well ask "Why continue as an engineer when the freight conductor gets the fatter pay envelope?" Mere professional pride will not long offset the high cost of everything which affects the engineer just as much as the freight conductor.

While discussing this matter recently we were asked point blank to explain how the engineers could stop the wage increase for platform men. The answer was ready. We stated that while the engineer could not stop wage increases he could, in many cases, if allowed to have more say or if some of his schemes for savings were earnestly tried, be able to save enough in reduced expense to offset the wage increase. We have in mind a case where a maintenance engineer was permitted to try out one of his theories and the net result was that along one line of effort alone, he effected a saving in maintenance expense which amounted to two-thirds of a $300,000 wage increase for platform men. We also recall the article in our March 22 issue by W. R. Dunham on rail conservation which gave concrete proof of the fact that the engineers are contributing their full share to keep the industry off the rocks.

The time is ripe for a fuller appreciation of what the engineers in charge of the various phases of electric railway maintenance are doing, and a part of that appreciation should be given through the medium of more adequate salaries.

Reasons for Thinking Prices Will Remain High

THERE are many reasons for believing there is to be no material decrease in the prices of material and labor at an early date and, indeed, that we are on a definite higher-price level. We have already quoted the opinion in favor of this view of Prof. Irving Fisher, who pointed out, in his address at the White House conference on March 3, that our gold reserve is now three times as large as in 1914 and that our credit instruments, in the form of demand deposits and notes, have increased about twofold during the same period. In addition, it is urged that labor will not be satisfied with a reduction in wages, and as the cost of labor is the greatest factor in the cost of all material produced, there is no reason to expect any material change in current prices.

This testimony is strikingly confirmed in a paper on "Prices, Yesterday, To-day and To-morrow," read at the Editorial Conference in New York on April 11 by O. P. Austin, statistician National City Bank of New York. Briefly, Mr. Austin attributes the present increase in prices to the inflation of the world's currency, coupled with the "scarcity demand" and the consequent increase in labor costs. He sees no immediate outlook for a reduction in either factor, so that no general reduction in prices may be expected, in the near future at all events.

If this is the case, it is important in its bearing upon public utilities. There is no use of either a company or the public postponing action on rate cases, hoping, like Mr. Macawber that something will turn up to help matters or that there is some Aladdin who can rub a magic lamp and in some unaccountable way change the situation.

The public is beginning already to think automatically of the present level of prices for most of the commodities which it buys, and the sooner the minds of everybody act in the same way about railway fares, the better. Actually, of course, viewed from the standpoint of the purchasing power of money, electric railway companies are not asking for any higher fares than they had before the war. This is because when measured in commodities and labor, 8 cents or so to-day are worth no more than the nickel was in 1914. The public should be brought to understand, therefore, that railway companies' pleas are not for fares of a higher value than formerly, only that their fares shall not be cut down because of the war.

A previous but exaggerated example of the present situation is the condition in the California mining towns during the gold rush days of '49. Then, according to report, a plate of ham and eggs cost $5, a pair of boots $75, carpenters' wages were $50 a day, and so on through the whole list. The reason for this was just that which exists to-day, namely, a relatively large supply of currency, a relatively small supply of goods or commodities, and a great need of commodities. We are not on the California gold rush basis but we are nearer it than in 1914. There may have been some decreases in price during the past six months in certain of the distinctively "war" materials, like steel and copper, but, on the other hand, there is no evidence of any reduction in the cost of labor which constitutes by far the largest item of expense in electric railway operation. In fact, the demands are for still greater pay and for shorter hours.

All-in-all, the lesson which must be drawn from the present situation is that the sooner we adjust all of our business, including our public utility rates, to existing conditions the better. There is no longer any excuse for living in the fool's paradise of expectations of an early return to pre-war prices.

Getting Shop Forces Back on a Satisfactory Working Basis

FOREMEN and shop superintendents find the conditions confronting them now in many respects quite as trying as those encountered during the war. While we were actually in the conflict the public was willing to put up with some inconveniences, and it was not over-critical regarding transportation facilities or such incidental matters as the appearance of cars. Department heads had to be satisfied with unskilled labor. Women, old men and boys constituted the bulk of the working forces, and much time was spent devising new methods for using this class of workers to advantage and for training them to fulfill the requirements. Now the traveling public expects the service to be equal or superior to that of pre-war times. Satisfactory service requires efficient maintenance, and this in turn can be accomplished only with skilled labor.

The problem for the employer is first to find a way to offer sufficient inducement to attract the skilled employee, and second to make conditions and surroundings sufficiently agreeable so that the employees will remain. To accomplish this, wages must be kept on a level with the market, and working conditions must be better than the average. The underlying motive for all labor is a desire for gain. All workers must have the necessities of life and all desire some of the comforts. Ambition should be stimulated and if good performance is followed by promotion and higher pay, the laborer is given something to work for which the old dead-level wage system discouraged. There must also be a certain amount of flexibility in rates of wages in order to get the most economical results. The plan of "hiring" men when work is plentiful and "firing" them when work is slack should be replaced by a carefully worked out system of schedules which will spread the work out uniformly over the entire year and so give all-year-round employment. The slack season will thus disappear and the work will be performed better by a smaller force of skilled workmen. For example, if painting schedules are co-ordinated with those for overhauling the equipment, cars can be returned to service in much shorter time and considerable duplication of work can be avoided.

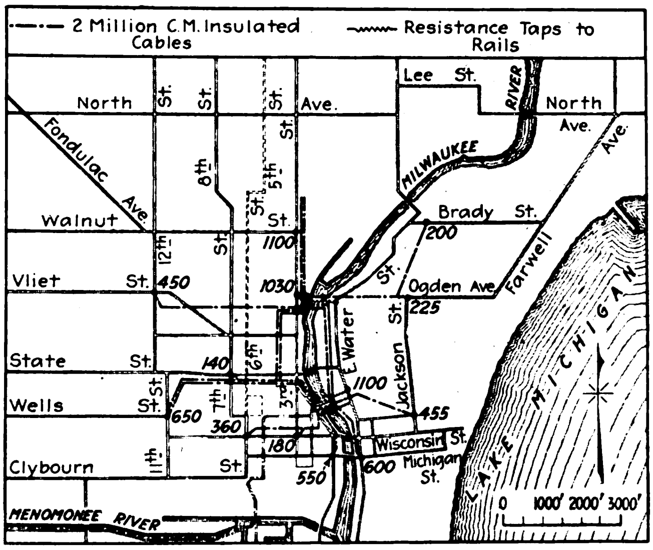
Modern working methods instill confidence in the workmen, make the work more attractive and prevent accidents. Working conditions must be agreeable if the quality of labor is to be kept high. The type of labor needed by electric railways comprises men who can think for themselves and who will remedy troubles because they know from what these troubles result. Supervision must be intelligent if the efficiency of labor is to be increased. Co-operation of managers, foremen and workers with frequent meetings to perfect and work out plans for improvement will raise the standard of the working forces and increase the efficiency of all departments. Such a correlation may prove to be the best first step toward getting the working forces back to a satisfactory basis.

Bureau of Standards Studies Return Circuit Conditions in Milwaukee

Report Recently Completed Is the First Prepared at the Request of a Public Service Commission

BY E. R. SHEPARD
Electrical Engineer of the Bureau of Standards

DURING the summer of 1918 the Bureau of Standards supervised an electrolysis survey in the city of Milwaukee. The survey was made at the request and under the authority of the Wisconsin Railroad Commission, following an appeal by the Milwaukee Electric Railway & Light Company to the commission for an investigation as to the adequacy of the protective measures provided by the company for preventing interference with service furnished by public utilities using sub-surface metallic structures. Following the usual practice of the bureau in conducting surveys, a temporary electrolysis committee was organized. This was composed of representatives of several interested utility companies and city departments, and an engineer of the commission who acted as chairman of the committee was also appointed. The members of this committee acted for their respective companies in all matters pertaining to the survey and jointly supplied such labor, material and transportation as were required. Several technical assistants were furnished by the railway company and the Wisconsin Telephone Company, and through the employment office of the former additional help was secured. The railway company and the telephone company each furnished a motor truck for the work and the other companies, when called upon, supplied help to aid in making measurements on their particular systems. An engineer of the commission was detailed to the work. He devoted practically his entire time to the investigation, which was in progress for about seven weeks.



LAYOUT OF INSULATED RETURN FEEDERS

Several meetings of the committee were held at which the progress of the work was reviewed and plans for improving conditions were discussed. These meetings were of an informal nature, and they were not confined to the committee members. The large attendance and active discussion at these meetings was evidence of the importance which the companies attached to the subject of electrolysis investigation.

About 120 pairs of wires were loaned by the Wisconsin Telephone Company for the period of the survey and these were used as pilot wires for making overall and potential gradient measurements on the tracks. An accompanying illustration shows the installation of one of these pilot wires across a wood-block pavement to its point of connection to the track. Various methods were employed to protect the wires where they crossed paved streets. The wires were usually buried between wood or stone blocks or laid in a narrow trench cut in asphalt pavement. These pilot wires, which were connected at practically all important intersections on the track network, were trunked through to a terminal board in the Grand Exchange of the telephone company. A map of the traction lines was mounted on the terminal board and the pilot wires were terminated in binding posts attached to the map at the points corresponding to the field connections. This arrangement greatly facilitated the making of measurements and afforded considerable interest to lay visitors as well as to engineers. In an illustration on page 772 is shown the test board with five Bristol, smoke-chart, recording voltmeters connected for track gradient measurements.

The following observations were made with recording voltmeters: Twenty-one over-all potential measurements on the tracks; 172 track gradient measurements; 230 potential difference measurements between water hydrants and tracks; thirty-five measurements of current flow on insulated negative feeders; fourteen measurements of current flow on water pipes.

Indicating instruments were used to make potential measurements between cable systems and other structures as follows: Wisconsin Telephone Company's cables, 190 locations; the Milwaukee Electric Railway & Light Company's cable, ninety-four locations; city cables, seventy locations.

A number of miscellaneous measurements and observations were made in addition to those enumerated. The Western Union and Postal Telegraph Companies made the records of their annual surveys available to the bureau, so that additional measurements on these systems were considered unnecessary.

Following is a brief resumé of the facts as brought out in the report of the Bureau of Standards to the Wisconsin Railroad Commission.

Considerable electrolysis of water and gas mains and services occurred in early years, principally in the vicinity of the Oneida Street station which for a time was the only source of railway current in the city. This trouble was somewhat mitigated by bonding the watermains to the return circuit at a number of points. Damage to underground structures has continued, but in recent years has been much less severe than formerly. Gas service pipes have been damaged in some locations by discharge of current to drained cable systems with which they come in close proximity.

The number of supply stations has been increased to five within the limits of the city proper and a large amount of negative copper has been installed for the sole purpose of reducing electrolysis. Between 1900 and 1912, the railway company installed upward of 350,000 lb. of bare, negative cables to supplement the rail return. This copper was connected in parallel with the tracks and was very effective in increasing the conductivity of the return circuit and in shunting open rail joints. Electrolysis conditions were greatly improved by the installation of this copper, although equally good results could have been secured with greater economy by the use of insulated negative feeders and good track bonding.

Since 1912 the railway company has installed about 420,000 lb. of copper as insulated negative feeders, most of which is in the form of lead-covered cables in ducts. This installation is said to have cost more than $114,000. A large part of this copper was installed in 1916 and 1917, and some feeders were not installed until September, 1918. In 1917 the Twentieth Street substation was converted for three-wire operation and has since been operated in that manner during the morning and evening peaks.

These various mitigative measures, together with some supplementary pipe and cable drainage, have greatly improved electrolysis conditions in all areas. Track gradients and overall potentials have been reduced to reasonably low values, and the additional protection required for the pipes in some districts can be secured by minor and auxiliary improvements.

LARGER PART OF CURRENT RETURNS OVER INSULATED FEEDERS

The insulated negative feeder system in the central district of the city is shown in the accompanying map. It will be noted that two power stations operate in this territory, but as they are close together and their negative buses are connected by heavy tie lines they must be considered as a single station from the standpoint of return current. The total average load on these two stations is 7065 amp. of which 4935 amp., or 70 per cent, is returned by the insulated feeders and 30 per cent by the resistance taps to the tracks immediately adjacent to the stations. In the three other substation districts the percentages of the toal loads returned by the insulated feeders are 71.5, 62.7 and 63.5 respectively. In the central district there is in use 35,400 lb. of copper per 1000 amp. of average load in the form of insulated negative feeders and for the five stations combined the value is approximately 32,700 lb. per 1000 amp. In St. Paul, Minn., where the Bureau of Standards made a similar study in 1917 and where a fairly adequate insulated negative feeder system is in use, the corresponding figure for the entire city was found to be approximately 35,700 lb. per 1000 amp. of load.

The average value of the twenty-one overall track potential measurements was 5.6 volts, and three exceeded 10 volts. Similar measurements made in Omaha in 1916 gave an average value of 10 volts for the thirty-three "overalls" taken, seventeen of which exceeded 10 volts. No insulated feeders were employed in Omaha at that time and these values have since been very greatly

TESTING FORCE IN ACTION

reduced by the adoption of three-wire operation. In 1917, twenty-three overall measurements were made in St. Paul, the average being 6.2 volts, with four exceeding 10 volts.

PIPES POSITIVE IN RAILS IN MANY CASES

Of the 230 potential difference measurements between water hydrants and tracks, seventy-seven showed the pipes to be positive to the rails. In thirty locations the pipes were positive by more than 0.5 volt and in seven locations by more than 1 volt, all quantities being average values.

PILOT WIRES INSTALLED IN WOOD-BLOCK PAVEMENT

The recommendations embodied in the report do not call for a further extension of the insulated negative feeder system, although some minor changes in the existing system are suggested. Electrolysis conditions during the three-wire operation in the Twentieth Street district were found to be greatly improved, and this form of operation is recommended for the Clinton Street substation district in the southern part of the city. It is strongly recommended that all rail joints having resistances in excess of 10 or 12 ft. of adjacent rail be repaired as rapidly as conditions permit and maintained to that standard.

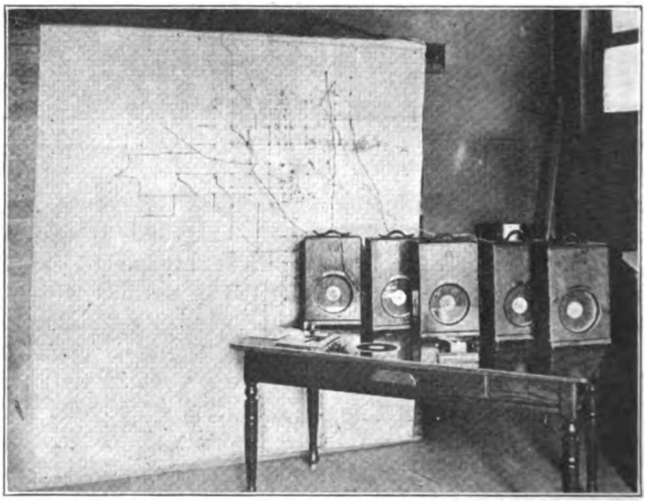
In locations where the pipes are found to be positive to the tracks by more than 0.5 volt after other improvements are carried out, restricted and supervised pipe drainage is recommended to take care of the residual potential. Some of the drainage connections which were made years ago are still in service but the currents carried by them have been greatly reduced by the installation of negative return feeders. One of these for which records are available connects an 8-in. cast-iron water main at Third and Poplar Streets to the negative bus at the Commerce Street station. In 1911 this cable carried 308 amp.; in 1912, 133 amp. and in 1918, 29.7 amp. This is an excellent example of the difference between pipe drainage as a primary and as a secondary means of electrolysis mitigation. General and specific recommendations for the protection of the various lead cable systems are included in the report.

The need for a permanent electrolysis committee is emphasized in the following concluding paragraph of the report:

"If the full benefits of this investigation are to be attained, it is of the greatest importance that steps be taken to establish some kind of a permanent organization through which the various interested companies and city departments can co-operate to maintain adequate electrolysis protection. The recommendations contained in this report are, in some instances, necessarily indefinite and conditional, and their adoption will require co-operation on the part of the several companies. Extensions of underground structures and changes in the railway negative circuit will call for partial surveys and additional mitigative measures from time to time. All of these matters make it imperative that a continuing committee be established if future, as well as present, protection is to be secured."

Such a committee was organized on Jan. 6, 1919, and arrangements were made for quarterly meetings. Following is the personnel of the committee: R. B. Brown, general manager, Milwaukee Gas Light Company, chairman; G. G. Post, electrical engineer, The Milwaukee Electric Railway & Light Company, secretary; H. P. Bohman, superintendent Milwaukee Water Department, treasurer; W. D. Hobbins, engineer Wisconsin Telephone Company; C. H. Jones, electrical engineer Chicago, North Shore & Milwaukee Railroad; F. W. Walker, general manager Milwaukee Northern Railway, and E. F. Jeffrey, engineer Western Union Telegraph Company. In addition to the above a representative of the Wisconsin Railroad Commission is to be present at each meeting, but he will be a non-voting member.

The cost of the survey, which totaled $3,165, was divided among the several interested companies. A large part of this was entailed in connection with the installation of the pilot wires and did not represent a cash outlay as the work was performed by regular field crews of the telephone and railway companies which took care of it in addition to their regular duties. Only the field service of the bureau engineer was charged to the job, the report being prepared at Washington at the expense of the bureau.



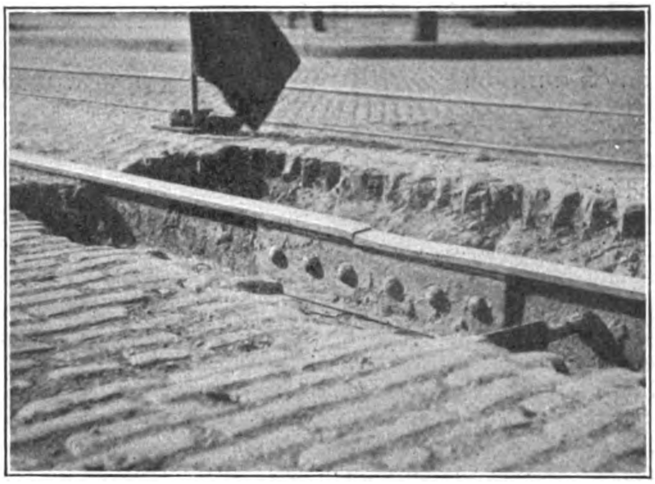
TEST BOARD AND RECORDING INSTRUMENTS IN TELEPHONE EXCHANGE

The Birmingham Railway Light & Power Company, Birmingham, Ala., has started operating its new brass foundry. From now on, brass parts necessary for replacements and for the repair of cars will be cast in the company's own shop.

The Reclamation of Electric Railway Track By Welding and Grinding*

In This Article the Virtues of Various Types of Welding and Grinding Equipment Used by The Connecticut Company Are Discussed and Their Adaptability to Various Requirements Is Pointed Out

By H. JACKSON TIPPETT
Assistant Engineer The Connecticut Company



A BADLY-CUPPED T-RAIL JOINT

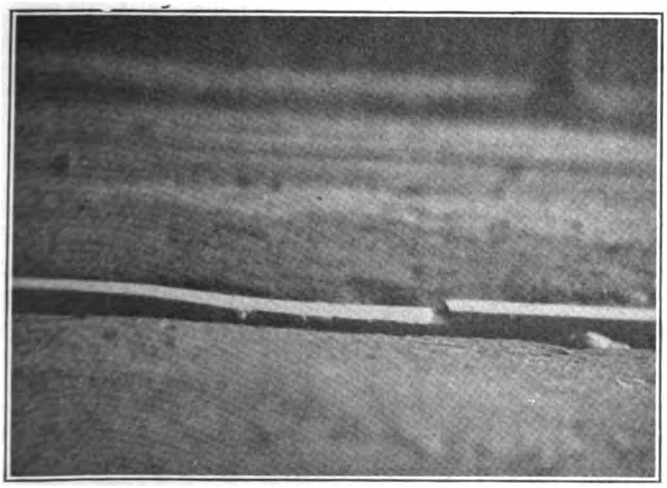
IN 1914 the management of The Connecticut Company approved a request of its engineering department for the purchase of power tools and equipment, for the purpose primarily of using them in arresting the rapid deterioration of the rail joints in general and of those in paved streets in particular. In the perfect track structure in city streets, the life of the whole track is determined by the life of the rail, and the life of the rail itself by that portion most liable to injury, namely, the rail end. It will probably never be known how many have been the attempts to solve the problem of constructing a perfect rail-to-rail connection. Recognizing the fact that the rail connections are the weakest points in the track structure, efforts have continuously been made to increase the length of rails and thus to decrease the number of joints. The economical limit has for the present been reached at 62 ft. What must have been the anxiety of the track maintenance man when the rails as originally laid were 3 ft. long or twenty times as numerous as at present?

Before the introduction of rail-grinding machines there was no satisfactory way of overcoming the distortion of the rail head at the rail end. Every effort was made to arrest it by the use of better foundation, better rail support on the tie and better mechanical rail fastenings. Hardening the rail steel itself by increasing the carbon content was also resorted to. Investigation into the cause of rail failures showed that rails from the same mills, of the same section and weight and rolled at the same time, were often not exactly the same in height and head dimensions. The difference was so slight that many considered it negligible but therein lay the root of rail joint trouble when a joint otherwise perfect had been made.

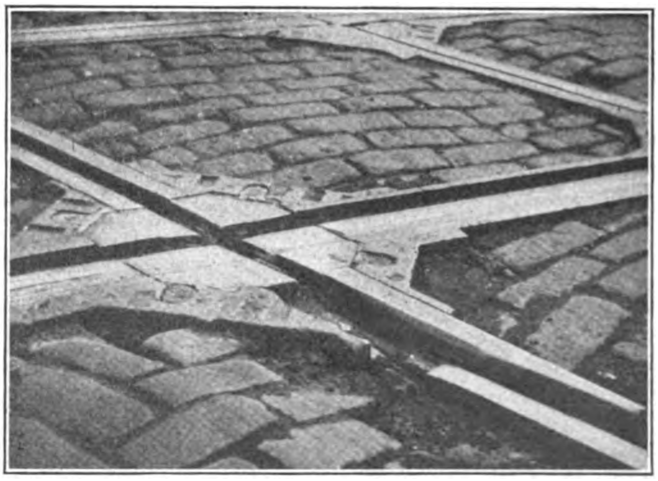
GRINDING MACHINES HELP ELIMINATE THE TROUBLE

Once the importance of this fact became fully recognized among engineers, means of removing this inequality in rail heads by grinding were adopted throughout the country. Many engineers now grind new rail ends as soon as possible after they are connected up and paved in. This grinding is, of course, of a very light nature and is purely a preventive measure, but its value cannot be overestimated.

The purchase of a Reciprocating grinder was author-



BROKEN JOINT ON NEW BRITAIN AVENUE, HARTFORD



BROKEN RAIL HEAD IN CROSSING FROG

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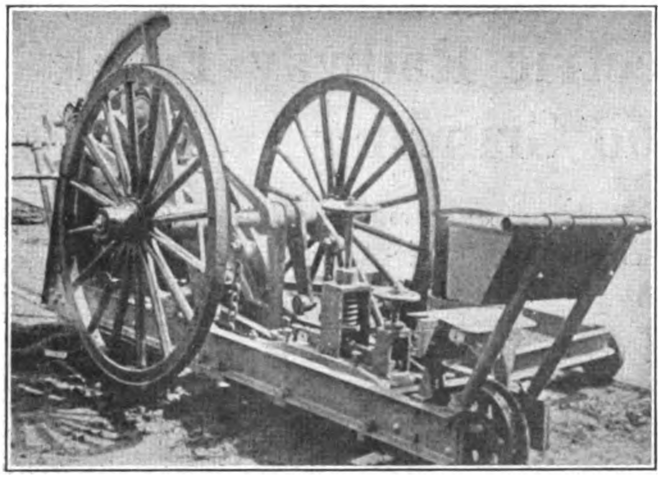
*Abstract of paper read before the Connecticut Society of Civil Engineers of New Haven, Feb. 18, 1919.



RECIPROCATING TYPE OF GRINDER

GRINDING A GROOVE IN SPECIAL WORK

ized in December, 1912, for use in the New Haven Division of this company. This machine is eminently suitable for "preventive" grinding work on new track. It is a grinder of the planing or scrubbing type. The mechanical arrangement for producing the planing action consists of a crosshead and block holder, which slides bodily in guides and is driven by a simple crank motion and connecting rod from a 3½-hp. motor taking its power from the trolley wire. The larger hand wheel shown in the illustration of this machine regulates the pressure of the grinding blocks on the rail, while the smaller wheel holds the blocks to prevent end play and adjusts them for vertical wear. The length of the grinding surface is 17½ in., the stroke is 5½ in. and the speed is 350 strokes per minute. This machine is the largest and most expensive of those used by this company, which has now five of these machines with two more on order. More than 20,000 ft. of rail was ground with this type of grinder in Bridgeport alone in 1918.

There is another type of rail failure that can be successfully reduced by the use of this machine, that is rail corrugation or the breaking down of the steel in the rail head into a series of regular waves. This creates a condition of rail which is often more widespread in its damage to pavement and rolling stock and more annoying from the noise caused than bad joints are. It is a noteworthy fact that corrugation is much more in evidence on grooved rail than on T-rail.

The Stow grinder shown in another illustration has been used for many years for grinding in a small way. Its particular field of usefulness, owing to its flexibility, is around special work where grinding in the groove is required. A new method of track reclamation appeared late in 1912, with the advent of the electric arc welder. To J. M. Yount, master mechanic United Railroads of San Francisco, must be given the credit for developing and adapting the process of electric arc welding with the use of the metal electrode to general repairs on electric railways. Of the various arc-welding processes, this method has at present the widest use. The purchase of the first Indianapolis arc welders by The Connecticut Company was authorized in 1914 for use on the Hartford division. Since that time similar welders have been furnished to four other divisions. In an accompanying illustration from a picture taken on Park Avenue, Bridgeport, the welder is seen mounted on four wheels. It consists of a battery of resistance grids. The current is drawn from the trolley wire at about 600 volts and the voltage is reduced by the resistance to about 250 across the arc. The metal rod in the hands of the operator forms one electrode and the rail forms the other. The rod acts as electrode and filler at the same time, automatically attaining the melting temperature and being deposited in a molten state at the point of contact with the rail. The operator wears a hood to protect his face, and colored glasses to neutralize the ultra-violet rays and prevent damage to his eyes. The work is screened from the view of the public for the same reason.

REPAIRING A BAD JOINT BY WELDING, ON PARK AVENUE, BRIDGEPORT

A cupped rail should not be surface welded if there is any vertical movement between the rail ends. The first operation necessary before welding is to tighten up the joint. If the plates are badly worn, mere rebolting will not prove effective for long. This has led to the expedient of first welding the old plates to the rail after they have been cleaned off and bolted up as tightly as possible. A fourth illustration shows a badly cupped T-rail joint on Grand Avenue, New Haven. Prior to the use of the arc-welding process the repair of such a joint would have necessitated cutting in a new piece of rail, usually about 4 ft. long. While this would allay the trouble temporarily, it left the job with two joints to be cared for in future in place of one. A broken rail, on New Britain Avenue, Hartford, is shown in another illustration. This joint was welded in 1911 by the Lorain method. The joint bars held perfectly, as is invariably the case, but the rail head broke above the bar. The repair was effected by welding in another piece of steel between the under side of the rail head and the top of the bar. In another case the break occurred around one end of the Lorain bar. To connect the two broken rail ends an old fishplate was cut to fit around the Lorain bar over the break and the plate was welded around its edges to the rail. There is at present no practical method of testing the strength of arc-welded rail joints in the field. The conductivity can be tested, which is an indication of electrical soundness, but high conductivity is not a proof of mechanical soundness. However, sample joints can be made in the shop or yard to which tests for porosity, soundness and strength can be applied.

GRINDING A WELDED JOINT WITH A ROTARY GRINDER

Much valuable surface-welding work has been done on the open-hearth steel in special track intersections. A photograph is reproduced to show a piece broken out of the rail head in a crossing frog in Bridgeport. If the break in the web of the rail is not too low in the surrounding casting, it can be built up by welding and the missing fragment can be replaced with new steel to avoid the renewal of the whole piece. At present the bulk of welding in special work lies more especially in building up the cups in open-hearth rail, which occur most noticeably on the "leaving" side of the manganese hard centers.

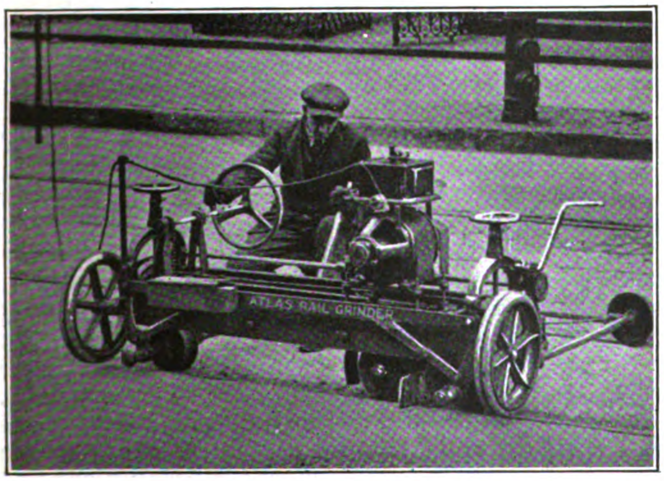
WELDING MANGANESE CENTERS WAS NOT SUCCESSFUL

Attempts to surface-weld such alloys as manganese steel centers in switches, mates and frogs by the bare-metal-electrode method have not been successful. Since the chief characteristics of manganese steel are due to its heat treatment and manganese content, any action tending to disturb the effects of the heat treatment or burn up the manganese is detrimental. The welding of manganese centers, if done at all by this method, should only be carried out as a last resort in an attempt to secure a temporary repair until a new center is received. In using the welding method, the welded metal on the top of the rail is left a little high and requires grinding down to a fine surface. The machine which we use to do the bulk of this work is the Seymour grinder as shown herewith.

The rotary grindstone of this is driven by a 3-hp. motor at a speed of 2500 r.p.m. Before the method of surface-welding cupped rails became general this machine proved valuable for grinding out the cup or depression. This, in reality, was merely spreading the low spot over a greater length of rail. It was done by first placing the rotary stone at the bottom of the depression and then offsetting the two wheels eccentrically on each side. Then by passing the stone back and forth over the depression the shoulders were ground off to a regular vertical curve of long radius.

The first of these machines was bought in 1914 and there are now five distributed over the various divisions of our line. The operator of this grinder wears eye protectors as a safety-first protection against steel and emery dust. The wheel used is 9 in. in diameter, 3 in. wide and of Grade Q corundum. The grinding bricks and wheels used on the various machines for different classes of work are standardized, six grades and shapes having been selected as the most suitable.

Practice has shown that when making surface welds the Indianapolis welder can work faster than the grinder can follow it up. In order to get the maximum efficiency out of the welder, therefore, additional grinders have been purchased recently. The Atlas grinder is shown on this page. Its field is similar to that of the Seymour grinder but the mechanical method of doing the grinding is somewhat different since the main carriage remains stationary and the grinding parts move back and forth on guides and are controlled by the wheel and lever in the hands of the operator. The main weight of the machine is on the grinding side and it is readily derailed by lowering the derailing wheels and raising the light side. The first of these machines was re-



ANOTHER TYPE OF ROTARY GRINDER AT WORK

A RAIL JOINT READY FOR WELDING

ceived last year and there are three more on order at the present time.

Up to this point particular reference has been made to general repair work with the Indianapolis welder, the great field of usefulness of which lies in its ability to do quick and satisfactory surface welding and other emergency work. In 1917 the question of securing rail with which to carry out necessary paving work became more difficult than ever, and a number of instances occurred where work was authorized to proceed but no new rail was available. It was therefore necessary to accept the situation and continue to use the existing rail by making such repairs as were necessary by welding. As the Indianapolis welders were required on regular repairs, and to take them off such maintenance work for the sake of construction would have been to take a step backward, the management approved the recommendation of the engineering department for the purchase of additional welders to take care of this reconstruction work.

New Atlantic welders made by the Lincoln Bonding Company were purchased and received in June, 1918, and immediately put to work. One of the illustrations shows the portability of this apparatus. In the picture the joint is ready for welding the plates to the rail, and the operator is about to put on his hood and commence work. This welder differs from the Indianapolis welder in construction. It consists of a mounted dynamotor, with a control over the amperage and the voltage, designed to give the best results with either the carbon or metal electrode. Less responsibility is thus thrown on the operator to secure good work. This machine can also be adapted to surface welding work. The Connecticut Company now has these welders in Bridgeport, New Haven and Hartford. The work done since the first of all this equipment was received in 1913 to the end of 1918 shows that corrugation has been removed from some fourteen miles of rail. Also approximately 55,000 joints have received some attention from the welding and grinding gangs. Since there are about 250,000 joints on the company's system the number of joints that have received attention represents about 22 per cent of the total. In addition to this a large number of repairs of all kinds have been made to special work. The reduction in the cost of making repairs to broken rails and faulty joints by welding as compared with the old methods of cutting in a new piece of rail is conservatively placed at 75 per cent. The greatest savings lie in repairs to rail joints where there is still considerable life in the rail head. Many years of life are thereby added to the track.

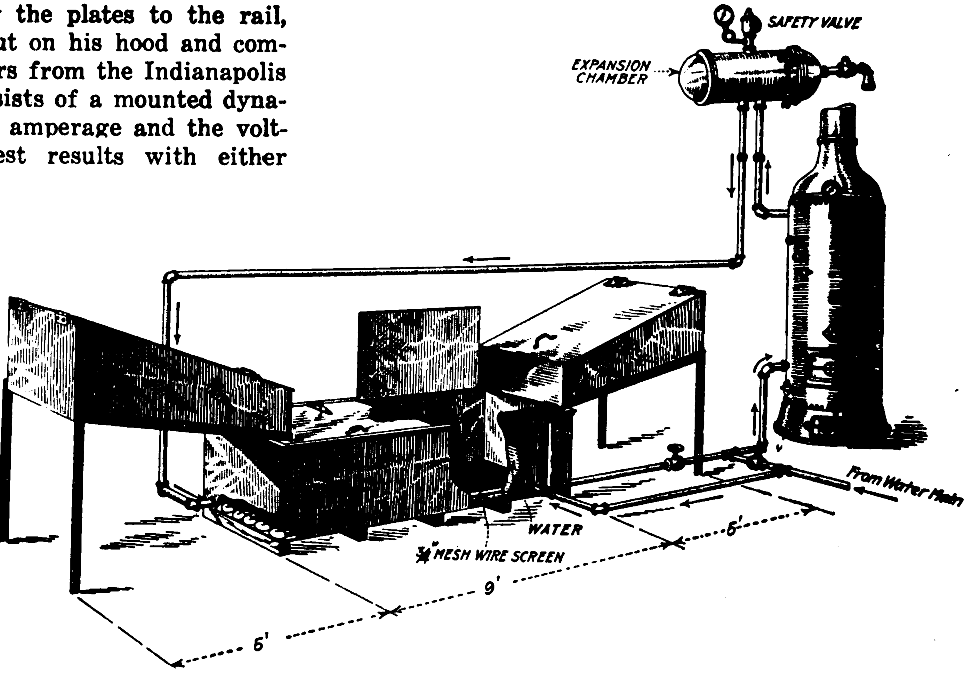
In the case of the repairs to special work the life of each piece varies so greatly that even after repairs have been made the added life is difficult to estimate. The savings effected by the use of this equipment have resulted in a reduction of operating cost of the road and a postponement in capital outlay due to the increased life of the track.

Centralizing the Cleaning and Saturating of Waste

Union Traction Company of Indiana Uses Original Device in These Operations and Saves 50 Per Cent in Waste and Labor

By INSTALLING, at its Anderson shops, equipment for washing and saturating with oil all of the waste used at its six division shops, the Union Traction Company of Indiana has made a 50 per cent saving in waste and labor used in this work. At each shop are three waste cans. Two of these are kept full of clean, saturated waste and the third is used for dirty waste removed from the cars. When the third can is full it is sent to Anderson where the waste is washed and resaturated with hot oil. Thus waste can be used three or four times before it is fit only to be discarded.

The particular feature of interest in the equipment is the saturating outfit, which is represented diagrammatically in the accompanying sketch. This was built in the local shops. It consists of a double sheet-steel tank, two draining tables and a water heater. The tank is made of two boxes, one within the other, leaving water-jacket space between. In the bottom, between the two is a pipe radiator through which hot water from the heater, installed for the purpose, is circulated. The water in the jacket is thus heated.



The tank is divided into two equal parts by a vertical partition, one side being used for saturating new and the other for cleaning and saturating old waste. The tanks are filled with oil which is maintained at a temperature of from 90 to 100 deg. Fahr.

At each end of the tank is an inclined, covered draining table, also made of sheet steel.

M. F. Skouden, superintendent of motive power of the company, states that one man cleans and saturates all of the waste for the system, which comprises more than 450 miles of track and more than 350 cars. New waste can be saturated in two hours and all waste is allowed to drain for two hours. About every ten days the old oil is run through a filtering plant and is thus reclaimed.

Manufacturers' Tests of Railway Motors*

The Various Detail Parts with Materials Used in Their Manufacture Are Given in a Chart Which Presents an Intelligible Perspective of the Tests Necessary

BY J. S. DEAN
Railway Engineering Department, Westinghouse Electric & Manufacturing Company

THE problem of the manufacturer of railway motors is to put on the market a piece of apparatus that has an evenly balanced electrical and mechanical design, restricted in size by definite space limitations, rigid in construction, light in weight, attractive in general appearance, competitive in price, and that will develop a specified brake-horsepower with a liberal factor of safety to meet the emergencies of railway operating conditions to which this class of apparatus is subjected in service.

Electrically railway motors must develop a specified brake-horsepower without undue heating of the windings, they must commutate all working currents with minimum sparking at brushes, and have ample insulation to prevent grounding of windings under normal operating conditions. The mechanical design, while light, must be of such proportions as to withstand the stresses set up by the high peripheral armature speed, the vibrations due to the rigid mounting on the trucks, and the shocks and hammer blows resulting from the high speed operation over all conditions of tracks, and roadbed.

In order to fulfill these requirements in the most economical and efficient manner, it is found advisable during the course of building a railway motor to make a succession of tests of the materials and detail parts that go to make up the assembled motor. It is also necessary to subject the completed motor to a series of tests to check the calculations of the designing en-

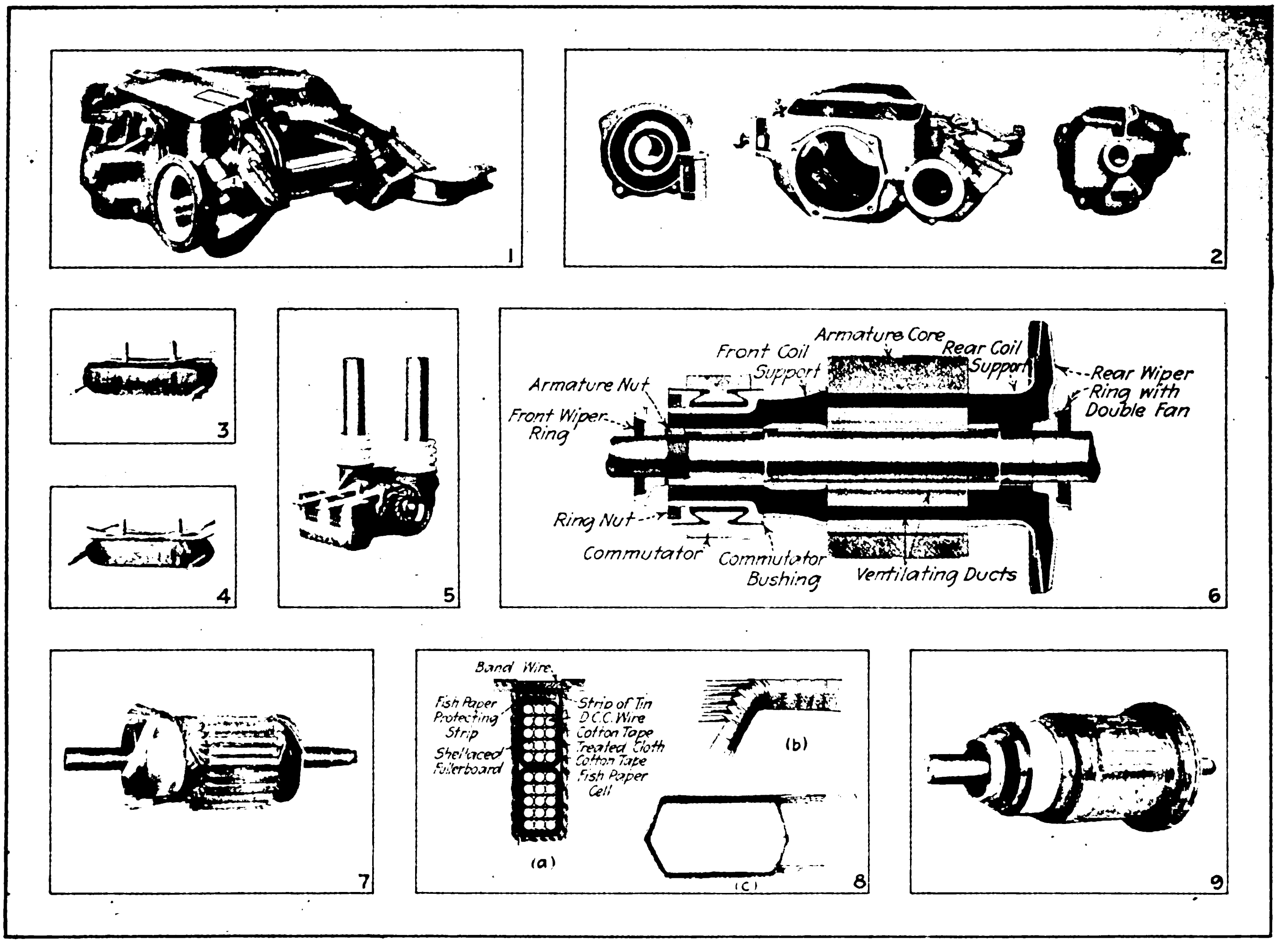

1
2
3
4
5
Armature Core
Front Coil Support
Rear Coil Support
Armature Nut
Rear Wiper Ring with Double Fan
Front Wiper Ring
Ring Nut
Commutator
Commutator Bushing
Ventilating Ducts
6
7
Band Wire
Fish Paper Protecting Strip
Shellaced Fullerboard
Strip of Tin
D.C.C. Wire
Cotton Tape
Treated Cloth
Cotton Tape
Fish Paper Cell
(a)
(b)
(c)
8
9

Fig. 1—A typical 50-hp., 600-volt box-frame commutating pole railway motor. Fig. 2—Motor frame complete with armature bearing housing removed. Fig. 3—Main field coil and pole. Fig. 4—Commutating coil and pole. Fig. 5—Brushholder. Fig. 6—Cross-section showing parts as they are mounted on the armature shaft. Fig. 7—Armature partly wound. Fig. 8—Armature coils; (a) cross-section of coils; (b) taping between leads prevents short-circuits; (c) wire-wound coil. Fig. 9—Armature banding.

VARIOUS DETAIL PARTS COMPRISING A RAILWAY MOTOR

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*This is the first of a series of articles to be published in the ELECTRIC RAILWAY JOURNAL, dealing with the testing of railway motor parts and materials by manufacturers.

Railway Motor Material Chart

Grouping of Motor Parts to Show Details Necessary and Materials Required in Construction

Motor	Frame	Main casting		Metal	Cast steel
		Pole pieces		Metal	Elec. sheet steel Steel plate Hot rolled steel
		Coils		Metal	Copper wire Copper strap
				Insulation	Cotton tape Treated linen Fishpaper Asbestos paper Impregnating gum Plastic insulator Amber insulator Insulating varnish
		Coil springs		Metal	Spring steel
		Coil washers		Metal	Sheet steel
		Brush holder		Metal	Cast brass Sheet steel Spring steel Copper braid Copper strap
				Insulation	Porcelain Micarta
		B.H. clamps		Metal	Hot rolled steel
		Fittings		Metal	Copper cable
				Insulation	Rubber bushings Torpedo twine
		Covers		Metal	Malleable iron Sheet steel
		Brushes		Carbons	Crushed coke Graphite Pitch
	Housings			Metal	Malleable iron Cast steel
	Armature bearings			Metal	Malleable iron Bronze Babbitt
	Axle caps			Metal	Cast steel
	Axle bearings			Metal	Malleable iron Bronze Babbitt
	Bolts, nuts and lock washers			Metal	Steel Spring steel
	Armature	Shaft		Metal	Axle steel Special alloy steel
		Core	Spider	Metal	Cast steel Malleable iron
			Coil support	Metal	Malleable iron
			Lamination	Metal	Elec. sheet steel
			Finger plate	Metal	Sheet steel
			Armature nuts	Metal	Forged steel
		Fans		Metal	Sheet steel Malleable iron
		Commutator	Bushings	Metal	Malleable iron Cast steel
				Insulation	Micarta Mica
			V-rings	Metal	Malleable iron Cast steel Forged steel
				Insulation	Mica
			Segments	Metal	Hard-drawn copper
				Insulation	Mica
			Nut	Metal	Cast steel Forged steel
		Coils		Metal	Copper wire Copper ribbon Copper strap
				Insulation	Cotton tape Treated linen Mica tape Fishpaper Fishpaper and mica Fullerboard Plastic insulation Amber insulation Asphaltum varnish
		Keys		Metal	Cold-rolled steel
		Bands		Metal	Steel wire Strip tin Tin solder
		Solder		Metal	Half and half Tin
		Insulating material		Insulation	Treated linen Jute rope Torpedo twine Friction tape Treated duck Fullerboard Fishpaper Cement Cement paper Surgical braid Fishpaper and mica Drilling Linen twine Mica Insulating varnish Shellac
Accessories	Pinion			Metal	Forged steel
	Gears			Metal	Cast steel Rolled steel
	Dust shields			Metal	Sheet steel Malleable iron
	Axle collars			Metal	Malleable iron Cast steel Forged steel
	Gear cases			Metal	Malleable iron Sheet steel

gineer in the case of a new motor, and to see that stock motors of a standard approved design pass the rigid inspection requirements. In some few cases the contracts of customers specify special witness tests of materials and of the completed motors, which call for additional testing facilities to comply with requirements of their specifications.

LARGE AMOUNT OF TESTING APPARATUS IS NECESSARY

All of this work requires a large variety of expensive, complicated and delicate testing apparatus, as well as a trained force of engineers and expert workmen who are skilled in their respective lines to supervise and conduct these tests in order to eliminate all defective materials, and to insure a finished product that will measure up to all requirements as approved by the engineer of tests.

In presenting this subject for the benefit of railway men, some of the most important details will be treated under the following subdivisions:

1. Railway Motor Material Chart.
2. Metals and Alloy Testing.
3. Testing the Insulating Materials.
4. Carbon Brush Testing.
5. Tests of Detail Parts of Motors.
6. Testing the Assembled Motor.

To get an intelligent perspective of the various detail parts and corresponding materials that are required in the make-up of a railway motor, the accompanying layout of a railway motor material chart and detail photographs are given to aid in the further presentation and better understanding of this subject matter.

By reviewing the material chart, one is impressed with the great variety of metals and insulating materials that enter into the make-up of a railway motor. This fact tends to complicate the manufacturer's problem, as all materials must be covered by a purchasing department specification, setting forth the requirements they must meet before being approved and accepted by the raw material inspection department.

To facilitate the work of this department and to insure that only approved materials enter into the completed motors, well-equipped laboratories and testing departments are at their disposal for making the required tests. Some of the most important of these tests will be outlined and described later under their respective headings as given in the subdivisions previously mentioned.

Steel Trolley Wire Being Substituted for Copper in Los Angeles

THE substitution of steel trolley wire for copper wire has just been begun by the Los Angeles Railway Company. Officials of the company state that they have been unable to obtain a sufficient supply of copper wire to care for their maintenance needs and that the price of copper wire is so high as to be practically prohibitive. They feel that steel wire is not nearly as good and as it is much heavier it requires several times as many men in its installation. Also there is no doubt that it will prove more injurious to trolley wheels than did the copper wire. Twenty-six miles of steel wire has already been received and will be installed as rapidly as possible. More of this steel wire is on the way.

Experts Talk to Business Editors

Addresses Before New York Editorial Conference Indicate Maintenance of Present High Prices and Need for Real Co-operation of Capital With Labor

UNDOUBTEDLY the three foremost questions in these days of readjustment have to do with (1) the stabilization of industry through proper understanding of and attention to post-war price tendencies and other financial problems; (2) the attainment of better co-operation between capital and labor through their mutual adherence to enlightened principles, and (3) the extension of foreign trade.

With the desire of securing for themselves and passing on to their readers the latest information on such points, the editors of the New York Business Publishers Association on April 11 held an industrial conference which was addressed by men qualified to speak authoritatively. The full remarks of the eight speakers cannot be presented here, but an effort will be made to give a sufficient summary to indicate the vital importance of their utterances.

ENORMOUS INFLATION IN CURRENCY

The addresses on the financial aspects of reconstruction were of two sorts. One, by Francis H. Sisson, vice-president Guaranty Trust Company, New York, N. Y., was a general survey of various post-war financial problems. The others, by O. P. Austin, chief statistician National City Bank, New York, N. Y., and Irving Fisher, professor of economics, Yale University, were confined to the question of price trends and control.

Mr. Sisson expressed the conviction that this country is awakening to a realization that its prosperity depends upon increased production and that consequently foreign markets need to be expanded. The United States now holds, however, more than one-third of the world's reserve of gold coin and bullion and is already creditor to other nations to the extent of $12,000,000,000. The remaining low stock of foreign gold cannot with safety be drained away, and anyway the "unpegging" of sterling and franc exchange has raised an invisible tariff wall, so that as long as the dollar remains at a premium this country will be a good one to sell in but a poor one to buy from. The way out of the difficulty seems to be the purchase here of foreign securities, although the government must actively protect the property rights acquired.

In regard to the steam railroad situation under government operation Mr. Sisson said:

> Experience has proved that the economies effected have been negligible in comparison with the expense added; and that, on the whole, less efficient service—less satisfactory to the public and less promising for future needs—has been rendered at a largely increased cost to the shipper and the taxpayer. By July 1 more than $500,000,000 must be provided to meet maturing railway obligations, and Congress must appropriate at least $1,250,000,000 to maintain these essential properties.
>
> The lack of public understanding of the factors entering into the railroad problem has been responsible for most of the difficulty of its solution. If the war has served to increase that understanding and to save the country from a more disastrous experiment in government ownership and control, the immediate expense will have been worth while. We may find, in spite of its colossal cost in service and convenience, that the experiment has been a blessing in disguise, because it offers a most conclusive demonstration of the failure of the theory of state socialism in this country, when subjected to a practical test.

In discussing prices Mr. Austin, who is one of the foremost financial statisticians of this country and was formerly chief of the government statistical department at Washington, averred that the principal causes of price advances during the war were (1) "scarcity demand," (2) the advance in wages and (3) "inflation." Chronologically, the first cause of the advance seems to have been the "scarcity demand" for war materials, food, clothing, manufactures, manufacturing materials and the labor required for their prompt production. This was quickly followed, however, by an enormous world inflation, in which paper money with a face value of $36,000,000,000 was emitted by the printing presses of the countries at war. The legal tender circulating medium of the world was thus advanced from $15,000,000,000 in 1913 to more than $45,000,000,000 in 1918, most of the gold formerly in circulation passing into the vaults of the governments and their great banks as a partial basis for this greatly enlarged paper currency.

The face value of the paper currency issued in the four years of the war was greater than the value of all the gold and all the silver mined in all the world since the discovery of America. Meantime, the national debts of the world advanced from $40,000,000,000 in 1913 to $220,000,000,000 in 1919 and the annual interest charge from $1,750,000,000 to $10,500,000,000. This quintupling of governmental promises to pay had also an important bearing upon the world finances, while the fact that bank deposits in the fifteen principal countries of the world grew from about $25,000,000,000 in 1913 to approximately $75,000,000,000 in 1919 still further increased the currency supply, especially in countries like the United States, in which the check plays so important a part in current business transactions.

This enormous inflation, coupled with the continued "scarcity demand" for food, manufactures, manufacturing material and the labor required for their production, was accompanied by great advances in prices first in the materials for the war. The advances gradually extended to other articles which their respective producers had to exchange for those in which the advance had already occurred, and this made the advance in prices world-wide, applying to all classes of articles irrespective of their immediate relation to the requirements of the war.

In discussing the relative weights of the three price-increase factors mentioned above, Mr. Austin made the following statements:

> It appears on close analysis that the "scarcity demand" created by the war was not so great in food, clothing or manufacturing materials as has been pictured, while the fact that fifteen million men are still under arms minimizes the reduction in military demands which had been expected.
>
> The fact that the increase in compensation of labor was

in most cases given because of the fact that the cost of living had already advanced at least somewhat minimizes the relative importance of this factor in attempting to discover the real causes of the general world-wide advance in prices. And it must also be remembered that several million persons who had not been engaged in the industrial and business world came to the assistance of those engaged in these duties during the war.

Where then shall we turn in the search for the principal cause of the general advance in prices? The most prominent among the possible or probable causes is the theory advanced or accepted by the historians, economists, statisticians and financiers of the world that inflation in currency is usually accompanied or closely followed by an advance in prices. As high an authority as a member of the present Federal Reserve Board, Professor A. C. Miller, recently declared that "the abundance of money must be credited with at least an equal influence in explaining the high prices which have prevailed."

PRICES WILL NOT DECLINE RAPIDLY

If such are the causes of the advance in prices, what prospect is there for an early removal of any or all of the causes? Mr. Austin answered this question in part as follows:

> Although the demand for war material has terminated, the other features of the "scarcity demand" will continue at least in a somewhat modified form in the immediate future, especially as relates to world requirements of food, manufacturing material and manufactures. Moreover, developments thus far do not point to an early reduction in labor costs.
>
> That part of the price advance caused by inflation can only be cured by deflation, by a reduction in the enormous stocks of currency which has trebled during the war while that other form of slowly moving currency, governmental obligations, has quintupled. Is it probable that these two forms of currency can be or at least will be reduced in the near future?
>
> Present indications are that the governments of the world will be compelled to collect in taxes about $1,000,000,000 a week as compared to $1,000,000,000 a month before the war, and this does not include anything for "sinking funds" or other provision for reduction of outstanding debts. If this be true, is it probable that the governments in those countries which have greatly increased their circulation and must now demand such enormous increases in annual payment of taxes will find it advisable or possible to reduce materially the amounts of currency available for such payments?
>
> If the governments which have been the chief participants in the world increase of currency should fail to reduce materially that excessive supply, and if the world's demand for food, manufacturing material and manufactures is to continue at the present rate, are we justified in expecting a general reduction in prices in the near future? The question answers itself. There will, of course, be instances in which there will be material reductions, but in general terms the outlook for marked or rapid decline, at least in the near future, does not seem encouraging.

STABILIZING THE DOLLAR

Professor Fisher outlined his plan to substitute a "goods-dollar" for the gold dollar as the standard of value. This proposal finds its justification in the fact that great price fluctuations are chiefly due to money conditions. Since a descending value of gold cannot lower the price of gold it must raise the prices of other things in terms of gold; and since an ascending value of gold cannot raise the price of gold, it lowers the prices of other things in terms of gold. The fluctuating prices produce industrial instability, financial crises and social injustice.

Professor Fisher's plan, in general, may be summarized in the following way:

> (1) To abolish gold coins and convert the present gold certificates into "gold-dollar certificates" entitling the holder to dollars of gold bullion of such weight as may be officially declared from time to time.
>
> (2) To retain the virtual "free coinage"—that is, deposit—of gold and the free redemption of gold-dollar certificates.
>
> (3) To designate an ideal composite goods-dollar consisting of a representative assortment of commodities, worth a dollar at the outset, and to establish an index number for recording, at stated intervals, the market price of this composite dollar in terms of the gold dollar.
>
> (4) To adjust the weight of the gold-bullion dollar at stated intervals, each adjustment to be proportioned to the recorded deviation of the index number from par.
>
> (5) To impose a small "brassage" fee not to exceed any one change in the gold dollar's weight.

The crux of the plan lies in the rule by which the index number regulates the dollar's weight. Its significance is, that to keep the gold dollar from shrinking in value the weight is increased, it being thus recognized that a depreciated dollar is a short-weight dollar. Reversely, to keep the dollar from growing in value the weight is shrunk, for an appreciated dollar is an overweight dollar.

The plan outlined has received the approval of a large number of economists and business men of influence, including President Hadley, Yale University; a committee of economists appointed to consider the purchasing power of money in relation to the war (consisting of Royal Meeker, United States Commissioner of Labor Statistics; Prof. Wesley Clair Mitchell, Columbia University; Prof. E. W. Kemmerer, Princeton University; Prof. Warren M. Persons, Colorado College; Prof. B. M. Anderson, Jr., Harvard University); Frank A. Vanderlip, president National City Bank, New York; George Foster Peabody, New York; John Perrin, federal reserve agent, San Francisco; Henry L. Higginson, Boston; Roger W. Babson, statistican; John Hays Hammond, mining engineer; John V. Farwell, Chicago; United States Senator Robert L. Owen; the late Senator Newlands; and Sir David Barbour, one of the originators of the Indian gold exchange standard.

WHAT INDUSTRIAL CO-OPERATION MEANS

The capital-labor phase of readjustment was discussed by Charles P. Steinmetz, consulting engineer General Electric Company; John Calder, formerly general manager Remington Typewriter Company and during the war active head of important manufacturing work for the government; V. Everit Macy, president National Civic Federation and appointee of President Wilson as chairman of committee on adjusting wages in private shipbuilding plants; and Dr. Charles A. Eaton, who recently resigned his Fifth Avenue pastorate in New York City to devote himself to problems of industrial reconstruction.

According to Mr. Steinmetz, the interests of capital and labor are the same in some respects but the opposite in others. In general, in any industry, those interests which have to do with industry on the outside, customers, etc., are identical. Within the industry concerned the interests of employer and employees are often opposite to each other.

The initiative in adjusting differences should lie with the employer. Co-operation of capital and labor should be the aim, but this implies two parties working together, not one settling the matter and telling the other "you must do this and that and then we will co-operate." Unfortunately, Mr. Steinmetz said, most of the serious efforts made in this direction have been of this character—the employer has worked out plans and then asked the employees to co-operate on those plans. Very often those plans have been good, and the whole scheme would have been satisfactory if it could have been worked out jointly.

Mr. Steinmetz criticized welfare work which is based on paternalism. As for the bonus system, this has the disadvantage of giving a share in the profit but not in management. The English shop committee system presents the difficulty that labor unions may look upon the institution of such committees as a move to eliminate the unions. A better way to secure co-operation is through the wage dividend, which Mr. Steinmetz described as follows:

> Capital is entitled to a fair rate of interest on the money invested, and labor is entitled to a fair rate of wages for the work done. All profits beyond that belong to capital and labor. These should be divided into dividends on capital stock and the balance into dividends on labor stock as determined by yearly wages. This system is in operation in a number of corporations, in electric utilities companies and others.
>
> It lacks provision for share in the management. We could carry it further and recognize labor as equivalent to capital and give the labor stockholder the same right as the capital stockholder in the management. This does not set up rival administration, but brings about joint control by evolution and not by revolution.
>
> How far should employees be recognized as stockholders? There are many things that show that only those who have been with the organization for a number of years should be recognized as wage stockholders. We could set the limit at ten years. The labor stockholders would not be many and would not make any radical change in industry, and every year or so we could change the minimum, going down to six or five years. This would eliminate any opposition except from the extreme socialists who refuse to recognize capital at all.

RAISING SUPERVISORY STANDARDS

Mr. Calder expressed the conviction that only through enlightened and energized employers and their foremen in industry will a permanent advance be made. Individual organizations sincerely aiming at democracy in their industrial relations must insure that their foremen are instructed and willing co-operators, and the particular technical competence for which they were originally selected is no guarantee of this. The standard of executive intelligence and sympathy must be raised.

On the subject of "Organization in the Settlement of Industrial Disputes," Mr. Macy said in part:

> It is of the utmost importance for the peaceful and productive development of industry that both employers and employees should be thoroughly organized in order that trade agreements may be worked out between them. Before this can be successfully accomplished, however, employers must place in the hands of broad-minded, experienced men the responsibility of formulating and carrying out their labor policies. Such men might be called labor advisers, administrators, or engineers.
>
> A group of such men representing the manufacturers of an industry should meet with the international presidents of the unions employed and in conference reach an agreement covering the questions of wages and hours for the entire industry or for districts. Local boards, on which the employers and the employees should have equal representation, should then be set up for the purpose of establishing local, or district, working conditions and of interpreting the detailed application of the wage scale to individual plants.
>
> I wish especially to emphasize the fact that the establishment of such committees must in no way be taken as an alternative or as a counter weapon against agreements with the regularly constituted trade unions, for no plant committee can make agreements covering competing firms, nor do they have the responsibility of an organization behind them. Above all, they cannot have the advantage of being guided and controlled by men of national experience.

Dr. Eaton declared that the principles of representation in industry, if properly applied, will make a new era in industrial relations. This does not mean that the workers are to manage industry, but the management will no longer represent only capital. It will represent labor as well. Dr. Eaton sees a marked willingness on the part of employers to consider plans for eliminating autocracy in their business.

The subject of foreign trade problems was covered by G. A. O'Reilly, foreign trade expert Irving National Bank, New York, N. Y. He stated that the tendency of manufacturers and salesmen to force their views and wares upon foreign buyers had fortunately been largely checked, and the American view had been broadened. He emphasized the fact, however, that remaining problems need to be solved without delay.

Causes and Prevention of Corrosion of Pipe Carrying Hot Water

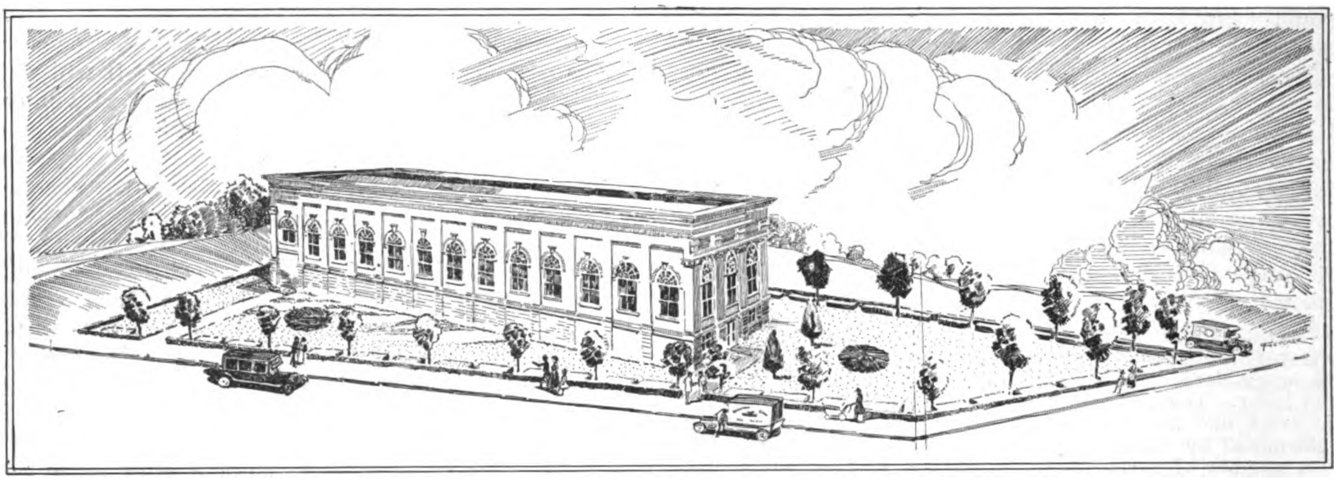
By a Process of "Deactivation" Even Water Which Has Considerable Acidity May Be Rendered Nearly Non-Corrosive

A STUDY of the causes of corrosion of pipe carrying hot water led to the development of the Speller system of "deactivating" water by the removal of oxygen. This was mentioned briefly in the issue of this paper for March 8, page 454. Essentially this system, in which the National Tube Company is interested, consists in bringing the water under pressure in contact with large iron surfaces on which the corroding action takes place and the corroding ability of the water is virtually destroyed.

The company has reprinted a paper read before the American Society of Heating and Ventilating Engineers last year, which gives details of the process and also explains in simple language the chemistry involved. The authors show that any water may be distinguished by the terms "active" and "inactive," the quality of activity being dependent upon certain substances which modify the universal tendency of even the purest water to initiate the corrosion process. The inherent tendency of pure water to attack metal may be greatly aided when gases are dissolved in it. An inactive water is one that does not appreciably corrode iron. It has been demonstrated that an inactive water after a few minutes aëration becomes capable of doing great damage to iron.

Every metal when placed in water is subjected to a certain fixed tendency to go in the solution,. and the initial reaction in corrosion is analogous to solution in acids. Water exists in the liquid state not only in the form of its molecule but also as ions, which are formed by the breaking up of the molecule. These are called the hydrogen and the hydroxyl ions. The concentration of the former in the water determines its ability to attack iron. The ability of acids to attack iron is due to their greater tendency to ionize.

While the tendency of iron to corrode depends to a certain degree upon the amount of acids present in the surrounding water, corrosion may be arrested even in distinctly acid water by deactivation. Experiments with this process of deactivation have been carried on now for several years and the process has proved to be quite effective. The development of the process illustrates the value of theory in its application to practical problems.



PLANTING SCHEME FOR GROUNDS AROUND DOCK STREET SUBSTATION, SCHENECTADY (N. Y.) RAILWAY

Planting the Grounds Around the Shop or Substation

A Commendable Practice, Carried Out at Small Cost, Illustrated from the Experience of the Schenectady (N. Y.) Railway

THE Dock Street substation of the Schenectady Railway is not situated in the most beautiful part of the city, but F. Palmatier, superintendent of power, has made its grounds very attractive by the use of a simple planting scheme. The sketch reproduced shows the idea which Mr. Palmatier had in view and the photographs indicate how he was able to carry out his idea at very small expense. The photographs were taken after the foliage had begun to fall, but sufficient remained to indicate the extent to which it had been possible to carry out the plan in 1918.

For the back hedge 100 American arbor vitæ plants were set 24 in. apart. These cost 14 cents each. The front hedge was of Japanese barberry planted 14 in. apart. Four hundred plants were required at a cost of 9 cents each. In the hedges, at intervals of 25 ft. Catalpa Bungeii trees, grafted on 6-ft. stems were placed. They cost $1.25 each.

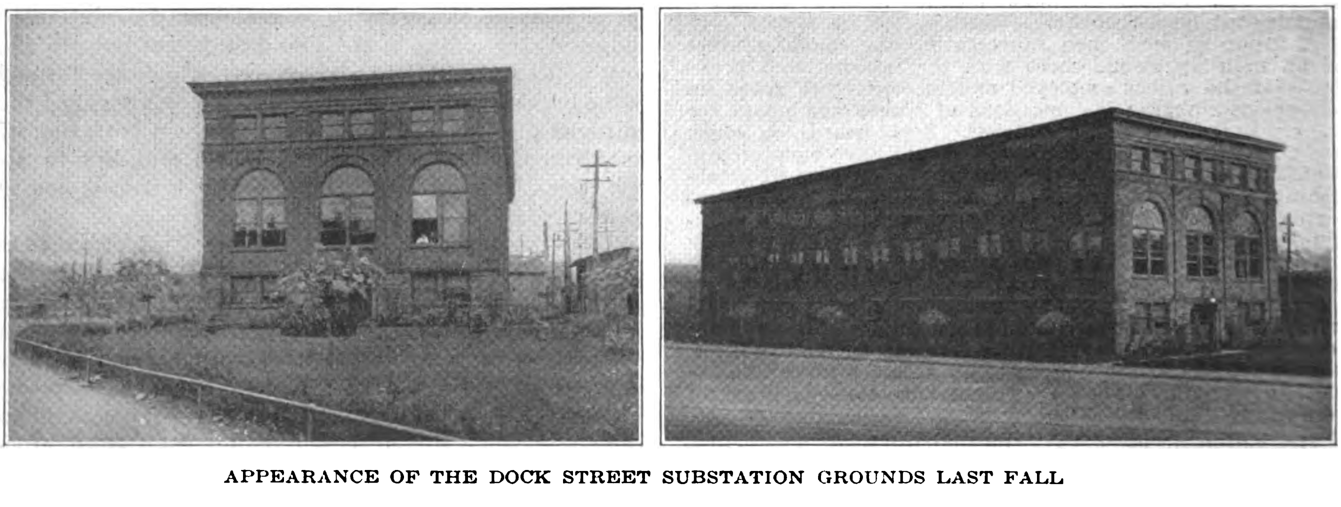
Along the long side of the building are hardy hydrangeas, 4 ft. apart, with salvia between. The hydrangeas cost 12 cents each. At the front entrance forty roses, costing 25 cents each, were placed on 2-ft. spacing, and blue spruce trees (Kosteriana), costing $5 each, were planted in the lawn. Around the whole plot are small beds, 3 ft. x 7 ft., thirty-six in number, which are now planted with 100 tulips each for early spring bloom. The total cost of these was $36. The center bed, on the entrance side, contains 600 Darwin tulips, for early spring bloom, and it cost $12. This bed is 12 ft. in diameter.

After the tulips cease blooming the bulbs will be lifted and brought indoors for curing. The center bed will then be filled with cannas, placed 12 in. apart, with a row of salvia similarly spaced. This bed will be set off with a row of dusty miller. The small beds will contain annuals, such as asters, sweet peas, etc., with one peony bush in each bed.

The first planting of the Dock Street substation ground cost about $155. As hot beds are maintained behind the station the cost of the small annual plants will be only that of the seeds. All labor is furnished by the regular power department force.

Safety Cars Satisfactory in Mansfield

H. A. Cowgill, superintendent Mansfield Public Service & Utility Company, Mansfield, Ohio, states that the safety cars operated by this company have given great satisfaction to all parties concerned. There is a growing desire on the part of the trainmen to operate the new cars, not only on account of the slightly greater wage rate but because the men find themselves less tired at night than they did when operating the larger cars. Several men entitled by seniority to day runs prefer night runs on safety cars.



APPEARANCE OF THE DOCK STREET SUBSTATION GROUNDS LAST FALL

Some Mysterious Car Ailments

Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD

A Commutator of an Interpole Motor That Insisted on Developing Flat Spots

A FEW DAYS after the motors on a car operating in city service in the Middle West had been overhauled the commutator of one of the motors developed a bad flat spot. The armature of this motor had been changed when the motor was overhauled and a newly-rewound armature had been installed. The flat spot was removed by turning the commutator down and the armature was again put back into the motor and the car was returned to service. After two weeks' time the car again came into the shop with a bad flat spot which covered from five to six bars of the commutator. As it seemed probable that a mistake had been made in winding the armature this was removed and the original armature was reinstalled in its place. The connections and throw of the leads for the newly-rewound armature were checked over carefully but no trouble was found. After another two weeks' service of the car the original armature came back with a very bad flat commutator. The commutation of the motor was watched while it was in service and this appeared to be sparkless but in starting there appeared to be a heavy drag so that the motor would start hard with a heavy pull on the line. It was then decided that there must be a defect in the field or in the connections to them, although both the shop foreman and master mechanic were certain that the fields had been reconnected as they were before overhauling. However, the polarity of the field coils was tested and it was found that one of the interpole fields was reversed. The coil was changed to give the desired polarity and the car again returned to service. No further trouble was experienced with flat spots so it was evident that the remedy was effective.

How a Balky Car Was Cured

A HIGH-SPEED interurban car operating on a railway line in the Central Western States was reported for irregular action of the control equipment. This car was equipped with automatic battery type control and a 14-volt storage battery was used to supply the operating current. The trouble as reported was that sometimes the control equipment would notch up only to the second series resistance point, while at other times the equipment would operate satisfactorily. A representative of the control manufacturer inspected the equipment for a possible defect. At that time, however, the control equipment was working satisfactorily, and nothing unusual was found. The equipment continued to operate properly for nearly a month after this inspection. Then it went back to its old tricks. The master mechanic of the road took the case under his special supervision and rode on the car for two days in service before anything unusual occurred. He decided that there must be a loose connection somewhere and accordingly had the car shopped for detailed investigation. A careful inspection was made of all terminals and connections, but all appeared to be tight. He was just getting ready to have the car rewired as a last resort when his attention was called to a connection which was tapped onto the lead running to No. 2 line switch. He removed the tape from the connection and found it loose, so that it could be moved back and forth on the wire from which the insulation was removed. By operating the control equipment with this connection removed, it was found that it would notch up only to the second point, while with the wire connected firmly to the exposed wire the control equipment would notch up to its proper position. The wires were cleaned carefully and again resoldered and the trouble of the erratic action was overcome.

Exceptional Causes for Hot Armature Bearings

HOT armature bearings, aside from the annoyance they cause, are the most costly of all equipment troubles, since they usually result in excessive damage to the armatures through rubbing the pole faces. One large railway experienced a large amount of trouble from this source on some new motors which had just been placed in service. Engineers from the manufacturer and railway company at first thought that the trouble might be caused by improper packing of the bearings or the use of inferior waste. Accordingly, all bearings were repacked carefully by an experienced man and the highest grade of waste only was used, but the trouble still continued.

In checking some of the new bearings for clearance before they were placed in service it was discovered that the bearings were not round. The bearings were intended to be 0.006 in. larger than the shaft. When measured across one axis proper clearance was found but when measured on an axis at right angles to this there was no clearance at all. It was also discovered that the bore of the bearings was not true with the housing fit, so that there was a tendency for the bearings to bind on the shaft. The diameter of the bearings at the two ends was also not the same. These inaccuracies and imperfect machining had resulted from the jigs in which the bearings were machined, allowing the bearings to spring out of shape somewhat due to the strain of machining. All bearings were accordingly removed from the motors and carefully rebored and the trouble from hot armature bearings entirely disappeared.

Use As Incubators Does Not Improve Air Brake Equipment

A VERY uncommon freak accident occurred on an electric railway which puzzled the mechanical department for some time. A motorman operating one of the cars had a collision which was very serious and did considerable damage. He insisted that at the time of the accident he was operating his car very carefully and that he had applied the brake in sufficient time to have enabled him to make the desired stop without accident, but that the brakes apparently did not operate properly. The air brakes on the car were subjected to a very careful inspection; the piston travel was measured, all adjustments carefully tested, and everything was found in satisfactory condition. The car was returned to service and continued to operate satisfactorily for several weeks, when again it had an accident similar to the one just described. It was then decided that all air-brake apparatus on the car should be dismantled in an endeavor to locate the cause for the trouble. Accordingly, the entire air-brake apparatus was removed from the car and taken apart.

In one of the passages of the triple valve there was found a collection of eggs which had been deposited there by an insect and were developing. As they spread out and grew larger, the air passing through the passage blew them into one of the ports of the triple valve. This became choked and caused the slow application of the brakes. The action of releasing the brakes, or of another application cleared the obstruction so that the equipment operated properly. Operation continued to be satisfactory until additional eggs were developed so as again to choke the port of the triple valve and prevent the passage of air.

Motormen Are Not Always to Blame for Rough Operation

THE jerks and inconvenience to passengers from the sudden starting or stopping of cars are most commonly blamed on the motorman by the traveling public. Some of these are caused by faulty condition of the equipment as appears from the following experiences:

On returning to the terminal with his car a motorman reported that he could not get any braking effect from a service application of the brakes and had continually to move his brake handle into emergency position to stop the car. This resulted in exceedingly rough operation and caused severe criticism from the passengers. The trouble was eventually located in the motorman's brake valve and on removing this from the car and taking it apart a small piece of rubber from a gasket was found stopping up a port on the seat of the valve. This piece had been pinched off the gasket by careless assembling of the valve and was the cause of the trouble.

Another case of air-brake failure caused in a similar manner as the preceding was due to the air-brake inspector, in assembling a hose, allowing the end of the hose connection to cut the inner lining so that this in turn completely closed the end. Owing to its unusual character, the location of this defect baffled the inspectors for a considerable time.

Considerable trouble was experienced on a large railway property with stiff, or hard-working, brake valves. But a short time would elapse after they were lubricated before they would be reported again for being stiff. Tests of various lubricants were made but it was not until one of the workmen suggested olive oil that the desired results were obtained. This might be considered as an expensive lubricant to use but with the small amount of oil required and the freedom from troubles, the results easily justified its use.

Why Manufacturer's Test-Stand Results Did Not Apply on the Line

AN ELECTRIC railway that was just placing some newly equipped cars in service experienced considerable trouble due to the motors flashing over. These motors were of a late interpole type with tapped-field control and the flashing occurred during the operation of the tapped-field position. The manufacturer's engineers were severely puzzled to account for the trouble as the motors had showed exceptional overload capacity on test at the manufacturer's plant. The operation of the equipment in service was watched carefully and tests were made to determine the maximum temperature rise of the motors while in service. All appeared normal and the temperature rise was not excessive.

Meters were then installed in some of the principal circuits and readings of current and voltage were taken during operation. These readings showed that there was an abnormal current swing in passing from the full-field to the tapped-field position of the control. The resistance of the two parts of the fields was then taken and it was found that instead of cutting out 40 per cent and leaving 60 per cent in circuit on the tapped-field position as was intended, 60 per cent was being cut out. A mistake had been made in the permanent wiring of the switch group at the manufacturer's plant. All connections had been made according to the wiring diagram but this did not indicate which were the large and which the small portions of the fields. The trouble was corrected by interchanging the two outside leads to the motor fields. The motor leads were disconnected from the car wiring and were pulled back through the motor bushings to the inside of the motors. After interchanging the two outside field leads they were again pulled back and reconnected to the leads running to the switch group. This produced a change in the direction of rotation of the motors so that the car moved in the opposite direction from that indicated by the master controller and to correct this the leads from the master controller to the reverser were exchanged. After the necessary changes had been made the equipments operated satisfactorily.

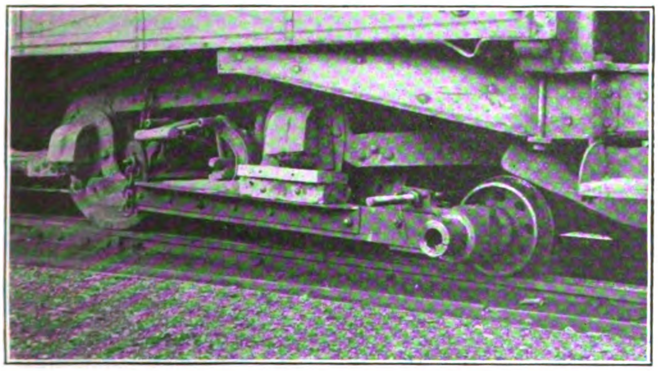
Handling Cars with Broken Axles

Detroit United Railway Has a Pony Truck That Does the Work of an Auto Wrecking Car Always Ready for an Emergency Call

BROKEN axles are something which, as the saying goes, "happen in the best of regulated families" or in this case, on the best electric railway systems. For years studies have been made of this subject but the problem still remains to build an axle of efficient weight that is positively immune against breakage. Careful watching and periodical tests make it possible to remove from service the greater number of imperfect axles before an actual breakage occurs, but as it is sometimes impossible to detect the weakness which later results in an emergency call for assistance or a "pull in," most railways find it advisable to provide themselves with some form of equipment to be used when the necessity arises.

The Detroit United Railway has developed a pony truck which will fit any type of electric car truck, without the use of any bolts for fastening it, and which enables a car with a broken axle to proceed to the shops under its own power with a minimum of delay to traffic.

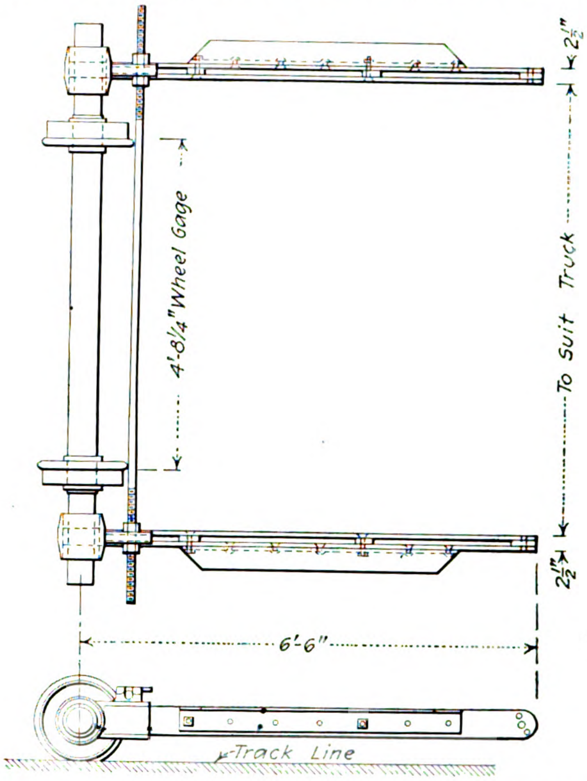
The first device developed was a skid, but this has now been replaced by the pony truck outfit shown in the accompanying figures. Each side arm is made up of two plates separated by a filler plate, riveted in place. A chain hook slips between these plates at the free end of the side arms and a chain passing over the car truck and fastened on either side by the chain hooks supports the arms. To the opposite end of the side arms are riveted heavy journal castings, 8 in. in length, and having inserted from each end brass bushings 2½ in. long, which leaves a 3-in. oil well between the bushings. This oil well is packed with oily waste to insure perfect lubrication. The journals of a 5-in. axle, fitted with 14-in. pony wheels, fit into these journal boxes. To eliminate some weight and provide a simple means of handling this truck, the axle is bored hollow 2¾ in. in diameter and to a depth of 15 in. To keep the side arms at proper distance a spacing rod is set in a socket just behind the pony wheels.



METHOD OF ADJUSTING PONY TRUCK TO CAR TRUCK WITH A BROKEN AXLE

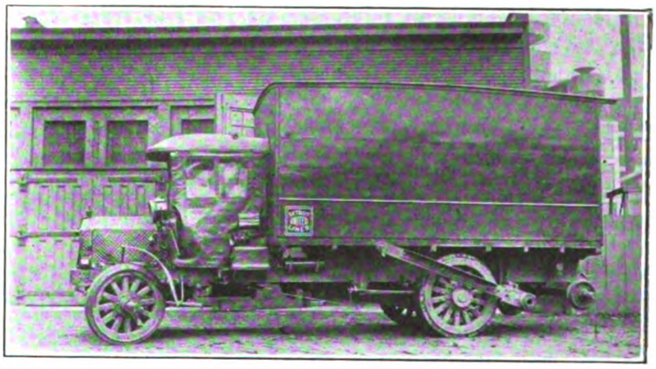
This pony truck outfit is carried assembled on the automobile wrecking cars for the city lines, and on the interurban lines the outfit is carried on the motor cars of work trains.

The operation of placing the pony truck in position under the car truck is simple and takes about five minutes for two men. The spacing rod is first removed. The side arms are then taken off by releasing one tail nut on each. The short bar is used on each end of the pony axle to lift it, and place it in position either behind or ahead of the damaged car truck. The car truck is jacked up, the side arms adjusted with chains and wooden blocks, the spacing rod is snapped in place, the jacks are removed, and the car is taken under its own power to the shops.



ASSEMBLY DESIGN OF PONY TRUCK FOR BROKEN AXLES

Before this device was developed, a trolley wrecking car had to be called, and the damaged car was pulled to the nearest wye. Here the car was jacked up and a new truck put under it. This meant a considerable delay to traffic and consumed a great deal to time. Aside from the saving in traffic tie-up, it is estimated there is a saving of at least $20 per car in labor cost for each emergency case of this kind.



DETROIT AUTOMOBILE WRECKING CAR WITH PONY TRUCK ATTACHED

Not the least important feature in dealing with such emergencies is the wrecking equipment. A trolley wrecking car is subject to much delay in arriving at the scene of trouble, having to make a greater mileage and having to come to a stop perhaps 1000 ft. or more from the wreck, because of the line up of cars between it and the wreck. This then makes it necessary to drag the pony wheels and wrecking apparatus this additional distance by hand.

For this purpose the Detroit United Railway has an automobile wrecking car, the body of which was built in the railway company's shops and placed on a 5-ton Packard chassis. The chassis cost $4,500, the body $350, and the wrecking equipment and tools with which it is furnished cost $1,350. The equipment consists of one set of pony trucks for carrying broken axles, three each of three types of jacks, four sets of replacing frogs, two sets of block and tackle, 500 ft. of 1⅜-in. rope, and 500 ft. of 1-in. rope, wound on two reels suspended at the front of the body, together with the usual complement of small equipment, such as lanterns, crowbars, splice bars, chains, picks, shovels, rubber coats and boots and carbic hand lights. This same equipment is also carried on motor cars of work trains on interurban lines.

The company has three automobile wrecking outfits, two of which are lighter than the one described. These cars are used for all kinds of emergencies. For the car described there are two competent wrecking men always on duty. There are two shifts of twelve hours each, so the truck is available for service on a moment's notice.

The cost of the pony truck outfit is approximately $200, and a patent on it has been applied for.

Is the Core of Stranded Wire Disproportionately Stressed?

Actual Stretch of Outside Wires Is Greater but Due to Their Increased Length the Per Cent Stretch Is the Same

BY PAUL A. B. SAHM
Associate Electrical Engineer United States Bureau of Standards

IN AN article entitled "Details of Line Construction with Special Reference to Guying and Anchors" by Charles R. Harte, on page 868 of the ELECTRIC RAILWAY JOURNAL for Nov. 16, 1918, the assumpton is made that the center wire of a seven-wire strand takes all the load at first and breaks long before the others, and that it should, therefore, not be counted in determining the strength of the entire strand. The following is given in the hope that it will clear up a misunderstanding seemingly quite common among engineers regarding the behavior of stranded wires in tension.

The above assumption is not warranted even if the strand is loosely wrapped. If it is closely wrapped from the start so that the ratio of length of outside to inside wire remains constant, all wires will take their proper portion of the load.

Because it is difficult for the manufacturer to make up a long strand without a splice in any one wire, most specifications for guy strand require that not more than one wire be spliced in a given length of wire. This splice does not, of course, develop the full strength of the wire, and in order to "play safe" some companies specify that the guy strand with one wire broken shall meet the desired rating. This, however, is no reason for "picking on" the center wire.

Assume a seven-wire strand of 100 in. length clamped so that the wires cannot change their relative positions at the clamps and stretch the entire strand 1 per cent. Assume the outside wires wrapped close and 1 per cent longer than the inside wire (0.97 per cent listed by American Steel & Wire Company).

Let L_{si} = stretched length of inside wire.
L_{so} = stretched length of outside wire.
L_{oi} = original length of inside wire.
L_{oo} = original length of outside wire.

Then the stretch of the inside wire is

$L_{si} - L_{oi} = 101 - 100 = 1$ in. $= 1$ per cent.

The stretch of each outside wire is

$L_{so} - L_{oo} = 101 \times 1.01 - 100 \times 1.01$

$= 102.01 - 101 = 1.01$ in., $\frac{1.01}{101} =$

1 per cent of its original length.

It is seen that although the actual stretch is greater for the outside wires the per cent stretch is the same for all wires when wrapped close, and it is also evident that this will hold for any amount of stretch. If the wires will all stand the same total per cent of elongation they must all be equally near the breaking point and will break at the same time, even if of different diameters.

Assume now a similar strand with outside wires wrapped loosely and 1.2 per cent longer than the inside wire when slack and 1 per cent longer when under tension. Stretching the strand 1 per cent will give a stretch of the inside wire of 1 per cent (evidently) and a stretch of the outside wires of

$= 102.01 - 101.2 = 0.81$ in.

$L_{so} - L_{oo} = 101 \times 1.05 - 100 \times 1.012$

$\frac{0.81}{101.2} = 0.8$ per cent of its original length.

Up to this point the inside wire has stretched 25 per cent more than the outside wires and is, therefore, nearer the breaking point, but this condition changes as the strand is stretched further as may be seen from the following:

Stretching the strand 5 per cent will give a stretch of the inside wire of 5 per cent (evidently) and a stretch of the outside wires of

$L_{so} - L_{oo} = 101 \times 1.05 = 100 \times 1.012$

$= 106.05 - 101.2 = 4.85$ in.

$= \frac{4.85}{101.2} = 4.8$ per cent of its original length.

At this point the inside wire has stretched only 4.2 per cent more than the outside wires as compared with 25 per cent in the previous case.

The permissible ultimate elongation of the component wires of the strand will vary over a much wider range than this so that there is no reason for expecting the center or any other wire to break sooner than the others and the center wire will carry only its proportion of the total load.

The above is for practical conditions and shows that even for loose strands the inside wire is only very slightly ahead of the outside wires as regards breaking and its strength certainly cannot be neglected. When testing stranded wire to the breaking point all wires are found to break at the same instant every time and this is also found in the field, except, of course, when the wires are corroded to different extents or are not solidly attached at the ends.

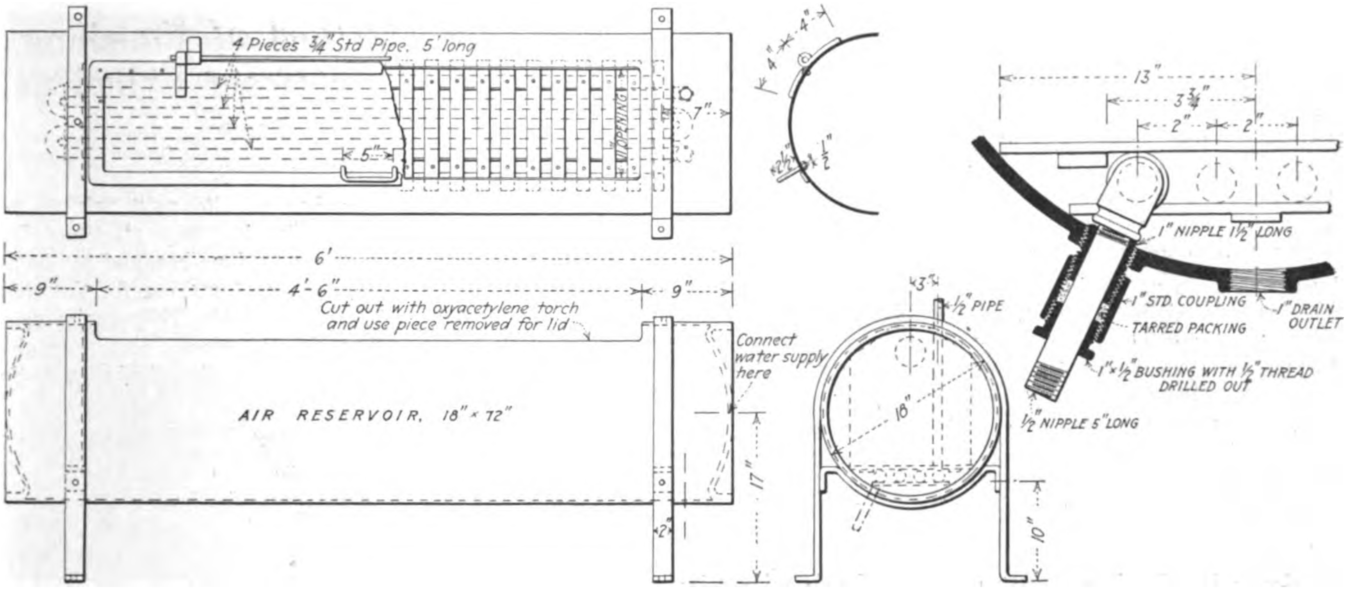

4 Pieces ¾" Std Pipe, 5' long
OPENING
7"
5"
6'
9"
4'-6"
9"
Cut out with oxyacetylene torch and use piece removed for lid
AIR RESERVOIR, 18" × 72"
Connect water supply here
17"
2"
10"
18"
½" PIPE
13"
3¾"
2"
2"
1" NIPPLE 1½" LONG
1" STD. COUPLING
TARRED PACKING
1" DRAIN OUTLET
1" × ½" BUSHING WITH ½" THREAD DRILLED OUT
½" NIPPLE 5" LONG

FIG. 1—DETAILS OF CONSTRUCTION OF PINION HEATING TANK USED IN SHOPS OF UNITED RAILWAYS COMPANY

Pinion Heating in Shops and Carhouses

United Railways of St. Louis Builds Simple Equipment for Heating All Pinions Before Installation

When pinions were made of softer materials there did not seem to be the same need for heating them before placing them on the motor axles as now exists with the harder heat-treated pinions. This has been the experience at the shops of the United Railways of St. Louis, where it has been found that the present grade of pinion when placed cold on the axle will often work loose.

All pinions are now heated by this company before being placed on the axles. To accomplish this the equipment, shown in Figs. 1 and 2, has been installed in the main shop. This heater was formerly an 18-in. x 72-in. high-pressure air storage tank. A section 11 in. x 54 in. has been cut out of one side with an oxy-acetylene torch and this, furnished with hinges, a handle and overlapping strips, forms a door in the top of the tank.

A steam coil lies in the bottom of the tank under a wire grating and is connected to a main steam line with a pressure of 150 lb. A gage, a ½-in. safety valve and a check valve are also provided. The tank is further equipped with a cold water inlet and a drain and steam trap, and is mounted as shown in Figs. 1 and 2.

There is a space of 12 in. above the grating for the water, which is heated to a temperature of 212 deg. Fahr. In this water pinions enough for the day's work are placed each morning and removed as needed by means of the hooks seen behind the tank in Fig. 2.

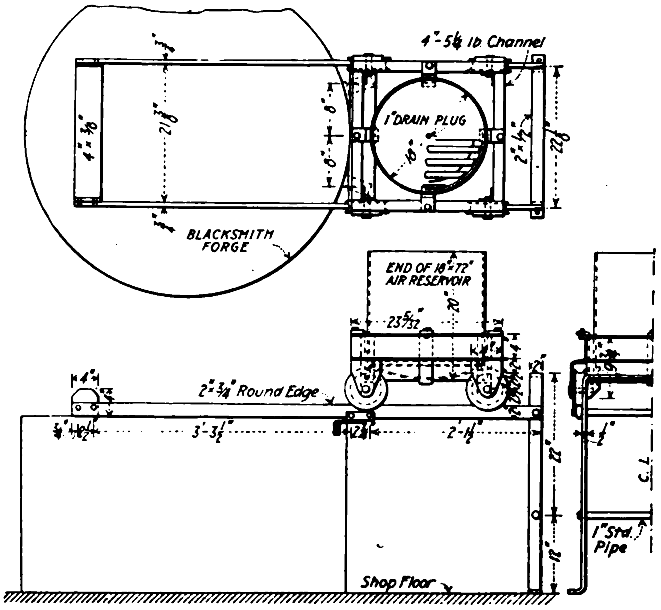

4"-5¼ lb Channel
4"×⅜"
21⅝"
8"
8"
1" DRAIN PLUG
18"
2"×½"
22⅝"
BLACKSMITH FORGE
END OF 18"×72" AIR RESERVOIR
23⅝"
20"
2"×¾" Round Edge
1¼"
¼"×1½"
3'-3½"
2'-1½"
22"
12"
1"
C.L.
1" Std. Pipe
Shop Floor

FIG. 3—DETAILS OF PINION HEATING TANK USED IN CAR HOUSES OF SAME COMPANY

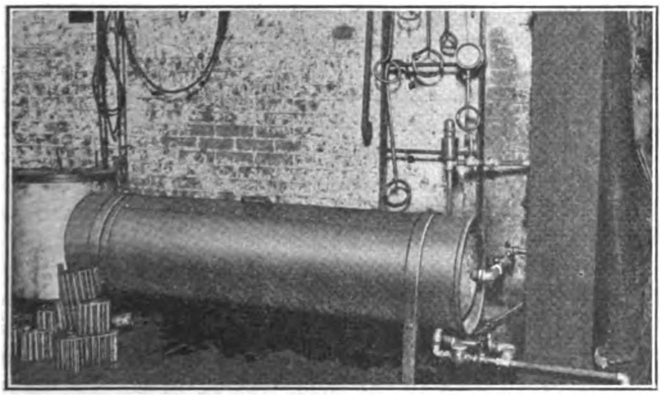


FIG. 2—PINION HEATING TANK DETAILED IN FIG. 1

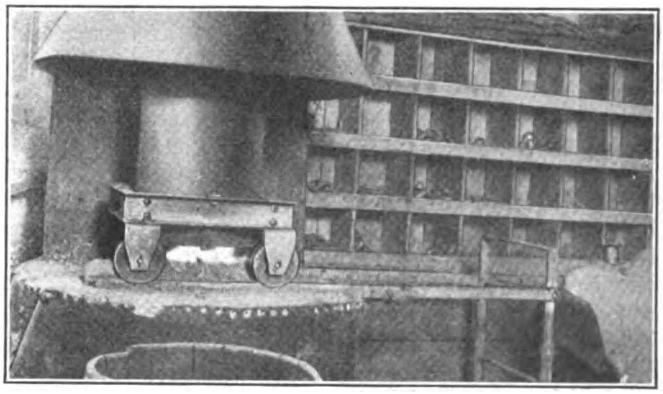


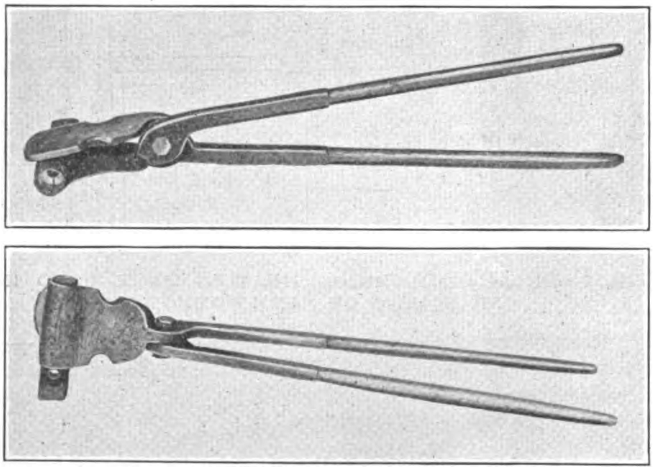
FIG. 4—PINION HEATING TANK OVER FORGE

A considerable amount of pinion changing is done at the outlying carhouses and as these in the summer are not provided with steam some other method of heating the pinions was essential. All of the carhouses are equipped with tools for making minor repairs and with a blacksmith shop so the heating equipment shown in detail in Fig. 3 and by photograph in Fig. 4, was arranged to heat the pinions over the forge.

This equipment, of which seven outfits are being built, consists of 20 in. cut from the end of an 18-in. x 72-in. air storage tank by means of an oxy-acetylene torch and mounted open end up on a truck built as shown in Fig. 3. This little pinion heating car, as it might be called, operates on a short track attached to the forge so that when the latter is needed for other purposes the car can be pushed to one side for a few moments. Pinions sufficient for the day's needs are placed in the tank each morning and removed as needed.

Unique Soldering Tongs Save Much Time in Soldering Connectors to Motor Leads

THE use of a knuckle-joint or screw-type connector to connect the motor leads to the car-body leads of electric cars is universal practice. These connectors are usually provided with a saw cut along the side. In order to solder these connectors to the leads they are filled with solder and the lead is inserted. To prevent the solder from running out the usual method is to wrap the connectors with friction tape and leave this in place during soldering and then remove it again after the soldering has been completed. To do away with the necessity for taping up these connectors the soldering tongs shown in the accompanying illustration have been devised by Fred Koebrich, foreman of the East New York surface shop of the Brooklyn Rapid Transit Company. These tongs are provided with a long jaw on one side which fits the connector very closely and provides a tight joint along the saw cut where the solder usually runs out. By using these tongs the terminal can be quickly inserted and the soldering completed without applying tape to the terminal. The handles of the tongs are made exceptionally long in order that there may be no danger of their becoming hot while soldering. Where connectors have become burned or have a rough surface a layer of friction tape laid inside the tongs will fit over the rough places and provide a tight joint.



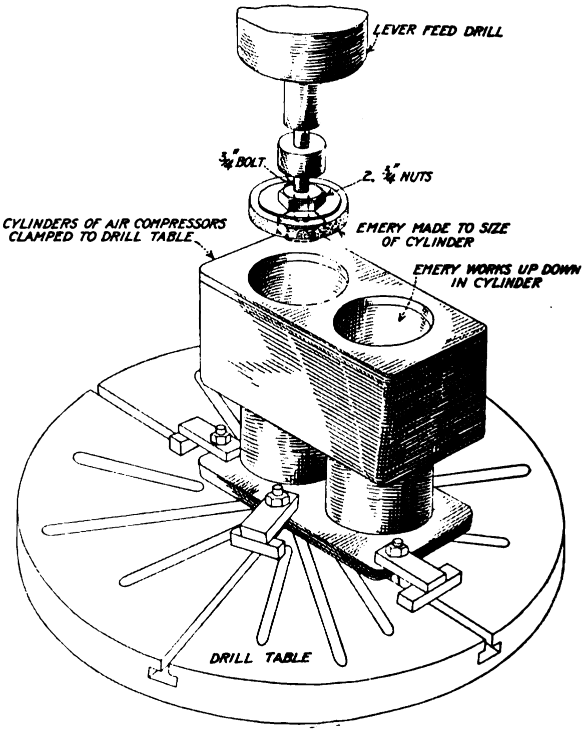
TONGS FOR SOLDERING CONNECTORS TO MOTOR LEADS

Satisfactory Method of Finishing Welded Air Compressor Cylinders

BY J. D. PRIDE

Master Mechanic Nova Scotia Tramways & Power Company, Ltd., Halifax, N. S.

DURING the cold weather of the past winter we had the misfortune of having our Gardner Rix motor-driven air compressor cylinders cracked by frost. This compressor was used at our quarries for furnishing the air necessary in drilling rock. The cracks were in the cylinder proper and did not extend to the outside of the water jackets. Owing to the design of the cylinder it was impossible to weld from the outside, so this work had to be done with the acetylene process on the inside. After the welding operations were finished, we gave the cylinder a gas test by plugging all openings, and by connecting the water inlet of the water jacket to a gas jet by means of a rubber tube. A lighted candle was then passed over the welds, which proved their tightness.


LEVER FEED DRILL
¾" BOLT.
2. ¾" NUTS
CYLINDERS OF AIR COMPRESSORS CLAMPED TO DRILL TABLE
EMERY MADE TO SIZE OF CYLINDER
EMERY WORKS UP DOWN IN CYLINDER
DRILL TABLE

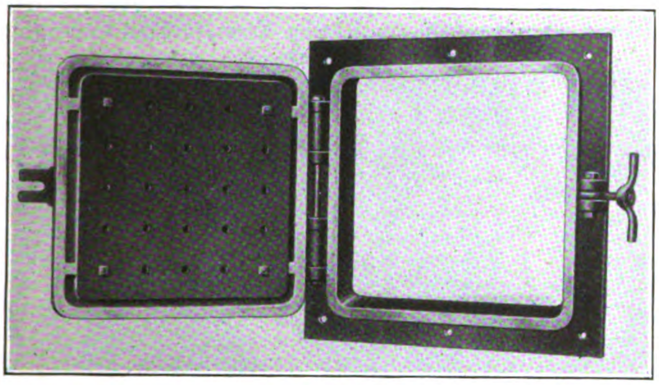
ARRANGEMENT FOR FINISHING AND SMOOTHING WELDED AIR COMPRESSOR CYLINDERS

The machining and smoothing off of the rough surface left by the welds inside the cylinders, without changing or losing the piston size, proved a greater problem than we had anticipated. We first tried to machine the cylinders by using a drill press with a boring bar, but owing to hard spots in the weld and the high speed at which it was necessary to operate, this method proved unsatisfactory. We then secured an old emery wheel and ground and dressed it down to the exact size of the cylinder bore. A mandrel for the emery wheel was made out of a ¾-in. bolt. By putting this through the hole in the wheel, and by screwing a nut on either side to hold it in place, the compressor cylinder was clamped to the table of the drill press and by means of the hand-speed spindle the emery wheel was worked up and down over the rough spots till they were smooth, and the cylinders were in as good condition as when received from the factory.

New Type Airtight Ash-pit Door

THE American Steam Conveyor Corporation, Chicago, and New York, has produced a new type of ash-pit door as the result of careful tests and study, covering all points essential to successful operation and durability.

An ash-pit door should be of ample size to allow easy removal of the ashes from the pit, but should not be unnecessarily large. If too large, it is impossible to keep the door from warping and thus leaking air, and it is also too heavy to be handled easily. A 24-in. x 36-in. door is ample for the largest pit and this is the size recommended for ordinary use. Three other sizes of doors are also built of the same general design. These are in size, 18 in. x 18 in., 22 in. x 26 in. and 24 in. x 24 in. The frame of the American ash-pit door is of cast iron with the hinge and locking lugs cast on. The frame is of an angle design and sets well back into the setting. It is easily fastened into the pit wall by four bolts, one in each corner. The door itself is of heavy cast iron and is provided with a heavy ventilated cast-iron liner to prevent contact with the hot ashes and consequent warping. The bearing surface of the door and frame is carefully machined to make an airtight joint.



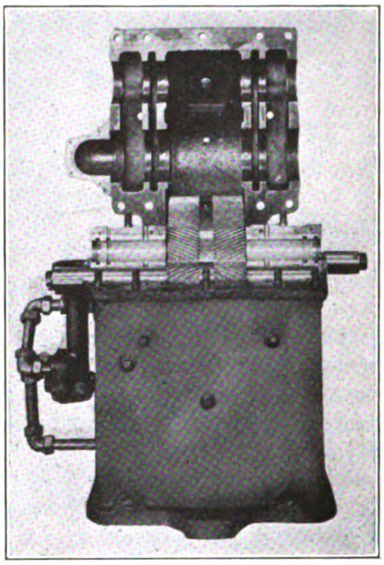
AIRTIGHT ASH-PIT DOOR

Reduction Gearing for Turbine Users

TERRY reduction gears, manufactured by the Terry Steam Turbine Company of Hartford, Conn., are again on the market, not having been obtainable during the last year, due to the concentration of this company almost entirely on turbines for the destroyers. Although made primarily for use with Terry turbines, the gears alone are available as a separate speed-reducing mechanism.

The Terry gears and pinion are of the stub-tooth, double-helical type, generated to true form. A well-ribbed, double-walled, box-like structure, extending the full depth of the case, forms a rigid support for each pair of bearings. The space between the walls acts as a water jacket for cooling the oil. The ribs between the walls act both as stiffening members and water baffles. The central part of the case, directly under the gears, forms an oil reservoir which contains sufficient oil to supply not only the gears, but also the turbine. The bearings are split horizontally to permit their replacement without removing the couplings.

Oiling is provided for by a forced feed system, the ring oiling system having been found unsatisfactory for turbine reduction gear bearings. The oil pump is located well below the oil level in the reservoir, to avoid suction lift. The oil is pumped from the reservoir through short, direct, brass piping to a self-cleaning strainer, thence through distributing passages to large, annular oil pockets around each bearing shell, and through the spray pipe from which the oil is sprayed, for lubrication of the gear teeth. The oil pressure gage is located in one of the above-mentioned annular oil pockets at the most distant point from the oil pump. The pump and its bevel gear drive make a complete unit without stuffing boxes, or exposed running parts. The pump gears may be removed for inspection without disturbing the driving mechanism or oil piping, and the bevel gears may also be inspected by removing a small cover. The gears may be furnished for either direction of rotation, the only change being location of the oil spray piping to lubricate the gears above or below the contact point.



NEW TYPE OF REDUCTION GEARING

Equipment Inspection on a Kilowatt-Hour Basis

THE use of energy meters in connection with inspection of equipment was discussed by W. C. Bolt, Bay State Street Railway, in the issue of this paper for March 22. For convenience in quickly applying for this purpose the Economy railway meters already in use a card was devised to be placed over the lower part of the meter dial face, on which were printed the readings corresponding to inspection periods. Since the Bay State adopted this plan of car inspection the new meters which are hereafter sold to be used for equipment inspection purposes as well as a means for inducing economical car operation, are to be equipped with the set-back indicating dials, as shown in the accompanying illustration. A meter may have one, two or three of these inspection dials, as the plan of inspection for any property may require. On each dial are two pointers, a black one which rotates with the consumption of energy by the car, and a red one which is

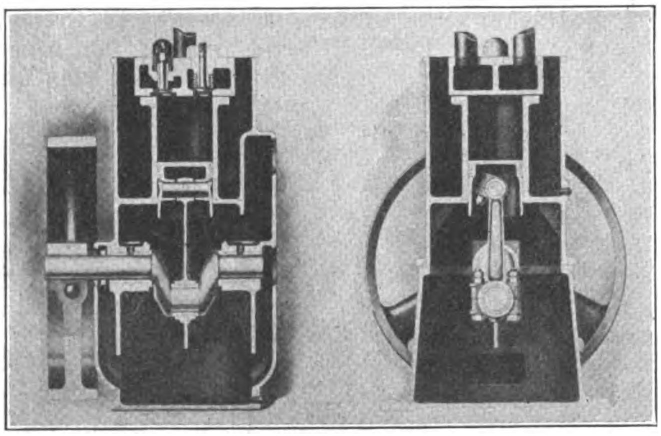
ENERGY METER EQUIPPED WITH MECHANISM FOR USE IN CONNECTION WITH EQUIPMENT INSPECTION set at the value of energy consumption corresponding to which an inspection is to be made.

The inspection dial hands are, of course, geared in with the meter driving mechanism, but they can be reset to zero by means of reset rods with knurled heads projecting from the bottom of the case. These rods are ordinarily locked but can be released by use of a key. They are pushed upward to engage the spindle carrying the hands. The red hands are set by opening the front cover of the meter; hence cannot be tampered with by an unauthorized person. With this scheme of inspection all that is necessary is to tell the carhouse forces to hold a car in for inspection when the black hand reaches the red hand.

The plan of inspecting equipment on a kilowatt-hour basis is adaptable to any electric car or locomotive, alternating or direct current. On one large property it is estimated that if the present daily brake and controller inspections were put on this basis it would be possible to reduce by 50 per cent the present number of inspections without changing the present factor of safety. This plan for car inspection has been developed by the engineering staff of the Economy Electric Devices Company, general sales agents for the Economy railway meter.

New Line of Small Air Compressors for Shop Use

THE Ingersoll-Rand Company of New York has recently placed on the market four sizes of Imperial Fourteen compressors. The capacity of these compressors runs from 3 to 45 cu.ft. per minute, at pressures up to 100 lb. per square inch. The small compressors can, however, be used for pressure requirements up to 200 lb. per square inch. They are single-acting machines of the vertical type built for belt drive. Where it is desired to drive them from a line shaft, both tight and loose pulleys are supplied. Where the use of independent motors is desired they can be furnished as a complete unit with the motor.



LONGITUDINAL AND CROSS-SECTIONS OF SMALL WATER-JACKETED AIR COMPRESSOR

The compressor in the small sizes is built with a ribbed cylinder for air cooling, for use where the service is intermittent, and with water-cooled cylinders of the reservoir type for continuous operation. Larger machines are water-cooled only.

The general appearance of these compressors resembles somewhat an automobile engine. The crankshaft and connecting rod are of drop forgings, and automatic splash lubrication is provided. Their construction is illustrated in the accompanying cross-section views.

Portable Electric Drill Used for Tightening Bolts

THE accompanying illustration shows a method that was used in the New York subway for tightening track bolts and screw spikes. A portable electric drill manufactured by the Van Dorn Electric Tool Company, Cleveland, Ohio, was used to furnish the power. A socket wrench, inserted in the tool head fits over the head of the bolt and is driven in the same manner that a drill would be ordinarily. This provides a very efficient and rapid method for doing this work.

TIGHTENING A SCREW SPIKE WITH AN ELECTRIC DRILL

Tool Tempering by Electric Heat

FOR the purpose of tempering tools the Westinghouse Electric & Manufacturing Company is using at its South Philadelphia Works an electric furnace in which a mixture of barium chloride and salt is kept in a fused condition and at any desired temperature by means of electric current. The furnace consists of a cast-iron cylinder about 3 ft. high and 3½ ft. in diameter packed with firebrick, with layers of asbestos. The central reservoir is 12 in. in diameter and 14 in. deep. The electrodes are set in the walls of the reservoir and the circuit is completed at starting by means of carbon sticks placed between them. Salt is fed into the reservoir and when it is fused it acts as a conductor and completes the circuit. The carbon sticks are then taken out and a mixture of barium chloride and salt is fed in, the final proportions being about 60 per cent barium chloride. The furnace throws off very little heat. It operates on a 16- to 30-volt a.c. circuit.

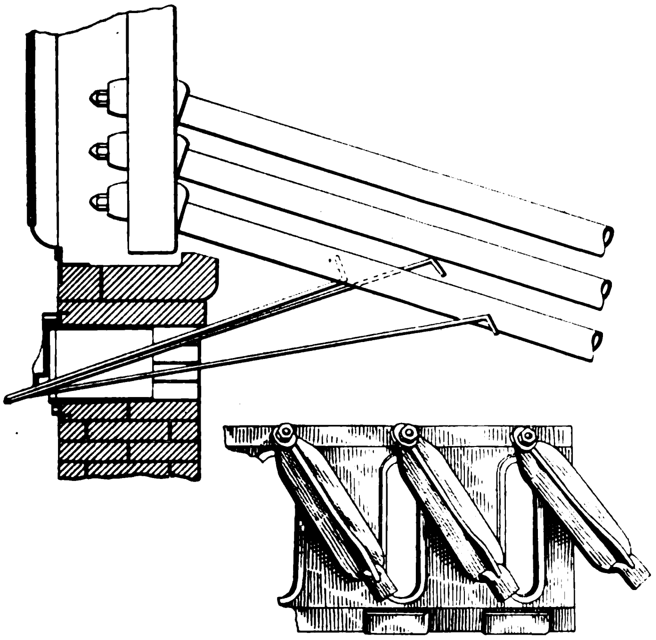
Scraping of Boiler Tubes in the Boiler Setting

A Casting with Openings in Front or Rear Wall of a Boiler Setting Gives Access for Scraping Off Cinder Deposit from Tubes

IN THE average boiler plant it is usual to operate the boilers at considerably above their rated or nominal capacity. High ratings are obtained by high air pressure under the grates, the effect of which is to lift small particles of incandescent coke and ash from the grates which are carried through the boiler in the furnace gases. A certain proportion of this coke or ash adheres to the bottom and sides of the tubes in the bottom row immediately above the fire.

A gradual building up of this cinder occurs which cannot be dislodged by the usual soot blowers or tube blowers, nor by the older hand lance method, and the only recourse is to cut the boiler out of service and scrape the cinder from the tubes after cooling down the furnace. This is an expensive operation and would be entirely unnecessary if means were provided so that it would be possible to scrape this cinder off the tubes while the boiler is in service.

The usual tube-dusting doors provided in horizontal water-tube boiler settings do not give access to the under side of the bottom row of tubes. To meet this condition the Combustion Engineering Corporation offers a tube scraping device illustrated herewith, the purpose of which is to provide openings in the front or rear wall of a boiler setting through which a light hook may be used for scraping the cinder from the bottom and sides of the lowest row of boiler tubes.



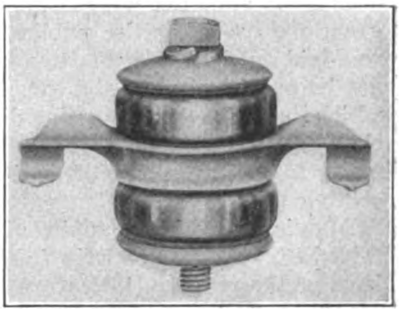
BOILER SETTING WITH TUBE SCRAPING DEVICE INSTALLED

These boxes are made in sections of three, four and five doors which are spaced the same distance apart as the boiler tubes in the boiler in which they are installed. Two or more sections are bolted on angles or Z-bars along the top and bottom sides providing one opening or door for each space between tubes. The castings are of sufficient strength to support the brick wall above them and they will, when placed under the rear header of a horizontal water-tube boiler of the Heine type, support the weight of the boiler also. The boxes are about 12 in. deep and heavily ribbed vertically between the doors or openings. When installed, the brickwork is so laid that the boxes are protected from radiant heat, and being in short sections of 21 in. to 35 in. in length will not warp and twist or loosen the brickwork above and below. Each opening is covered by a swinging door or cover, also of cast iron, the lower end of which passes behind a tapered spring catch which can be adjusted by a light blow of a hammer to hold the door tightly against the box.

When cleaning the tubes the attendant used a rod about ⅝ in. diameter and 10 ft. to 12 ft. long, of the same shape as an ordinary fire hook with one prong about 5 in. long.

Trolley Wire Suspension with Grid Resistor Insulators

A NEW trolley wire insulator has recently been introduced by the General Electric Company of Schenectady, N. Y. This is called type P-2, and consists of two duplicate porcelain insulators, a malleable iron yoke, a stud bolt, together with insulating and locking washers. The particular feature is the renewable porcelain insulation, which replaces the usual molded insulating material. Many electric railways using G. E. equipment are already using these porcelain insulators for supporting the grid resistors underneath electric cars. For such roads there may be a certain economy effected by carrying the insulator in stock for more than the one purpose. The malleable iron yoke has reinforced lugs for holding the span wire, and is reversible, so that it may be used with the lugs turned either up or down, as preferred. The stud bolt passes down through the center of the insulator. By rotating this, the ear will be drawn up tight against the bottom of the suspension, with the ear properly aligned with the trolley wire, regardless of its angle with the cross-span wire. A lock washer under the head of the stud prevents the same from loosening and backing out. All metal parts are protected against corrosion by electric oven sherardizing.



NEW TROLLEY WIRE SUSPENSION

Cuban Engineers Organize

On Feb. 21, 1919, there was formed in Cuba, with headquarters at Havana, an "Association of Members of American National Engineering Societies." The society has been incorporated, and it will include members of engineering societies within reach of headquarters. It is planned to meet about four times each year at a dinner or breakfast, or on an excursion, the idea being to emphasize the social rather than the technical side of the engineer's life. About thirty men from Havana and vicinity attended the organization meeting and a larger attendance is expected at the first regular meeting to be held soon.

Committee on Public Utilities Organizes

U. S. Chamber of Commerce Names Individuals to Report on Utility Question—Committee Meets and Adopts Program

THE Chamber of Commerce of the United States has created a committee on public utilities, which had its first session, for organization purposes, at the headquarters of the national chamber in Washington on April 16. The committee is composed of eleven members as follows:

Lewis E. Pierson, Irving National Bank, New York, (chairman); Henry G. Bradlee, president, Stone & Webster Management Corporation, Boston, Mass.; Arthur W. Brady, president, Union Traction Company, of Indiana, Anderson, Ind.; F. B. DeBerard, director of research, Merchants' Association, New York; P. H. Gadsden, vice-president, United Gas Improvement Company, Washington, D. C.; E. K. Hall, Electric Bond & Share Company, New York; Albert W. Harris, president Harris Trust & Savings Bank, Chicago; Charles L. Harrison, Chief of Ordnance, Cincinnati District, Cincinnati, Ohio; J. W. Lieb, vice-president, New York Edison Company, New York; P. W. Myers, president, St. Paul Association of Public and Business Affairs, St. Paul, Minn.; James S. Havens, Eastman Kodak Company, Rochester, N. Y.

The Washington representative of the ELECTRIC RAILWAY JOURNAL reports that after the meeting it was evident that the committee was very much alive to the public utility situation in the country, particularly as it affects the electric railway companies and the power companies affiliated with them. A very elaborate program for assisting the public utilities of the country was laid out by the committee, although its details cannot be published until the committee frames its report, which is to be made to the directors of the national chamber. Nevertheless, it is stated that the committee plans to call speakers of national prominence to the coming annual convention of the national chamber in St. Louis, at which a public utility section will be established, as the committee fully realizes that the problems of the public utilities are among the most serious of the reconstruction period of the nation, and require immediate consideration and solution.

PUBLIC UTILITY DATA TO BE COMPILED

At the St. Louis convention it is expected that the committee will have speakers representing the banking interests, the views of labor, representatives of municipal leagues, mayors of cities and others. After the convention, the committee purposes to compile authoritative data on public utility matters, so that material for a referendum may be sent to the national chamber's membership. Then, it is planned, a report will be formulated by the committee, to be forwarded to each chamber of commerce throughout the United States, particularly to local chambers of commerce, to enlist the interest of all who desire to work out various phases of public utility problems.

The committee, it was informally stated, came more or less to the conclusion or belief, in general, that mere increases in fares will not solve public utility problems, and that it will be necessary to obtain relief from taxes, such as paving taxes and other local taxes, to get public opinion in support of skip stops, and to work out other economies which, it is believed, are not always possible now under the control of public utility commissions.

A Portable Dispatcher's Office at Youngstown

A New Plan for Facilitating the Handling of Fare Boxes and Car Records Was Inaugurated on March 1

ON THE Youngstown, Ohio, city lines until recently a condition existed which made it necessary for the company to devise a movable dispatcher's or fare-box office. The circumstances were these: It was formerly the custom to remove the Cleveland fare boxes from the cars at the Public Square where the used boxes were placed in the treasury of the Youngstown Municipal Railway and empty boxes were supplied to the cars. The cars have some little distance to go before reaching the operating yards and carhouses where they are stored and on the way they take in a number of fares. The cars thus reach the yards with some money in the fare boxes, and it proved very difficult to prevent theft of this money. Although the yards are well patroled for general purposes the supervision could not be close enough to prevent the robbing of the boxes.

FARE-BOX CAR CONSTRUCTED

To overcome the above difficulty, and also to facilitate the handling of records on the cars, a new plan was put into effect on March 1 which involves the use of a portable dispatcher's or fare-box car stationed at the Haselton operating carhouse from which all Youngstown cars operate. This car is placed on the first track off the main line at the entrance to the carhouse when the cars are coming in during the evening and early night. All inbound cars stop at the fare-box car, and the fare boxes, car reports, trip sheets and time cards are removed by the dispatcher and placed in the car. This is furnished with fare-box racks along the side and a desk for the dispatcher. The car is an old single-truck car from which the seats were removed. On receiving the fare boxes the dispatcher gives the conductors receipts for them.

When all the runs are in, about 2.30 a.m., the fare-box car is run to the Public Square, where the loaded cash boxes are delivered to the accounting room of the treasury department and empty cash boxes are received and placed in the fare boxes. The car is then run to the operating yard, about 1000 ft. west from its first location, where it is placed on the No. 1 track off the main line. All cars operating out of the yards and carhouse in the morning pass this point and receive empty fare boxes and fresh trip sheets for the day's operation. Each conductor gives a receipt for his empty fare box.

The question might be raised as to why a fixed office would not have served the same purpose as the car. It could not be used in this case because all cars operate into one carhouse and out of both the carhouse and the yard. Hence portability was necessary. It might be mentioned also that between the time of the last run in and the first car out the dispatcher uses his time in checking time slips, car report cards and fare boxes. Obviously with this plan no thieving is possible and an excellent opportunity is afforded for casual inspection of the fare boxes. The plan described was worked out by R. Moses, assistant general superintendent of the company, which is a subsidiary of the Mahoning & Shenango Railway & Light Company.

LETTERS TO THE EDITORS

Mr. Schaddelee Defends His Plan

UNITED LIGHT & RAILWAYS COMPANY
GRAND RAPIDS, MICH., April 16, 1919.

To the Editors:

In your issue of April 12, on page 747, there is an article signed "Traffic Engineer." This article is a comment on my proposed plan of charging for street car fares.

If you had republished my entire article, so that "Traffic Engineer" could have read it, he would know that in my article I called attention to the injustice of charging the same fare to the short-distance rider as to the long-distance rider. The paragraphs I refer to are as follows:

> The inherent injustice and inequity of any straight fare schedule is that it charges the same fare to all passengers, regardless of the distance they ride and regardless of the number of times they ride per year or month. There has been some deviation from a straight fare basis by the sale of six tickets for a quarter, etc., but these deviations have been few and have not removed the inherent injustice of the straight fare schedule. Theoretically and as a matter of equity and justice, the prices charged for street car service should be based upon two factors, viz.—first, the distance that the passenger rides, and second, the number of times the passenger rides per year or per month. The unfairness of charging a passenger the same fare for riding half a mile as for riding from 5 to 8 miles is readily appreciated and understood by everyone. For that reason there has always been much earnest discussion in regard to ways and means to eliminate this injustice, or at least reduce it, and as a result we have the zone system.
>
> It is not my purpose to discuss this injustice of the fixed fare in connection with the distance of the ride, as this injustice cannot be solved apparently without the zone system, with its undesirable results in causing a congestion of population. The much greater injustice, to my mind, is the injustice of the fixed fare as applied to a passenger who uses the street car service say five or ten times per month, and the passenger who uses it from 40 to 100 times a month.

I believe "Traffic Engineer" and a good many other railway men have attributed decreases in riding to increased fares, when in many cases the decreased riding was due to other causes, and only a small portion of it due to the increased fare. In Cedar Rapids, Iowa, our company was voted a 6-cent fare by a direct vote of the people, yet for January, the first month when the increase was in effect, our total passenger revenue increased 26 per cent, and the number of passengers carried increased 9.4 per cent. In February, 1919, as compared to February, 1918, the increase in total passenger revenue was 23 per cent, and the number of revenue passengers carried increased 1.4 per cent, yet during these same two months we had other street railway companies, where the fare had not been increased at all, showing decreases in number of passengers carried.

My plan, as outlined in my article, is proposed in lieu of a straight 7-cent fare and provides for increases in the fares collected from every passenger. The casual rider will pay 10 cents just as easily as he will 5 cents, when it becomes necessary or convenient for him to use the street car, but the regular rider, especially the regular short-distance rider, is very apt to discontinue riding if he has to pay 7 cents every time he rides.

Under my plan the total increase to the regular rider would be 50 cents per month, no matter how many times he rode. The large majority of the people who ride during the peak hours are daily riders who ride to and from their residence to their place of occupation. These people are not responsible for the fact that as a rule all places of employment start work at practically the same time, and I can certainly see no justice in penalizing them because they ride during the peak hour, as they cannot help themselves in that regard.

My plan was not offered as a cure-all, or as an absolutely perfect system of charging for street car transportation. I merely offered it as an improvement over the old straight fare plan.

"Traffic Engineer" seems to think that I do not appreciate the wrong principle of the flat fare as applied to long and short-distance riders. As I have stated before, if he had read my whole article he would know better. I know of no other way of getting rid of this injustice except by the institution of a zone system, which is impracticable in its application in the smaller towns, and which in fact is very objectionable in big cities also, first, because it congests population, and second, because it would cause a lot of opposition on the part of wage earning and salaried employees who have bought homes in the outlying districts of these cities where they can buy, build and live cheaply, and which action they took on the expectation that the straight nickel fare, having been in use for many years, would not be changed.

"Traffic Engineer" should know that the great majority of casual riders ride between the peak hours, and if he will make a check of the number of passengers riding and the number of passengers carried per car between the peak hours, he will find that the only reason that these riders are desirable at all is because the companies have to run these street cars in accordance with franchise regulations, regardless of profit, and that the only reason that the company can afford to run these cars during these hours is due entirely to the fact that during the peak hours the cars are loaded.

Heretofore the street car companies have followed the senseless method of giving low fares during the peak hours, by issuing school children's and workingmen's tickets, good only during the rush hours. Under my plan the passenger who rides the oftenest gets the lowest fare, no matter at what time of the day he rides.

"Traffic Engineer" is also mistaken, in my opinion, as to the discouragement of the casual rider by increasing his fare. Now-a-days the casual riders are very largely composed of visitors to a city, including traveling men, and the people owning automobiles, who use the street car when the weather is very inclement, when the streets are impassable, or when their automobile is out of commission. These people will pay 10 cents just as quickly as they will a nickel, for many of them are willing to take a taxi which will cost them ten to twenty times as much as a 10-cent street car fare. The street car companies need additional net revenue, and if they can obtain it, it does not make any difference whether there is an increase or a decrease in the number of passengers carried. Depreciation, interest and dividends can be paid only from what is left of the gross revenue after the operating expenses and taxes have been taken care of.

"Traffic Engineer" states that: "A successful fare increase must have two elemental qualifications; it must apply to a sufficient number of patrons to provide an appreciable gain in gross revenues despite the inevitable decreases in patronage, and it must conserve net earnings by affording a minimum of discouragement to the most profitable classes of patrons." I claim that my plan includes both of these qualifications. There are two other vital considerations to be considered, namely, the plan must provide for the minimum of trouble, delay and inconvenience to the passengers and to the conductors, so as not to slow up the headway of the cars. My plan also provides for these qualifications.

"Traffic Engineer" and all street railway operators must remember that the public authorities and the public in general have their own ideas in regard to street car fares, and that we as street car operators cannot simply fix these fares in accordance with our own notions. At any rate, even the increase of a straight 5-cent fare to 6 cents, does not necessarily mean a loss in riding as is shown by our experience in Cedar Rapids, Iowa. The amount of riding is determined by the frequency of service, and the quality and comfort of the cars, rather than by the question of whether the rider has to pay 5 or 6 cents for his ride.

I am sure the great majority of automobile owners would not use the street cars daily, even if they were carried for nothing, and certainly no one would claim that it is cheaper for people to drive to and from work in an automobile, even as compared to a straight 10-cent fare. I know many automobile owners here drive their cars down in the morning and back at night, and they have to pay 20 cents a day for parking privileges.

R. SCHADDELEE, Vice-President.

Mr. Ford Ought to Have a Heart

NEW YORK CITY, April 15, 1919.

To the Editors:

Henry Ford's promised novelty in surface car design may prove to be a wonderful boon to the electric railway operators, but pending its commercialization I wish that Henry would quit knocking the industry. We who are connected with electric railways must admit that at present we are down, if not out, and while our noses are rubbing the resin, it isn't fair for Mr. Ford to slam us with a lot of phoney statistics such as were used to bolster up the erstwhile crusade of the gallant young jitney bus against the old and wicked electric car.

Mr. Ford reproves the electric railways, through an ELECTRIC RAILWAY JOURNAL interview, for their absurd practice of carrying around ten times as much car weight as passenger weight—such as would be the case, I presume, with a 12,000-lb. one-man car accommodating fifty rush-hour passengers. This works out (unless I, also, have become a little loose in my methods of thought) to 240 lb. per passenger, which, incidentally, is just about what Mr. Ford's own automobile (the one that he sells; not the one he drives) will weigh per passenger, unless someone rides a-straddle on the radiator. Be that as it may, Mr. Ford's accusation of 10:1 ratio leaves us on the horns of a dilemma; either Mr. Ford has used the wrong scale on his slide rule or else he figures rush-hour patrons at 24 lb. each! Or perhaps he was referring to our worst mistakes in city car design which were built so long ago that we are almost ashamed to acknowledge remembrance of the weight of 46,000 lb. Here the capacity of 100 and the aforesaid 10:1 ratio would give us a weight for our rush-hour patrons of exactly 46 lb. apiece.

Part of our foolish practice in this regard, according to Mr. Ford, is due to our error in adhering to 5-in. axles when a 2-in. diameter in Mr. Ford's new steel would be sufficient. A word on this new steel is warranted. The antiquated metal called for by our Association standards has an elastic limit reaching up to 60,000 lb. The beam strength of circular cross-sections varies as the cube of the diameter, and the cube of 5 is fifteen times the cube of 2; so that the metal in Mr. Ford's new 2-in. axle, which surely is to be as strong as our out-of-date 5-in. monstrosity, evidently will have an elastic limit of 900,000 lb. per square inch. Some steel! It's too bad that the industry didn't know about this steel before. And with that admission of error we hope that Mr. Ford will be satisfied.

Seriously, all of us would like the new venture to succeed. The industry might benefit by it. But its success won't be made more likely if Mr. Ford closes his eyes to a lot of facts that the electric railways have been learning during the past thirty years. If gasoline at seven times the cost of electricity can be shown to be good for the industry, the industry will change its motive power. But the industry has been told this same thing once before when the jitney bus came forward with its historic glass crash. Now the industry wants to be *shown!*

F. KINGSLEY.

AMERICAN ASSOCIATION NEWS

Chief Engineer Sanborn Addresses Rhode Island Section

AT THE MEETING of the Rhode Island Company section, held at Providence on March 4, J. H. Sanborn, chief engineer of the company, discussed the topic, "Way and Structures." He traced the development of this part of the electric railway from early days as it kept pace with the evolution of traffic. The company orchestra furnished music during the evening. A house committee was appointed with F. A. LaVoice of the claim department as chairman. This committee served a simple luncheon at the meeting and also served in promoting sociability. An incident was the first meeting of two employees of the company who had conversed over the telephone for a period of twenty years. The meeting was attended by 140 members.

C. K. Savery has been appointed by the executive council of the Connecticut Company Section to fill the vacancy in the office of secretary created by the resignation of W. E. Jones. Mr. Jones has resigned his position with the company to take one with the Rhode Island Company at Providence.

In the report of the Milwaukee meeting of the Wisconsin Electrical Association, in the issues of this paper for March 29 and April 5, John St. John, assistant general manager Milwaukee Northern Railway, was inadvertently referred to as the retiring president of the association, instead of John St. John, vice-president and general manager Madison Gas & Electric Company.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

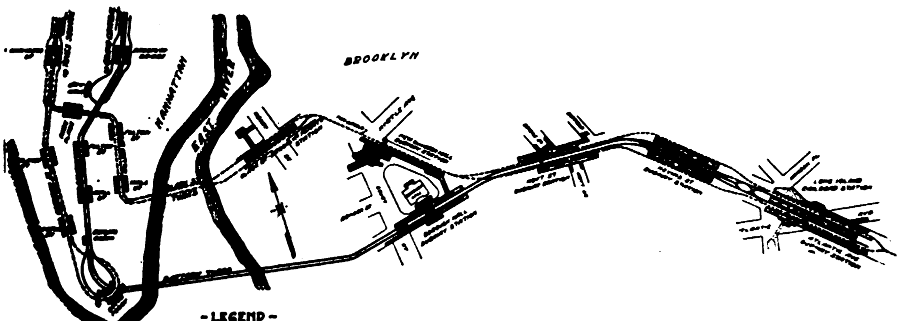
Another River Tunnel

Both East Side and West Side Rapid Transit Lines in New York Operating to Brooklyn

Beginning Tuesday morning, April 15, at one minute after midnight the new Clark Street tunnel under the East River connecting the Wall and William Street station in Manhattan, with the Borough Hall subway station, in Brooklyn, was put into use by the Interborough Rapid Transit Company.

East Side Lines Use Old Tube

The Fourth and Lexington Avenue (East Side) Interborough lines have been going through the old Battery tunnel to Brooklyn and will continue to do so. The Seventh Avenue Interborough lines, however, have heretofore had their terminus in lower Manhattan at Wall and William Streets. The Broadway-Seventh Avenue (West Side) trains, under the new arrangement, go to Brooklyn, but use the new Clark Street tunnel.



ROUTES OF INTERBOROUGH TUBES UNDER EAST RIVER

Tracks through the two tunnels come together at Borough Hall, Brooklyn, and make a four-track route in Brooklyn between Borough Hall and Atlantic Avenue.

Test Runs April 8

With the opening of the Clark Street tunnel, passengers from Brooklyn have a through direct express service to either the East Side or the West Side of Manhattan and to the Bronx, without change of cars at Rector or Wall Street, or change to the Forty-second Street shuttle.

The power was turned into the cables and third-rail for the first formal tests of the new Clark Street tunnel at 10 o'clock on the forenoon of April 8. The first test train was operated at 1.30 p. m. Tests were made not only of power facilities, but of signal system and safety appliances, track alignment, clearance of cars, both as to ceilings and edges of station platforms, etc. Trial operation of trains proceeded each day until the line was opened to the public. The Times Square station at Forty-second Street, being in the heart of the theater district, the new line makes available to Brooklyn riders a service that promises to be very attractive.

20 Miles for Five Cents

The longest ride available on a single fare will be from Atlantic Avenue to East 241st Street in the Bronx, on the White Plains Avenue line, a distance of 20.23 miles. On the steam railroads, at 3 cents a mile, the regular rate, the fare (exclusive of war tax) would be 61 cents.

The distance between Atlantic Avenue and Van Cortlandt Park on the West Side line is 16.85 miles, and for a steam railroad ride of that length the fare (exclusive of war tax) would be 51 cents. The Interborough lines have averaged in cost more than $4,000,000 a mile.

Cost About $7,500,000

The new line has been under construction since 1914 and cost, completed, between $7,000,000 and $8,000,000. The tunnel line consists of twin tubes, which enter the river in the vicinity of Old Slip, Manhattan, and cross to the Brooklyn side, extending down Clark Street to Fulton Street and thence to a junction with the existing Interborough lines in Brooklyn, at Borough Hall. It has been constructed under the direction of the engineers of the Public Service Commission, and directly in charge of Clifford M. Holland, the commission's tunnel engineer. The opening was attended with very little confusion to the public.

Public Utility Triangle

A Very Interesting Statement of the Case by British Columbia General Manager

George Kidd, general manager of the British Columbia Electric Railway, Vancouver, B. C., has explained to the employees of the company through their own magazine how the public utility executive behind the mahogany desk must try to secure an even measure of justice to the public, the employees and the investors. Mr. Kidd said in part:

I suppose lots of you who have worries must feel that it would be fine to be a general manager. I cannot speak for a private business, but I know that it is not altogether an enviable position in a public utility business.

Triangular Relationship Explained

In a public utility there is a triangular relationship between public, employees and investors. The shareholders have an equal duty to public and employees; the public has an equal duty to allow the employees and the shareholders fair wages; and the employees similarly have an equal responsibility to public and investors.

For a time, two of the three sides of the triangle may get more than their share, at the expense of the third; or one may get ahead of the other two; eventually there must be a readjustment.

The service we give the public is our estimate of the public's needs, commensurate with our resources, but in order to keep abreast with the public we ask for complaints and suggestions. Similarly, the management tries to learn the employees' needs and meet them.

The public is, unfortunately, not well acquainted with the investor. There are over 10,000 investors in British Columbia who have put their savings into securities of this company. Everybody acknowledges that saving money is a virtue, but as soon as the economical man or woman invests it he or she seems to be turned into a capitalist, with all the odium that the word conveys. The thousands of savings bank depositors in Vancouver are no different from the small investors in this company.

The employee is entitled to fair remuneration. Wages come from the public. The rates charged for service must be sufficient to pay the employees and the shareholders fair remuneration, the one for their work, the other for the use of their money. There is nothing to be ashamed of about capital. If we expect interest from the savings bank we should give investors in a company like this a fair return on their money.

The Investor Is Regulated

Do the employees understand the investors and the public rightly? Neither the investor nor the employee can expect the public to pay anything they may ask. The investor already has submitted to regulation by the public in the form of the public utilities commissions, and has had the return on his investment restricted.

Similarly, employees cannot expect the public to think well of them if they ask the public to pay any wages they may demand, for wages affect rates.

I like to think of a company such as this as a trustee for the public. Our duty is not solely to pay a fair return on capital, but to fulfill our trust to the public in furnishing the best possible service at the lowest possible cost, while paying good wages to our employees and maintaining our fair share of the cost of government.

I am afraid capitalists of old would turn in their graves should they hear this open discussion of a company's business with its employees, but such is the trend of relationships between employer and employee to-day. We invite the public to investigate our business from their point of view, and as one of the other members of the triangle the employees have a similar privilege.

Third Buffalo Arbitrator

Former President of Chamber of Commerce on Board with Messrs. Richey and Allison

Orson E. Yeager, lumberman and former president of the Chamber of Commerce of Buffalo, N. Y., has been selected as the third member of the board of arbitration which will determine the amount on which the International Railway will be allowed a return in any service-at-cost agreement that may be entered into between the city of Buffalo and the railway. Albert S Richey is the city's representative on the board and James E. Allison, Jr., St. Louis, is the representative of the company.

The three arbiters held their first conference on April 15. The taking of testimony in the valuation proceedings will start within a week or ten days. The city and the company both have the right to reject the final report of the arbiters. The board will not fix the rate of return the company may eventually receive or the fare to be charged.

The bill permitting the city and the company to enter into a contract along the lines of the service-at-cost plan of Cleveland has been passed by the Legislature at Albany and a hearing will be held on it by the Mayor. The bill practically nullifies the 5-cent fare agreement embodied in the company's franchise. Whatever agreement is made will be subject to a mandatory referendum. There is a general feeling it will be overwhelmingly defeated by the voters again.

An agreement has been reached between the International and its union platform employees whereby the $225,000 due the men as back pay and which was awarded them by the War Labor Board will be paid in installments. The money was due on April 1. After a series of conferences with E. G. Connette, president of the International Railway, the men have agreed to accept the sum in installments. The first payment of $50,000 will be made on April 28; the second payment of $50,000, on Nov. 14, 1919; the third payment of $25,000 on Dec. 21, 1919, and the remaining $100,000 on Jan. 28, 1920.

Absence of Snow Helps

The New York *Times* has been figuring the saving that has accrued to the city, the public utility corporations and to individuals on account of the recent mild winter, with its almost total absence of snow. In discussing the matter from the standpoint of the electric railways the *Times* said:

> Anything less than 2 in. of snow is not considered a storm by the electric railway companies. It was estimated by a railroad man that for each additional inch of snow above 2 in. the cost to each company is approximately $5,000 an inch. In zero weather this is increased because the work proceeds slower, the wear and tear on equipment is greater, and more labor is required. The nearest approach to snow fighting this year was in the last storm when snow sweepers were held in readiness to be sent out. The cost of sending out a sweeper or a plow was estimated at about 30 cents a mile, this being greater according to the depth of the fall.
>
> The cost of snow removal to the New York Railways in recent years was: 1913, $42,324; 1914, $188,509; 1915, $53,957; 1916, $149,022; 1917, $73,478, and 1918, $127,522. To the advantages of a mild winter must also be added the saving that comes in approximating schedules, for disorganized operation means a loss in efficiency of the service.
>
> Here is a comparative table of snow removal costs:

Lines.	1916-1917.	1917-1918.
Third Avenue	$92,000	$99,000
New York Railways...	73,478	127,522
Brooklyn Rapid Transit	83,245	103,103
New York & Queens County Railway	2,790	6,043

Ford vs. Birney

W. P. Strandborg of the Portland Railway, Light & Power Company, Portland, Ore., demands attention with "Picking on the Little Fellows," in *Watt's Watt* for April 11. Mr. Strandborg says:

> Once upon a time, Henry the Ford, now High Lord of Lizzieland, was a young blacksmith in a small town entirely surrounded by Michigan. And, one night a fool setting hen flew in from the village chestnut tree that stood in front of his door and located herself on a pile of scrap near the glowing forge. In due time she finished her task and there was a nice little gasoline cootie running around the place. Whereupon Henry the Ford threw a monkey-wrench at it and christened it "Flivver."
>
> To-day, the entire civilized world will bear witness of the truth of this strange miracle and the State of Oregon is going to spend $23,000,000 in the next three years to give more elbow-room to the "Flivvers." That's why we build more highways, these days.

Have Had Lots of Fun

> It came to pass that all the world chuckled and smiled as Henry the Ford's little Lizzie began to cover the earth like seventeen-year locusts or a smelt run up the Sandy, but history fails to record that anybody refused to buy one if he had the price or ride in one if he had the chance.
>
> But the funny writers and the comic papers and cartoonists had a pleasant spell while Lizzie was learning the ropes. And, Lizzie had too many good points to be kidded off the map—this is not a paid adv.
>
> The arrival in our midst of the cute little Birney safety cars has been greeted with the same joyous and happy abandon. It has been the same in the many cities where the busy little Birneys have won their way into general popularity and where they have never been replaced after once being adopted.

Uncle Sam Likes Them

> Not only have private street railway companies without number inaugurated Birney car service, but Uncle Sam, when he was brought face to face with the greatest war the world has ever known, was obliged to step in and solve the transportation situation in a score or more of great war-working industrial centers and shipyard cities. Uncle Sam built nothing but Birney safety cars, because they were the type of equipment that would best fill the bill, all things considered.
>
> Our company was allotted twenty-five of these cars and they have been placed in operation on two of our lines—Irvington-Jefferson and Williams Avenue. Except in the case of a small handful of persons, the car riders on these lines have accepted the new type of car with marked approval.
>
> Patrons on other lines have asked us when we were going to be able to extend our Birney car service to their districts. It is a peculiar fact that those who have expressed themselves real peevishly about the little "tanks," have not (and there is not a single exception) based their complaint on any defect in either service or equipment or on any condition of operation that would not, with equal force, apply to any other type of car.

Safety Devices Overlooked

> The objectors, conscientious or otherwise, have overlooked the specific advantages that the Birney car possesses over other types of equipment, particularly in the matter of safety.
>
> Most of the kickers, too, overlook the distinct improvement in service through the use of the Birney car whereby we are able to give more frequent service than we could with any other kind.

Put Labor on the Board

Bridgeport Manufacturer and New Haven Director Sounds Note of New Industrial Democracy

Walter B. Lasher is one of the big business builders of Bridgeport, Conn. He has many corporation interests, but he also has many civic interests. He knows labor, its hopes and its aspirations. One of Mr. Lasher's jobs has been chairman of the Bridgeport Traffic Commission. In that post he has made a study of electric railway problems that has convinced him that a number of features of operation as at present followed need correcting. This has led him to suggest that labor be represented on the board of directors of the Connecticut Company or its local successors in Bridgeport if the segregation of the properties there is brought about. Mr. Lasher's views are highly interesting. They are interesting in themselves as such and also because they have evoked favorable reception from the local press. Mr. Lasher is quoted as follows:

> If more boards of directors included in their make-up the men who had the grime of toil in their fingernails, everybody would be better off. Every community is full of the examples of successful men who have had to fight their way from the bottom—who have learned their business from the ground up. It's true of the trolley company, and it's true of every company.
>
> A concern that employs as many workers as the Connecticut Company has a hidden capital of brains and executive ability in its men. Bring this ability to the top—give it an outlet.
>
> I have a lot of faith in the men behind the controller and at the end of the trolley rope. Treat them like men—give them a chance. Why, at present, they are not treated like human beings at all, but simply like cogs in a machine. They are not known by their names, but by their numbers, like so many convicts.
>
> Give them a chance to take a pride in their own ability. Put up their names in the trolley car: "This car operated by Motorman John Smith and Conductor Sam Jones," so that the passengers can know the operators and say "Good morning, Mr. Jones," when they get on, instead of seeing merely a number on a man's hat.

Municipal Properties Subject to Commission Control

In a decision handed down by the Illinois Supreme Court on April 15 in the case of the Springfield Gas & Electric Company against the city of Springfield, the court held as unconstitutional the clause in section 10 of the public utilities act exempting municipally owned public utilities from the operation of the act. The court said:

> The persons who use the products or service of public utilities are entitled to the benefits of the public utilities act and are entitled to its protection against extortion, discrimination and inferior service by whomsoever furnished. If a customer is oppressed by extortionate charges or discriminated against by wrongful rate or inferior service the wrong is the same whether done by a municipal corporation or a private corporation.

The fact that this section of the act is declared void does not affect the validity of the remaining sections. However, the ruling is likely to act as a damper on the ardor of certain Chicago Aldermen who claimed, in advocating municipal ownership, that the control of service would be removed from the jurisdiction of the State commission.

Detroit Attacks Railway Problem Again

The defeat of municipal ownership at the recent election in Detroit, Mich., blasted the hope of the Street Railway Commission in finding relief from transit ills by this means, but it has not served to deter the commission from seeking elsewhere for possible help. At its meeting on April 11 the commission decided to invite Henry Ford to explain to the commission his plan for providing transportation by self-contained vehicles, and the members also concluded to proceed at once to examine into the details of the Tayler plan of operation as in use in Cleveland.

One thing seems certain, there will be no piecemeal construction of railway lines to compete with the Detroit United Railway. The commission has again gone on record to this effect. The reasons for this remain as strong as ever. They have been set forth before by the commission and were reviewed in the ELECTRIC RAILWAY JOURNAL for March 29, page 659.

In connection with the inquiry of the commission into the Tayler plan of operation Edward T. Fitzgerald, secretary of the commission, has been instructed to communicate with Fielder Sanders, street railway commissioner of Cleveland, and ask him for a comprehensive report on the plan, especially with respect to the valuation of the physical property. The members of the commission will probably visit Cleveland after they have had an opportunity to digest Mr. Sanders' reply.

Mr. Ford Plans Experimental Road

Henry Ford, the automobile manufacturer, who last fall made application for a franchise to connect the blast furnace and shipyard at his plant with Michigan Avenue, is now applying for franchises on Fort Street, Boulevard and South Dearborn Road and running through Oakwood, Ecorse Township and Dearborn. The rate of fare specified in the franchise is a maximum of 2½ cents per mile with a minimum fare of 5 cents. It is over this proposed road evidently that Mr. Ford proposes to operate his new gasoline street car, about which he was interviewed in the ELECTRIC RAILWAY JOURNAL for April 12. In a statement attributed to him on April 11, Mr. Ford reiterated some of the points brought out by him in the previous interview. He is quoted as follows:

> Gas-driven street cars seem to be the logical successors to the electrically driven cars and I am going to lend my efforts to building and operating the first one in this city.
>
> If it proves itself by far the superior car, and there is no doubt about it in my mind, I will be willing to work out a system with Mayor Couzens or any private concern which is willing to take the manufacture over with the end in view of bettering transportation facilities.
>
> We will build the first car this summer and operate on the streets. I have no personal interest in building this car aside from making it possible to offer Detroit and the rest of the country a modern means of transportation. There are about 125,000 street cars in operation in this country to-day and there is need for about 500,000. If the car we build is what is wanted we will be glad to offer it to some one to manufacture.
>
> The main trouble with transportation everywhere is the high fare. When this problem is solved transportation will be greatly improved. The gas-driven cars will make this possible. The public will get better service and the people operating the transportation system will make more money, because more people will travel.

Court Upholds Receiver's Labor Attitude

Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, remains firm in his decision to deal with nothing but committees of the employees themselves. The recently organized union carried its case to the Mayor in the hope of having Mr. Garrison recede from the stand which he has announced, and, failing in this attempt, carried the matter to Federal Judge Julius M. Mayer, by whom Mr. Garrison was appointed.

The conference before Judge Mayer was held on April 16. He upheld Mr. Garrison in his refusal to recognize the Amalgamated Association. Judge Mayer asserted, however, that the unionists had misunderstood the receiver's position. He suggested that the men obtain their representation through a general election by the entire body of Brooklyn Rapid Transit employees.

In this connection he suggested that a committee so prominent in the community that its integrity would be beyond dispute be selected to aid the employees in chosing their representatives. He made the point plain, however, that the entire body of employees should be represented. He said that he wanted it understood that the receiver was ready at any time to hear any and all grievances which the employees might desire to present, but that grievances which he declared of the first class—namely, matters of general application as distinguished from specific cases of some wrong claimed to have been done to an individual person—should be presented by all the employees of the system and not by a part of the employees.

The union representatives reported back to the men at a meeting on the night of April 17 and the men voted to postpone the strike indefinitely. At that meeting a telegram was read from Governor Smith in which he expressed the hope that the organizers would delay action "until we have had an opportunity to talk it over." Union leaders promptly arranged for a conference with the Governor at Albany on April 18.

During April 17 the company announced that the tower and signal men had been granted an increase in wages. In a letter to Judge Mayer, Mr. Garrison said that no man would be discharged who did not deserve discharge by a breach of discipline. No man would be discharged because he chose to join a labor or other organization. Mr. Garrison said he had also arranged for proper settlement of any personal grievances presented by employees. It seemed to him that this met the situation in a rational way and assured justice and fairness to all concerned.

Appeals Against Wage Reductions

Union employees are already taking steps to guard against a reduction in the wage scales established by the War Labor Board. The Amalgamated Association, through its president, sent letters on April 11 to the Governor of Illinois, the Mayor of Chicago, the State Public Utilities Commission of Illinois and the management of the Chicago Surface Lines, appealing for protection against a wage reduction.

The Chicago Surface Lines contract, which became effective on June 1, 1917, does not expire until June 1, 1920. A wage scale of 30 cents to 39 cents over a five-year period was in force when the War Labor Board set a standard wage of from 43 cents to 48 cents last August. The Surface Lines appealed to the State commission for relief in the way of a higher fare which has not yet been granted, and the employees are fearful lest the company exercise its option of returning to the contract scale of wages when the War Labor Board award expires with the official declaration of peace. This is said to be one of the few companies, affected by the War Labor Board ruling, which has a contract to fall back upon with the end of the war. The management of the company has not stated its position with reference to the action to be taken when this time comes.

Illinois Public Utilities Act Satisfactory

The Illinois Senate committee on public utilities recently held a hearing on all bills affecting the public utilities act, and representatives of the Illinois Electric Railways Association appeared with representatives from the Illinois State Electric Association, the Independent Telephone Association and the Bell interests to protest against any change in the present law. About 190 representatives of the various interests met at luncheon in Springfield, and the effect of the proposed legislation was explained in detail by attorneys representing the utilities' interests, by a representative of the Chicago Association of Commerce, and by a representative of the Investment Bankers' Association of America.

At the hearing before the Senate committee some twenty speakers, including representatives of the public, the investors and the utility interests, addressed the committee in behalf of their respective organizations. It was the unanimous opinion that this meeting was very successful, and at the present time indications are that there will be no drastic changes made in the public utilities law.

News Notes

Railway Accepts Franchise Renewal.—The directors of the Cleveland (Ohio) Railway, have accepted the city's renewal of the Tayler grant until 1944.

Soldiers First in Des Moines.—Emil G. Schmidt, president of the Des Moines (Ia.) City Railway and the Interurban Railway, has ordered all heads of departments to give all returning soldiers and sailors preference in filling positions on these systems.

City Loses Traction Appeal.—The Court of Appeals has upheld the dismissal by the lower courts of the action of New York City against the Brooklyn, Queens County & Suburban Railroad to recover about $800,000 in percentages of gross receipts under the railroad law.

Governor's Commission Plan Accepted.—The Senate of New York, on April 15 without debate, and on a short roll call, unanimously adopted the plan of Governor Smith for the reorganization of the Public Service Commission in New York city. The new plan calls for a new regulatory commissioner and a commissioner in charge of construction.

Wage Arbitration in Scranton.—By a unanimous vote the union of employees of the Scranton (Pa.) Railway on April 7 agreed to the arbitration of their demands for increased wages and time and one-half for overtime. Several other minor items in the demands for a new agreement are also to be arbitrated. The motion to accept arbitration also included provision for the acceptance of the concessions made by the company on other demands.

Would Fix Strike Costs.—Fred Robertson, Federal District Attorney for the Kansas district, has filed in Topeka, Kan., a motion to tax the costs of the protection of the Kansas City Railway during the strike last winter. The total cost up to April 1 was $29,722, of which the railway paid $14,522 on order from Judge Pollock. In making his restraining order last winter Judge Pollock reserved the right to assess the costs of the protection against any of the parties, the city, the railway, and the Amalgamated Association. This petition is to ascertain upon whom the rest of the costs shall be placed.

Louisville Judge Rules War Is Over.—Judge Walter Evans of the United States District Court at Louisville, Ky., recently rendered a decision of interest in connection with awards of the War Labor Board. Judge Evans upheld the contentions of a well-posted attorney representing a client in the local court. It was held that the war was over, the decision being based on an address of President Wilson before a joint session of Congress just after the signing of the armistice, when the President stated that the war was over and reiterated the statement. The President as Commander in Chief of the Army has this right.

Powers of Iowa Commission Increased.—A bill which will work to the advantage of the electric railways of Iowa was passed in the Senate of the Iowa Legislature during the week ended April 12. The bill increases the powers of the present State Railroad Commission and authorizes that body to regulate rates and services of the electric railways. The present situation of the Des Moines City Railway was considered in the debate which preceded the passing of the bill. A number of the strongest members of the Senate defended the bill. The vote was nearly two to one in favor of its adoption.

Transit Bills for Philadelphia Advanced.—The Senate committee on appropriations on April 9 voted to report favorably two transit bills introduced by Senator Daix, one of which would empower the Public Service Commission to order the Philadelphia (Pa.) Rapid Transit Company to make extensions and improvements to its lines. The other bill, identical in its text and purpose to the Salus measure, which was defeated in the House at the last session, would obligate the Philadelphia Rapid Transit Company, under the discretion of the Public Service Commission, to establish transfer points and joint rates of fare with other companies to permit through routing of trains and cars.

So the Company May Know and Profit.—The Portland Railway, Light & Power Company, Portland, Ore., has inaugurated an "Employment Record Department" in charge of Mr. Warner. The purpose is to facilitate inter-organization promotions—*i.e.*, to use talent in the company's own ranks that might otherwise not become known at the time the men were needed. The plan includes new as well as old employees. The department will not employ men, but will prescribe forms of records for all employees and see that they are filled out and kept in convenient shape. Mr. Warner will spend six weeks in a study of employment management at Reed College, after which he will develop the plan more fully.

Wage Increase in New Albany.—A voluntary average wage increase of 5 cents an hour has been granted to the employees of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, as well as the men on the city lines at New Albany and Jeffersonville, Ind. This action was made following an announcement of the Inter-State Commerce Commission granting a 2-cent increase, to 7 cents, between Louisville and Jeffersonville and Louisville and New Albany. Interurban men will receive from 38 cents to 44 cents an hour. City conductors will receive 29 cents to 33 cents an hour, and motormen 32½ to 41½ cents. The new agreement holds for one year, or until it is renewed.

Conciliation Fails in New Jersey.—Union leaders in Newark, N. J., are drawing up a petition to the War Labor Board in view of their failure to reach an agreement with the Public Service Railway on the question of a nine-hour day with ten hours' pay. The conference on April 14 ended in a deadlock. The company said it would grant everything except the nine-hour day, but the union officials, insisting on this point, demanded its submission to the War Board for consideration. The company then announced that all the other points would have to be passed on by the War Labor Board. The present proceedings are in accordance with the terms under which the recent strike on the lines of the Public Service Railway in Newark was settled.

Wants Interurbans Built Now.—The Board of Commissioners of the city of Dallas, Tex., has called on the holders of the railway franchise granted by the city and of the interurban franchise between the city and C. W. Hobson to appear before the board to show cause why these interests should not proceed at once to carry out their agreement to build and operate two interurban lines out of Dallas. Under the terms of the franchises granted during the administration of Mayor Lindsley these two interurban lines, each at least 30 miles in length, were to have been built and in operation within a period of three years. Due to the war this time was extended, but now that the war is over and business conditions are fast becoming normal the city authorities feel that the railway interests should proceed to carry out their agreement, for which they are under bond to the city. The original agreement was that the two interurban lines should be under construction within six months after Oct. 1, 1917. The Dallas Railway and the Texas Electric Railway are the holders of the franchises.

Program of Meetings

Chamber of Commerce of the United States

The program for the seventh annual meeting of the Chamber of Commerce of the United States, to be held in St. Louis, Mo., April 28 to May 1, has just been published. The headquarters will be at the Statler Hotel. On the afternoon of Monday, April 28, there will be a meeting of the National Councillors, and in the evening a meeting of the Advisory Council of the War Service Committees. The first general session will be held at the Coliseum on the morning of April 29, with a second general session in the evening and group meetings in the afternoon. The same program will be followed on April 30, and on May 1 there will be two general sessions, together with two sessions of organization secretaries. The speakers will include the Secretary of the Treasury, the Secretary of Commerce, the Chairman of the United States Shipping Board, the Railroad Administrator, and others prominent in business and government circles.

Financial and Corporate

Receiver in St. Louis

Tottering for Many Months, United Railways Joins Long List of Roads Now in Courts' Hands

Rolla Wells, former Mayor of St. Louis, Mo., and recently Governor of the Eighth Federal Reserve District, St. Louis, on April 12 was appointed receiver of the United Railways Company, which operates all the local St. Louis lines. The appointment was made by United States District Judge Dyer as the result of a petition entered in the court on April 11 by a New York stockholder in which the railway company joined.

JUDGE LAMM SPECIAL MASTER

Judge Dyer also announced that before the time came for the settlement of claims by the receiver he would appoint Judge Henry Lamm of Sedalia as special master to hear the representations of the various claimants and pass on the receiver's report. Judge Lamm has been serving as special master in the original receivership suit brought by John W. Seaman, New York, a stockholder.

Former Judge Henry S. Priest, chief counsel for the United Railways, and Charles W. Bates, former city counsellor, who was one of the attorneys in the Seaman receivership suit, were appointed by Judge Dyer as attorneys to the receiver.

The appointment of a receiver was due to the inability of the company to meet a loan of $3,235,000 from the War Finance Corporation. Samuel W. Adler, who made the application for a receiver, is the holder of $135,000 of underlying bonds of the St. Louis Transit Company. The naming of Mr. Wells forestalls the suit of John W. Seaman, a stockholder, who some time ago started an action to have an accounting, with the ultimate view of having the courts take charge of the properties. The railway joined in the application on which the appointment was made. The petition to the court stated that action was taken for the purpose of preventing the dismemberment of the system.

WAR FINANCE LOAN NOT RENEWED

The loan granted by the War Finance Corporation in June, 1918, was for six months and has never been formally extended. An issue of $3,500,000 of Union Depot Railroad 6s, an underlying issue, matured on June 1, 1918. To meet this issue, the railway borrowed from the War Finance Corporation, and $3,487,000 of the bonds were retired, leaving a total of $13,000 still outstanding.

A plan to pay off the War Finance Corporation loan was under way when the receiver was appointed. The company had an application before the Missouri Public Service Commission to issue $2,160,000 of one-year 8 per cent notes. This, with treasury cash and Liberty bonds, would have enabled the company to pay the loan. To do this, it was purposed to deliver the $3,487,000 Union Depot bonds to the trustee of the first general gold 4s who in return would deliver a like amount of the 4s still unissued. These bonds, it was planned, were to be deposited as collateral for the new note issue.

Following the admission of insolvency by the United Railways it was announced that the two committees formed for the protection of the company's general mortgage 4 per cent bonds, due in 1934, will hereafter work together in the interests of these bonds only.

Breckinridge Jones, president of the Mississippi Valley Trust Company, St. Louis, is chairman of one committee, and N. A. McMillan, chairman of the board of the St. Louis Union Trust Company, is chairman of the other bondholders' committee.

The other members of the committee headed by Mr. Jones are David R. Francis, Jr., of Francis Bros. & Company, St. Louis; A. G. Hoyt, of the National City Company, New York; A. H. S. Post, president of the Mercantile Trust & Deposit Company, Baltimore, and F. H. Ecker, treasurer of the Metropolitan Life Insurance Company, of New York.

Arkansas Company Extends Operations

The Arkansas Light & Power Company, Arkadelphia, Ark., has acquired in fee the property of the Arkansas Public Service Company, which owns franchises and transmission lines in the great rice belt of eastern Arkansas, the property in fee of the Denning Coal Company, the controlling interest in the Pine Bluff Company, at Pine Bluff, Ark., operating 9.5 miles of electric railway, and the controlling interest in the Missouri & Southeastern Utilities Company.

The company has effected a permanent financing of this purchase by the sale to bankers of bonds and stock, and the floating debt of the company has been paid. The bonds are secured by a first mortgage on all of the company's property, with the exception of a small underlying mortgage on one of the plants, which is being reduced annually.

In order to provide for its future power needs the company has started construction of a transmission line from England through Little Rock to the coal fields near Russellville, where it will build a central power plant.

The mortgage provides for the issuance of $5,000,000 bonds. Of this amount $1,824,000 has been issued. The capital stock outstanding consists of $2,440,000 common and $1,500,000 7 per cent cumulative preferred.

Lehigh Transit Loses

War Conditions and Heavier Taxes Cause Twenty-three Per Cent Reduction in Net Income

The gross earnings of the Lehigh Valley Transit Company, Allentown, Pa., for the year ended Nov. 30, 1918, showed a gain of $445,071 on 15.5 per cent as compared to the preceding fiscal year. The total operating expenses and taxes, however, rose $593,200 or 32.2 per cent. As a result the net income finally suffered a loss of $105,281 or 23.2 per cent.

COMPARATIVE INCOME STATEMENT OF LEHIGH VALLEY TRANSIT COMPANY FOR YEARS ENDED NOV. 30, 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Gross earnings	$3,320,145	100.0	$2,875,073	100.0
Operating expenses and taxes	2,433,620	73.3	1,840,419	64.0
Net earnings from operation	$886,5 5	26.7	$1,034,654	36.0
Non-operating income	142,834	4.3	144,755	5.0
Gross income	$1,029,359	31.0	$1,179,409	41.0
Depreciation allowance	43,761	1.3	141,146	4.9
Interest on funded debt	563,319	17.0	554,602	19.3
Interest on floating debt	50,499	1.6	9,347	0.3
Debt discount and expense	23,523	0.7	0,777	0.7
Net income	$348,256	10.4	$453,537	15.8

The year's decline was the direct result of war conditions and heavier taxes. The company's annual report does not present any subdivisions of earnings or operating expenses and taxes, so that only the general showing can be indicated. Owing to the smaller net income in 1918, the preferred dividends were discontinued.

The depreciation allowance for 1918 was $43,760 as compared to $141,145 in 1917. The accrued depreciation reserve, which has been accumulated from the balances left each year since 1911 from an amount equal to 22 per cent of gross railway earnings after the payment of maintenance and renewal expenses, was $284,352 on Nov. 30, 1918. The year before this balance was $312,279.

The surplus earnings of the allied Easton Consolidated Electric Company for the last year were $101,756. This sum resulted in a profit of $46,304 on the investment for the Lehigh Valley Transit Company.

Schedule in Bankruptcy Filed

Schedules in bankruptcy of the Interborough Consolidated Corporation, the holding company of the Interborough Rapid Transit and the New York Railways, were filed in the Federal Court at New York on April 14 by the receiver, James R. Sheffield. They are incomplete for the reason that the bankrupt is the owner of stock in other corporations the value of which is problematical. For the purposes of the schedules the stock is placed at par value.

Its largest liability is the half-yearly interest due on April 1 on approximately $67,825,600 of 4½ per cent bonds on which the company defaulted. The interest due, about $1,500,000, is cumulative. The bonds are secured by $33,912,800 of the capital stock of the subsidiary Interborough Rapid Transit Company.

The total liabilities, according to the schedules, amount to $69,685,264. A list of about 2500 bondholders accompanied the schedules.

Among the assets are promissory notes of the Interborough Rapid Transit Company, $1,300,000; unliquidated claims, $124,291, consisting of interest due on Interborough-Metropolitan collateral trust bonds; deposits in banks, $544,967; loan to the Interborough Rapid Transit Company, $500,000; one year 6 per cent notes of the Interborough Rapid Transit Company, $800,000, and demand notes of the Rapid Transit Subway Company, a subsidiary of the Interborough Rapid Transit Company, $1,000,000.

The bankrupt company holds 96.89 per cent of the $35,000,000 capital stock of the Interborough Rapid Transit Company, $15,061,600 of the $17,495,000 capital stock of the New York Railways and $1,035,741 of the total capital stock of $2,350,000 of the New York Transportation Company, commonly known as the Fifth Avenue Bus Company.

Receiver Sheffield has reduced the expenses of running the bankrupt company from $41,534 a year to $3,721.

Want Foreclosure Sale Set Aside

Decision was reserved by Justice Charles B. Sears of the Supreme Court at Batavia, N. Y., on April 14 on the show-cause order argued before him in connection with the sale of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y. The order asked why the sale of the road on March 12 for $500,000 should not be set aside. The property was bought by Willis A. Matson and William F. Foster, Rochester, acting for a bondholders' committee and a new corporation, the Rochester, Lockport & Buffalo Railroad Corporation.

The action was brought by W. Crawford Ramsdell and Samuel T. Church, Albion, N. Y., bondholders and stockholders of the original company. It is claimed by them that the property was worth more than $500,000 and that, in fact, an expert has stated that the road could be junked and sold, exclusive of right-of-way, for $963,000. Proof was offered that on a resale bids would be made for at least $640,000. Moreover, it was claimed that $174,000 cash in the possession of the Buffalo, Lockport & Rochester Railway went with the property, so that the buyers really bought the road for $325,000. It was said that the $174,000, had it been used to pay the interest on the bonded indebtedness of $2,799,000, would have made the foreclosure sale on March 12 unnecessary.

Collusion between some of the incorporators of the new Rochester, Lockport & Buffalo Company, the Lincoln Trust Company, New York, trustee of the mortgage, and some of the officers of the Buffalo, Lockport & Rochester company was charged. It was claimed that the fact that the railway had on hand $174,000 was not made known to prospective bidders until the time of the sale.

Messrs. Ramsdell and Church own $4,000 of bonds, $7,755 of preferred stock and $9,025 of common stock of the Buffalo, Lockport & Rochester Railway. They were represented at the show-cause proceeding by Fluhrer, Reed, Wage & White, Albion. Gerard, Scott & Bowers, New York, appeared for the Lincoln Trust Company and William Osgood Morgan, New York, for the bondholders' committee comprising R. Holmes Smith, Frederick Nichols and D. B. Manna, Toronto. Harris, Beach Harris & Matson, Rochester, appeared for Willis A. Matson and the Rochester, Lockport & Buffalo Company, which has already applied to the Public Service Commission for permission to issue $3,700,000 of stock.

New York Tax Law Needs Change

In a recent paper prepared for the National Tax Association by M. H. Hunter, of the University of Illinois, in regard to the taxation of public utilities in the State of New York, it is stated that the laws are too complex. Furthermore, there is no way of comparing tax burdens on different classes of property.

In Professor Hunter's opinion, the addition of the special franchise tax has no justification, and its attempted administration has filled the courts with litigation and has failed to bring justice and satisfaction. From the difficulties experienced under the present system, it would seem advisable to follow the example of some other states and adopt some unit method of taxation, either the earnings or the ad valorem basis.

If this were done it would be comparatively easy to extend the system to mitigate the present outstanding inequalities and injustices of local assessments. Finally, it is believed that utility property should be taxed at about the same rate as other property, "unless it be desired that the users of public utilities should bear especially heavy or light tax burdens."

Financial News Notes

No Offer for Bowling Green Lines.—Pursuant to an order issued by the Court of Appeals the property of the Southern Traction Company, Bowling Green, Ky., was offered for sale on April 7, with a provision that it was to be operated. The minimum bid of $21,000, set by the court, was not received, however, and the property will now probably be offered for sale as junk.

Receiver for Chattanooga Company.—John Graham, Philadelphia, and Percy Warner, Nashville, were appointed receivers of the Chattanooga Railway & Light Company, Chattanooga, Tenn., on April 17 by Federal Judge Sanford. The action was taken on the petition of the Commercial Trust Company, Philadelphia, Pa., representing the holders of $2,790,000 of the company's first mortgage bonds.

Common Stock Dividend Increased.—Henry L. Doherty & Company, New York, N. Y., announce that the monthly distribution on Cities Service Company bankers' shares, payable on May 1 to shares of record of April 15, will be 41.1 cents on each share. This compares with a monthly disbursement of 39.6 cents on April 1 and is equivalent to an income return of approximately 13½ per cent annually on bankers' shares at their present market price.

Common Stock Dividend Resumed.—The directors of the Pacific Gas & Electric Company, San Francisco, Cal., have resumed dividends on the common stock at the rate of 1¼ per cent quarterly. An initial quarterly cash dividend of 1¼ per cent on the common stock was paid in April, 1912, and continued to April, 1913, when it was passed. The dividend was resumed in March, 1916, and paid to October, 1917, when discontinued.

Successor Interurban Organizes.—The Rochester, Lockport & Buffalo Railroad Corporation, organized as the successor to the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., sold under foreclosure recently, has organized as follows: E. R. Wood, president; A. S. Muirhead, vice-president, and W. W. Foster, secretary, treasurer and general manager. Directors: E. R. Wood, F. Nicholls, R. Home Smith, D. B. Hanna, A. S. Muirhead, F. W. Zoller, W. A. Matson, W. W. Foster and D. M. Beach.

Worcester Bonds Extended.—On petition of the Worcester (Mass.) Consolidated Street Railway for approval of an agreement for an extension for a period of two years of the company's twenty-year first mortgage bonds to the amount of $115,000, the Massachusetts Public Service Commission has approved an agreement made between the railway and the American Trust Company, trustee, whereby the maturity of the bonds is extended two years from Jan. 1, 1919, and the interest on the bonds is increased from 5 per cent to 7 per cent per annum.

Governor Signs Gross Receipts Tax.—The Morgan bill re-enacting the gross receipts tax on utility corporations, which was recently signed by Governor Edge of New Jersey, provides for a tax upon the gross receipts of these concerns rather than upon the taxable gross receipts as contained in last year's act, thereby producing 12 to 15 per cent more revenue. The reason for a re-enactment rather than an amendment, it is stated, is because the act passed by the last Legislature was approved prior to the general tax act and there was a question as to whether the general tax act did not complicate or repeal the provisions of the gross receipts tax act.

Unfavorable Report on Successor Company.—Acting on the unfavorable report of the committee on incorporation the Connecticut House has rejected the bill authorizing the Somers Electric Company to buy the property of the Hartford & Springfield Street Railway and conduct the railway in South Windsor, East Windsor, Windsor Locks, Enfield and Somers. Advocates of the bill claimed that the organization of the Somers Electric Company was merely a "preparedness" measure in order that some corporation might be in a position to acquire the railway in case reorganization or change in ownership became necessary. The Hartford & Springfield Street Railway is now in the hands of a receiver.

An Echo of the Lorimer Failure.—The claim of the Lorimer-Gallagher Construction Company, Chicago, Ill., against the Southern Traction Company, East St. Louis, Ill., for $850,000 was allowed by Federal Judge English in a decree filed at Danville, Ill., on March 30. However, it recognizes the priority of claims totaling $110,000 for right-of-way and other expenses incurred before the road was built. The road is ordered sold, but no date is fixed. The same decree provides that the La Salle Street Bank, Chicago, Ill., also one of former Senator Lorimer's enterprises, which is in the hands of a receiver, must surrender to the construction company $1,200,000 of the traction company's bonds, which it has been carrying as "book assets" of the bank. The litigation was begun five years ago by J. Y. Sanders on a note for $100,000 against the traction company, turned over to Sanders by C. B. Munday, who was sentenced to five years' imprisonment for wrecking the La Salle Street Bank, of which he was vice-president.

Would Issue $1,054,000 of Bonds.—The Hudson & Manhattan Railroad, New York, N. Y., which operates under the Hudson River between New York and New Jersey, has applied to the Public Service Commission for the First District of New York for an order to permit the company to issue $1,054,000 of 5 per cent bonds under the company's first lien and refunding mortgage. The company states that the principal will be used for the reimbursement of its treasury for expenditures made for additions and betterments to its property, and in part for paying obligations incurred by the company for the purchase of rolling stock. The application, states that of the whole amount applied for $308,500 face value is on account of expenditures for betterments and improvements amounting to $246,800. The larger amount is needed to cover this sum, because the bonds will be sold at 80. The sum remaining under the application — namely, $745,000, face value—is on account of expenditures amounting to $188,500 for retiring underlying mortgages and $460,000 for payments for rolling stock.

Financial Clouds Hang Over Washington.—During the past four months, under the 5-cent rate, the City & Suburban Railway, included in the system of the Washington Railway & Electric Company, Washington, D. C., it is stated, has failed by $15,522 to meet its fixed charges. In any event the company is now running at a loss and means have not been devised for replacing all the cars damaged in the recent fire. Report that the Washington & Great Falls Railway & Power Company, which operates a line through Maryland to Great Falls, would discontinue operations on account of lack of funds was denied by its officials. Arrangements have been made to carry it along temporarily, at least. This concern rents both power and cars from the Washington Railway & Electric Company.

Seattle Sells Railway Bonds.—The city of Seattle, Wash., has finally sold $400,000 of bonds for new construction. They are now being offered for subscription. On Aug. 10, 1918, the City Council passed an ordinance adopting a plan for additions, betterments and extensions to the existing municipal railway system. The plan adopted called for the construction, equipment, maintenance and operation of a single or double-track railway from East Eighty-fifth Street and Tenth Avenue Northeast; also on East Marginal Way, also on West Spokane Street to Admiral Way, being three distinct additions to the municipal railway lines as they then existed. The estimated cost of these improvements was placed at $1,200,000. Early in January, 1919, the Council issued a call for bids for $400,000 of the bonds to be applied to the payment of construction costs. No bids for these bonds were received on the opening day, Feb. 1. Recently R. M. Grant & Company, New York, and the Oscar P. Dix Company, Seattle, submitted a joint bid for $400,000 of the bonds, which was accepted. The bonds bear interest at 5½ per cent per annum, and are payable in twenty years. They are an obligation dependent upon railway earnings.

Electric Railway Monthly Earnings

ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$10,850	$10,599	$251	$458	†$207
1m., Feb., '18	8,261	11,696	†3,435	422	†4,857

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$81,841	*$54,110	$27,731	$20,645	$7,086
1m., Feb., '18	67,485	*51,493	15,992	19,942	†3,950
12m., Feb., '19	942,247	*606,873	335,374	240,445	94,929
12m., Feb., '18	887,921	*520,282	367,639	230,385	137,254

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$142,147	*$109,326	$32,821	$21,273	$11,548
1m., Feb., '18	137,791	*106,144	31,647	30,565	1,082
12m., Feb., '19	1,858,986	*1,446,404	412,582	285,866	126,716
12m., Feb., '18	1,422,833	*1,211,754	211,079	361,669	†150,590

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$2,036,430	*$1,314,916	$721,514	$540,602	$180,912
1m., Feb., '18	1,619,202	*1,154,493	464,709	478,854	†14,145
12m., Feb., '19	22,784,373	*15,155,763	7,628,610	6,159,414	1,469,196
12m., Feb., '18	19,894,954	*12,893,881	7,001,073	5,382,618	1,618,455

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$198,998	*$143,811	$55,187	$56,657	†$1,470
1m., Feb., '18	211,037	*188,824	22,213	70,702	†48,489
12m., Feb., '19	3,198,977	*2,200,296	998,681	830,883	167,798
12m., Feb., '18	3,068,576	*2,216,916	941,660	829,466	112,194

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$338,383	*$278,572	$59,811	$69,946	$†10,135
1m., Feb., '18	311,063	*224,992	86,071	66,648	19,423
12m., Feb., '19	4,309,937	*3,392,686	917,251	819,869	97,342
12m., Feb., '18	3,742,457	*2,602,427	1,140,030	789,726	350,380

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$24,455	*$19,133	$5,322	$5,041	$281
1m., Jan., '18	29,422	*20,554	8,868	5,075	3,793
12m., Jan., '19	315,099	*214,066	101,033	60,237	40,796
12m., Jan., '18	343,802	*218,322	125,480	61,150	64,330

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$252,993	*$180,479	$72,514	$39,879	$32,635
1m., Feb., '18	198,928	*127,155	71,773	40,626	31,147
12m., Feb., '19	2,988,074	*2,009,660	978,414	479,812	498,602
12m., Feb., '18	2,454,308	*1,596,230	858,078	489,526	368,552

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jan., '19	$703,547	*††$445,902	$257,645	$186,811	$70,834
1m., Jan., '18	589,787	*††344,825	244,962	178,895	66,067
12m., Jan., '19	7,780,890	*††5,228,113	2,552,777	2,226,103	326,674
12m., Jan., '18	6,123,067	*††3,661,231	2,461,836	2,148,609	313,227

* Includes taxes. † Deficit. †† In January, 1919, $21,106; January, 1918, $17,571; twelve months, 1919, $542,925; twelve months, 1918, $198,278, included for depreciation.

Traffic and Transportation

Domestication As a Solution

Bridgeport Man Wants Local Lines Controlled Locally, with Manager and Employees as Directors

W. B. Lasher, chairman of the Traffic Commission of Bridgeport, Conn., has replied in the Bridgeport *Standard Telegram* to the question propounded by it, "What to your mind is the best way to get the 5-cent trolley fare in Bridgeport, secure adequate service and transform a trolley failure into a trolley success?" Mr. Lasher's reply outlines a complete program for the operation of Bridgeport's lines for Bridgeport's benefit. Mr. Lasher advocates:

Formation of a Bridgeport corporation to lease from the Connecticut Company all rights for the tracks, wire, power and material for the operation of the trolley service in the city of Bridgeport.

Purchase of 100 Birney one-man safety cars.

Reduction of the fare within the city limits to 5 cents.

Control of the Bridgeport lines to be put in the hands of a board of directors so selected as to assure operation of these lines for the best interest of all concerned. This board to be made up of five men, as follows:

1. A representative of the trolley men—the actual operators of the line in question.
2. A representative of the Common Council of Bridgeport—say, the chairman of the streets and sidewalks committee.
3. A representative of the investors who furnish the new capital for the proper equipment and operation of the Bridgeport lines.
4. The local trustee of the Connecticut Company (Charles E. Sanford), to represent the lessors of the rails and operating rights.
5. The manager of the local traction lines.

Mr. Lasher explains:

> Understand that this is only a rough outline, but I believe it embodies a workable plan and can be put into effect without further decree of the United States courts, or other complications which make for doubt and delay.
>
> The basic ideas are twofold. They are:
>
> 1. To give the people the service to which they are entitled at the 5-cent fare, justifying this fare by improvements in equipment and economies of operation which will assure a fair return to the investors.
>
> 2. To restore the old feeling of confidence and co-operation between the city's most important utility and the community which it serves by separating the Bridgeport lines and putting them under a control that is democratic and representative.
>
> That to my mind, having a representative of the trolleymen act as one of the five controlling directors, is one of the most important factors in the whole plan.
>
> We must recognize the fact that no element in the success of a great utility is more important than the human element—the people who actually perform the work of operation. The man behind the controller box must have a voice in the operation and direction of the company he serves.
>
> Finally, the manager of the local lines should be included as a director, for obvious reasons. He, with the men under him, shares the responsibility for the practical operation of the lines. And like the men under him, he gets his orders from the top too often without having a chance to voice the results of his own ability and practical experience.
>
> The five directors would then represent all the interests having a stake in the operation of the lines and should be able to bring about that condition of mutual confidence, helpfulness and responsibility which means so much in the operation of a public utility.
>
> This situation, in a company backed by local capital, responsive to local wishes, alert to the changing demands of service, should make the present trolley troubles vanish like mist on the horizon.

Everybody Pays in Seattle

Those Who Expected Era of Free Rides to Be Ushered in Keenly Disappointed

The time-honored custom of extending free transportation on city railway lines in Seattle to patrolmen, detectives, firemen and city employees ended at midnight on April 8, by order of Thomas F. Murphine, Superintendent of Public Utilities and head of the municipal traction system. The only exceptions to the straight nickel fare are the student conductors and motormen on observation trips, and municipal railway employees when their duty requires them to be on the cars.

MR. MURPHINE BACKED BY LAW

It has developed that Mr. Murphine is backed in his fight to abolish free fares by a city ordinance passed last July fixing fares on the municipal railway. The ordinance provides that the fare shall be 5 cents and no authority is given any city employee to ride free.

An order abolishing tickets has also been announced, and all commutation tickets issued by the Puget Sound Traction and the municipal traction lines will be redeemed.

Mr. Murphine also proposes to abolish school tickets as soon as the present supply is exhausted, and substitute a metal disk. He states "tickets are an economic waste, and a nuisance. The new school disks will go into the fare box just like a nickel."

The police department is leading in the campaign against the edict of Mr. Murphine abolishing free fares. Chief of Police Warren asserts that he was promised by Mayor Hanson that if the department would work for the municipal purchase, he would see that none of the privileges enjoyed by the police were disturbed. Chief Warren also asserts that the efficiency of the police department will be materially affected, as many of the patrolmen will walk to and from their beats, rather than pay fare, causing loss of much time.

Jersey Fare Hearings

Commission Has Before It Plea for Seven-Cent Fare, Pending Conclusion of Zone Inquiry

At the time of the order of the Board of Public Utility Commissioners of New Jersey to the Public Service Railway to restore the 6-cent fare, the question of the future rates for the company was left with the hearing on the application for a 7-cent fare set for April 7 and the hearing on the proposed zone plan set for April 14. Thus they are entirely separate proceedings, both of which are still in progress.

PROFESSOR ANDERSON QUESTIONED

On April 7 Prof. Henry C. Anderson, head of the mechanical engineering department of the University of Michigan, under Dean Mortimer E. Cooley, a company witness, was unavoidably absent and an adjournment was granted by the commission to April 14. On that date Professor Anderson testified that the physical valuation of the company's property was $99,417,442, or at the rate of $117,000 a mile of track, exclusive of power houses. He believed the figures he gave as an appraisal were fair, for rate-making purposes, and said that a company must get a fair return for what it actually possessed or else returns on the original investment must be increased when the cost to reproduce showed itself to be higher in successive years. He explained at considerable length the details under which the inquiry to establish the appraisal value had been conducted. Professor Anderson also testified as to the cost of reproducing the physical properties of the railway based on labor and material costs between 1911-1915, 1914-1918 and for 1918, the totals rising from $113,504,471 for the first period to $163,648,707 for 1918.

In the matter of the other fare proceeding before the board, postponement of one week was granted on April 14 to the several municipalities concerned in which to gather their evidence for presentation in opposition to the restoration of the 7-cent fare asked by the railway pending the adoption of the proposed zoning plan.

NO LONG POSTPONEMENT

City Counsel Congleton and other municipal representatives urged that a postponement of three weeks be granted. Vice-President Wakelee of the railway stated the company was entirely willing to submit to an investigation of its affairs, but he felt that the 7-cent fare should be restored at once, pending the board's decision on the zoning plan. He said:

> The facts justify the application. and show the necessity for it. The company is facing insolvency as the result of a mounting deficit and this board might just as well say no to our application as to grant an adjournment of three weeks. Our treasury is empty, there is a huge deficit. The company wants to do business. Facts as to our operating expenses stand and no amount of investigation will controvert these facts.

Milwaukee Increase Denied

Commission's Estimate of Future Revenues and Expenses Leads It to Refuse Relief

The Wisconsin Railroad Commission on April 5 handed down a decision denying the petition of the Milwaukee Electric Railway & Light Company for increased fares in Milwaukee and the suburban districts. The general attitude of the commission was that its hopeful estimates of the company's future revenues and expenses afforded it no ground for granting rate increases which would result in giving more than a fair return.

In connection with ordering a changed accounting method under which the property of a strictly railway character will be kept apart from properties of other sorts, the commission used substantially the valuation found in other cases but rearranged it. It found that the value of the strictly railway property in the single fare area was $15,991,305, including $500,000 for materials and supplies. Similar totals for the suburban railway property would be $1,320,698 without materials and supplies and $1,363,198 with an allowance for these items. The interurban property was valued at $5,425,444. The power property of all the company's utilities was segregated, amounting to $11,318,752, and fixed charges on such property appear among the expenses of the railway department as a portion of the cost of power. The total value of all the properties of the company, excluding materials and supplies, was placed at $45,603,154 as of Dec. 31, 1918, except for additions to the Milwaukee Light, Heat & Traction property since 1914.

In considering the company's revenues and expenses, the commission stated that the last six months of 1918 included the period of highest operating costs, and that reductions rather than further increases were likely to come. Moreover, it believed that gains would be made in the revenues, which had been held down by the influenza epidemic and other causes. It therefore laid aside the actual revenue and expense figures for the last half of 1918 and compiled a statement of what it believed would be "normal revenues and expenses at present price levels for materials and labor and with revenues on the present basis for a future half-year period." This estimate of the commission would lead to an amount of $671,684 available to meet a return of 7½ per cent or $599,674 on the railway property in the single-fare area.

A similar estimate for the suburban-fare-area revenues and expenses showed a deficit of $8,849 for the six months, which would fall short $59,969 of a 7½ per cent return on the suburban railway property. The consolidated statement for both single-fare and suburban areas, however, would show a margin of about $13,000 per half year above a 7½ per cent return.

In regard to the rate of return, the commission said that, while in many cases it had indicated that 7½ per cent return on fair value was not under the circumstances in the cases decided an unreasonable return, these holdings were not to be taken as necessarily meaning that the earning of such a return should be provided at all times under all conditions for all utilities or for all departments of utilities. Nor is the failure to earn 7½ per cent a proof that rates may be advanced.

The commission added that for some time it had noticed an inadequacy of car supply leading to actual loss of revenue, and it could not neglect this fact in a rate case. It estimated that seventy-one new cars are needed under its modified service standard. Before making any final order directing such a purchase, however, it offered to the company an opportunity to present helpful data.

Omaha Company Appeals

Carries Its Fare Case to Supreme Court on the Ground of Confiscation Under Present Rates

The Omaha & Council Bluffs Street Railway has filed in the Nebraska Supreme Court an appeal brief from the findings and judgment of the State Railway Commission of Nebraska in connection with the company's petition to charge a 7-cent fare on its lines within the city of Omaha.

The case will be called for hearing on May 5. After a recent extensive hearing before the commission that body issued an order to the effect that the company had not made a full and complete showing as to operating revenues, and expenses and fixed charges, properly chargeable to the Nebraska property. The company refutes that statement. The commission further ruled that the case should be continued for the taking of additional testimony, and directed its engineering department to check physical valuation, and its accounting department to check books and records of the company during its entire life.

Company Claims Confiscation

The company, in its brief just filed with the Supreme Court, says that the 5-cent fare has become not only unreasonable but confiscatory. It asks for an emergency rate increase.

Among the financial statements shown in the brief are the following:

Company's valuation figures...	$19,755,400
Valuation by commission's expert	20,948,038
Outstanding bonds	9,619,000
Outstanding stock	8,990,000
Maintenance and operation, 1914	1,608,231
Maintenance and operation, 1918	2,467,000
Estimated increase of maintenance and operation for 1919, compared with 1914	1,321,518
Fixed charges per year	480,950

Unless the present 5-cent fare is increased, the company figures that earnings for 1919 will fall short by $422,600 of the amount necessary to pay interest on the bonds. The company sets forth that a large item of increased expenditure was due to increase of wages to motormen and conductors which became effective on June 1, 1918, and another increased scale of wages effective on July 17, 1918.

Six Cents in Spokane

Companies Sought Seven Cents and Concessions from City Looking Toward Consolidation

Following the hearing in Spokane, Wash., before the Public Service Commission on April 2, on the application of the Spokane Traction Company and the Spokane & Inland Empire Railroad for 7-cent fares the commission, as noted very briefly in the ELECTRIC RAILWAY JOURNAL for April 12, page 761, issued an order making a 6-cent fare effective immediately for a ninety-day period. The new rate was set to go into effect on all lines on April 6. No change in the present transfer or school-ticket system is made. It was proposed to supply conductors with strips of five tickets to be sold for 30 cents, as an accommodation to those not wanting to handle pennies.

Wage Increase Announced

Officials of the railways conferred after the fare decision had been handed down and announced a wage increase to platform men of 6 cents an hour, effective the same time that the 6-cent fare went into effect.

The hearing opened on April 2, with the cross-examination of Mayor Fassett by the attorneys for the railways.

The Mayor contended that the figures of the Spokane Traction Company for maintenance were too high.

Will G. Graves, attorney for the Traction Company, read into the record the War Labor Board recommendation for increased wages for traction employees.

D. L. Huntington, president, recalled in rebuttal, protested against using the increased revenue figures for the first of this year as a basis for figuring income. He said:

> We cannot prognosticate the future by a few days' spurt one way or the other. For instance, the figures of increased traffic for the first twenty-one days in March are not borne out by the remaining days of the month, although weather conditions were ideal.

Concessions to Railways

On the eve of the hearing before the commission, the City Council offered its first concessions to the railways when it passed a resolution favoring consolidation of the two lines and agreeing to submit to the people amendments to the city charter which would assist in bringing about the merger. The concessions which the Council proposes in the charter amendments are:

Relief from the car mileage tax.

Abrogation of all paving burdens, excepting those necessarily imposed upon the streets by the railways themselves.

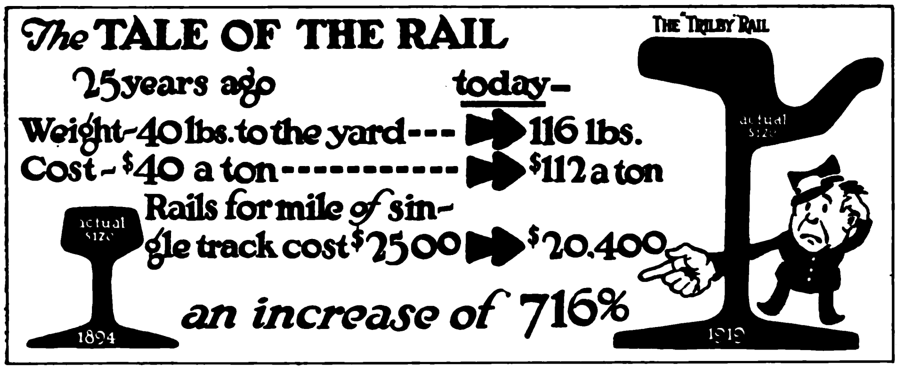
Suspension of all charges for the use of bridges.

Elimination in the franchise of competitive lines which would be torn up after the consolidation.

Officials of the railways declare that they will immediately take steps to bring about the consolidation of the railways within the ninety-day period set by the Public Service Commission. They see no reason why the company and the city should not know exactly where they stand in ninety days if both sides act with diligence.

Attractive Los Angeles Posters

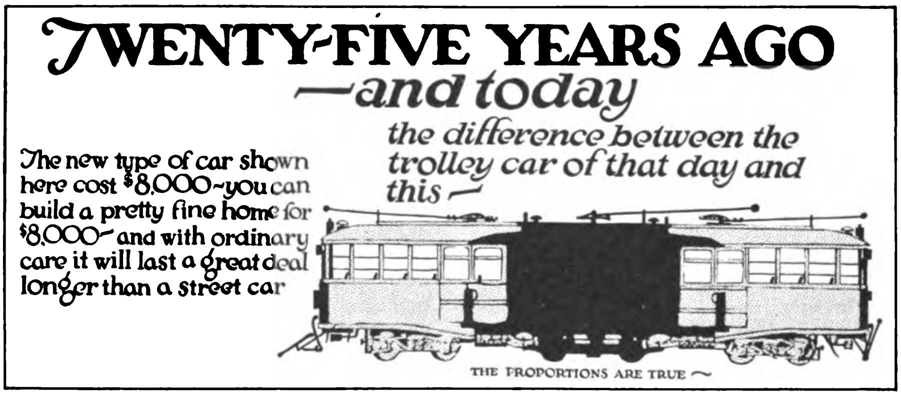
The first two of a series of cards being placed on the cars of the Los Angeles (Cal.) Railway are reproduced in the accompanying engravings. The cards are printed on both sides and placed in the upper bulkhead windows, so they may be easily read from both inside and outside sections. No comment of any kind, outside of a direct statement of the fact, will appear on any of the cards. The cards have been received in a spirit of good-will by patrons, and apparently have excited increased interest in the general problem confronting the railway. They are unusually attractive from a typographical standpoint, much of which merit is necessarily lost in reproduction and in reduction in size from the original.



A STUDY IN RAIL SIZES AND COSTS, LOS ANGELES RAILWAY

Dallas Company Keeps Its Promise

Under the head of "Keeping Faith with the People," the Dallas (Tex.) Railway is running a five-column advertisement in the Dallas newspapers setting forth in detailed form the improvements promised under the service-at-cost franchise granted by the city and the progress made on these improvements to date. The introduction to the advertisement follows:


TWENTY-FIVE YEARS AGO
—and today
the difference between the trolley car of that day and this—
The new type of car shown here cost $8,000—you can build a pretty fine home for $8,000—and with ordinary care it will last a great deal longer than a street car
THE PROPORTIONS ARE TRUE

A STUDY IN CAR SIZES AND COSTS, LOS ANGELES RAILWAY

> As a public utility, with a whole city to serve, the Dallas Railway recognizes that it has a public trust to discharge. It realizes that while the company and the public have mutual obligations, the rights of the public must come first.
>
> The company is proud of the property as it stands to-day. It thinks the public should be proud of its railway. So that the public may judge for itself, the company purposes to give an account of its stewardship.
>
> And every man who is open-minded and fair will approve this determination to rout ill will with candor, to confront prejudice with facts and in the friendliest spirit to discuss problems which only cordial co-operation can solve.
>
> When the citizens of Dallas granted the present management the railway franchise, certain promises were made to make certain extensions and improvements on the Dallas Railway. In order that our people may know what extensions and improvements were promised, and the progress made as of this date, we are itemizing them below.

At this point in the advertisement there appears a list giving in detail the work being carried out. As the individual items of which it is composed are not of general interest elsewhere than in Dallas it has accordingly not been included here. The advertisement concludes as follows:

> You will observe that the Dallas Railway is "keeping faith with the people." The above improvements represent an actual outlay in dollars and cents of $860,550. Every part of the material represented by the above has been ordered. This is your railway and you are entitled to know what we are doing, and what we intend to do in the future toward bettering the railway service in this city. We are firm believers in the open door. Our cards are on the table, face up. Your interests are our interests. We want the people of the city of Dallas to know the facts about the Dallas Railway
>
> Could anything be fairer?

I. T. S. Preparing for Summer

Officials of the Illinois Traction System, Peoria, Ill., are arranging the summer time card. It will become effective on or about May 1.

Transportation News Notes

Six Cents in Paducah.—An agreement was reached on April 2 between the City Commissioners and the Paducah (Ky.) Traction Company, whereby fares will go to 6 cents. For the past six months a 7-cent fare has been effective. The company is now in the hands of a receiver.

Terre Haute-Indianapolis Increase Authorized.—On application filed by the Terre Haute, Indianapolis & Eastern Railway, Indianapolis, Ind., the Interstate Commerce Commission on April 14 authorized the company to increase fares for the purpose of increasing revenues to meet advanced material and operating costs.

Wants a Ten-Cent Fare.—The Massachusetts Northeastern Street Railway, Haverhill, Mass., has filed notice with the Public Service Commission of Massachusetts of an increase of single passenger fares from 6 cents to 10 cents, effective May 7. However, five tickets can still be bought at the old rate, or five for 30 cents.

Interurban Increases Fare.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has increased the fares from 2½ cents to 2¾ cents a mile, following an order of the Public Service Commission of Indiana. No decision has been made yet in reference to the increase in city fares. The company asked for an increase of 1 cent on the city lines.

Referendum Asked at Akron.—Opponents of the city ordinance providing for an increase in fares to 6 cents in Akron, Ohio, on the lines of the Northern Ohio Traction & Light Company late on April 8 filed petitions for a referendum signed by more than 8000 voters. City officials said that the referendum would be submitted at a special election not later than May 20.

Seven-Cent Fares at Worcester.—The Public Service Commission of Massachusetts issued an order on April 14 establishing a cash fare of 7 cents in place of the former 6-cent unit on the Worcester Consolidated Street Railway. Tickets are to be sold by conductors in strips of ten for 65 cents. An increase of approximately 33⅓ per cent is ordered in workingmen's tickets, and pupils' tickets are to be sold at the rate of ten for 35 cents.

Yonkers Increase on April 18.—The Yonkers (N. Y.) Railroad has formally accepted the conditions of the ordinance passed by the Aldermen recently and granting the company the right for a period of two years to charge a 5-cent fare on the cars within the city limits and an additional fare on the cars that cross the city line in either direction. The acceptance, dated April 6, makes it possible for the railroad to put the new fare plan into effect on April 18, as under the terms of the ordinance it becomes operative ten days after being accepted by the company.

Canadian Fare Increase.—The City Council of London, Ont., on April 7 adopted by a vote of six to five a resolution to grant increased fares to the London Street Railway on condition that the company improve the service in respect to time and speed. The measure, City Solicitor T. G. Meredith advised, will require the assent of the Legislature, and if opposition is offered it is possible that the franchise act will be invoked to compel a vote of the people before the scheme becomes effective. The present fares are 5 cents cash, seven regular tickets or nine workingmen's tickets for a quarter.

Sees Hope in One-Man Cars.—One-man cars are being urged by A. D. Mackie, general manager of the Springfield (Ill.) Consolidated Railway. Mr. Mackie does not favor an increase in fare beyond the present 6-cent rate. It is his opinion that the falling off in patronage that would follow a further fare increase would more than offset the additional revenue secured. The only alternative is a reduction of operating expenses. A principal means to this end would be the elimination of the conductor on the cars. The plan of the company would be to introduce one-man cars gradually.

Transfers Discontinued.—The hearing on the complaint of Jamestown against the Warren & Jamestown Street Railway and the Jamestown Street Railway before the Public Service Commission for the Second District of New York over the proposed discontinuance of transfers on April 15 was adjourned by the commission on April 8 at the request of the city and companies. The answer of the Jamestown Street Railway alleges that "it is under no obligation imposed by statute, franchise or otherwise to issue transfers to or honor transfers from the Warren & Jamestown Street Railway line," an arrangement which it proposed to discontinue on April 15 because of a substantial loss of traffic and revenue.

Wants Class Freight Rates Revised.—The Indiana Railways & Light Company, Kokomo, Ind., has filed a petition with the Public Service Commission of Indiana asking for a revision of class freight rates on interline shipments. The petition sets forth that shippers are complaining that the interurban rates for hauls more than 80 miles are more than steam road rates and that considerable long-haul business is being lost by the electric railways because of this difference in rates in favor of steam roads. A letter accompanying the petition says that it was filed in accordance with an understanding reached in an informal meeting with Public Service Commissioners Lewis and Edwards on March 28 and that no action is to be taken on the petition until the other electric railways have filed similiar petitions.

Legal Notes

ALABAMA—*Ordinance to Transport Police Officers Construed.*

An ordinance of the city of Montgomery requiring the traction company to furnish free transportation to police officers when in uniform was construed to entitle a plain clothes man wearing only a badge to free transportation. (Montgomery Light & Traction Co., *vs.* Avant, 80 Southern Rep., 497.)

ILLINOIS—*Where There Was No Grant, There Need Be No Performance.*

Where a street railway, upon obtaining its franchise, obligated itself to a park board, having jurisdiction of streets, to pave certain street intersections not required to be paved by its franchise from the city, the contract was *nudum pactum,* since the company derived its right to operate on the streets from the City Council, and the park board had granted nothing. (South Park Commissioners *vs.* Chicago City Ry., 122 Northeastern Rep., 89.)

INDIANA—*There Are No Degrees of Negligence.*

As a matter of law there can be no degrees of negligence, and hence no degrees of duty. Hence, the use of such terms as "slight care," "great care," "highest degree of care," or other like expressions in instructions, as indicating the quantum of care the law exacts under special conditions and circumstances is misleading and constitutes an invasion of the province of the jury. (Union Traction Company of Indiana *vs.* Berry, 121 Northeastern Rep., 655.)

KENTUCKY—*Responsibility of Master for Improper Use of Appliances.*

The rule requiring the master to exercise a proper degree of care to guard dangerous instrumentalities owned by him applies only where the instrumentality is dangerous in itself and not where it becomes dangerous from improper use.

Where the employees of an electric company, instead of putting wire used for repair in a safe place, connected it with a high-voltage wire with the avowed intention of injuring thieves, it was held that they were not acting within the scope of their employment so as to render the employer liable to trespassers who came in contact with the wires. (Craig's Administratrix *vs.* Kentucky Utilities Co. Craig *vs.* Same. —209 Southwestern Rep., 33.)

MASSACHUSETTS—*Violation of Rules Constitute Negligence.*

That a street car went fast past another car going in the opposite direction after a stop, and that the motorman did not sound the gong, both violations of the street railway's rules, was negligence, in an action for injuries to a boy struck by the car. (Prendergast *vs.* Boston Elevated Ry., 122 Northeastern Rep., 318.)

MASSACHUSETTS—*Person Injured Crossing Through One Car to Reach Another.*

A person on the platform of an elevated railway attempted to pass through a car to reach the other side of platform to take her train and was caught in the door of the first car and injured. She was held to be at most a licensee, to whom the railroad owed no duty except to refrain from wanton misconduct. (Rhodes *vs.* Boston Elevated Ry., 122 Northeastern Rep., 194.)

MICHIGAN — *Conflicting Jurisdiction Over Fares of State and Federal Court.*

Where a street railway filed a bill in a federal district court attacking a city ordinance fixing maximum fares, the State court did not then have jurisdiction of a bill filed by the city to secure an injunction restraining the street railway from collecting any fares in excess of those specified in the ordinance. (Detroit United Ry. *vs.* Dingman, 170 Northwestern Rep., 641.)

NEW JERSEY—*Cost Where Municipal Contractors in Street Were Unnecessarily Slow.*

Where contractors adopted a method of constructing a sewer which unnecessarily interrupted travel for eight months on a street railway line, the actual cost of taking up the tracks, laying temporary tracks, and restoring the situation, should be paid by the contractors, under P. L. 1903, page 164, Sec. 7, and P. L. 1907, page 29, Sec. 5. (Public Service Ry. *vs.* Frazer, et al. 105 Atlantic Rep., 387.)

New Publications

Boiler Water Treatment

Reprint of Engineering Bulletin No. 3 prepared by the United States Fuel Administration in collaboration with the Bureau of Mines. Bureau of Mines Technical Paper, No. 218. Copies may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., five cents per copy.

Opportunity Monographs

Vocational Rehabilitation pamphlets for disabled soldiers, sailors and marines to aid them in choosing a vocation. Prepared by the Federal Board for Vocational Education and issued in co-operation with the War and Navy Departments. Government Printing Office, Washington, D. C.

The Engineering Experiment Station of the University of Illinois.

Bulletins Nos. 13 and 19 issued by the University.

These illustrated bulletins cover the present technical facilities of the experiment station and the university and also include plans for the future.

The Earning Power of Railroads

By Floyd W. Mundy. James H. Oliphant & Company, 61 Broadway, New York, N. Y. 422 pages.

This 1918-1919 edition continues the compiler's policy of presenting important statistics relating to the earning power and securities of steam railroads in the United States and Canada.

Railway Statistics of the United States of America for 1917

By Slaton Thompson. Bureau of Railway News & Statistics, Chicago, Ill.

This publication is the fifteenth of a series dealing with steam railroad statistics. It presents the statistics for the year ended Dec. 31, 1917, as compared with the official reports for 1915, and it also gives recent statistics of foreign railways.

Steam Engines

By E. M. Shealy, associate professor of steam engineering, University of Wisconsin McGraw-Hill Book Company, Inc., New York, N. Y. 290 pages. Illustrated, cloth. $2.50 net.

This is part of the engineering education series prepared in the Extension Division of the University of Wisconsin and intended to be used as a text-book for correspondence students. It is the third of a series of three books for students pursuing a general course in steam engineering, the other two being "Steam Boilers" and "Heat." The book is practically non-mathematical in character and covers the range of topics usual in books of this class. A few pages at the end are given to the subject of steam turbines. As is necessary in a book intended for education by correspondence, the language is simple and the points made are illustrated by means of diagrams and numerical problems wherever possible.

Rest Periods for Industrial Workers and A Case of Federal Propaganda in Our Public Schools

Two publications by the National Industrial Conference Board, 15 Beacon Street, Boston, Mass.

The first of these pamphlets constitutes Research Report No. 13 and was issued in January. It reports the experience of leading American establishments with rest pauses for the workers, especially for women, with a view of giving some idea of the extent to which systematic recesses in the day's work have been practiced in this country and also to determine broadly how far such pauses are desirable from the standpoint of health and of industrial efficiency.

The second pamphlet, which was issued in February, contains criticisms of three pamphlets issued by the United States Bureau of Education for the intermediate and upper grades of elementary schools and for high school use, entitled "Lessons in Community and National Life." Ostensibly, these lessons are for use in the presentation of social and political economics in the public schools and for casual reading by older readers, but they are held to contain bad economic reasoning and to be partisan in their character.

Personal Mention

Milwaukee Changes

The engineering and operating divisions of the way and structures department of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., have recently been consolidated. These were formerly operated as separate divisions. With this change E. J. Archambault has been made assistant engineer of way and structures. Mr. Archambault has been in the engineering department of the Milwaukee Company for the last seven years in charge of the civil engineering force. Mr. Charles Lederer, formerly city roadmaster, becames assistant superintendent of way.

Col. Joseph H. Alexander, who recently returned from France, has been elected vice-president of the Cleveland (Ohio) Railway.

W. E. Jones has resigned from the Connecticut Company, New Haven, Conn., to accept a position in the accounting department of the Rhode Island Company, Providence, R. I.

H. C. Eddy, senior inspector of traffic of the Board of Public Utility Commissioners of New Jersey, recently gave an illustrated lecture, "Development of the Electric Railway," before the Engineers' Club of Trenton.

James S. Sayers, Wilmington, Del., has been appointed chief engineer for the Trenton & Mercer County Traction Corporation, Trenton, N. J. He was connected with the Trenton company some years ago, but left to accept a position in Wilmington.

Mrs. W. T. Waters, who became publicity manager of the Georgia Railway & Power Company, Atlanta, Ga., and assistant editor of *Here We Are*, published by that company, when her husband left for training camp in August, 1917, returns to peace-time life, her husband having returned ready to resume his work for the company.

Joseph A. Kellogg, Glens Falls, N. Y., has been nominated by Governor Smith for member of the Public Service Commission for the Second District to succeed Jerome L. Cheney, now a Deputy Attorney-General. Mr. Kellogg, is a former Supreme Court Justice. He conducted Governor Smith's campaign from the Syracuse headquarters of the Democratic Committee last fall.

J. G. Huntoon, general manager of the Tri-City Railway, Davenport, Iowa, has contributed an interesting and well-written article to the Davenport *Times* analyzing the part which the automobile has played in the reduced revenues of electric railways. Mr. Huntoon shows that the development of electric railway and interurban lines is at a standstill in most parts of the United States and sums up his presentation of the subject with the statement that either increased revenues or decreased expenses must accrue to the companies if they are to provide a fair return to the investor.

R. W. Belcher has been elected secretary of the war service executive committee of the Chamber of Commerce of the United States, of which Joseph H. Defrees, Chicago, is chairman. Mr. Belcher takes up the work which was inaugurated by W. H. Manss at the great reconstruction conference, held under the auspices of the National Chamber at Atlantic City last year. For the last year and a half Mr. Belcher has been a captain in the Ordnance Department. He was secretary of the Civil Service Commission of the city of New York during the administration of Mayor Mitchel, and also served for a period as the secretary of the National Civil Service Reform League. His headquarters are at Riggs Building, Washington, D. C.

Paul Shoup, San Francisco, Cal., who had been serving as a director of the Southern Pacific Company during the unexpired term of William Sproule, now with the Railroad Administration, has been elected to the board of directors of the Southern Pacific Company for a full term. On July 11, last, Mr. Shoup was elected a director and vice-president and assistant to the president of the Southern Pacific Company. He had formerly been president of the Pacific Electric Railway. Mr. Shoup did not sever his connection with the Pacific Electric Railway, however, for he is the executive representative of the Southern Pacific Company on the Pacific Coast, with general supervision over the Pacific Electric Railway.

Edmond S. Gillette, mechanical and electrical engineer of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., has resigned to become associated with the Lyon-Metallic Company at Montgomery as service engineer. Mr. Gillette has been with the Aurora, Elgin & Chicago Railroad for six years, in charge of the operating and maintenance departments. He has served as a member of the power distribution committee of the American Electric Railway Engineering Association, and chairman of the electrical engineering committee of the Illinois Electric Railway Association. He is a member of the Master Car Builders' Association. Mr. Gillette became connected with the Aurora, Elgin & Chicago Railroad following his graduation from the University of Wisconsin, where he won national honors in athletic events.

Eugene C. Clarke has resigned from the position of superintendent of instruction and efficiency of the Tacoma Railway & Power Company, Tacoma, Wash., to become associated with John

A. Beeler, consulting engineer, with New York City as headquarters. Mr. Clarke has been very successful in handling transportation department employees and securing voluntary co-operation on the part of the men. He was formerly connected with the Brooklyn Rapid Transit Company as supervisor of instruction, but his activities in Brooklyn were much wider than his title there indicated. He was one of the electric railway pioneers in the field of accident prevention. His educational work in Brooklyn in this connection attracted wide attention and was liberally drawn upon for use on other systems.

Rolla Wells, who has been appointed receiver of the United Railways, St. Louis, Mo., has long been identified with business interests in that city. Mr. Wells' father, the late Erastus Wells, operated the first city railway in St. Louis, which incidentally is said to have been the first street railway west of the Mississippi River. It was a horse car line and operated on Olive Street, from Fourth Street to about Seventeenth Street. Rolla Wells was employed by the Missouri Railway on this line, becoming assistant superintendent and later general manager. He resigned in 1879. Mr. Wells is sixty-three years old. He holds large financial interests. He served as Mayor of St. Louis from 1901 to 1908. He was chosen governor of the Federal Reserve Bank for the Eighth (St. Louis) District in 1914 and served until Jan. 1, 1919. He was graduated from Princeton University. Mr. Wells was treasurer of the Democratic National Committee during the campaign of 1912.

Nicholas J. Cunningham, for the last sixteen years executive secretary of the Springfield Gas & Electric Company and the Springfield Traction Company, Springfield, Mo., on April 8 tendered his resignation in order that he might devote himself more fully to the development of extensive holdings of oil land in McCulloch County, Tex., where he owns a large acreage. Mr. Cunningham will remain in Springfield, however, until fully relieved of his responsibilities. Notwithstanding his close application to the duties of the position which he has held with the public utility corporation, Mr. Cunningham has found time to organize and operate a number of other very successful business enterprises. Two of the city's most popular amusement places were established by Mr. Cunningham. Mr. Cunningham entered the public utility field with the Peoria Gas & Electric Company. In 1903 he went to Springfield as secretary of the Springfield Gas & Electric Company. In 1906 he brought about the consolidation of this company with the Springfield Traction Company. Since that time he has been executive secretary of both companies. Mr. Cunningham assisted in the organization of the Missouri Association of Public Utilities and was secretary of the association for six years. He was born in Peoria, Ill., and was educated there and at St. Victurs Academy, near Kankakee, Ill.

Obituary

A. B. du Pont Dead

Antoine B. du Pont, electric railway expert, inventor, engineer and the man who first managed the street railway system in Cleveland, Ohio, under the 3-cent fare plan of the late Mayor Tom L. Johnson, died of pneumonia on April 11 at his residence in Cleveland, Ohio.

Mr. du Pont is perhaps best remembered in Ohio as the close associate of Tom Johnson in Cleveland. This was because there attached to Mr. du Pont's work in this connection much that was spectacular, necessarily so but not because Mr. du Pont would have had it so. However, his Cleveland experience played only a small part in Mr. du Pont's career in the electric railway field, in which he early earned for himself a reputation for ability. Thus among his notable works were his many patents, among them the du Pont truck, and the task he performed as a member of the Traction Valuation Commission, which fixed the valuation of the Chicago railway properties for the 1907 settlement ordinances.

Mr. du Pont was born in Louisville, Ky., on April 20, 1865. His uncle, A. V. du Pont, was the chief owner of the old Louisville Railway, and his father, Bidermann du Pont, was largely interested there. Mr. du Pont was graduated from the Rensselaer Polytechnic Institute at Troy, N. Y., at twenty-one. He first tried his hand as a coal mine engineer, but wanted to get into railroading. He then returned to Louisville and worked in the track department of the Louisville Railway on construction and maintenance. Later he was invited to join forces with Tom L. Johnson in Brooklyn, N. Y. Subsequently he rejoined Mr. Johnson in Detroit and electrified one of Detroit's systems. When all the lines in Detroit were consolidated Mr. du Pont became general manager. Mr. du Pont's reputation for getting things done had now been firmly established, and he was invited to St. Louis. As vice-president and general manager of the St. Louis Transit Company he tore out the cable lines and put in electricity. While he was engaged in this work he found time to design and install the great terminals to handle the world's fair crowds. He went to Cleveland as a volunteer and plunged into the struggle in the 3-cent fare fight. A characteristic remark attributed to him was to the effect that there was more music to his ears in the fare register than there was in the stock ticker. To him, it was the folks who pay the fares, not the brokers, that made street railroads.

His wife, who was Miss Elizabeth C. Hibbs, assistant secretary to Tom L. Johnson, three daughters and a son survive him. Mr. du Pont also is survived by two brothers, T. Coleman du Pont, New York, former president of the E. I. du Pont de Nemours Powder Company, Wilmington, Del., and E. M. du Pont, president of the Johnstown (Pa.) Traction Company.

Col. Robert Andrews, president of the Safety Car Heating & Lighting Company, New York, N. Y., from 1889 to 1908, died on April 7 at the age of eighty-four years.

Col. James I. Baird, eighty-nine years old, civil engineer of national note, died at Detroit, Mich., on April 6. Colonel Baird supervised the construction of the Lake Street Elevated Railroad, Chicago, now known as the Chicago & Oak Park Elevated Railway.

H. E. Crawford, president of the Windsor, Essex & Lake Shore Rapid Railway, Kingville, Ont., is dead. He had been in poor health for some time. Before removing to Chatham in 1915 Mr. Crawford was in the store business in Tilbury for many years.

Favors M. O. on Reasonable Basis

Roger Mills, secretary and manager of the Sioux Falls (S. D.) Traction System, which is owned and controlled by the Mills family, is one of those aware of the unmistakable tendency toward cities extending their sphere of influence over utilities and other activities that affect directly the life and habits of the vast majority of the people. He even sees in municipal ownership of street railways a greater means of growth and prosperity for cities than through the city owning any other utility. The *Daily Argus Leader*, Sioux Falls, S. D., quotes Mr. Mills in part as follows:

> In a great many ways city ownership of the electric railway would mean more to the growth and prosperity of the city than the owning of any other utility. It is only natural that conflicts should arise between the city and the corporation over how the streets are to be used and maintained. The city can go ahead with a street paving program and not expect the electric railway to put thousands of dollars into paving which is really a detriment to business, decreases the patronage and causes high maintenance and renewal charges. Under city ownership there would be no conflict over paving questions. When a street was ordered paved, the car tracks could be paved at the same time, by the same contractor and in any manner that the property owners desired.
>
> There is a crying need in Sioux Falls right now for new lines. With the present prospects of heavy pavement charges it is doubtful if we could undertake to build any of these lines. Failure to extend is going to hamper the growth and development of the city, but it is unfair to ask or expect us to construct these additional lines and then be forced to pay $10,000 or $12,000 a mile to pave them. I say to you frankly that we are not contemplating any new lines or extensions.
>
> In addition to building more lines it would be possible under city ownership to give more frequent service, as there would be no difficulty in the city securing ample funds for this purpose and at a lower interest charge than we are compelled to pay. Rates of fare could also be lowered and placed on a service-at-cost basis, if though desirable, which would greatly increase the patronage.
>
> We do not have to sell or turn the road over to the city unless we want to. If the city is going to try to take away from us something we have created without giving just compensation, then we are opposed to and will try and obstruct city ownership of the electric railway. On the other hand, if it is for the best interests of the city to own the road, and the city will treat fairly with us, making satisfactory allowance for the unexpired time under the franchise, then we would be willing to negotiate.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Coal Stocks Low Under Short Production

Accumulation of Stocks During Summer by Power Companies Would Help Relieve Shortage Which Will Appear This Fall

The coal market at the present time shows little activity. Production of bituminous coal is now approximately 25 per cent below the production of the corresponding week of 1918, and production of anthracite coal is approximately 50 per cent below that of the same period last year. Anthracite producers are operating two and three days a week. Stocks of coal above ground are not very great. Buyers are holding off, individual stocks are diminishing and everybody seems to be waiting for something to happen. The result will be, coal interests believe, that when buying starts it will start with a bang and the fortunate ones will be those whose orders are filled, while the rest wait for stocks to build up sufficient in size to supply them.

The railroads take approximately 25 per cent of the coal mined per year for locomotive use. Power stations for utility purposes take approximately the same amount. Hence the importance of the railway power house in the coal market. Utility companies had laid in considerable stock of coal under rather high prices and some of that stock is still reported on hand. In some cases this coal is being used with no measure for restocking for reserve purposes. Again, other utilities' operators are leaving their old stocks as reserve and are purchasing from month to month merely sufficient quantities to carry them through. Small quantities, sufficient to carry many a company for a month, may be purchased for about 50 cents per ton under the price set by the Fuel Administration. This price can as a rule, however, be obtained from only the smaller coal producers. The large producers are holding practically to the price set by the Fuel Administration, although that body really passed out of control early this year.

The price of anthracite coal will increase 10 cents a ton per month from now on till 50 cents is added, but there is no indication as to what the price may be when the rush of buying is under way. This rush is sure to come, following the procedure of the buying public in holding off with its orders. The state of the coal market next fall will be the answer to the present quiet condition of that market. Many coal operators claim there will be a runaway coal market this fall and winter unless more interest than at present is shown in summer stocking.

Bids on the supply of coal for the season are being witheld on account of the uncertain market and the basing of prices on federal regulations in effect last fall. Coal operators believe they will have labor troubles when the present wage agreement runs out, and are refusing long contracts except at top prices. After 1919, anthracite miners will have a documentary claim on a demand for higher wages, but as to whether or not they will have a moral claim remains to be seen. The Department of Labor is not making any easier any possibility of a reduction in wages, and any attempt on the part of operators to that end is liable to lead to serious difficulties.

Bituminous mines are on a forty-eight hour basis, and there is evidence in the wind of an effort to be made to reduce those hours to five days of six hours each. The pay would not only be the same for some of those affected by this proposed week of thirty hours but further effort would be made to even increase this wage on the part of a certain class of the men.

From one region, however, there is a report that the executive of the state in which that region is located has set himself against any reduction in wages. A meeting of the miners provides the information that were it not for this assurance given them in the upholding of their wages, there might have been a division in their ranks when the question of a reduction should come up. This is merely one evidence of a possible susceptibility on the part of some miners to accept a possible reduction.

A short time ago the price of coal nearly underwent a further increase of 50 cents. Had this been accomplished there would now be more possibility of looking for a reduction. A considerable deterrent to an increase in the price the last of this year will be brought into play if more attention is paid to the increasing of stocks this summer.

Trolley Wire Market Showing Slightly Increased Activity

There is an increased movement in bare trolley wire noted in some sections of the country. This movement, however, is practically only for replacements and repair. In certain cases where particularly heavy traffic conditions and mechanical strains are more apparent, cable of a different fabrication than bare copper is finding considerable activity in lengths of about a mile and slightly over. This is true especially in the Southern cities.

Activity in Special Work Renewals

Fred Bland, Director of Tramway Department of Edgar Allen & Company, Sees Active Business Ahead

In a discussion on special track work conditions in the United Kingdom on Feb. 21 at the plant of Edgar Allen & Company, Ltd., Sheffield, England, Fred Bland, director of the tramway department, expressed himself in optimistic vein on the future of electric railway special work. During the preceding week, Mr. Bland said, more worth-while inquiries had come in than during any single week since the opening of the war. If the tramways realized that there was no prospect of an early reduction in the cost of manganese track work in sight, orders would soon be brisk. There was no likelihood that solid manganese would decline in popularity although a few undertakings were using cast steel and others were considering built up work, and even considering the return of short switches because of the cost, still the demand for manganese would be the same in some form or other. Manchester and Glasgow were the two large cities where insert construction was a standard along with manganese, which, however, was becoming the greater of the two. He certainly would favor a cut in prices if that were possible, but labor was higher than ever, and manganese was going up instead of going down.

During the war, hardly one-fifth of the tramways department staff had remained with the company, while the government had requisitioned the buildings used for assembling and fitting pieces before shipment. Now, as the track specialists were drifting back from war service and their facilities in manufacture were being restored, Mr. Bland said that his company was ready for anything. Even if the company had been permitted to keep its full staff, it would have been of no avail because for a long time no tramway was allowed to order any track work without a permit, at first from the Ministry of Munitions (Priority Department) and later by the Tramways (Board of Trade) Committee testifying that such work was necessary. Now this committee has finished, and orders are free to come along, and priority of ordering would be an important feature in delivery promises.

It was obvious therefore, that the need for replacements was urgent. Outside the oxy-acetylene welding little else had been done by the tramways themselves to keep going, concluded Mr. Bland.

Sale of the British Westinghouse Holdings

Chairman Tripp, Returning from England, Announces Sale of Interests and New Commercial Alliance

Gen. Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, returned to New York recently from a trip to England. He said that the British interests have practically been sold.

"Subject to the successful accomplishment of certain legal details in Europe, which, however, may be waived by the Westinghouse company if thought desirable," said General Tripp, "an agreement has been reached with certain important British interests under which the Westinghouse company sells for cash its British holdings and enters into a commercial alliance looking to the development of export business.

"The commercial plan will be instituted immediately upon the assumption that the whole deal will be consummated on one of the bases above indicated. No further details can be given out at this time."

General Tripp believes that foreign trade prospects depend on the successful outcome of the peace conference. Some method of international financing to provide for the obligations growing out of the war must be formed, he declared, before normal commercial conditions can be expected.

Rolling Stock

Quincy (Ill.) Railway expects to install a number of new cars of the latest type and one rotary snow sweeper. The service also will be improved and better schedules arranged.

Washington Railway & Electric Company, Washington, D. C., which lost thirty-one cars and its Eckington carhouse in a fire, as noted in these columns of March 1, is holding up the replacement of these cars, it is reported. It is probable that this is due to the considerable outlay necessary for this replacement.

Springfield (Ill.) Consolidated Railway, through A. D. Mackie, general manager, has notified the City Commission that the operation of one-man cars will be a necessity in order to keep the company out of the hands of a receiver. The company has had its fare increased from 5 cents to 6 cents and says that further increases are out of the question.

Franchises

Detroit, Mich.—Henry Ford has applied for franchises to establish a system of street railways in the townships of Springwells, Ecorse and Dearborn and the village of Oakwood, connecting the Ford blast furnaces, shipyard and tractor plant.

East St. Louis, Ill.—The East St. Louis & Interurban Electric Railway has asked the City Council of East St. Louis for a franchise to construct a line and operate cars in East St. Louis. The proposed route of the line will extend from Tenth and Market Streets to the Free Bridge.

Track and Roadway

Fort Madison (Iowa) Street Railway.—This company reports that it will reconstruct approximately 3300 ft. of single track.

Berkshire Street Railway, Pittsfield, Mass.—The Berkshire Street Railway has begun to dismantle its 7-mile line between Lanesboro and Cheshire, which has been closed to traffic since early in January, 1918.

Kansas City (Mo.) Railways.—Plans are being contemplated for the construction of an extension of the Independence cross-town line of the Kansas City Railways from the present northern terminous at Liberty and Moore Streets to Sugar Creek, about 2½ miles, this summer. P. J. Kealy, president of the company, has accepted a proposition of the business men of Independence to loan the company $50,000 for ten years at 6 per cent interest, the proceeds of the loan to be used in building the new line.

Interborough Rapid Transit Company, New York, N. Y.—Operation of trains through the new Clark Street tunnel has been begun by the Interborough Rapid Transit Company. The new service enables passengers on the West Side line to travel direct to Brooklyn without changing to the shuttle or transferring.

NEW YORK METAL MARKET PRICES

	Apr. 3	Apr. 17
Copper, ingots, cents per lb	15 50	15 37½
Copper wire base, cents per lb	17.25 to 18.00	17.25 to 18.00
Lead, cents per lb	5 25	5 00
Nickel, cents per lb	40	40 00
Spelter, cents per lb	6.62½	6 45
Tin, cents per lb	†72.50	†72.50
Aluminum, 98 to 99 per cent., cents per lb	30.00	31.00

† Government price in 25-ton lots or more f.o.b. plant.

OLD METAL PRICES—NEW YORK

	Apr. 3	Apr. 17
Heavy copper, cents per lb	13 00 to 13 25	13.50 to 13 75
Light copper, cents per lb	10 50 to 11 00	11.00 to 11 25
Heavy brass, cents per lb	7.25 to 7.50	7.50 to 8.00
Zinc, cents per lb	5.25 to 5.50	5.25 to 5 50
Yellow brass, cents per lb	6.00 to 6 50	6.50 to 7 00
Lead, heavy, cents per lb	4 25 to 4 50	4.00 to 4 25
Steel car axles, Chicago, per net ton	$26 00 to $28 00	$26 00 to $28 00
Old carwheels, Chicago, per gross ton	$22 00 to $23 00	$22.00 to $23 00
Steel rails (scrap), Chicago, per gross ton	$17 00 to $17 50	$17.00 to $17 50
Steel rails (relaying), Chicago, gross ton.	$16 50 to $17 00	$17.00 to $17.50
Machine shop turnings, Chicago, net ton	$6 50 to $6.00	$7.50 to $7.00

ELECTRIC RAILWAY MATERIAL PRICES

	Apr. 3	Apr. 17
Rubber-covered wire base, New York, cents per lb	20	20
Weatherproof wire (100 lb. lots), cents per lb., New York	24 25	23.00
Weatherproof wire (100 lb. lots), cents per lb., Chicago	23 75 to 37.35	23 75 to 37.35
T rails (A. S. C. E. standard), per gross ton	$49 00 to $51 00	49.00 to 51.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	$47 00 to $49 00	47.00 to 49.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$45 00 to $47 00	45.00 to 47.00
T rail, high (Shanghai), cents per lb	3	3
Rails, girder (grooved), cents per lb	3.75	3.75
Wire nails, Pittsburgh, cents per lb	3¼	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3 25	3.25
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	2.75	2.75
Tie plates (brace type), cents per lb	2.75	2.75
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb	3	3
Angle plates, cents per lb	2.75	2.75
Angle bars, cents per lb	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb	4 35	4.35
Steel bars, Pittsburgh, cents per lb	2 35	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4 20	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5 25	5.25
Galvanized barbed wire, Pittsburgh, cents per lb	4.10	4.10

	Apr. 3	Apr. 17
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.70	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount †	80%	80%
Car window glass (single strength, first three brackets, B quality), New York, discount	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount	81%	81%
Waste, wool (according to grade), cents per lb	14 to 17	14 to 17
Waste cotton (100 lb. bale) cents per lb.	8 to 13½	8 to 13½
Asphalt, hot (150 tons minimum) per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	.....	.....
Asphalt filler, per ton	......	.....
Cement (carload lots), New York, per bbl	$2.90	$2.90
Cement (carload lots), Chicago, per bbl.	$3.05	$3.05
Cement (carload lots), Seattle, per bbl.	$3.13	$3.13
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.53	$1.53
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.60	$1.63
White lead (100 lb. keg), New York, cents per lb	13	13
Turpentine (bbl. lots), New York, ents per gal	69½	78

† These prices are f. o. b. works, with boxing charges extra.

New York State Railways, Rochester, N. Y.—Construction will be begun soon by the New York State Railways on an extension from Dominick Street, Rome, through Carey Street to the Y. M. C. A. building at the Rome Brass & Copper Company's plant.

Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y.—The Public Service Commission for the Second District of New York today passed an order directing the Geneva, Seneca Falls & Auburn Railroad to extend its track from its present terminus in Cayuga Lake Park 150 ft. easterly and that it erect at the new terminus a suitable shelter for waiting passengers. The company is also to provide and maintain a safe and convenient pathway from the new terminus to the Lake road at the foot of the hill on the shore of Cayuga Lake, properly lighted when cars are operated during the night.

Tulsa (Okla.) Street Railway.—Double tracking is now being laid by the Tulsa Street Railway from North Main and Cameron to North Cheyenne and Duluth Streets.

St. Thomas (Ont.) Municipal Street Railway.—The ratepayers of St. Thomas will be asked to vote on a bylaw for the issue of debentures for $50,000 for street railway improvements, including the reconstruction of the Talbot Street line, improving the carhouse, remodeling of cars and the purchase of new equipment.

Portland & Oregon City Railway. Portland, Ore.—It is reported that the Portland & Oregon City Railway will construct a 12-mile extension of its line to tap the Sand-Hayden and Cornwell timber tracts.

Dallas (Tex.) Railway.—The City Commissioners of Dallas have passed an order directing the Dallas Railway to begin at an early date the construction of a new single track line on Myrtle Street from Colonial Avenue to the Oakland Cemetery south of Dallas. Prior to the passage of the order, J. F. Strickland, president of the company, signed an agreement with the City Commission to begin work on this extension by Sept. 1, 1919, and to complete the line by Jan. 1, 1920.

Houston (Tex.) Electric Company.—The City Council of Houston has issued an order directing the Houston Electric Company to lower its tracks on Washington Avenue between Bethne Street and Houston Heights Boulevard. The order also directs the company to pave that portion of the street under and between its tracks. The work will cost approximately $60,000.

Richmond & Ashland Railway, Richmond Va,—Announcement has been made by Oliver J. Sands, head of a citizens' committee, that he and his associates have accepted the offer of George Taylor, representative of the Gould interests, to sell the property of the Richmond & Chesapeake Railway from Richmond to Ashland. It is understood that service will be resumed at once.

Seattle (Wash.) Municipal Street Railway.—Thos. F. Murphine, Superintendent of Public Utilities, in a recent communication to the city utilities committee, asked authority to spend approximately $200,000 in betterments to the municipal street railway system. The work contemplated will connect the recently acquired traction system and the other municipal lines, and facilitate the handling of traffic in the congested districts. The proposed betterments include: connection of Division A with traction line at Third Avenue and Pine Street, 15th Avenue bridge connections, connection of the two systems at 24th Avenue N. W. and West 67th Street, connection of Division A and Westlake Avenue lines, connection of Division A and North Seattle car barns, Leary Avenue construction, Ballard Avenue and Market Street lines, and Avalon Way double tracks.

Power Houses, Shops and Buildings

Quincy (Ill.) Railway.—New machinery will be installed by the Quincy Railway at its power house to permit the use of Keokuk power and to permit the steam plant to stand idle, ready for emergencies. Four new feed wires will be run from the power house to various parts of the system.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—A new one-story and two-story car repair shop, 60 ft. x 190 ft. will be constructed by the Terre Haute, Indianapolis & Eastern Traction Company on East Wabash Avenue, Terre Haute.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has closed a contract with the officers of the New York Catholic Protectory under which the Commission will obtain for a consideration of $75,000 a plot of approximately 12 acres between the foot of Herschel Street and Westchester Creek, Unionport, to be used as a storage yard for the Pelham Bay Park branch of the Lexington Avenue Subway. It is hoped to close title shortly so that construction of the yard can begin at an early date, and be completed by or about the time the elevated portion of the Pelham Bay Park branch, for which bids were received by the Commission a few days ago, is completed. The site is estimated as sufficient to accommodate more than thirty trains of Interborough Rapid Transit Company's steel cars. Space will also be provided for the storage of materials.

Kansas City, Mo.—The Halpin Dwyer Construction Company has begun grading the site of the new interurban terminal at Tenth and McGee Streets.

Lima Electric Railway & Light Company, Lima, Ohio.—It is reported that the Lima Electric Railway & Light Company, which is controlled by the Ohio Electric Railway, plans the construction of a large power plant.

Trade Notes

J. F. Davis, Chicago, Ill., has recently purchased and is offering for resale a large number of boilers from the Du Pont Powder Company's plant. The aggregate cost is said to be in the neighborhood of $500,000.

Chicago (Ill.) Pneumatic Tool Company has moved its Milwaukee office from Room 1305 Majestic Building to Room 1418 in the same building, where more convenient quarters which are necessitated by the constantly growing business of the company in this district have been obtained.

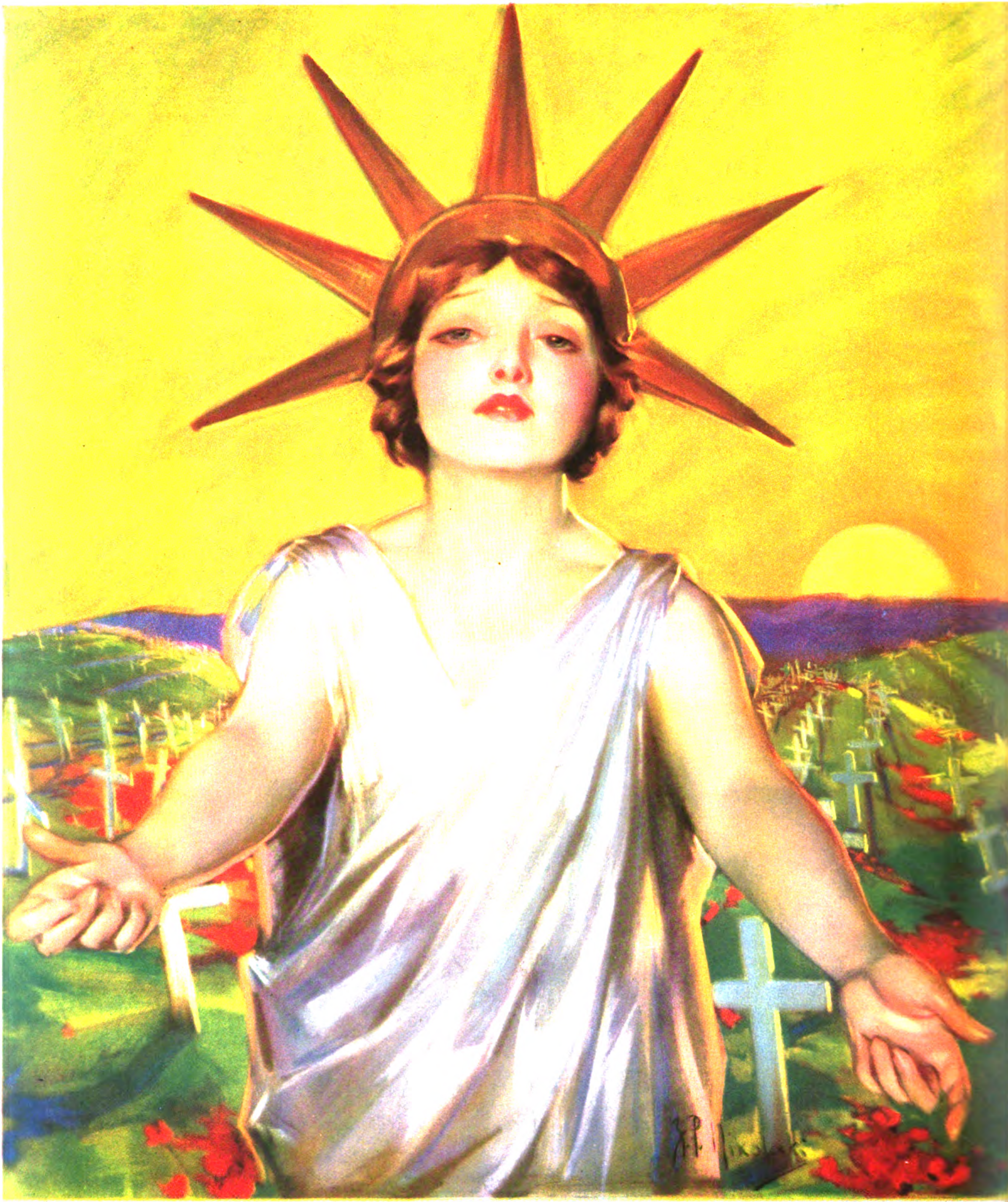
Bailey Meter Company, Cleveland, Ohio, will move its main office and works from Boston, Mass., to Cleveland, Ohio, effective May 1. The Boston office, with H. D. Fisher as manager, is retained to handle sales and engineering service work in the New England district. For the present New York and Philadelphia districts will be covered from Boston and all other districts will be covered from Cleveland.

Economy Electric Devices Company, Chicago, Ill., reports that the Seattle Municipal Railway has ordered 251 more Economy power saving railway meters. This order is in addition to the present equipment, installed last summer on the one-man cars of the Municipal Railway. This last order was placed through the Burton R. Stare Company, Seattle agent for the Economy Electric Devices Company.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Changes.—Capt. N. H. Callard, who has been discharged from government service is appointed to the railway sales department in the capacity of commercial engineer. W. Keith McAfee has been transferred to the service department as railway engineer. F. D. Kennedy is appointed superintendent of the railway department of the works.

Liberty Steel Products Company Inc., Chicago, Ill., announces the appointment of J. M. Borrowdale as sales representative in the railroad department with office at 1901 McCormick Building, Chicago. Mr. Borrowdale was formerly superintendent of car department of the Illinois Central Railroad and for the past two years has been connected with Johns-Manville Company as sales representative in their railroad department.

Daniel T. Pierce, formerly assistant to the president of the General Asphalt Company, and at one time assistant to the president of the Philadelphia Rapid Transit Company, has just returned from more than a year's service with the Red Cross in France. Mr. Pierce is located temporarily at Room 1031, 120 Broadway, New York, and will represent in this country important Franco-Italian interests as well as act for American manufacturers seeking business in France and other European countries.



IF YE BREAK FAITH WITH THEM WHO DIE
THEY WILL NOT SLEEP,
THO POPPIES GROW IN FLANDERS FIELDS

Supplement to Electric Railway Journal, April 26, 1919.

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Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, April 26, 1919 *Number* 17

Feel an Individual Responsibility for the Victory Loan

EVERYONE was happy on Nov. 11 last, when the armistice was declared. The war was over and the principles for which we entered it were safe. But the signing of the armistice did not end our part in the conflict for liberty. The success of the Victory Loan is the most immediate duty which remains. We must see it through, and this can be done only if each person responds so far as he, or she, can, as with the preceding loans. It is this appeal of Liberty to the country to keep the faith, which is pictured in our colored insert of this week. We must make certain that the fruits of victory are not only won but kept, and this can be done only by strengthening our national treasury, by stimulating business, by placing our utilities on a firm foundation and by co-operative effort in all directions by which this country may recoup through industry and thrift the losses which it suffered through the war.

Do you wonder why we mention all these points together? Simply because national prosperity demands not only that the Victory Loan be taken up, but even more that it get without delay into the proper hands. The loan will not benefit the country to the highest degree, unless the bonds are widely distributed in the hands of the public. The banks must not be expected to provide all the funds.

The member banks of the Federal Reserve System alone had at the end of 1918 more than 20 per cent of their total loans and investments (exclusive of fixed investments) tied up in United States war paper. The amount of such paper, of course, has a direct effect upon the current rates of interest for commercial loans. Hence, if the banks are to finance at reasonable rates the public utilities and the scores of other businesses which urgently need development, the public should not compel the bankers to tie up several billions more in government securities.

Through the co-operation of the banks, their depositors and the general public can take the greater part of the Victory Loan and pay for it out of a year's income. Such assistance the banks can and will gladly give, but the public must do the rest. Help restore the nation's prosperity while paying its bills.

Brighten Up the Shop Grounds With a Bit of Color

MEN who work in the electric railway shop or power house are just as human as those who work in starched linen and spend their time in swivel office chairs. Being human they like flowers and will work better when they associate their work with the attractiveness of a garden, large or small as the circumstances permit. This fact needs no argument. Why is not more done in a practical way to exemplify it?

In last week's issue of this paper a short article was printed giving some detail of what the Schenectady Railway is doing to beautify the plots on which its substations are situated. This work is the result of the conviction and persistence primarily of one man, but the whole organization is pleased to co-operate with him and all are proud of the result. Here then is the first requisite—some one who will make it his job to put a planting scheme across. A volunteer, in general, will get the best results. The second thing is to have a plan, which might well be prepared in co-operation with all the flower lovers available. When such a plan is made well ahead of requirement, the plants cost little. Finally, persistence in caring for the plants must be insisted on. Plants are sensitive to care; they respond marvelously to intelligent attention.

Let's make the waste spaces around the railway buildings blossom this year as a sign of gratitude for victory and peace, if for no other reason!

Are There Any Mitigations to a Receivership?

AS RECEIVERSHIPS are becoming more common among electric railways it is worth while to consider whether there is any bright side to such a condition. In the first place, a company which goes into the hands of a receiver is at least freed from that mocking phrase: "The worst is yet to come." When the courts take charge the crisis has arrived. The public is brought up with a sharp turn to a realization of the fact that the railway's cries of "Wolf, wolf" were true after all; stockholders begin to see that loss of their equity is worse than postponement of dividends, and employees are sobered by the prospect of a reduction in staff if not the disbanding of the force and the dismembering and sale of the property.

The receiver comes to his task armed with powers vastly in excess of those possessed by the most able and courageous manager. He is armed to cut through prejudice, politics and precedent instead of going around them or of standing at bay among a host of conflicting interests. He can postpone a thousand and one litigations if it appears that the money can be spent otherwise to better immediate advantage.

One would expect that a receiver would retain the local executive as his right arm. Yet this is not always the case, although that fact is not necessarily a reflection upon the manager retired. It is his misfortune not his fault if he has been obliged to act against his personal judgment in refraining from giving more service or carrying out other reforms. Likely enough when the receiver arrives he will find that the manager long became discouraged in making suggestions to an obdurate board of directors. As a result, the local public will not have the necessary faith in his promises even under a receivership, unless backed up or inaugurated by other men who come well recommended.

This accounts for the rise of the electric railway expert or consultant. He is the specialist where the local manager is the family physician. He comes to the task equipped with experience in handling certain types of railway disease among a large number of patients. Like the receiver, he is not bound by local conditions nor has he been so close to the daily detail drudgery that he cannot see the possibilities of economy in cost or of increase in traffic. The greatest traction expert in the world would soon lose his usefulness, if within five minutes he had to advise a foreman how to wire some lamps and then confer with a banker over the telephone on the meaning of a million-dollar wage increase! Therefore, a wise receiver will not only secure the benefit of specialists but will insist that the executive of the recovered property be given powers that will permit him to leave the smaller things to smaller men.

Keeping the Mind Focused on Transportation Fundamentals

NEVER in the history of the electric railway industry have there been so many plans for improving electric railway service and putting the whole business on a more rational basis than at present. Scheme follows scheme with such rapidity that unless the few fundamentals are held clearly in mind confusion is apt to result. These fundamentals are that the public desires to be transported with the greatest possible frequency and speed, in comfort and safety, and at a reasonable cost. As a standard in determining these things it will use a combined picture of all other available means of transportation. Many times undoubtedly this standard, which will vary somewhat in the minds of different individuals, will be set higher than it is possible for the electric railway to attain. It is then obviously the duty of the electric railway, while endeavoring to meet the highest ideals of service, to explain the real situation to the public. While the explanation is being given, every effort will naturally be made in the line of reducing headway, increasing schedule speeds, providing more comfortable and more sanitary cars, operating these cars more smoothly and at the same time keeping operating costs at a minimum. These things being done it will be possible in the long run to prove the case of the railways for a reasonable rate of return on its investment of money and effort.

Of course, where the fares are inadequate, it is impossible for a railway to do as much in the way of improving its service as it would like. Nevertheless, there are certain directions in which it can work which will be of benefit both to the public and itself. Thus, changes in the direction of shorter headway of cars will encourage people to ride who otherwise would walk, will reduce loading time because fewer people board each car, will help to keep tracks clear of conflicting traffic because drivers of vehicles realize more clearly that the tracks are primarily for the railway, etc. Higher speed permits the same service to be given with fewer cars or more service with the same cars. Higher speed is the result of various factors, including efficient use of well-selected equipment which in turn tends to economy in energy, and elimination of unnecessary stops, which again results in energy economy, etc. Attention to the comfort of passengers attracts business because the well-ventilated, well-seated car affords rest to the passenger as well as transportation. Application of safety principles is reflected in the accident claims account, a possible source of very great financial saving and of improvement in public relations.

Almost any railway can afford to go to considerable length in the directions mentioned without exhausting the possibilities of giving better service at less net cost, considering cost in the broad sense with due regard to the purchasing value of the dollar.

The Public Suffers When Justice to Utilities Is Denied

WHEN will the public learn that it is really concerned with the financial conditions of public utility corporations? When will it cast aside its cloak of indifference and cease to make light of the troubles of these companies with the typical American remark of "We should worry?" F. H. Sisson of the Guaranty Trust Company of New York put this situation very clearly in an address, abstracted last week, when he showed that direct interest in the welfare of such corporations is not limited to those who are stockholders in the companies, because the solvency of many banks and insurance companies—which means millions of individuals—is dependent on the protection given to public utility securities which are included in their assets.

One is naturally forced to reflect seriously on this situation when hearing of financial disaster overtaking the great transportation agencies of the country. The latest big company to be added to this list is the United Railways of St. Louis. This corporation, with an investment of more than $100,000,000 in road and equipment, passed into the hands of a receiver last week after a hard struggle to meet expenses with a 6-cent fare.

It is possible to dwell at length on the conditions which brought about this calamity, but the story has now become an old one. We think a better lesson can be learned from considering the prospects confronting the industry as a whole. No one property need be taken as an example, because with few exceptions a similar lesson is impending in all the larger cities. This being true, it is no cause for wonder that the people do not grasp readily at opportunity for municipal ownership. The voters of Detroit doubtless had this in mind when they refused to sanction the taking over of the local transportation system even at a reduced purchase price.

The authorities of St. Louis had a chance about a year ago to make a fair settlement for renewal of the railway franchise, but after long months of bickering the best offer they could agree upon fell short of meeting the basis which would be accepted by the security owners. In Chicago, too, the people had an opportunity not long ago to approve an ordinance which would have assured improved transportation at actual cost. They rejected the compromise terms, and while the company still has some eight years of life under the present agreement the people are not getting the service which would have been made possible on the other basis. Instead, we understand that a certain political element has started to cloud the real issue by suggesting the advisability of building a separate rapid transit system to be paid for out of the city's traction fund. The prospectus sounds attractive, but as usual the important fact is being held back from the public that a separate system means a separate fare and that the existing rapid transit lines cannot be forced into an arrangement which would give the advantages of unified service. In New York, in a similar way, the receivership of the surface lines naturally suggests a segregation of the underlying properties with a new fare every time a passenger changes to a different line. This would be one way of effecting an increase in fare, though perhaps an inconvenient one to the public. If the issue of universal transfers was an obligation of the consolidated company, the insolvency and dissolution of the company removes that obligation. Any enforced extension of the transfer system then to the underlying companies is a burden added to their original charters, for which they should receive compensation.

The moral in the several cases cited above is the same. It means that co-operation is needed in order to get the best results. Both parties to these disputes can get along for a time without a harmonious settlement, but in the end—for the benefit of the public as well as the companies—all will have to do what should have been done years ago, namely, bury all prejudice and get together for the common good.

No One Can Really Desire to Lose His Hundred Rides

THE frightened bather who suddenly finds himself carried beyond his depth is not likely to be overjoyed to hear a voice from the shore yelling: "The danger began five minutes ago when you were 20 yd. out, and it has been getting 20 per cent greater every minute." In such a crisis the bather wants a lifesaver rather than statistics.

In the present critical electric railway situation such may well be the frame of mind of many a company in regard to an analysis of the 1917 statistics just compiled by the Bureau of the Census. These statistics will not of themselves save the railways from destruction. Nevertheless, they are capable of performing invaluable service along two lines—they can prove to the public that the railways should not be blamed for their present lamentable position, and they can emphasize the fact that the railways are worth saving. Consequently we would direct particular attention to the preliminary census figures for the period 1907-1917 reproduced elsewhere this week.

During this decade the electric railways of the United States did their best to make both ends meet. The industry grew, to be sure, but its income advanced at a declining rate and its expenses rose at a greater and an increasing rate. Of the $300,353,786 or 69.9 per cent gain in income from all sources for the decade, $156,186,263 arose in the first five years, but of the $201,285,402 or 80.1 per cent advance in operating expenses $119,698,298 came in the second five years. The operating ratio in 1917 at 63.7 per cent was considerably greater than that of 58.7 per cent in 1912, and it even ran higher than that of 60.1 per cent in the first year of the decade.

The miles of single track gained only 3746 or 6.9 per cent in the second half of the decade as compared to 6683 or 19.1 per cent in the first half, and the passenger cars only 3752 or 4.9 per cent as compared to 6146 or 8.8 per cent. This restricted expansion of the industry was but the inevitable result of its lessened earning power, but still the industry was trying to do its full duty to the general public. It succeeded in largely checking the great increase in free riders of the first five years, although the transfer traffic advanced more rapidly and for the decade kept pace in rate of increase with the revenue traffic. Moreover, the industry increased its output of revenue car-miles at a greater rate in the second five years than the cars and the number of employees, in spite of the considerably greater increase of expenses over these items and over income as well.

The detailed statistics in general speak for themselves, but two individual items may well be mentioned. Owing to differences in the accounting classifications a strictly comparable figure for taxes is not presented, but, as explained elsewhere, the minimum increase over 1912 was $10,728,730 or 30.7 per cent. The other item is wages. That the present heavy wage burden had its beginnings some time ago is indicated by the fact that from 1907 to 1917 the salaries and wages increased more than twice as rapidly as the number of employees, and from 1912 to 1917 more than six times as rapidly. And this in an industry where during the decade the salaries and wages have averaged about 60 per cent of the operating expenses!

What will the next census show? One would dread to think of it were he not confident that the public must see the vital necessity of giving adequate support to the electric lines. More than eleven billion revenue passengers in 1917—such a figure may not mean much to a public which is now much bored by war figures less than trillions. But here is a simple figure which tells a great story—electric railways in 1917 provided 100 trips for every man, woman and child in the United States. What other public industry comes closer to the daily life of each individual, or has had a more beneficial effect upon community life and prosperity? The electric lines must be preserved.

Courtesy by Employees Pays Both Company and Man

SEVERAL times recently we have advocated editorially the importance of utilizing employees' co-operation in promoting general good-will. We have been trying to convince railway men that they may be overlooking their best publicity medium in failing to use the platform employees to spread information about the company and to create a favorable public opinion.

And now comes a news item from Chicago to the effect that one of the older conductors on the Surface Lines, familiarly known as "Mike," and beloved for his courtesy, had died. The point of the story which interested us was that by his politeness and kindness he won the affection of hundreds of men, women and children passengers and that a large floral offering from these friends was conspicuous at the funeral. It was related in the daily press that on a rainy day he was known to signal for his motorman to stop the car in places where there was no mud or water, so that the dresses of the women would not be soiled.

What a wonderful place for making friends for the company is the platform of the car! What a force in the community would be the public utility company which could boast that a large percentage of employees were men who were popular with their patrons! It is not impossible to achieve this result, and the executive who can surround himself with a loyal force of employees, actively at work for the good of the management, need have no worries about the final outcome in matters in which popular favor counts for much.

The Zone Fare in Practice

ABERDEEN

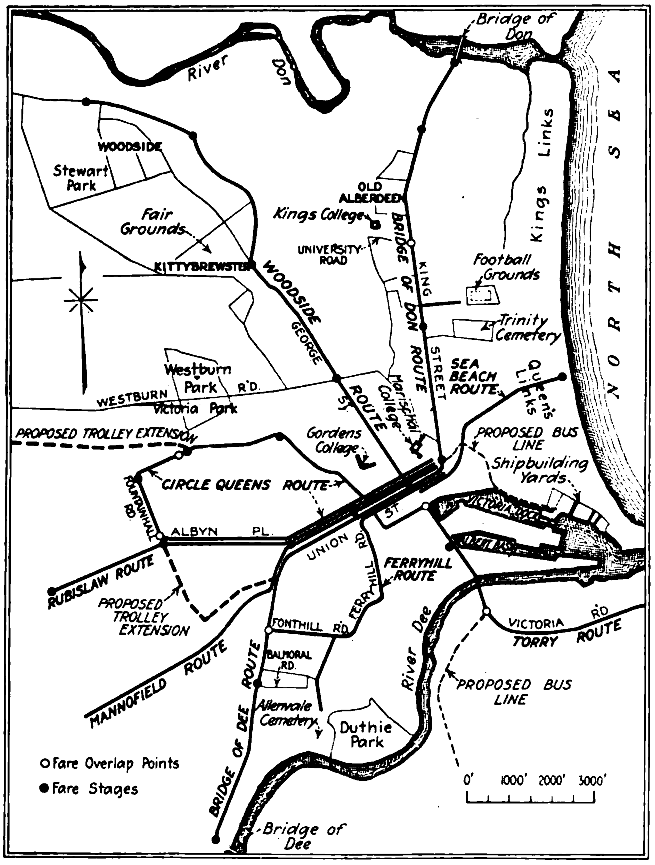
The Combination of Zone and Universal Fare Used in This City of 165,000 Stimulates Both Short-Haul and Long-Haul Riding—Why an Average of More Than Eighteen Passengers per Car-Mile Has Been Obtained in a City Built Up Along American Lines of Housing

BY WALTER JACKSON

THE SHIPROW, AN ABERDEEN SLUM STREET AS IT APPEARED BEFORE THE DEMOLITION OF ONE SIDE

THE visitor to Aberdeen who expects to find either cold or fog in winter because of its extreme northerly location is pleasantly surprised at the mildness of its January days in comparison to British cities much further south. Nor is the first good impression of Aberdeen spoilt by its appearance, for its immaculate cleanliness and its buildings of the famous Aberdeen silver-gray granite justly entitle it to the name of "The Silver City by the Sea."

Like other old cities, Aberdeen is full of antiquities, some desirable and others undesirable. Among the latter class are the ancient granite tenements or flats in the older part of the city from which many of the inhabitants cannot be tempted any more readily than a New York apartment dweller can be induced to set up a residence in Brooklyn or New Jersey, far from the Great White Way! There seems to be general agreement among the officials interviewed that Scotsmen are much less inclined to seek the isolation of a cottage than Englishmen. Whether this is so or not, it is clear that quite a number of Aberdonians prefer cramped quarters if they can only be near the center of the city's activities. A proof of this is afforded by the view at the head of this article, showing "The Shiprow" which is within a couple of minutes' walk from the Municipal Building visible in the background. Since this photograph was taken, one side of the street has been cleared away as a step in the municipality's housing program, but the building on the opposite side still has its full complement of tenants. G. M. Fraser, city librarian, who kindly loaned this view from his collection, said: "The only way you can get some of these people out is to shell them out."


Bridge of Don
River Don
WOODSIDE
Stewart Park
Fair Grounds
KITTYBREWSTER
WOODSIDE GEORGE ST. ROUTE
OLD ABERDEEN
Kings College
UNIVERSITY ROAD
BRIDGE OF DON ROUTE
KING STREET
Kings Links
Links
Football Grounds
Trinity Cemetery
NORTH SEA
SEA BEACH ROUTE
Queens Links
Westburn Park
WESTBURN R'D.
Victoria Park
PROPOSED TROLLEY EXTENSION
Gordens College
Marischal College
PROPOSED BUS LINE
Shipbuilding Yards
CIRCLE QUEENS ROUTE
FOUNTAINHALL RD.
ALBYN PL.
UNION ST.
VICTORIA DOCK
ALBERT BASIN
RUBISLAW ROUTE
PROPOSED TROLLEY EXTENSION
FERRYHILL RD
FERRYHILL ROUTE
FONTHILL RD
VICTORIA RD
TORRY ROUTE
River Dee
MANNOFIELD ROUTE
BALMORAL RD.
BRIDGE OF DEE ROUTE
Allenvale Cemetery
Duthie Park
PROPOSED BUS LINE
○ Fare Overlap Points
● Fare Stages
0' 1000' 2000' 3000'
Bridge of Dee

MAP OF ABERDEEN, SHOWING PRESENT ROUTES AND PROPOSED CAR AND BUS EXTENSIONS—ALSO FARE STAGES, OVERLAPS, ETC.

About fifty years ago Aberdeen took the first great step in its modernization when it widened Union Street. This is a magnificent thoroughfare about 1 mile long and easily wide enough for four tracks should they be needed. It is so wide that other vehicles keep off of the car tracks, so that it is the regular thing for motormen to make up time when they reach the principal street downtown—which is surely a novelty! It would have been well for Aberdeen if it had several Union Streets, but most of the old circuitous and narrow lanes downtown have remained to this day to such a degree that only a single track can be laid on some streets and loops are out of the question. Even where there is room, as at Castle Street, the foot of Union Street, a loop is not permitted as this would interfere with the weekly market. Thus at the very center of the city's car service, the cars must be turned back on the four tracks by means of cross-overs. It would seem from this that not privately-owned street railways alone are encumbered by tradition.

The Corporation of Aberdeen began to clear out some of its slums as long ago as 1883 by pulling down the old buildings and then leasing the land for the erection of private business buildings. Later, in accordance with the housing of working class act of 1890, it acquired 2¼ acres of vacant ground on which it erected workmen's flats as follows:

Urquhart Road, eight buildings with nine tenants each	72
Park Road, four buildings with nine tenants each	36
Roslin Street, two buildings with twelve tenants each	24
Total tenants	132

As in the case of other British cities, the war has made the problem of future additional housing most acute, for private building is made commercially impossible by the rise in labor and materials. Municipal and State subvention of some kind has therefore become a certainty. In Aberdeen alone it is expected that 1500 buildings of various types will have to be built under governmental auspices during the next five years, merely to meet the shortage of buildings rather than to replace existing structures.

However, the younger sections of the Aberdeen of to-day are as close to American ways as can probably be found anywhere in Great Britain. There are blocks and blocks of one-family and two-family houses very similar in the up-to-dateness of their fittings to American homes. Mingled with these are blocks of six-family houses—the favorite size of flat. Aberdeen has plenty of room for cottages, but many people prefer or have to live in the flats because they get more value for the money. For example, a certain class of apartment can be rented for from $60 to $70 per annum. Like accommodation in a cottage would cost $95 to $100 per annum. Therefore, it is not astonishing to find flats in the suburban sections to such an extent that certain areas carry restrictions against the building of tenements.

A SCENE ON UNION STREET, ABERDEEN, SHOWING THAT THE BICYCLE IS NO MEAN COMPETITOR OF THE STREET RAILWAY

SCENE AT A CAR STOP, SHOWING SHIELD (WHITE LETTERING ON A RED SHIELD) ON A MUNICIPAL LIGHTING POLE

With regard to the whole question of the construction of cottages in the suburbs, it has been observed that it is not the poorer-paid workmen but the higher-paid mechanics or business men who are most desirous to live in them. The laborer may prefer to stay further in town because of his longer working hours and because food is usually a little cheaper in the center of the city than in the suburbs. Therefore, the matter of rate of fare is relatively unimportant. In Aberdeen, this contention is particularly true as will be seen from the fare schedule presented later.

LAYOUT OF THE ROUTES AND SHORT-HEADWAY SERVICE

For its population of 165,000, Aberdeen has approximately 14½ miles of single track, divided among eight routes as shown in Table I.

In addition to the excellent individual headways, four of the routes overlap on Union Street, which means a car every half minute or less for a distance of a mile. Such service for a great part of the day, plus the half-penny short-distance rate, induces the man in a hurry to take the first car that will take him anywhere near his destination. In any event, walking along Union Street is reduced to a minimum.

The Bridges, or River Dee to River Don, route is the only through line at present. The others are turned back at Castle Street, owing to the different riding characteristics on opposite sides of the town which, of course, would result in unbalanced travel. An exception to this would be the conversion of the Torry and Woodside lines into a through route. This will probably come under consideration in connection with the widening of Market and St. Nicholas Streets. It is expected that this second through line would have continuously good travel between the paper and woolen mill section at the Woodside end and the shipyards and great fish establishments at the Torry end.

Because of the heavy intermediate short-haul travel, there is little need to economize mileage through turnbacks. At present cars are turned back at only one point, and the chief reason for this is car shortage. In discussing this aspect of operation, William Forbes, general manager Aberdeen Corporation Tramways, said that even if the traffic near the ends of the routes was somewhat thinner it was good policy to give through car service in order to discourage walking. The riding habit in Aberdeen, he added, was far from the saturation point. Twenty to thirty cars added to the present peak of eighty-six would prove that.

In accordance with the policy of eliminating the walker; the stops are spaced somewhat closer than is usually the case in Great Britain. The following table shows variations from 390 to 633 ft., and the average for the system as a whole is placed at 471 ft. or slightly more than eleven to the mile. Of course, these

TABLE I—STATISTICS OF THE DIFFERENT ROUTES IN ABERDEEN

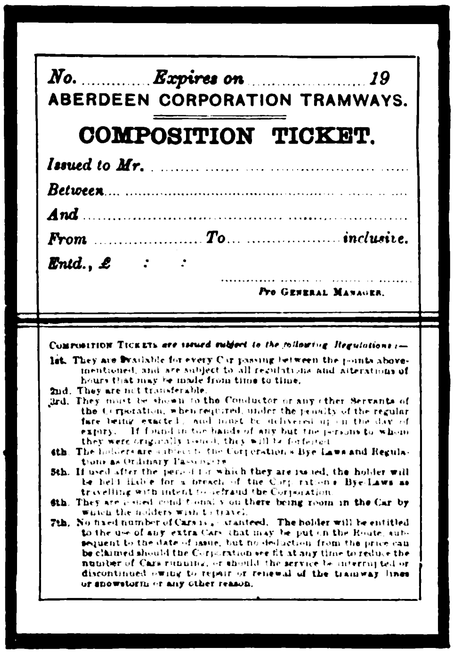
Route	Miles	Headways, Minutes	Feet Between Stops	Passengers per Car-Mile
(1) Woodside	2.4	2 to 6	495	13.4
(2) Circular	3.3	3 to 5	444	14.8
(3) Mannofield	2.1	4 to 7	435	14.1
(4) Bridges	4.1	5 to 7½	525	14.9
(5) Rubislaw	1.9	6 to 10	498	14.0
(6) Ferryhill	1.5	7½ to 10	426	14.6
(7) Torry	1.7	2½ to 7½	390	17.2
(8) Beach	0.9	7½ winter Special in summer	633	19.4

Note—Some of the route mileage is joint mileage.

are only possible, not compulsory, stops. Compulsory stops are those ordered by the inspector of the Board of Trade. They include busy traffic points, but not schools, fire engine stations or the like. About 90 per cent of the stops are made on the near side of intersections, the exceptions being due chiefly to the location of the poles from which the stop signs are carried. Stops are prominently indicated by red signs with white lettering as well as by painting the pole with a striping of red and white. A red shield on similarly-marked poles designates the fare zones.

Several of the waiting rooms at terminals were built jointly for the police and tramways departments. At Dee, the waiting depot includes a refreshment room, the operator of which acts as caretaker. At a number of intermediate stops rustic shelters are provided.

The Aberdeen speed limits for motor cars are 20 m.p.h. and for street cars 14 m.p.h. The schedule speed of the cars for the entire system is 7.6 m.p.h. There are no traffic rules to prevent automobile parking, but offending vehicles can be removed at the discretion of the policeman. The traffic policemen always give preference to street car traffic where blockades are concerned.


No. .... *Expires on* 19
ABERDEEN CORPORATION TRAMWAYS.
COMPOSITION TICKET.
Issued to Mr. ....
Between ....
And ....
From .... *To* .... *inclusive.*
Entd., £ : :
....
Pro GENERAL MANAGER.

COMPOSITION TICKETS *are issued subject to the following Regulations*:—
1st. They are available for every Car passing between the points above-mentioned, and are subject to all regulations and alterations of hours that may be made from time to time.
2nd. They are not transferable.
3rd. They must be shown to the Conductor or any other Servants of the Corporation, when required, under the penalty of the regular fare being exacted, and must be delivered up on the day of expiry. If found in the hands of any but the persons to whom they were originally issued, they will be forfeited.
4th. The holders are subject to the Corporation's Bye Laws and Regulations as Ordinary Passengers.
5th. If used after the period for which they are issued, the holder will be held liable for a breach of the Corporation's Bye-Laws as travelling with intent to defraud the Corporation.
6th. They are issued conditionally on there being room in the Car by which the holders wish to travel.
7th. No fixed number of Cars is guaranteed. The holder will be entitled to the use of any extra Cars that may be put on the Route, subsequent to the date of issue, but no deduction from the price can be claimed should the Corporation see fit at any time to reduce the number of Cars running, or should the service be interrupted or discontinued owing to repair or renewal of the tramway lines or snowstorm or any other reason.

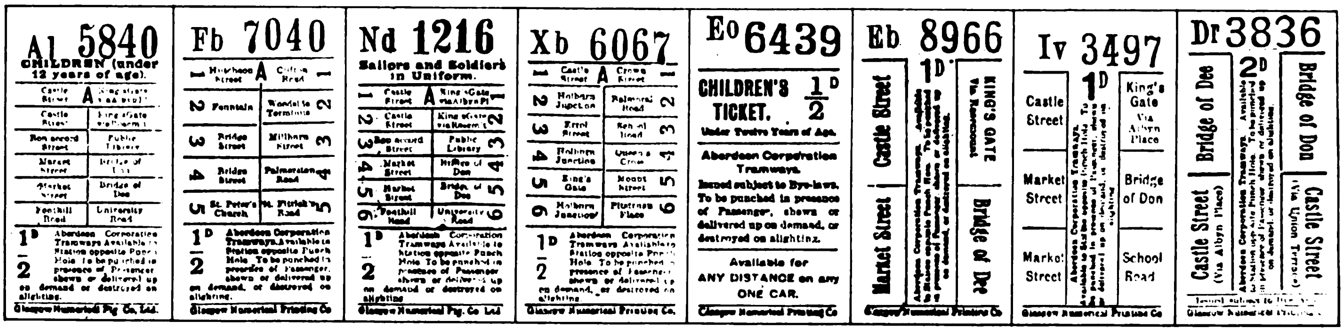
COMPOSITION (COMMUTATION) TICKET, WORDING PASTED ON INSIDE OF NUMBERED CLOTH BOOKLET, GREEN FOR ADULTS AND RED FOR CHILDREN

multiplied by the city's car-mile operating cost, plus 2½ per cent.

The management now has under consideration several additions to the service, of both tramway and omnibus character. The tendency of these extensions is to broaden rather than lengthen the city.

FARE SYSTEM COMBINES ZONE AND UNIVERSAL PLANS

A most interesting feature of the Aberdeen system of fares is that while a single-stage ride may be obtained for a half-penny, all the stages from the center of the city to a terminus cost only 1 penny. It follows that a person living in the suburban territory is situated just as favorably as under American conditions, while at the same time the railway secures short-haul riding that would not come at the higher fare. Nothing could prove the latter statement better than Aberdeen's experience with the Torry line, which serves a working-class district. When the only fare on this line was 1 penny, it earned just 9d. (18 cents) per car-mile and was the lowest of all. Five years ago the ½d. fare was instituted whereupon the traffic more than doubled, and the earnings rose to 17.2d. (34.4 cents) per car-mile. Instead of a seven and one-half minute service, cars are run every two and one-half minutes the greater part of the day! On some days the limitations imposed by a single track on part of the route actually make it impossible to handle all of the service offered.


Al 5840
CHILDREN (under 12 years of age).
Castle Street A King's Gate via Albyn Pl.
Castle Street | King's Gate via Rosemount
Bon accord Street | Public Library
Market Street | Bridge of Don
Market Street | Bridge of Dee
Fonthill Road | University Road
1D/2 Aberdeen Corporation Tramways Available to Station opposite Punch Hole. To be punched in presence of Passenger shewn or delivered up on demand or destroyed on alighting.
Glasgow Numerical Ptg. Co. Ltd.

Fb 7040
1 [illegible] Street A Clifton Road 1
2 Fountain | Woodside Terminus 2
3 Bridge Street | Millburn Street 3
4 Bridge Street | Palmerston Road 4
5 St. Peter's Church | St. Fittick's Road 5
1D/2 Aberdeen Corporation Tramways. Available to Station opposite Punch Hole. To be punched in presence of Passenger, shewn or delivered up on demand, or destroyed on alighting.
Glasgow Numerical Printing Co

Nd 1216
Sailors and Soldiers in Uniform.
1 Castle Street A King's Gate via Albyn Pl 1
2 Castle Street | King's Gate via Rosemount 2
3 Bon accord Street | Public Library 3
4 Market Street | Bridge of Don 4
5 Market Street | Bridge of Dee 5
6 Fonthill Road | University Road 6
1D/2 Aberdeen Corporation Tramways Available to Station opposite Punch Hole To be punched in presence of Passenger shewn or delivered up on demand or destroyed on alighting
Glasgow Numerical Ptg. Co. Ltd

Xb 6067
1 Castle Street A Crown Street 1
2 Holburn Junction | Balmoral Road 2
3 Errol Street | [illegible] Road 3
4 Holburn Junction | Queen's Cross 4
5 King's Gate | Mount Street 5
6 Holburn Junction | Pitstruan Place 6
1D/2 Aberdeen Corporation Tramways Available to Station opposite Punch Hole. To be punched in presence of Passenger shewn or delivered up on demand, or destroyed on alighting.
Glasgow Numerical Printing Co.

Eo 6439
CHILDREN'S TICKET. 1D/2
Under Twelve Years of Age.
Aberdeen Corporation Tramways.
Issued subject to Bye-laws. To be punched in presence of Passenger, shewn or delivered up on demand, or destroyed on alighting.
Available for ANY DISTANCE on any ONE CAR.
Glasgow Numerical Printing Co

Eb 8966
Castle Street | 1D | KING'S GATE Via Rosemount
Market Street | | Bridge of Dee
Aberdeen Corporation Tramways. Available to Station opposite Punch Hole. To be punched in presence of Passenger, shewn or delivered up on demand, or destroyed on alighting.
Glasgow Numerical Printing Co

Iv 3497
Castle Street | 1D | King's Gate Via Albyn Place
Market Street | | Bridge of Don
Market Street | | School Road
Aberdeen Corporation Tramways. Available to Station opposite Punch Hole. To be punched in presence of Passenger, shewn or delivered up on demand, or destroyed on alighting.
Glasgow Numerical Printing Co

Dr 3836
Bridge of Dee | 2D | Bridge of Don
Castle Street (Via Albyn Place) | | Castle Street (Via Union Terrace)
Aberdeen Corporation Tramways. Available to Station opposite Punch Hole. To be punched in presence of Passenger, shewn or delivered up on demand, or destroyed on alighting.
Issued subject to Bye-laws
Glasgow Numerical Printing Co

SPECIMENS OF ABERDEEN FARE RECEIPTS

Although some of the streets downtown are so narrow as to permit only one track, there is no one-way operation of either cars or general vehicles. No block signals are used for cars running over these single-track sections. The motormen depend upon their time-points and upon seeing the upper-deck headlight which shows the color used to identify a given line. This scheme has worked satisfactorily to date despite the fact that cars in each direction have to be operated at intervals of two minutes. The longest single-track section of this kind is 850 ft.

The 14½ miles of track (measured as single track) previously mentioned is all that the city has. However, some additional service is due to the fact that the Aberdeen Suburban Tramways, a privately-owned company, runs over the municipality's tracks. The Suburban cars while within the city limits handle all local business as a city car. For this service the city pays the Suburban Tramways a sum equal to the mileage

In addition to the ½d. short-ride minimum fare for the adult rider, the Tramways have two other tickets of this denomination, as follows: Children's tickets, for ages from two to twelve years inclusive, good for the usual penny distance; sailors' and soldiers' tickets (since Aug. 20, 1917). The penny tickets, as already noted, are good for a full ride from the center of the city to the terminus of the line. If, however, a passenger on the Bridge of Dee-Bridge of Don through line wishes to ride from terminal to terminal, his fare would reach the maximum of 2d. In other words, the penny full-route fare does not apply to maximum cross-town rides. Furthermore, a passenger on the Circle Queen's line would not be permitted to loop around for a single penny fare, as the terminus of this route, from the fare standpoint, is at its mid point, as indicated. A sightseer, therefore, who wanted to go all the way around would have to pay 2d. There is another condition where the fare could exceed the normal penny charge, namely, in the case of turnbacks. Thus, on the Woodside route it is customary to turn back some cars at Kittybrewster. If through passengers boarded the Kittybrewster car they would expect a free transfer to the following through car. To avoid this possibility, the tickets are punched to Kittybrewster and it is ordered that only the through cars shall carry such riders to the terminus for a penny. If a passenger boards a following car at Kittybrewster he must purchase a new ticket.

KINDS OF FARES AND ROUTE EARNINGS

As it is not desirable to discourage short-haul crosstown riders, a few overlaps have been established. One of these allows a penny ride from King's College (University Road) to Ferryhill (Fonthill Road), as indicated by the parallel lines on the map. The other overlaps, similarly indicated, are of minor importance. Overlaps are used as little as possible since they tend to confuse the conductor, and with a half-penny base fare there is little need for their establishment.

AN EXAMPLE OF ABERDEEN'S CUSTOMARY FLAT—THE SIX-FAMILY HOUSE

ABERDEEN HAS THOUSANDS OF THESE COMFORTABLE ONE-FAMILY HOUSES

Before passing on to the statistics showing the classifications of passengers according to fares paid, note should be made of what is locally termed a "composition" ticket. This is a non-transferable commutation ticket of such long-established popularity that the public would strenuously protest if it were withdrawn. Such tickets, good for periods of three months, are sold for as low as 13s. ($3.12 up to 21s. 9d. ($5.22). Children's tickets are sold at half price. Should the holder of a ticket be unable to use it because of illness during the entire quarter, he can have the ticket extended for the lost time on production of a doctor's certificate! The composition ticket is especially popular on the Mannofield line where about one-fifth of the riders are commuters. Roughly, the full adult rate is 12s. 6d. ($3.00) for the first 2100 ft. and 6d. (12 cents) for every additional 300 ft.

TABLE II—PASSENGERS AND RECEIPTS PER CAR-MILE FOR YEAR ENDED MAY 31, 1918

Route	Passengers	Average ½ d. Stage, Ft.	Passengers per Car-Mile	Receipts per Car-Mile in Cents
Woodside	6,955,248	3,192	13.4	25.7
Circular	6,192,348	3,105	14.8	25.5
Mannofield	4,617,138	3,390	14.1	25.6
Bridges (Dee to Don Rivers)	6,381,839	3,495	14.9	25.4
Rubislaw	2,259,088	2,919	14.0	24.5
Ferryhill	1,604,496	3,264	14.6	23.4
Torry	3,724,532	3,000	17.2	24.0
Beach	1,004,839	....	19.4	34.9
Total	32,739,528	Average	15.06 Average	25.4

* Exclusive of commutation or composition tickets.

The several classes of tickets referred to are shown in the accompanying group. The children's ticket of the 6400 series is the one used for the straightaway ride from the center of the city to a terminus while that of the 5800 series is used in case of overlaps. It will further be noted that the 1d. and 2d. tickets do not show as many stages as the ½d. ticket. The tramways also sell celluloid tokens at full price in lots of 1s. upward to the postoffice and other employers of messengers.

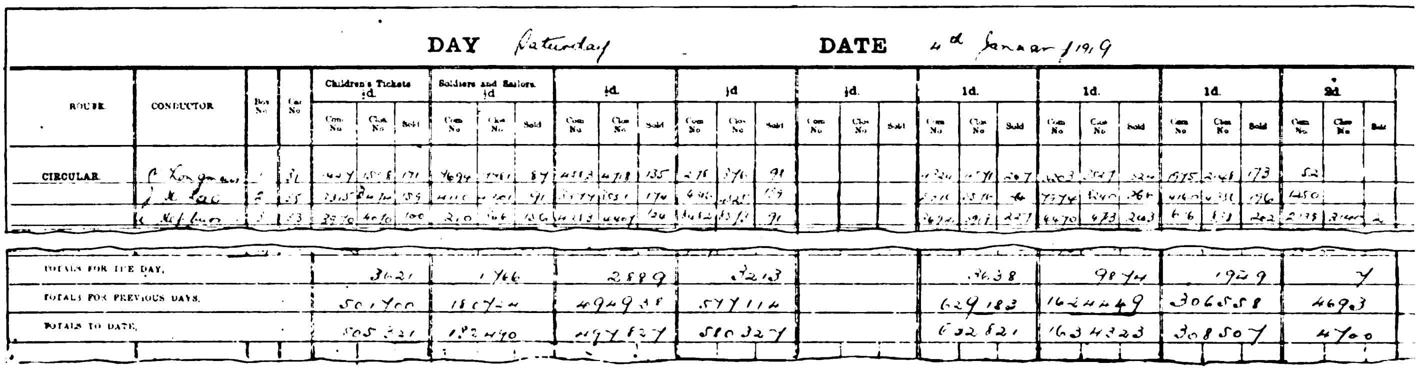
In view of the extremely moderate fares, it is interesting to observe the high car-mile earnings. Thus, the report for the year ending May 31, 1918, shows the results given in Table II.

Even these excellent figures will be exceeded during the present fiscal year, Mr. Forbes' estimate being 45,000,000 passengers and a revenue of £140,000. The figures given in Table III cover the thirty-three weeks from June 1, 1918, to Jan. 23, 1919.

The high earnings per car-mile of the Beach line are to be attributed to the fact that the adult fare on this pleasure route is 1d. for any distance whereas the line is only 0.9 mile long. It is rightly held that people on pleasure bent should not begrudge paying a slightly higher fare on a line that has heavy travel only two or three months in the year. Individual half-penny stages are shown in Table II. The average half-penny stage for the entire system is about 0.6 mile, the average penny stage or center to terminus ride, 1.9 miles, while the single 2d. ride is 3.7 miles.

TABLE III—PASSENGERS AND RECEIPTS PER CAR-MILE FOR THIRTY-THREE WEEKS ENDED JAN. 22, 1919

Route	Number of Passengers Carried	Passengers per Car-Mile	Receipts per Car-Mile (in Cents)
Woodside	5,593,408	18.3	29.4
Circular	5,079,386	18.5	29.6
Mannofield	3,811,306	14.5	24.8
Bridges	5,217,311	18.7	30.0
Rubislaw	1,776,369	17.2	27.6
Ferryhill	1,321,294	18.5	28.6
Torry	3,267,154	20.8	28.2
Beach	922,123	24.8	42.6
Total	27,088,351 Average	18.2 Average	30.1



DAY Saturday DATE 4th January 1919

ROUTE	CONDUCTOR	Box No.	Car No.	Children's Tickets ½d. Com. No.	Clos. No.	Sold	Soldiers and Sailors ½d Com. No.	Clos. No.	Sold	½d. Com. No.	Clos. No.	Sold	½d Com. No.	Clos. No.	Sold	½d. Com. No.	Clos. No.	Sold	1d. Com. No.	Clos. No.	Sold	1d. Com. No.	Clos. No.	Sold	1d. Com. No.	Clos. No.	Sold	2d. Com. No.	Clos. No.	Sold
CIRCULAR	C Longman	1	31	[illegible]	[illegible]	171	4694	[illegible]	87	[illegible]	4718	135	[illegible]	[illegible]	91				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	575	[illegible]	173	52		
	J. M. Lee	2	25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	91	[illegible]	[illegible]	174	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	196	1450		
	[illegible]	3	53	[illegible]	4010	100	[illegible]	[illegible]	[illegible]	4313	[illegible]	[illegible]	[illegible]	[illegible]	91				[illegible]	[illegible]	[illegible]	4470	473	243	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

	Children's Tickets ½d.	Soldiers and Sailors ½d	½d.	½d	½d.	1d.	1d.	1d.	2d.
TOTALS FOR THE DAY.	3621	1766	2889	3213		3638	9874	1929	7
TOTALS FOR PREVIOUS DAYS.	501700	180724	494938	577114		629183	1624449	306558	4693
TOTALS TO DATE.	505321	182490	497827	580327		632821	1634323	308507	4700

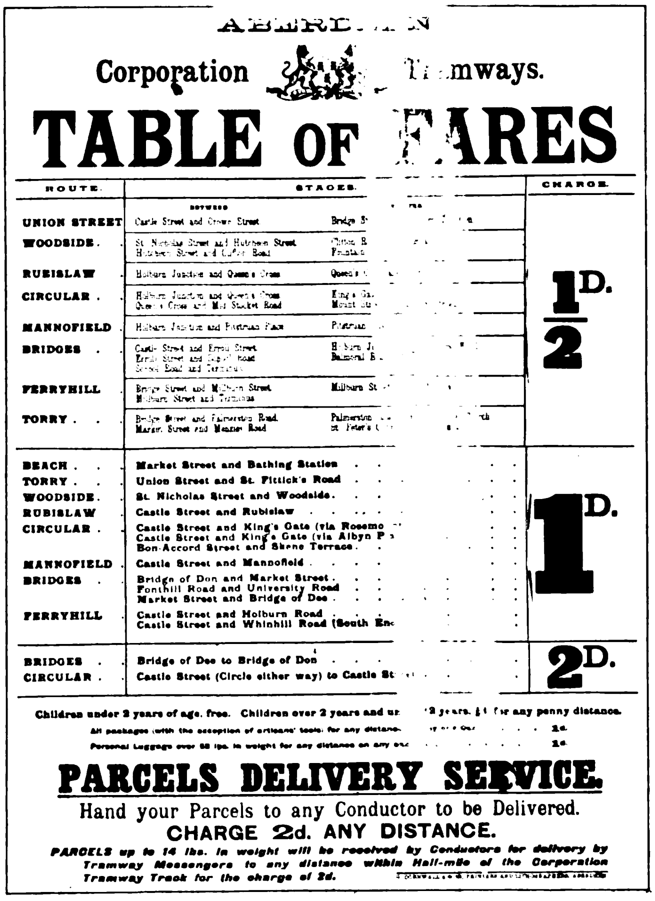
CONDUCTOR'S WAYBILL FOR DAY COMPLETE WITH RECORD OF ALL CLASSES OF TICKETS, TOTAL

For the fiscal year ending May 31, 1918, the traffic according to classification [illegible] ets, except composition, was as given in Table [illegible].

TABLE IV—NUMBER AND CLA[illegible] ON OF TICKETS SOLD, YEAR ENDED [illegible] 1918

Description	N[illegible]	Percentage	Value, Per Cent
Children's tickets	3,[illegible]	11.17	6.99
Soldiers' and sailors'	[illegible]	4.41	2.95
½d. ordinary	[illegible]	25.16	15.69
1d. ordinary	1[illegible]	59.12	73.97
2d. ordinary	[illegible]	0.14	0.40
Total	3[illegible]	100.00	100.00

A striking feature is the lar[illegible] number of children's tickets sold. An Aberdonia[illegible] [illegible]gster would rather spend his half-penny for a [illegible] than anything else. With no change in fares, the [illegible] rel increased from 27,141,275 for the fiscal year [illegible] g May 31, 1917, to 32,739,528 for the fiscal y[illegible] [illegible] ng May 31, 1918. This raised the number of [illegible] per inhabitant per annum to 229. The income increased from £100,073 to £116,397; operating expenses increased from £36,047 to £39,400, while fixed charges, depreciation, renewals, etc., decreased from £27,283 to £27,188. So far, Aberdeen's careful management and intensive cultivation of the riding habit have made it unnecessary to increase fares. However, the increase in labor charges has been particularly heavy, and no one can predict what will happen if the upward trend continues. With reasonably good fortune, on the other hand, Aberdeen will be able to write off the rest of its investment charges within three or four years.



ABERD[illegible]N

Corporation Tramways.

TABLE OF FARES

ROUTE.	STAGES.	CHARGE.
	BETWEEN	
UNION STREET	Castle Street and Crown Street Bridge S[illegible]	1/2 D.
WOODSIDE.	St. Nicholas Street and Hutcheon Street Hutcheon Street and Clifton Road Clifton R[illegible] Fountain[illegible]	
RUBISLAW	Holburn Junction and Queen's Cross Queen's C[illegible]	
CIRCULAR.	Holburn Junction and Queen's Cross Queen's Cross and Mid Stocket Road King's Ga[illegible] Mount St[illegible]	
MANNOFIELD	Holburn Junction and Pitstruan Place Pitstruan[illegible]	
BRIDGES.	Castle Street and Erroll Street Erroll Street and Regent Road School Road and Terminus Holburn J[illegible] Balmoral R[illegible]	
FERRYHILL	Bridge Street and Millburn Street Millburn Street and Terminus Millburn St[illegible]	
TORRY.	Bridge Street and Palmerston Road Market Street and Menzies Road Palmerston [illegible] th St. Peter's [illegible]	
BEACH.	Market Street and Bathing Station	1D.
TORRY.	Union Street and St. Fittick's Road	
WOODSIDE.	St. Nicholas Street and Woodside	
RUBISLAW	Castle Street and Rubislaw	
CIRCULAR.	Castle Street and King's Gate (via Rosemo[illegible] Castle Street and King's Gate (via Albyn P[illegible] Bon-Accord Street and Skene Terrace	
MANNOFIELD	Castle Street and Mannofield	
BRIDGES.	Bridge of Don and Market Street Fonthill Road and University Road Market Street and Bridge of Dee	
FERRYHILL	Castle Street and Holburn Road Castle Street and Whinhill Road (South En[illegible]	
BRIDGES.	Bridge of Dee to Bridge of Don	2D.
CIRCULAR.	Castle Street (Circle either way) to Castle St[illegible]	

Children under 2 years of age, free. Children over 2 years and u[illegible] 2 years, ½d for any penny distance.

All packages (with the exception of artisans' tools) for any distance [illegible] 1d.

Personal Luggage over 28 lbs. in weight for any distance on any car [illegible] 1d.

PARCELS DELIVERY SERVICE.

Hand your Parcels to any Conductor to be Delivered.

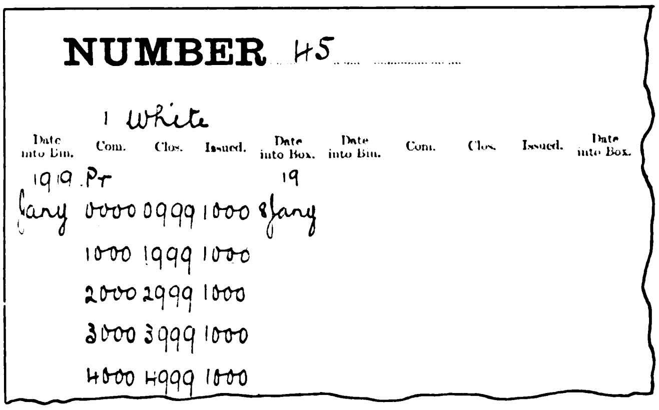
CHARGE 2d. ANY DISTANCE.

PARCELS up to 14 lbs. in weight will be received by Conductors for delivery by Tramway Messengers to any distance within Half-mile of the Corporation Tramway Track for the charge of 2d.

TABLE OF FARES POSTED IN ABERDEEN CARS

FARE COLLECTION AND AUDITING

It is an interesting fact that for several years prior to 1916, the Aberdeen Corporation Tramways used the prepayment system of fare collection. From an operating standpoint prepayment was satisfactory, but some of the passengers continued to agitate for the old way

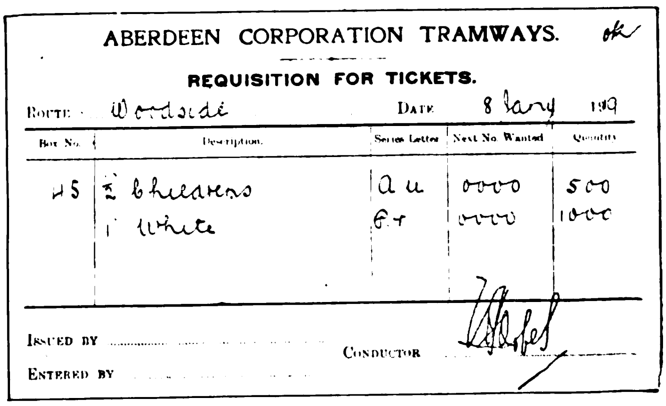


NUMBER 45

1 White

Date into Bin.	Com.	Clos.	Issued.	Date into Box.	Date into Bin.	Com.	Clos.	Issued.	Date into Box.
1919. Pr				19					
Jany	0000	0999	1000	8 Jany					
	1000	1999	1000						
	2000	2999	1000						
	3000	3999	1000						
	4000	4999	1000						

INDIVIDUAL TICKET BOX RECORD OF TICKETS HELD FOR A GIVEN CONDUCTOR



ABERDEEN CORPORATION TRAMWAYS. ok

REQUISITION FOR TICKETS.

Route Woodside Date 8 Jany 1919

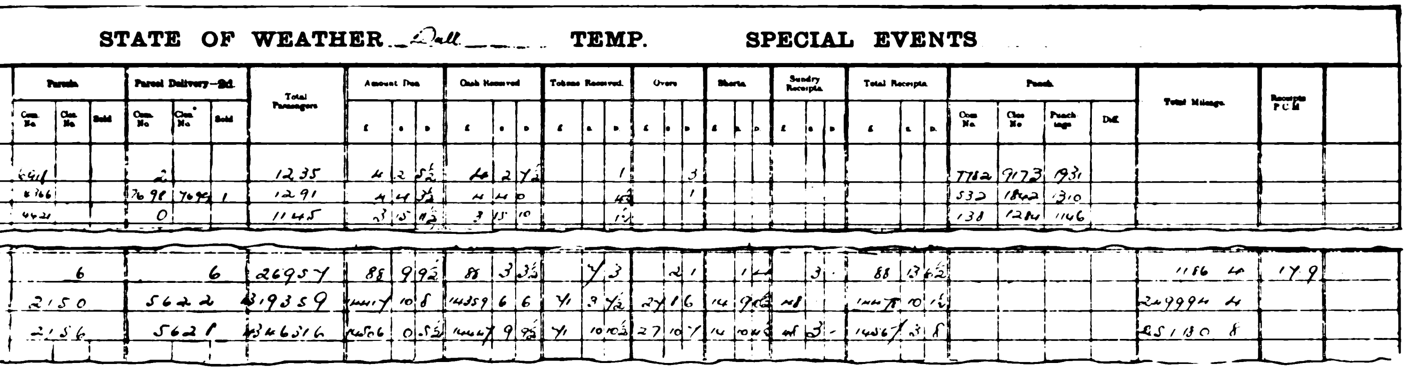
Box No.	Description.	Series Letter	Next No. Wanted	Quantity
45	½ Childrens	a u	0000	500
	1 White	G r	0000	1000

Issued by

Entered by

Conductor

CONDUCTOR'S REQUISITION FOR TICKETS



STATE OF WEATHER Dull TEMP. SPECIAL EVENTS

Parcels			Parcel Delivery—2d.			Total Passengers	Amount Due			Cash Received			Tokens Received			Overs			Shorts			Sundry Receipts			Total Receipts			Punch				Total Mileage	Receipts P C M	
Com. No	Can. No	Sold	Com. No	Can. No	Sold		£	s	d	£	s	d	£	s	d	£	s	d	£	s	d	£	s	d	£	s	d	Com No.	Can No	Punchings	Diff.			
641			2			1235	4	2	5½	4	2	7½			1			3										7782	9173	1931				
6366			7698	7699	1	1291	4	4	3½	4	4	0			4½			1										532	1842	1310				
4421			0			1145	3	15	11½	3	15	10			1½													138	1284	1146				
		6			6	26957	88	9	9½	88	3	3½		7	3		2	1		1	4		3	·	88	13	6½					1186 4	17.9	
2150			5622			319359	14417	10	8	14359	6	6	41	3	½	27	1	6	14	9	6½	48			14478	10	1½					249994 4		
2156			5621			346316	14506	0	5½	14447	9	9½	41	10	10½	27	10	7	14	10	4½	48	3	-	14567	3	8					251130 8		

REVENUES. NUMBER OF PASSENGERS. NOTATION CONCERNING TICKETS WORKED OUT OF ORDER, ETC.

until their wishes were met by the municipality. Hence, the present method of fare collection is the customary one of getting the money within the car and giving a receipt for the fare paid. Operating conditions are not severe enough to call for loading in queues, but at the busy city terminals and shipyards it is customary for the conductress to collect the fares on the lower deck when the car is loading; otherwise it would not be possible to get all the money on a car which seats twenty-four below, thirty upstairs and has no limit on standees. The platforms are wide enough to allow two passengers to board at one time, so that it is not uncommon to fill up a car in a minute.

As there are no 1½d. or other odd fares, the ratio of passengers who have exactly the right amount of copper runs up to 80 per cent. The conductress starts the day with 5s. 6d. in change, and it is customary for her to keep the half pennies in a separate pocket for greater convenience in making change for pennies. Otherwise she carries the usual outfit of ticket holders, money bag and punch. The last-named is the Williamson ticket punch made at Ashton-under-Lyne. It is of the standard type with registering count of every ticket punched, a compartment for the punchings and a bell signal. The Aberdeen Corporation Tramways bought these punches outright instead of paying an annual rental.

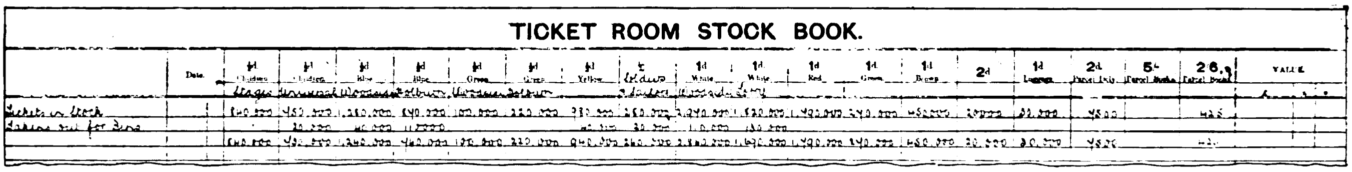
To check the proper collection of fares and to see that each passenger has the correct receipt and is not over-riding, the Tramways employ four ticket inspectors in shifts of two each as compared with 130 conductresses and nine conductors. The inspectors' shifts are so arranged that all are on duty during the rush periods. The daily report from a ticket inspector to the general manager gives a record of the routes which he inspected and a record of any missed fares which he noticed and called to the attention of the conductor; passengers per car and other important data may also be included. It is estimated that the loss of revenue from all causes does not exceed 2 per cent. It would not be safe for dishonest passengers to ride beyond their half-penny limit habitually as the conductor would soon learn to spot them. Passengers who refuse to pay may be turned over to the police if they will not give their names and addresses. Where prosecution has been necessary, recalcitrant passengers have been fined up to £3 or nearly $15. Dishonesty in conductors is punished by instant discharge. In general, each car is checked at least twice a day. More frequent inspection would be possible, of course, if the inspectors did not have other duties.

WILLIAM FORBES, general manager Aberdeen Corporation Tramways, is no stranger to American electric railway practice. He is not only an assiduous reader of the ELECTRIC RAILWAY JOURNAL but also spent two years in the United States during 1907 and 1908 on the office force of Westinghouse, Church, Kerr & Company, consulting and constructing engineers. Mr. Forbes was born in Aberdeen thirty-six years ago. After completing his school years, he entered the employ of the Caledonian Railway. After eight years of experience on that railroad in all branches of steam railroading he went to America to gain an experience of American business methods which has stood him in good stead in his present post. It was upon his return from the United States that he became traffic superintendent and assistant manager of the Aberdeen Corporation Tramways. He succeeded R. Stuart Pilcher as general manager when Mr. Pilcher was called to Edinburgh early last year to electrify and operate the tramways taken over by the municipality.

The only other outside supervisory officers are four traffic inspectors and one motorman inspector.

All cash transactions between the conductresses and the receiving department are carried out at the executive offices. When the conductress starts, she makes out a signed requisition for tickets as per the form reproduced. These tickets are taken out of a specific bin containing several thousands of each classification. They are issued from day to day to the conductresses in the order of their serial numbers until the supply is exhausted. In other words, every conductress uses tickets numbered in continuity up to say 10,000, until a new series is begun. If, by chance, she uses a pad out of order, entry of the error is made in a "Tickets out of order" book, but she retains the tickets and issues them the following day instead. A "Ticket discarded" book is also used to keep track of tickets purchased but not used for one reason or another. Such care is necessary since each ticket has a money value. Without going into too great detail, it may be pointed out that from the ordering of the tickets from the printer (Glasgow Numerical Printing Company) to the return of unsold tickets by the conductresses, every ticket is identified exactly, and responsibility fixed from the receiving clerk who gets the tickets from the printer to the general manager who O.K.'s the discarding of tickets used for instruction or other purposes. For example, the tickets reproduced in this article came under the latter heading. Tickets are balanced weekly.

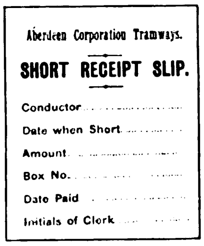
When the conductress receives her tickets at the start of the day's work she also receives her waybill (trip sheet) on which she enters the opening numbers of each kind of ticket supplied. On this waybill she writes in her trip-by-trip terminal times as taken from


TICKET ROOM STOCK BOOK.

DAILY RECORD OF TICKETS TAKEN OUT OF STOCK

the master time-table which shows the day's work of every car. Then as each half trip is completed she records the top numbers of the tickets left.

The Rubislaw waybill reproduced shows that the conductress began her first shift at 9.58 a.m. at the Castle Street terminus. At the end of her first shift she turned in her waybill and cash except the 5s. 6d. change, to the cashier. The cashier then counted the money and checked the same against the number of tickets sold as indicated by the cashier's personal subtractions. Then the amount due was entered by her in the "office column." Upon this, the conductress was asked to sign the waybill for "Collection No. 1," following which it was returned to her for the next shift. In this case "Collection No. 2" was also turned in at the head office on the last trip downtown. As there are no cash-handling facilities at the car-houses now, the conductress does not turn in until the following day the cash collected on the last night trip uptown to the carhouse. She does, however, give up her waybill and tickets to the carhouse foreman who in turn sends them to the receiving department. Hence the conductress before beginning her next day's work must report to the receiving department for the final balancing of tickets and cash. Conductors or conductresses who have early runs do not have to go through this "hangover" process as they complete their day's work before the closing of the offices. As tickets are furnished in continuity from a specific bin for each conductress, the opening numbers on a waybill must correspond to the closing numbers of the preceding day. Every conductress is held absolutely responsible for the correct issue of tickets, and is therefore expected to see that ticket and waybill numbers check exactly when she takes over the work of another.


Aberdeen Corporation Tramways.

SHORT RECEIPT SLIP.

Conductor ....

Date when Short ....

Amount ....

Box No. ....

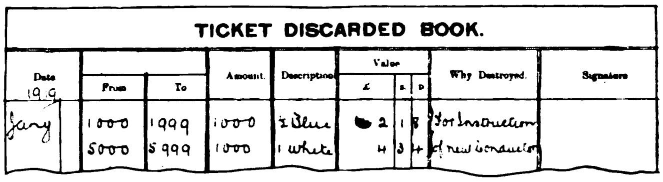
Date Paid ....

Initials of Clerk ....

SHORT RECEIPT SLIP

Overs are given to the Employees' Friendly Society at the end of the fiscal year. As a check upon the efficiency and honesty of the cash clerks and conductresses, a "short receipt" slip is given to the conductress by the cashier. It is obvious where the fault lies if the same conductress receives such slips from all of the cashiers!

Shortages must be paid over at once, but in the event of a dispute where the shortage is large, or where the working of tickets out of order demands time to check the waybill, the shortage is not paid until the following day after the conductor's opening numbers have been checked with the previous day's closing numbers and the cashier's subtractions have been checked by the journal clerk.

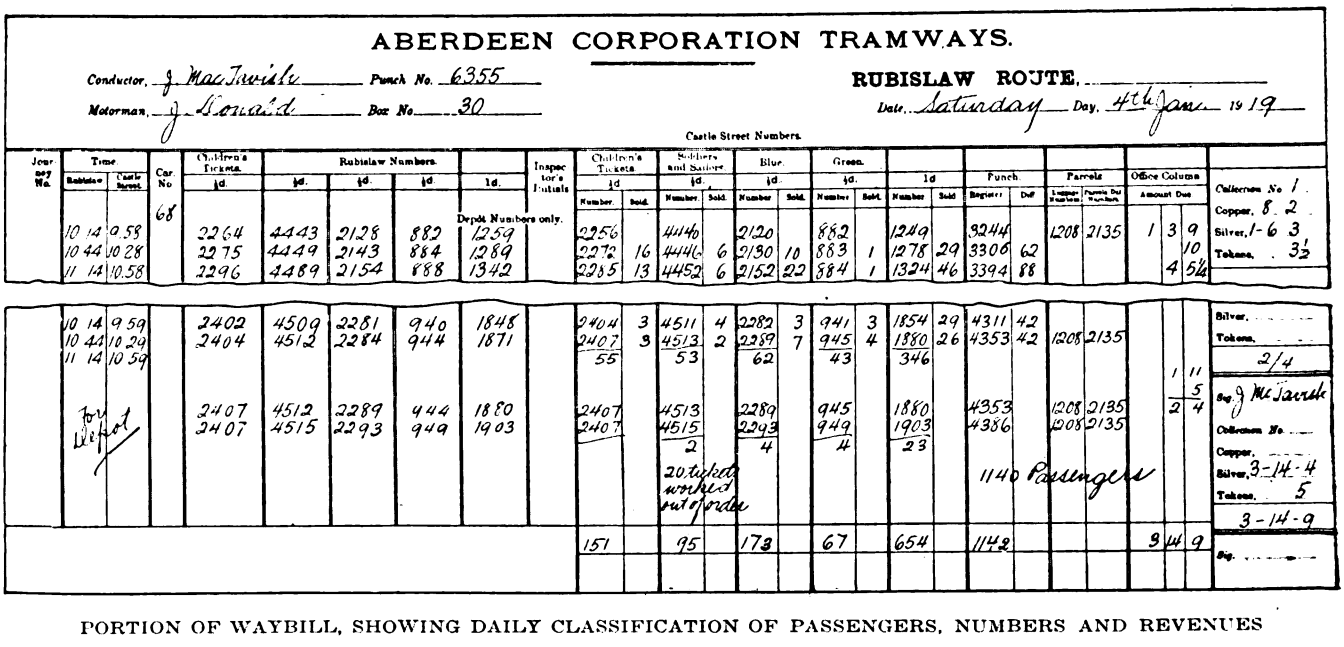

TICKET DISCARDED BOOK.

Date 1919		From	To	Amount.	Description	Value £	s	D	Why Destroyed.	Signature
Jany		1000	1999	1000	½ Blue	2	1	8	For Instruction	
		5000	5999	1000	1 White	4	3	4	of new Conductors	

RECORD OF FARE RECEIPTS USED FOR NON-REVENUE PURPOSES

The entire receiving staff is made up of eight women and girls, and these carry out all the functions from the receipt of new tickets to the making out of cash balances day by day. It may be added here that the counting of punchings is rarely if ever found necessary as the punch is an exceedingly accurate machine.

One rather novel feature not directly related to the matter of accounting for fare collections is that while the late conductresses are making their returns, boys are turning the trolley poles for them. Where neces-


ABERDEEN CORPORATION TRAMWAYS.

Conductor, J. MacTavish Punch No. 6355

Motorman, J. Donald Box No. 30

RUBISLAW ROUTE.

Date, Saturday Day, 4th Jan. 1919

Castle Street Numbers.

Journey No.	Time Rubislaw	Time Castle Street	Car No	Children's Tickets ½d.	Rubislaw Numbers ½d.	Rubislaw Numbers ½d.	Rubislaw Numbers ½d.	1d. Depôt Numbers only.	Inspector's Initials	Children's Tickets ½d Number	Sold	Soldiers and Sailors ½d. Number	Sold	Blue ½d. Number	Sold	Green ½d. Number	Sold	1d Number	Sold	Punch Register	Diff	Parcels Luggage Numbers	Parcels Due Numbers	Office Column Amount Due		
	10 14	9.58	68	2264	4443	2128	882	1259		2256		4140		2120		882		1249		3244		1208	2135	1	3	9
	10 44	10 28		2275	4449	2143	884	1289		2272	16	4446	6	2130	10	883	1	1278	29	3306	62					10
	11 14	10.58		2296	4489	2154	888	1342		2285	13	4452	6	2152	22	884	1	1324	46	3394	88				4	5¼
	10 14	9 59		2402	4509	2281	940	1848		2404	3	4511	4	2282	3	941	3	1854	29	4311	42					
	10 44	10 29		2404	4512	2284	944	1871		2407	3	4513	2	2289	7	945	4	1880	26	4353	42	1208	2135			
	11 14	10 59								55		53		62		43		346							1	11
																										5
	For Depot			2407	4512	2289	444	1880		2407		4513		2289		945		1880		4353		1208	2135		2	4
				2407	4515	2293	949	1903		2407		4515		2293		949		1903		4386		1208	2135			
												2		4		4		23								
												20 tickets worked out of order								1140 Passengers						
										151		95		173		67		654		1142				3	14	9

Collection No. 1.
Copper, 8 2
Silver, 1-6 3
Tokens, 3½

Silver, ...
Tokens, ...
2/4
Sig. J McTavish
Collection No. ....
Copper, ...
Silver, 3-14-4
Tokens, 5
3-14-9
Sig. ....

PORTION OF WAYBILL, SHOWING DAILY CLASSIFICATION OF PASSENGERS, NUMBERS AND REVENUES sary, relief conductresses are provided and fifteen to thirty minutes' time is allowed for making a final report at the end of the day.

IMPROVED ROLLING STOCK

The standard Aberdeen car is of the double-deck type with windshields instead of vestibules. It is 30 ft. long over all including two 6-foot platforms open on the boarding side and with an emergency exit gate (used in prepayment days) on the inner side. The trucks are Brill 21-E with two Westinghouse 25-hp. motors on the earlier cars and GE-200-K 35-hp. motors on the later cars. Hand brakes of the ordinary type are used on most of the cars, but sixteen of more recent construction have been fitted with Peacock brakes which are more popular with the men. The Westinghouse magnetic brake is used only on grades or in other emergency conditions.

Although the seats in the upper deck are of slat, home-made manufacture, those on the lower deck are considerably in advance of the wooden longitudinal seats found on most British cars. They are comfortably upholstered in a composition leather, while American-made "Rico" sanitary straps are available for the standees. Another feature is the use of patented roof ventilators, known as the "Eros Air Extractors," in place of the customary monitor side-sash ventilation. Illumination is afforded by four six-lamp circuits of Siemens 16-cp. special filament lamps. One each of these lamps is over the conductor's position, another is used to illuminate a white bullseye in the front bulkhead, a fourth for the red bull's-eye tail light required in the rear bulkhead according to Board of Trade regulations, two more for the destination sign and another for the colored box light carried from the upper bulkhead in place of a dasher headlight.

Tuesday, Jan. 7, 1919.
From Inspector F. Murdoch.

To the General Manager.
Sir—I beg to report:

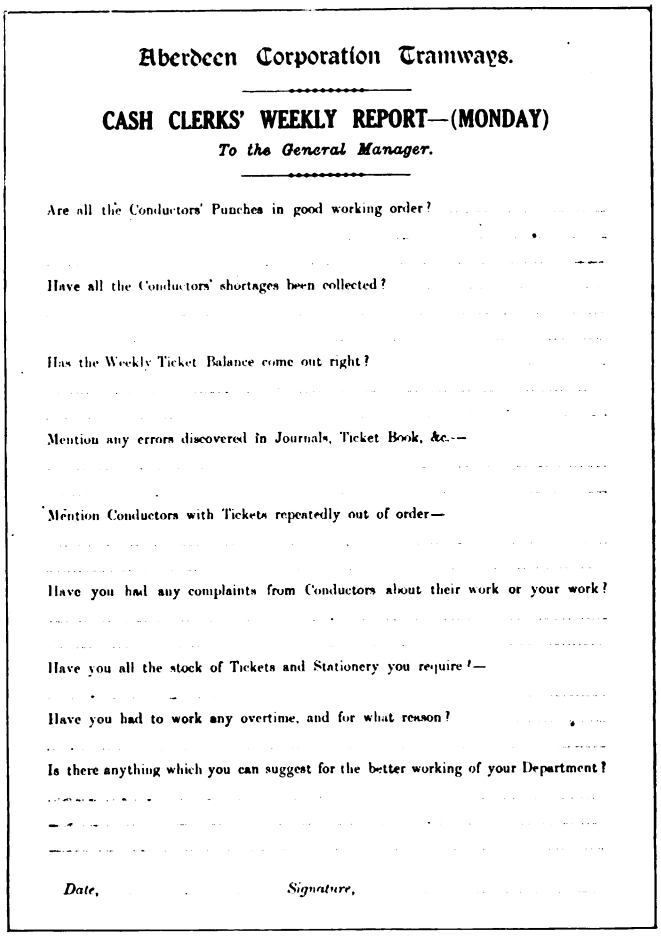
Car 77. Conductor V. McGregor. 10:46 a.m. Woodside.	Checking said car at Loch Street on the journey to town I found one missed penny fare in the saloon from Clifton Road. I informed the conductress and saw she collected same.
Car 33. Conductor Jenny Davidson. 11:19 a.m. Queen's X.	Checking this car at Bridge Street while proceeding to Castle Street I found one missed fare in the saloon from Mount Street. I informed the conductress and saw she collected halfpenny.
Car 37. Conductor Daisy MacDonald. 11:42 a.m. King's Gate.	I checked this car at Bridge Street while proceeding to Castle Street and found one missed fare in the saloon from Mount Street. I informed Miss MacDonald and she then collected halfpenny.
Car 5. Conductor H. Haig. 8:23 p.m. Bridges.	Checking this car at Holburn Road while proceeding to Bridge of Dee I found two missed penny fares in the saloon from Bridge Street. I informed Miss Haig and saw she collected same.

PART OF ABERDEEN TICKET INSPECTOR'S REPORT

Passengers enter the carbody either through the 21-in. center bulkhead door on the lower deck or the 22-in. door on the upper deck. At busy loading points the front entrance is also used. They are not permitted to leave via the front way except at terminals. For their convenience, as well as that of the conductress, push-button dry-battery bell signals are installed in the bulkheads and the window posts. Platform accidents are minimized by the use of motorman's mirrors, one at the side and one directly in front.

A recent improvement has been the addition of a hood or canopy on the upper deck to shelter outside passengers against wind and rain. This has proved very popular. The total weight of these cars is 22,400 lb. or 415 lb. per seated passenger.

Satisfied that it could improve upon the type described, the management has recently completed the first of three cars in which upholstered cross seats are used on the lower deck. As shown in an accompanying illustration, double and single seats have been installed owing to the restriction that the space between tracks must be wide enough to permit a person to stand between passing cars without injury. This type of car has two seats less on the lower deck but gives two seats more on the upper deck. The one in use has already demonstrated its popularity.



Aberdeen Corporation Tramways.

CASH CLERKS' WEEKLY REPORT—(MONDAY)

To the General Manager.

Are all the Conductors' Punches in good working order?

Have all the Conductors' shortages been collected?

Has the Weekly Ticket Balance come out right?

Mention any errors discovered in Journals, Ticket Book, &c.—

Mention Conductors with Tickets repeatedly out of order—

Have you had any complaints from Conductors about their work or your work?

Have you all the stock of Tickets and Stationery you require?—

Have you had to work any overtime, and for what reason?

Is there anything which you can suggest for the better working of your Department?

Date, *Signature,*

CASH CLERK'S WEEKLY REPORT TO THE GENERAL MANAGER

EMPLOYEES

Like all other British tramways, Aberdeen has been obliged to employ a very large proportion of women. Thus the roster for January 1919 shows 130 conductresses against nine conductors. The eight cash clerks are women and there is also a woman ticket inspector. As the Corporation is obligated to return men to their positions as they return, the few motorwomen employed recently have already been replaced although they had proved thoroughly competent. The chief difference in efficiency is due to the fact that the women are absent more frequently. They are inclined to average about one day off every week whereas the men, in accordance with the layout of work, get one Sunday off every three weeks and serve six hours on

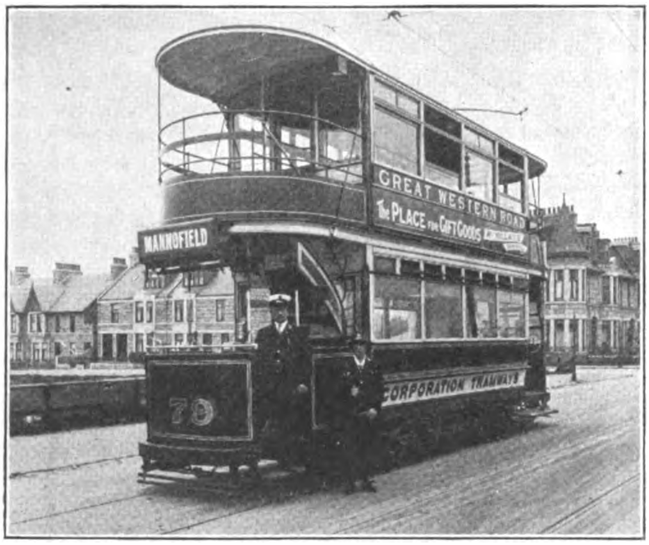
TABLE V—SHOWING STAFF OF ABERDEEN CORPORATION TRAMWAYS

	Male	Female	Total
Managerial and administrative	2	...	...
Chief clerk	1	...	...
Chief cash clerk	...	1	...
Cash clerks	...	7	...
General office, clerks, traffic clerks, timekeeper, storekeeper, typists, etc	5	7	23
Inspectors:			
Chief inspector	1	...	...
Ticket inspectors	4	1	...
Traffic regulators	2	...	...
Motorman inspector	1	...	9
Motormen	105	...	105
Conductors	9	130	139
Cleaners	28	...	28
Repair staff	52	...	52
Miscellaneous, including parcels messengers	16	...	16
Total	226	146	372

all other Sundays, an average of four and one-half hours for the three weeks. In general, a fifty-four and one-half-hour, seven-day week is in effect, the four and one-half hours on Sunday counting as overtime at 50 per cent additional pay. Fifteen minutes a day is paid for as signing-on or reporting time.

One week, platform employees are assigned two-swing runs, beginning at 7 a.m. and finishing at 6 p.m. with a break between 10 a.m. and 1 p.m. The following week, the same employees start at 10 a.m. and finish at 11.30 p.m. with a break between 1 p.m. and 6 p.m. Before the war the tramway service was given from 5 a.m. to midnight. Up to the present time, the last cars are leaving the center of the city at 11 p.m. Under these circumstances, it is not difficult to arrange the schedule on the basis of two crews to one car.

It may be mentioned here that the public is fully apprised of these "first and last car" schedules through the use of schedule boards which are posted at all terminals and at many places throughout the city.

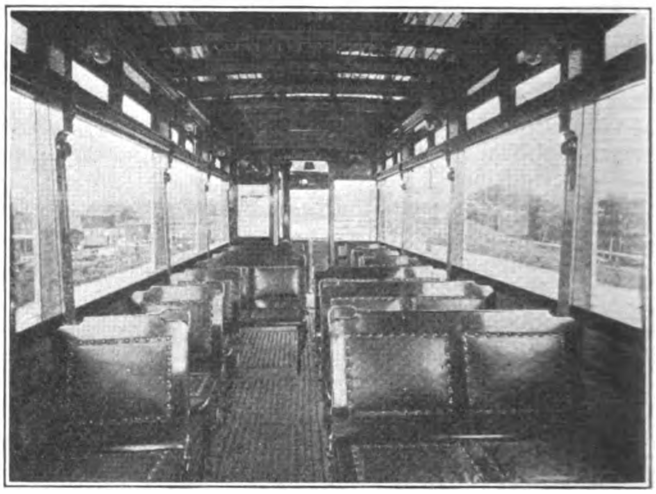


STANDARD ABERDEEN CAR—NOTE THE CHARACTERISTIC TWO-FAMILY GRANITE SUBURBAN HOUSES IN THE BACKGROUND

Headways are so short now that it is no longer necessary to put timetables in the cars.

Wages reach their maximum after four years' service in the case of motormen and three years in the case of conductors and conductresses. The first-year wages of motormen have gone up from £1 3s. 2d. ($5.56) to £2 17s. 8d. ($13.84) and those of fourth-year motormen have advanced from £1 13s. 2d. ($7.96) to £3 7s. 2d. ($16.12). Conductors' first-year wages are the same as motormen, but do not go beyond the latter's third-year rate, which is now advanced from £1 10s. 9d. ($7.38) to £3 4s. 9¼d. ($15.55). The wages of women conductors range from £2 3s. 6½d. ($10.45) for the first year to £2 10s. ⅜d. ($12.01) for the third year. It is plain from these figures that the increase in wages is as serious a factor in Great Britain as in the United States. In these calculations a shilling is taken as the equivalent of 24 cents.

Although the Aberdeen property with its eighty-six cars and 250 transportation employees is not a big system, the highest standards of operation are followed. Traffic is carefully checked every day as shown in the traffic inspectors' reports, ampere-hour meters are on all cars to check the use of energy, Bundy recorders are installed on all the routes for the time-checking of the platform employees, instruction bulletins on the avoidance of accidents reinforce the regular efforts of the motorman instructor, etc. In short, the same spirit of progress shown in building up the income account is manifested in handling the operating details.



INTERIOR OF LOWER DECK OF ABERDEEN CAR, SHOWING ARRANGEMENT OF CROSS-SEATS IN STAGGERED RELATION BECAUSE OF DEVIL-STRIP RESTRICTIONS

Diesel Engine Defined

THE Diesel Engine Users' Association of Great Britain has formulated some definitions which are now before the members, preliminary to adoption, and which will serve to clarify phraseology in this field. A Diesel engine is defined as a prime mover actuated by the gases resulting from the combustion of a liquid or pulverized fuel injected in a fine state of subdivision into the engine cylinder at or about the conclusion of a compression stroke. The heat generated by the compression to a high temperature of air within the cylinder is the sole means of igniting the charge. The combustion of the charge proceeds at, or approximately at, constant pressure. A semi-Diesel engine is a prime mover actuated by the gases resulting from the combustion of a hydrocarbon oil. A charge of oil is injected in the form of a spray into a combustion space open to the cylinder of the engine at or about the time of maximum compression in the cylinder. The heat derived from an uncooled portion of the combustion chamber, together with the heat generated by the compression of air to a moderate temperature, ignites the charge. The combustion of the charge takes place at, or approximately at, constant volume.

Eleven Billion Fare Passengers in 1917

Preliminary Statistics of Bureau of Census Show Accumulating Burdens of Electric Railways—100 Rides a Year to Every Person in United States

THE street and interurban railways of the United States during the calendar year 1917 transported more than eleven billion fare-paying passengers, representing an average of more than 100 trips for each man, woman and child in the United States. The electric railways in that year operated 102,603 cars on 32,535 miles of line, comprising 44,812 miles of track. They employed 294,826 persons, to whom were paid salaries and wages aggregating $257,240,362. They received revenues amounting to $650,149,806 from railway operations. The rates of increase in the various items presented by the report were in most cases materially less during the period 1912-17 than during the preceding five years.

The details of this showing are given in Tables I and II from a preliminary report by S. L. Rogers, director of the Bureau of the Census, Department of Commerce. This report, which was prepared under the supervision of Eugene F. Hartley, chief statistician for manufactures, relates to the calendar years 1917, 1912 and 1907. The statistics cover electric-light plants operated in connection with electric railways and not separable therefrom, but do not cover mixed steam and electric railways or railroads under construction.

The report for 1917 in Table I gives figures for 947 operating and 364 lessor companies. The number of operating companies compares with 975 in 1912 and 945 in 1907. The line mileage represents an increase of 6.9 per cent over 1912 and 27.4 per cent over 1907, and the corresponding rates of increase in track mileage were 9.1 and 30.3 respectively. The total number of cars reported—comprising 79,914 passenger cars and 22,689 freight and other non-passenger cars—shows increases of 9.1 per cent for the period 1912-1917 and of 22.7 per cent for the decade 1907-1917. The electric locomotives in use numbered 357 as compared to 277 in 1912 and 117 in 1907. During the later five-year period an increase of 4.4 per cent in the total number of employees was accompanied by an increase of 28 per cent in salaries and wages; and during the ten-year period 1907-17 the corresponding rates of increase were 33.1 per cent and 70.4 per cent.

The total primary horsepower amounted to 4,200,192 hp. in 1917, an increase of 14.7 per cent over 1912 and of 66.7 per cent over 1907. The great bulk of this power was derived from steam, which contributed 3,543,915 hp. to the total as compared to 627,983 hp. obtained from water and 28,294 hp. from internal-combustion engines. The rate of increase in steam power, however, was considerably less than the rates for the other forms of power.

A pronounced tendency to use larger units appears in the case of all three classes of power. Between 1907 and 1917 the average horsepower of the steam engines increased from 716 to 2036; of the water wheels, from 403 to 1987, and of the internal-combustion engines, from 398 to 534.

In addition to 11,304,660,462 revenue passengers, the electric railways carried 3,021,137,935 transfer and 181,116,176 free passengers, making a total of 14,506,914,573. This total represents an increase of 19.5 per cent during the period 1912-1917 and 52.2 per cent for the

TABLE I—COMPARATIVE CENSUS FIGURES OF ELECTRIC RAILWAYS IN UNITED STATES FOR DECADE 1907–1917

	1917	1912	1907	Per Cent of Increase 1907–1917	Per Cent of Increase 1912–1917	Per Cent of Increase 1907–1912
Number of companies	1,311	1,260	1,236	.....	.....	.....
Operating	947	975	945	0.2	*a*2.9	3.2
Lessor *b*	364	285	291	.....	.....	.....
Miles of line	32,534.68	30,437.86	25,547.19	27.4	6.9	19.1
Miles of single track *c*	44,811.53	41,064.82	34,381.51	30.3	9.1	19.4
Cars	102,603	94,016	83,641	22.7	9.1	12.4
Passenger	79,914	76,162	70,016	14.1	4.9	8.8
All other	22,689	17,854	13,625	66.5	27.1	31.0
Electric locomotives	357	277	117	205.1	28.9	136.8
Number of persons employed	294,826	282,461	*d* 221,429	33.1	4.4	27.6
Salaries and wages	$257,240,362	$200,890,939	$150,991,099	70.4	28.0	33.0
Total horsepower	4,200,192	3,661,385	2,519,823	66.7	14.7	45.3
Steam engines:						
Number	1,741	2,258	3,368	*a*48.3	*a*22.9	*a*33.0
Horsepower	3,543,915	3,165,888	2,411,527	47.0	11.9	31.3
Internal-combustion engines:						
Number	53	48	41	.....	.....	.....
Horsepower	28,294	24,190	16,335	73.2	17.0	48.1
Water wheels:						
Number	316	383	228	38.6	17.5	68.0
Horsepower	627,983	471,307	91,961	582.9	33.2	412.5
Kilowatt capacity of dynamos	2,928,454	2,505,316	1,723,416	69.9	16.9	45.4
Output of stations, kilowatt-hours	7,240,502,789	6,002,659,036	4,759,130,100	52.1	20.6	26.1
Energy purchased, kilowatt-hours	4,947,348,042	3,017,368,753	*e*	.....	64.0	.....
Passengers carried	14,506,914,573	12,135,341,716	9,533,080,766	52.2	19.5	27.3
Revenue	11,304,660,462	9,545,554,667	7,441,114,508	51.8	18.4	28.3
Transfer	3,021,137,935	2,423,918,024	1,995,658,101	51.4	24.6	21.5
Free	181,116,176	165,869,025	96,308,157	88.1	9.3	72.2
Revenue car mileage	2,139,222,930	1,921,620.074	1,617,731,300	32.2	11.3	18.8
Income account (operating companies):						
Railway operations—revenues	$650,149,806	$535,996,122	*d*$400,896,034	62.2	21.3	33.7
Auxiliary operations—revenues	59,675,286	31,515,582	17,291,824	245.1	89.4	82.3
Non-operating income	20,282,948	18,418,813	11,556,396	75.5	10.1	59.4
Income from all sources	$730,108,040	$585,930,517	$429,744,254	69.9	24.6	36.3
Operating expenses	$452,594,654	$332,896,356	$251,309,252	80.1	36.0	32.5
Deductions from income (including taxes)	221,062,456	184,894,272	*f*138,094,716	60.1	19.6	33.9
Net income	$56,450,930	$68,139,889	$40,340,286	39.9	*a*17.2	68.9
Dividends *g*	48,337,435	51,650,117	26,454,732	82.7	*a*6.4	95.2
Surplus	$8,113,495	$16,489,772	$13,885,554	*a*41.6	*a*50.8	18.8

(*a*) Denotes decrease.

(*b*) Lessor companies, 1917, include companies maintaining separate organization though leased to and controlled through stock ownership by other companies, largely in Pennsylvania. In 1912 and 1907 these were treated as merged and not included in the number reported.

(*c*) Includes track lying outside the United States (1917, 29.95 miles; 1912, 31.91 miles: and 1907, 27.52 miles), but excludes track not operated.

(*d*) For 939 companies.

(*e*) Figures not available.

(*f*) Inclusive of charges for sinking funds, carried as profit and loss accounts.

(*g*) Dividends were paid by 300 operating companies in 1917 and by 292 in 1912.

decade 1907-1917. The revenue car mileage totaled 2,139,222,920, an increase of 11.3 per cent over 1912 and of 32.2 per cent over 1907.

The electric power consumed in 1917 aggregated 12,187,850,831 kw-hr., of which 7,240,502,789 kw.-hr. were generated by the companies themselves and 4,947,348,042 kw.-hr. were purchased. The rate of increase in total power consumed during the five-year period 1912-1917, which amounted to 35.1 per cent, was much greater than the rates of increase during the same period in revenue car mileage and passengers carried—11.3 per cent and 19.5 per cent respectively. This difference was due mainly to the rapid increase in the light and power business done by the railway companies.

TABLE II—INCOME STATEMENT OF ELECTRIC RAILWAYS IN UNITED STATES FOR THE CALENDAR YEARS 1917 AND 1912

	1917	1912
Railway operations—revenues	$650,149,806	$535,996,122
Railway operations—expenses	421,250,838	*
Net revenue, railway operations	$228,898,968	*
Auxiliary operations—revenues	$59,675,286	$31,515,582
Auxiliary operations—expenses	31,343,816	*
Net revenues, auxiliary operations	$28,331,470	*
Net operating revenue	$257,230,438	$234,615,348
Taxes assignable to operations	45,756,695	*
Operating income	$211,473,743	*
Non-operating income	20,282,948	18,418,813
Gross income	$231,756,691	*
Deductions from gross income	175,305,761	*
Net income	$56,450,930	$68,139,889
Dividends	48,337,435	51,650,117
Surplus	$8,113,495	$16,489,772
Profit and loss accounts:		
Charges for sinking fund and other reserves	$9,927,578	$6,229,136
Sundry appropriations of net income	8,257,632	*
	$18,185,210	*
Profit and loss credits	1,205,910	*
Net total	$16,979,300	*
Deficit	$8,865,805	*

*Exact comparative figure not available; see text.

The income of the companies from all sources in 1917 aggregated $730,108,040, of which sum $650,149,806 represented revenues from railway operations, $59,675,286 was derived from auxiliary light and power business and $20,282,948 was non-operating income. The revenues from railway operations increased by 21.3 per cent during the period 1912-1917 and by 62.2 per cent between 1907 and 1917, but those from light and power business increased by 89.4 per cent and 245.1 per cent during the five-year and ten-year periods respectively.

The operating expenses aggregated $452,594,654, an increase of 36 per cent over 1912 and 80.1 per cent over 1907. The deductions from income, comprising taxes, interest and other fixed charges, amounted to $221,062,456, an increase of 19.6 per cent for the later five-year period and of 60.1 per cent for the decade. The net income, therefore, was $56,450,930, a sum less by 17.2 per cent than the net income of 1912 but greater by 39.9 per cent than that of 1907. Of the 947 operating companies, 300 paid dividends aggregating $48,337,435, a decrease of 6.4 per cent as compared with 1912.

OBSTACLES TO FULL COMPARISON

The second monetary column in Table II was added by this journal to indicate as far as possible the comparison between the full income statements for 1912 and 1917. It is explained by the Bureau of the Census, however, that a complete comparison is impossible because the schedule for the census of 1917 differed in some respects from that used in 1912. These differences were caused by changes in the I. C. C. system of accounts.

For example, the $535,996,122 of revenues from railway operations and the $31,515,582 of revenues from auxiliary operations as now reported for 1912 can be checked against the differently combined figures given in the 1912 census report, but no exact information is at hand to show how the $322,896,356 of operating expenses for 1912 should be divided between railway operations and auxiliary operations. This amount of $332,896,356 includes "operating expenses of light and power departments" to the amount of $14,195,822, but it is not clear that this latter sum represents all expenses chargeable against light and power operations. Hence strictly comparable figures are not deducible.

Furthermore, in 1917 the revenues and expenses of auxiliary operations other than those of the light and power department are included under "auxiliary operations." These revenues amount to $5,326,411 and are included in the $59,675,286. Such was not the case in 1912 and 1907. The auxiliary operations—revenues of 1912 and 1907 ($31,515,582 and $17,291,824 respectively) pertain to "light and power departments only."

With respect to taxes, too, the schedules differ. In 1912 and 1907 the taxes were a deduction from income and were reported as a whole for all operations, amounting to $35,027,965 in 1912 and to $19,765,602 in 1907. In the 1917 schedule, however, "taxes assignable to operations" were reported. Taxes assessed on "miscellaneous physical property" do not enter into this account. The differences, perhaps, are not very important, and in general it may be said that the figure given for 1917, namely, $45,756,695, is fairly comparable with the foregoing figures for 1912 and 1907.

The 1912 census report gives a net income of $61,910,753 after the payment of $191,123,408 for deductions from income, including taxes, interest, rentals and miscellaneous. It will be noticed that the 1912 figure for deductions from income, as given in Table I, is $184,894,272. This difference of $6,229,136 is due to "charges for sinking fund," which according to the present I. C. C. system of accounts is a "disposition of net income" account, whereas in 1912 it was under "deductions from gross income."

The foregoing explains the increase in net income to $68,139,889 for 1912 as reported in Table I and Table II, for the changes in "deductions from gross income" and in "net income" are counterbalancing. It also explains the change in surplus from the $10,260,636 reported in the 1912 census to the $16,489,772 in Tables I and II.

Lastly, in regard to the profit and loss accounts shown in Table II, changes in the schedules make it impossible to give comparable figures except with respect to "charges for sinking fund and other reserves." But the 1912 schedule called for "charges for sinking fund, if any," while the 1917 item included "other reserves." Possibly all items of the latter character were not included under "charges for sinking fund" in 1912. Otherwise, the amount in 1912 comparable with the $9,927,578 of 1917 is the item of $6,229,136 before noted. Comparative figures for "sundry appropriations of net income" and "profit and loss credits" are not available for 1912. The following comparison can be made:

	1917	1912
Surplus	$8,113,495	$16,489,772
Charges for sinking fund and other reserves	9,927,578	6,229,136
Balance	Deficit $1,814,083	Surplus $10,260,636

Western Railway Club Holds Electrical Night

Paper by Messrs. Potter and Dodd Shows More Railroad Electrification and Larger Percentage of Steam Line Electrified in America Than in Rest of World—Saving in Coal, Design of Locomotives and Current Collection Considered

ON MONDAY night, April 21, the Western Railway Club held its first electrical night at the Sherman Hotel, Chicago. A get-together dinner preceded the meeting. The evening was devoted to a paper on "Electrification of Trunk Line Railroads" by W. B. Potter, chief engineer, railway and traction department, General Electric Company, and S. T. Dodd, railway and traction engineering department, General Electric Company.

The paper, an abstract of which appears below, was delivered by Mr. Dodd and was followed by lantern slides of representative American installations explained by Mr. Potter. Mr. Potter also described competitive tests which had been conducted between electric and steam locomotives to the glory of the former. He stated that he believed extensive electrification would soon take place in France and Italy.

In the discussion which followed the slides, E. Marshall, electrical engineer Great Northern Railway, explained various features of the 27 miles of electrification on his road, outlining some of the difficulties resulting from three-phase service. He stated that probably there would be no more three-phase lines built. N. W. Storer, traction engineering division, Westinghouse Electric & Manufacturing Company, emphasized the importance of the conservation of fuel. He said that it is not expected that all the railroads will be electrified, but in many instances the possible advantages are so great that undoubtedly many roads will be electrified soon. Regeneration by electric locomotives, he said, gives ease of control, permits a great saving of power and makes for greater safety of operation. The question of the type of drive appeals strongly to the steam railroad operator, and each line wants to satisfy its own ideas sometimes at the expense of efficiency in operation. The big question now is what is the tendency of the times. What weight of train is to be the future requirement and what will be the limit of demand, e.g., weight, length of train, speed, etc.? Is it necessary that large fleets of freight trains be moved almost simultaneously? On these and other questions the builders of electric locomotives must receive information from railroad operators.

O. C. Cromwell, mechanical engineer, Baltimore & Ohio Railroad, spoke briefly on the electrification of his road. In answer to questions, Mr. Potter explained that the controlling factors as to whether a given railroad should adopt a.c. or d.c. service are the relative cost of maintenance and upkeep and whether constant or variable speed is desired.

Following the discussion a moving picture entitled "The King of the Rails" was run. An abstract of the paper by Messrs. Potter and Dodd follows:

MAIN LINE ELECTRIFICATION

The subject of main-line electrification is one of world-wide importance but seems to have been recognized especially in the United States, for in spite of our great mileage we have more actual main-line electrification and a greater proportion of our total mileage electrified than all the rest of the world. The following approximate statements will show this fact:

RAILWAY ROUTE MILEAGE OF THE WORLD

United States	265,218
Europe	217,000
Rest of the world	230,902
Total	713,120

The 265,000 miles in the United States represents about 400,000 miles of single track. To this must be added about 50,000 miles of trolley lines; making the total railway single track in the United States approximately 450,000 miles.

In considering heavy electrification, if we eliminate the electric roads which are devoted strictly to motor car service and include under our category those tracks, both steam road and trolley, which are handling freight and passenger service with electric locomotives, we find in the United States approximately 675 electric locomotives operating over 4875 miles of route, or 8300 miles of electrified track. Compared with this, in all the rest of the world there are approximately 450 electric locomotives operating over 1000 miles of route, or 1750 miles of track. That is, the percentage of electrified route mileage in the United States is about ten times as much as the percentage in all other countries combined.

REASONS FOR ELECTRIFICATION

Probably the freedom from smoke and cinders has been the definite impelling cause in all the early electrifications. Such systems as the Baltimore Tunnel, the New York Central Terminal at New York, the Detroit River Tunnel and the Cascade Tunnel on the Great Northern, were primarily electrified in order to overcome the disadvantage of smoke.

To-day, however, there is an argument for electrification which within the last two years has been more sharply emphasized than any other. This is the conservation of fuel. When we realize that 25 per cent of the coal mined in the United States is used on its railroads, we see the importance of considering this feature. This, therefore, is the only one among the various reasons for electrification to which we will particularly direct attention.

To present a figure showing the economy of electric operation it is necessary to make some sort of estimate of the ton-miles included in railway traffic. Taking the reports of revenue traffic for the year 1914 and including the estimated tonnage of cars and locomotives, we find that the railway traffic for that year amounted to about 1,000,000,000,000 ton-miles. Out of this, the movement of coal for railway purposes, together with the coal cars and locomotive tenders carrying the same, amounted to about 12 per cent.

The energy demand per 1000 ton-miles for railroad service varies widely under different conditions, but the average on the recently electrified sections is approximately 33 watt-hours at the power house per ton-mile moved over the railroad. For contingencies we might increase this item approximately 20 per cent and we have assumed in the following table 40 watt-hours per ton-mile as an amply conservative basis for estimating the electric energy.

POWER DEMAND FOR ELECTRIC OPERATION OF STEAM RAILWAYS IN UNITED STATES—1914

Ton-miles excluding tenders but including 25 per cent of the railway coal cars	930,000,000,000
Watt-hours per ton-mile (assumed)	40
Annual energy consumption, kilowatt-hours	37,200,000,000
Coal required at central steam power stations at 2.2 lb. per kilowatt-hour, tons	40,000,000
Average continuous load, kilowatts	4,250,000

The actual fuel used on steam locomotives for the year in question was 128,400,000 tons of coal and 40,000,000 bbl. of oil, or a total coal equivalent of 140,000,000 tons. The preceding table shows that the same tonnage could have been moved with electric locomotives by an expenditure of 40,000,000 tons, a saving of 100,000,000 tons per year. It is difficult to know how to emphasize this conclusion. We admit that the statistics which we have presented are more or less approximate, but the indication that electrical operation of railways in the United States would result in a yearly saving of 100,000,000 tons of coal is in itself a conclusion that, in view of the critical conditions of the last two years, must demand attention. We do not propose to suggest that all the railroads in this country will ever be operated electrically, certainly not within any reasonable time, but the figures to which we have called attention emphasize the importance from this standpoint of considering railway electrification wherever the conditions admit.

The figures given were prepared on the basis of the 1914 reports when the coal production for the country was 513,000,000 tons. Statistics for the last year are not available, but unofficial estimates have indicated that the coal production for 1918 was 685,000,000 tons. All the figures given in the preceding table would presumably be increased by 25 per cent to 30 per cent in order to represent conditions to-day.

FURTHER SAVING FROM WATER POWER

Although for purposes of comparison we have devoted considerable space to the saving in fuel that would result from the use of central steam power stations for the operation of railways, it is self-evident that the utilization of water power is more vital to the subject as affording the only known means for effectually conserving our limited fuel supply. At the present time, the water-power development in the United States amounts to about 5,000,000 kw. Knowledge as to the possible future hydraulic development is indefinite, as many of the water-power sites have not been completely surveyed. Estimates as to the presumable ultimate development vary considerably, but are around 50,000,000 kw.

The relative amount of power required for complete railway electrification is less than is usually supposed. A number of power stations capable of delivering 37,200,000,000 kw.-hr. per year with an average twenty-four-hour load of one-half the installed capacity would have an aggregate installation of approximately 8,500,000 kw. The statistics of steam and hydraulic electric power plants in the United States indicate that in 1917 there were installed, in central stations for lighting and power purposes, approximately 9,000,000 kw., in railway power stations 3,000,000 kw., and in isolated stations 8,000,000 kw.; a total installed capacity of about 20,000,000 kw. It is apparent that instead of the problem being prohibitive in size, there is already installed in the country a power station capacity of more than twice the requirement for operating all the railroads electrically. The power that would be required really is not excessive as compared with the electrical development which has already been accomplished.

The present tendency of modern power development, both steam and hydraulic, is toward the growth of large central power stations and inter-connected distributing systems. These power stations will be situated at points of cheap coal supply or of hydro-electric development, and will furnish power for cities and industries over a wide section. The same systems will also furnish power for the railways in their territory.

The Montana Power Company may be cited as an illustration. This company has twelve hydraulic power stations feeding into a common distribution system at 100,000 volts. The total installed capacity is approximately 175,000 kw. with possible extensions by future development of an equal amount. Power is furnished for lighting and industrial purposes to various cities throughout the state and also to the Chicago, Milwaukee & St. Paul Railway. The average twenty-four-hour power demand for the 440 miles of the Chicago, Milwaukee & St. Paul electrification is only in the order of 15,000 kw. with a maximum of about 28,000 kw.

DESIGN OF LOCOMOTIVES

A comparison of American electric locomotive development with European, and particularly Continental, shows a characteristic difference in the method of transmitting the power of the motor to the driving wheels. In America the success attained with the many heavy high-speed motor cars and the utilization of these cars in many cases for hauling trains, naturally led to the building of similar equipment for locomotive purposes only. This type of locomotive is the most economical design, but as the tractive effort is transmitted through the truck center pin, this type is commonly limited to a weight of about 60 tons. For heavier locomotives of this type, weighing from 60 to 100 tons, the two trucks are usually connected and the tractive effort transmitted directly through the trucks instead of through the locomotive frame.

The Continental designers, having had little experience with heavy motor-car equipment, were skeptical of gearing and the practice of mounting motors directly on the axle. Their efforts have been mainly directed toward substituting the electric motor for the steam locomotive cylinder, retaining all of the side rods and adding a few more. There is a difference, however, between driving side rods from a steam piston and from a motor-driven crank, which does not seem to have been fully appreciated. In a steam engine the maximum stresses and pin pressures, so far as the driving power is concerned, may be predetermined from the piston area and steam pressure. In an electric locomotive, however, having a motor-driven crank and side rods, the maximum stresses are influenced by variations in the wheel centers and the wear of bearings. The mechanical design must be strong enough to withstand the driving torque at 45 deg. angle from the center, and at as much less angle as may result from the variations. As an extreme illustration, with one side stripped and the other on dead center, the stresses would be in excess of any practicable design.

The Continental locomotives show many variations of the side-rod drive, both with the jack cranks direct driven by the motor through parallel rods or by means of gearing. Comparing only the most important trunk-line electrifications in Europe and America, we find that out of nine European railroads operating 210 locomotives, there are represented twenty-eight different types, while out of fourteen American railroads operating 364 locomotives only twenty-one types are represented. The cause for this difference is to be found in the historical development outlined herein and in the fact that the American development has largely been determined by commercial reasons.

The design of American locomotives for low speed freight and passenger service has been influenced largely by the heavy motor car with motors geared directly to the driving axle. A gearless motor which could develop as tractive effort a proportion of the weight on the axle comparable to the geared motor would furnish a still simpler design. Recent developments along this line indicate the possibility of such a gearless low-speed locomotive at a comparable price.

The design of electric locomotives for high-speed passenger service at 60 to 80 m.p.h. is a more complicated problem. A substantial saving through the elimination of turntables and incident delays being obtained by designing the locomotive double ended and capable of running equally well in both directions, this desirable requirement involves features of design differing from that of a steam locomotive built for operation in one direction only.

A feature in the design of a double-ended locomotive is to control the lateral oscillation and to minimize its effect on the track. This characteristic is more in evidence on tangent track where the flanges of the guiding wheels are free to move within the clearance, than on curves where the flanges of these wheels bear firmly against the outer rail. This characteristic also appears, though in a different form, in the single ended steam locomotive, as the front and rear ends are not both subjected to the reactionary influence of two guiding trucks. In any event the wheels at the front and rear ends must be relied upon to withstand the effect of these lateral oscillations.

In a double-ended locomotive with guiding trucks at each end, any lateral oscillation will deliver a thrust at the truck center plate both at the front and rear ends. The roll of the locomotive body has little tendency to transfer weight to the outside guiding wheels and, therefore, has but little effect in holding down the outer rail. The lateral movement of the locomotive, however, does increase the weight transferred to the outside guiding wheels in proportion to the height of the center plate above the rail head.

The problem presented is to design a double end locomotive with leading and trailing trucks which shall have sufficient guiding force for the front end and with such characteristics as to minimize the cause and effect of lateral oscillations.

To minimize the cause of lateral oscillations the front and rear trucks should be restrained so far as possible from any individual movement, other than that essential to proper guiding of the locomotive. Experience has demonstrated that a two-axle truck with an articulated connection accomplishes this desired result much more effectually than either a two-axle bogie or pony truck.

To minimize the effect of lateral oscillations the characteristics should be such that the truck will allow a time element during delivery of the thrust against the rail head and such that any lateral thrust at the center pin will produce a large vertical component at the outer guiding wheels. Raising the bearing point or center plate of guiding trucks to 60 in. or 70 in. above the rail head has shown by tests that these characteristics can be obtained in that manner. We wish to direct attention to the fact that a successful double-ended high-speed locomotive can only be obtained by a proper study of the front and rear trucks.

For high-speed passenger service with speeds of the order of 60 to 80 m.p.h. if a locomotive is equipped with geared motors the gear reduction approaches a small ratio, if the armature is to be kept within practical rotative speeds. This presents all the disadvantages of increased weight due to gears with their cost of maintenance without the compensating advantage of the increase in tractive effort usually gained by gear reduction. Consequently, it appears to us that for such speeds and for such service the gearless motor with the armature mounted directly on the axle presents the best solution. The bipolar gearless motors on the New York Central Railroad which have been in service for twelve years have shown very low maintenance.

COLLECTION OF CURRENT

The trolley pole and wheel which has so well served the electric railway is not well adapted for the heavy service we have been considering, nor is it a convenient device for movement in both directions. The pantograph collector which requires no attention on reverse movement has long been used, but it is only within the past few years that its capacity as a collecting device has been fully demonstrated. Rolling and sliding contacts have both been tried with results distinctly in favor of the slider. The wear of the working conductor or trolley wire is due far more to the destruction by arcs at the point of contact than from the mechanical friction, hence it is most important that the wire be so supported as to eliminate any rigid spots which are the usual cause of this arcing. The wire should be lifted slightly and really supported by the collector rather than that the collector should run underneath a wire held in rigid relation to its support. Lubrication of the collecting surface not only reduces the wear but seems slightly to improve the contact presumably because of less tendency to chatter than with bare metal. The amount of current that can be successfully collected seems limited only by the current capacity of the working conductor. Tests have shown no arcing at the contact with 3000 amp. at 30 m.p.h., and 2000 amp. has been collected with equal success at more than 60 m.p.h. A copper conductor with copper wearing strips on the collector has been found to give the best results. Measurements taken on the Milwaukee Railway indicate the working conductor will have a life of more than 100 years before it will have to be replaced because of wear.

REGENERATION

Regeneration as used in this connection implies the use of electric braking and the utilization of the energy in the train as electric power, which is fed back into the distributing system. The train on a down grade drives the motors as generators, which is comparable to the action of falling water in a hydroelectric power station. Regeneration is of especial advantage on the long grades encountered in mountain districts. Grades of 20 to 50 miles in continuous length are found on almost all the railway lines crossing the Continental Divide. It eliminates the surging in the train and the variations of speed which are encountered in holding the train by air brakes. In addition to this, the wear of brakeshoes is eliminated and the delays which are often due to overheated brakeshoes on long grades are also avoided. The electric braking takes place entirely at the front end of the train, taking up all slack, and permits the air reservoirs to remain fully charged in reserve for emergency.

The amount of power returned to the trolley by regeneration varies with the amount of the grade and the type of train. On specific tests it has been shown that a train on a 2 per cent grade has regenerated 42 per cent of the power required to pull the same train up the grade. On a 1.66 per cent grade 23 per cent has been regenerated. The records for a particular month over the entire Rocky Mountain Division of the C. M. & St. P. for both freight and passenger trains show that the regeneration was equivalent to 11.3 per cent of the total power used.

A Franchise Is a Binding Contract

Supreme Court Decides in Columbus Railway Case that Unprofitableness Is No Excuse for Non-Execution

A DECISION was rendered by the United States Supreme Court on April 14 in the case of the Columbus Railway, Power & Light Company, appellant, vs. the City of Columbus, et al. The case arose over the right of the company to surrender and cancel two franchises, one passed on Feb. 4, 1901, and the other on Jan. 1, 1901, each for twenty-five years. These franchises called for the sale of eight tickets for 25 cents with universal transfers. The company declared that owing to an increase in its operating expenses the gross earnings of its railway lines for the year ending June 30, 1919, will fall short by approximately $250,000 of paying expenses, depreciation and taxes, leaving nothing for fixed charges or any return to the company on the value of its property. Part of the increase in operating expenses, *i. e.*, $560,000, was because of an increase in wages ordered by the National War Labor Board. The company set forth the importance to the federal railroad and military authorities of the maintenance by it of good service as a public utility and that the existing rates of fare were inadequate and confiscatory and that it desired to charge 5 cents for a single ride and 1 cent for a transfer.

THE DECISION HOLDS THE CONTRACT BINDING

The court first considered jurisdiction and held that on account of federal questions involved it could act.

It then held that the franchise, after being accepted by the company, was a binding contract, citing in support Cleveland vs. Cleveland Railway Company, 194 U. S. 512. Continuing, the court said:

We can have no doubt that under the authority of the laws referred to and in view of the terms of the ordinances in question and the acceptances by the grantees the city of Columbus made valid and binding contracts with the companies, binding for the term of twenty-five years. By these contracts, obligatory alike upon the city and the company, the city granted the right to use the streets and the company bound itself to furnish the contemplated service at the rates of fare fixed in the ordinances. We cannot agree with the contention of the appellant that these were permissive franchises, granted and accepted with the right upon the part of the company to abandon the uses and purposes for which the franchises were granted because the rates fixed became unremunerative as alleged in the amended bill. The authority under which the city acted came from the State, and was granted by proper statutes passed for that purpose. The contracts were made between the city and the company, and became mutually binding for the period named in the ordinances. This case does not involve the remedies which may be invoked against a street railway company which is or may become insolvent because of conditions arising since it entered into a given contract. The company seeks now by its own action to terminate the contracts, still binding upon it by their terms as to rates of fare to be charged, and seeks to have the aid of a court of equity by enjoining the city from any further requirement of service under them.

There is no showing that the contracts have become impossible of performance. Nor is there any allegation establishing the fact that taking the whole term together the contracts will be necessarily unprofitable. This case is not like the Denver Water Works case, 246 U. S. 178, and the Detroit Street Railway Company case, 248 U. S. 429, in both of which the franchise to use the streets of the city had expired by limitation, and it was sought to require continued operation of a water-works system in the one case and in the other of a street railway system, under rates which would afford no adequate return to the companies. In this case the company seeks the aid of a court of equity to avoid contracts duly made and entered into while the same are yet in force.

We are unable to find in the allegations in this bill any statement of facts which absolves the company from the continued obligation of its contracts unless the facts to which we have referred bring the case, as is contended, within the doctrine of *vis major*, justifying the company in its attempt to surrender its franchise, and be absolved from further obligation.

NOT LIKE "KRONPRINZESSIN CECILIE" OR MILWAUKEE CASES

We come then to consider whether the amended bill shows the happening of an event or events which have released the company from the obligations of the contract, and authorized it to cancel the same upon the surrender of its franchise. Justification for that course is said to exist in the conditions following the World War and resulting therefrom, particularly, in the great increase in wages by the arbitral award of the National War Labor Board which was due to the necessity of meeting the high cost of living as a direct result of war conditions. This, it is contended, presents a situation that made the subsequent keeping of the contract practically impossible except at a ruinous loss to the company. It is insisted that the principle recognized by this court in *Kronprinzessin Cecilie*, 244 U. S. 13, when applied to this case shows the existence of conditions excusing the performance of the contract. In that case it was held that the master and owner of the German steamship *Kronprinzessin Cecilie* were justified in apprehending that she would be seized as a prize if she completed her voyage to Plymouth and Cherbourg on the eve of the war, and her return to this country was a reasonable and justifiable precaution in view of the situation; that there was no liability for the shipments of gold agreed to be carried in that case; that the contract, not making an exception in the event of war intervening before delivery of the cargo, the circumstances showing peril of belligerent capture afforded an implied exception to the carrier's undertaking.

Much reliance is had by the appellant on the language used by Mr. Justice Jackson speaking for this court in Chicago, Milwaukee & St. Paul Railway *vs.* Hoyt, 149 U. S. 1, 14, 15, wherein it was said: "There can be no question that a party may by an absolute contract bind himself or itself to perform things which subsequently become impossible, or pay damages for the nonperformance, and such construction is to be put upon an unqualified undertaking, where the event which causes the impossibility might have been anticipated and guarded against in the contract, or where the impossibility arises from the act or default of the promisor. But where the event is of such a character that it cannot be reasonably supposed to have been in the contemplation of the contracting parties when the contract was made, they will not be held bound by general words, which, though large enough to include, were not used with reference to the possibility of the particular contingency which afterward happens."

Particular reliance is had upon the last sentence of the paragraph just quoted. This language was used in interpreting a contract of doubtful import, as the context shows. Such interpretation was made in view of the situation of the parties at the time when the contract was made, and in view of the nature of the undertaking under consideration.

> It certainly was not intended to question the principle, frequently declared in decisions of this court, that if a party charge himself with an obligation possible to be performed, he must abide by it unless performance is rendered impossible by the act of God, the law, or the other party. Unforeseen difficulties will not excuse performance. Where the parties have made no provision for a dispensation, the terms of the contract must prevail. United States *vs.* Gleason, 175 U. S. 588, 602, and authorities cited; Carnegie Steel Company *vs.* United States, 240 U. S. 156, 164, 165. The latest utterance of this court upon the subject is found in Day *vs.* United States, 245 U. S. 154, in which it was said: "One who makes a contract can never be absolutely certain that he will be able to perform it when the time comes, and the very essence of it is that he takes the risk within the limits of his undertaking. The modern cases may have abated somewhat the absoluteness of the older ones in determining the scope of the undertaking by the literal meaning of the words alone. The *Kronprinzessin Cecilie*, 244 U. S. 12, 22. But when the scope of the undertaking is fixed, that is merely another way of saying that the contractor takes the risk of the obstacles to that extent."

After quoting from one or two other cases in support of its conclusions the court said:

> It is undoubtedly true that the breaking out of the World War was not contemplated, nor was the subsequent action of the National War Labor Board within the purview of the parties when the contract was made. That there might be a rise in the cost of labor, and that the contract might at some part of the period covered become unprofitable by reason of strikes or the necessity for higher wages might reasonably have been within their contemplation when the contract was made and provisions made accordingly. There is no showing in the bill that the war or the award of the War Labor Board necessarily prevented the performance of the contract. Indeed, as we have said, there is no showing, as in the nature of things there cannot be, that the performance of the contract, taking all the years of the term together, will prove unremunerative. We are unable to find here the intervention of that superior force which ends the obligation of a valid contract by preventing its performance. It may be, and taking the allegations of the bill to be true, it undoubtedly is, a case of a hard bargain. But equity does not relieve from hard bargains simply because they are such. It may be that the efficiency of the service and fairness in dealing with the company which performs such important and necessary service ought to require an advance in rates; such was the strongly announced opinion of the National War Labor Board. But these and kindred considerations address themselves to the duly constituted authorities having the control of the subject matter.
>
> We reach the conclusion that the District Court was right in holding that this bill presented no grounds absolving the company from its contract, and justifying the surrender of its franchise. It follows that the decree is affirmed.

American Welding Society Progressing

The American Bureau of Welding, to operate under the auspices of the American Welding Society, was organized on April 11 with C. A. Adams as director, H. M. Hobart and A. S. Kinsey as vice-directors, W. E. Symons as treasurer and H. C. Forbes as secretary. Regular meetings of the bureau are to be held on the third Friday of each month. The bureau voted to establish a research committee and appointed fifty-two men representing a wide variety of interests to the committee. The membership of the committee will be augmented from time to time as needed.

Among the members of the research committee are experts from manufacturing companies and governmental and other bureaus. Included are men from the Bureau of Standards, Lloyds' Register of Shipping, National Research Council, Electrical Testing Laboratory, Massachusetts Institute of Technology, Stevens Institute of Technology, United States Navy Yard, University of Illinois, Lehigh University, University of Vermont and American Bureau of Shipping.

Why Gasoline Can't Compete in City Service

Gasoline Cars Cannot Coast or Stand without Consuming Much Fuel, Thus Raising Average Unit Consumption to Extremely High Figures

BY F. KINGSLEY

THERE seems to be some questioning of my last week's reference to gasoline as a prohibitively costly fuel. Also, the fact (mentioned at the same time) that gasoline may cost seven times as much as electricity for surface car operation appears to be too strong a medicine for our persistent radicals to swallow—if we may term as radicals those who insist that electricity as a motive power belongs to a past era. In consequence, I wish to submit, in detail, the derivation of the figure referred to, together with the remark that, so long as the proponents of the gasoline engine kept it on rubber tires we were at a disadvantage because there were a lot of things about automobiles that we didn't understand. However, now that the gasoline engine has been suggested in all seriousness for rail traction it becomes possible to make direct and accurate comparisons of gasoline and electricity.

To do this we need to start only with the assumption of a pair of similar cars, one with gas drive and the other with electric motors which consume, say, 1 kw.-hr. per car mile. Details as to size and weight of car are unimportant, although it may be remarked that such an energy consumption would be expected from a typical one-man car of about the same size as the one with which Henry Ford is going to revolutionize our industry. Details regarding speed and stops per mile are also unimportant except in so far as they affect the duration of what electric railway operators generally call length of unit run.

Here it becomes necessary to descend to first principles by pointing out that a street car, contrary to common impression, does not progress from one end of the line to the other at a constant and leisurely rate. Instead, its progress is made up of a series of relatively short jumps, or unit runs, which are made between stops. These runs may have a length of only one block or may be extended to eight or ten blocks, depending upon the wishes of riders to alight or pedestrians to ride. In general, however, experience has shown that for city operation the average run has a length of the order of 600 ft., and a duration of, say, forty-five seconds. Each of these runs is made up of a cycle of operations that is invariable in its order. First, there is a rapid acceleration (in modern cars sometimes reaching 2.5 m.p.hp.s.); then the power is shut off and the car "coasts," gradually losing speed as it runs under momentum; then when the next stopping point is almost reached the brakes are applied hard so as to bring the car to a halt as quickly as possible after the brakes go on; finally there is a stop of several seconds while passengers get on and off. Then the whole cycle is repeated, with only such changes as are necessitated by changing distances between stops and interferences by vehicles or unfortunate pedestrians.

POWER REQUIRED FOR ONLY 22 PER CENT OF TIME

Without going into too exhaustive details, it may be said that the rule of rapid acceleration has been demonstrated beyond any shadow of doubt. If acceleration is slow the car doesn't gain a high running speed before it is time to apply brakes for the next stop, and if the running speed is low the average speed, or schedule speed, is also low, and slow schedules mean high costs and accelerated receiverships. Also, paradoxical as it may be, rapid acceleration is economical of power. In brief, rapid acceleration is an essential of surface car operation. To obtain it, 50 hp. of motors have been placed on recent 7-ton cars. And these motors frequently may be called upon for 75 hp. under unfavorable starting conditions, since overload capacity is a recognized characteristic of electric motors, if not of the gas engine.

As a result of this requirement it is invariably the case that a modern surface car demands a large amount of power during a short period of acceleration and then demands no power at all during the other operations within each cycle or unit run. The duration of the period of acceleration may be said to be ordinarily not far from ten seconds with reasonably modern equipment. The duration of the remainder of the average cycle would thus be thirty-five seconds. City railway motors, then run in cycles roughly approximating full load for 22 per cent of the time and no load for 78 per cent of the time. This condition applies whether the motive power is electricity or gasoline. And also it is the condition which prevents the modern internal combustion engine, marvelous as it is, from ever displacing electricity for general city car operation, because the gas engine cannot run idle without using fuel.

To elaborate, the modern gas engine is a four-cycle machine. The pistons get an impulse only once in four strokes. Naturally the mechanical efficiency is not high, being of the order of 75 per cent. Consequently, when the engine runs at "no load," something like one-fourth as much energy is required to keep the engine turning over at speed as is required to pull the full load. In addition, the thermal efficiency at light loads is low and the unit fuel consumption is roughly doubled. An authority states that in explosion engines the total no-load consumption ranges from 30 per cent to 45 per cent of the total consumption at normal load. Making allowance for the various factors such as reduced turnover speed, irregular operation, careless handling and sloppy maintenance which may be expected in street car service, it is at least safe to take the lower of the above figures for the fuel consumption during the 78 per cent idle time.

ELECTRICITY, 1.5 CENTS; GASOLINE, 10.5 CENTS

Unit fuel consumption for an automobile engine under full load test seems to range from 0.8 lb. to 1.2 lb. of gasoline per brake-horsepower per hour, so that 1 lb. per horsepower-hour may be adopted as an average during the acceleration period of the hypothetical gasoline-driven street car in question. During the idle time the rate of consumption would then be 30 per cent of 1 lb., or 0.3 lb. for each horsepower developed at full load, but since the idle time is 3.5 times as long as the power-on period the total consumption while idling would be 1.05 lb. of gasoline for each horsepower-hour developed during the power-on period.

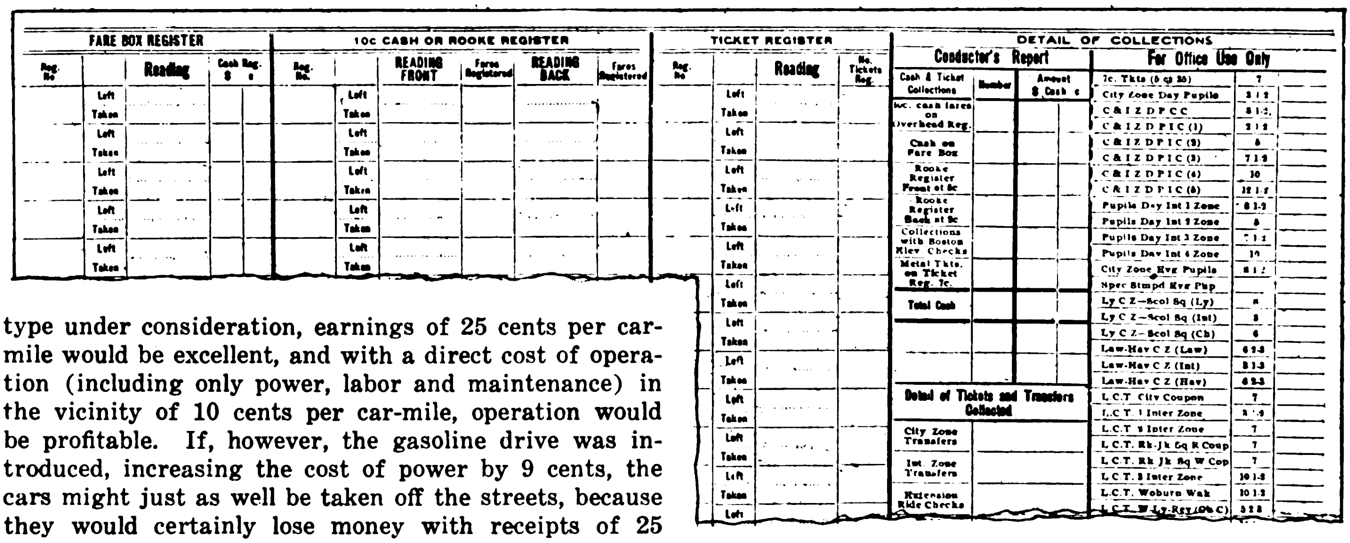
Losses from motor to wheels may be assumed to be the same for both electric and gasoline motors, as this gives the latter a little the best of it, and in consequence the power actually delivered is measured by the input to the electric motor on the one hand and by the fuel supply to the gas engine on the other. If the cars on which the two are mounted are similar, energy demands will be equal and costs directly comparable.

For the electric car the input has already been assumed at 1 kw.-hr. per car-mile, which, at thirty-five per cent load factor, could be purchased from any power company for about 0.9 cent, and, including an allowance of 0.6 cent for conversion, the total cost at the car would be 1.5 cent. For an exactly similar gasoline-driven car the energy consumption will also be 1 kw.-hr. per car-mile, or 1.34 hp.-hr. per car-mile. This, multiplied by the previously determined unit fuel consumption of 2.05 lb. per horsepower-hour, produces a car-mile consumption of 2.75 lb. Incidentally, this is the equivalent of 2.1 miles per gallon of gasoline. If the price of gas is taken at the not-unreasonable figure of 22 cents per gallon, the cost per pound of gas would be 3.8 cents. Finally, 2.75 lb. of gas per car-mile at 3.8 cents per pound makes a total cost of 10.5 cents per car-mile for the fuel for the gas-driven car. This is seven times the cost of 1.5 cents for moving the electrically driven car.

A word may be advisable in regard to the editorial on the subject appearing in the last issue of this paper. In this the cost of gasoline fuel "under the most favorable conditions" was cited as being 4 cents per car-mile for a 7-ton car (evidently not a 70-ton car as the linotyper made it). Such a figure could be obtained on the assumption of a 16-cent fuel, which we might get, although it doesn't exist yet for automobiles; a forty-second power-on period in a 100-second run, which would correspond to an extremely easy service involving something like three stops per mile; a 20 per cent no-load fuel consumption; and a full-load fuel consumption of 0.8 lb. per horsepower-hour, which figure can be reached by gasoline engines, at least on the test floor. Every one of these conditions is absolutely the most favorable one for the gasoline drive that could be considered as at all reasonable. That all, or in fact that any of such favorable conditions may be expected in commercial operation is highly improbable. In other words, the figures in the editorial gave the electric car the benefit of all doubt.

A word also may be desirable to explain why the above high figures for fuel consumption are not commonly believed to exist in automobile operation. The reason lies in the fact that practically all published statistics for buses hertofore have applied only to conditions involving a negligible frequency of stops and a slow acceleration. Yet the imposition of frequent stops with fast schedules, and the attendant irregular operation of the engine, not only increase the unit fuel consumption of the gasoline motor but also greatly increase the energy input required for the vehicle. Thus, statistics on actual fuel consumption of motor buses published in the ELECTRIC RAILWAY JOURNAL four years ago showed that a number of 4-ton buses generally in suburban operation made 4.5 miles per gallon of gasoline. This would be the equivalent of 2.3 miles per gallon for a 7-ton vehicle such as we have been considering, or say 3 miles per gallon if allowance of 30 per cent is made for the saving in rolling resistance if the vehicle is placed on rails. This compares with the 2.1 miles previously derived for severe city conditions and with the 4 miles derived for most favorable conditions.

In conclusion, it is important that recognition be given to the effect of an increase in cost of power such as that above outlined. For a small car, like the general



FARE BOX REGISTER				10c CASH OR ROOKE REGISTER					
Reg. No		Reading	Cash Reg. $ c	Reg. No.		READING FRONT	Fares Registered	READING BACK	Fares Registered
	Left				Left				
	Taken				Taken				
	Left				Left				
	Taken				Taken				
	Left				Left				
	Taken				Taken				
	Left				Left				
	Taken				Taken				
	Left				Left				
	Taken				Taken				

TICKET REGISTER			
Reg. No		Reading	No. Tickets Reg.
	Left		
	Taken		
	Left		
	Taken		
	Left		
	Taken		
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DETAIL OF COLLECTIONS

Conductor's Report

Cash & Ticket Collections	Number	Amount $ Cash c
10c. cash fares on Overhead Reg.		
Cash on Fare Box		
Rooke Register Front at 5c		
Rooke Register Back at 5c		
Collections with Boston Elev. Checks		
Metal Tkts. on Ticket Reg. 7c.		
Total Cash		

Detail of Tickets and Transfers Collected

City Zone Transfers	
Int. Zone Transfers	
Extension Ride Checks	

For Office Use Only

7c. Tkts (5 @ 35)	7	
City Zone Day Pupils	3 1-2	
C & I Z D P C C	3 1-2	
C & I Z D P I C (1)	3 1-2	
C & I Z D P I C (2)	5	
C & I Z D P I C (3)	7 1-2	
C & I Z D P I C (4)	10	
C & I Z D P I C (5)	12 1-2	
Pupils Day Int 1 Zone	8 1-2	
Pupils Day Int 2 Zone	5	
Pupils Day Int 3 Zone	7 1-2	
Pupils Day Int 4 Zone	10	
City Zone Eve Pupils	3 1-2	
Spec Stmpd Eve Pup		
Ly C Z—Scol Sq (Ly)	8	
Ly C Z—Scol Sq (Int)	3	
Ly C Z—Scol Sq (Ch)	6	
Law-Hav C Z (Law)	6 2-3	
Law-Hav C Z (Int)	3 1-3	
Law-Hav C Z (Hav)	6 2-3	
L.C.T City Coupon	7	
L.C.T. 1 Inter Zone	3 1-3	
L.C.T 2 Inter Zone	7	
L.C.T. Rk-Jk Sq R Coup	7	
L.C.T. Rk Jk Sq W Cop	7	
L.C.T. 3 Inter Zone	10 1-2	
L.C.T. Woburn Wak	10 1-2	
L.C.T. W Ly-Rey (Ob C)	5 2 3	

BACK OF DAY CARD USED ON THE BAY STATE SYSTEM

type under consideration, earnings of 25 cents per car-mile would be excellent, and with a direct cost of operation (including only power, labor and maintenance) in the vicinity of 10 cents per car-mile, operation would be profitable. If, however, the gasoline drive was introduced, increasing the cost of power by 9 cents, the cars might just as well be taken off the streets, because they would certainly lose money with receipts of 25 cents and a direct operating expense of 19 cents per car mile. If there are certain peculiar attractions and advantages of the gas-driven car sufficient to increase receipts in proportion to any such increased cost of operation, they have not yet been put forward, and no one with common sense believes that they exist. Consequently the electric railway industry can do no better than to dismiss the whole gas-drive insanity from mind —unless, perhaps, the old plan of the motor-bus line promoters should be revived, and the fuel consumption of small gas cars on easy runs be compared with those of large electric cars operating on a severe schedule. In this case an analysis of the conditions should promptly provide the comparison with a place in the waste basket. As for the question of extremely light cars, which naturally would be favored by the supporters of an extremely costly fuel, this is something solely for the car designer. It is up to him to say whether the use of an extremely light car body that will rack itself to pieces in three or four years will pay for itself by its savings in energy during that period. But in any case the form of this energy must be electricity, because that is by far the cheapest form for city service that is now known.

Designs have been prepared for passenger cars to be operated in Saxony and Prussia with Diesel engines as the prime movers and electric drive for the axles. The engines are placed in the middle with passenger bodies at the ends, the total weight of the car, unloaded, being 64 tons.

Ten-Cent Fares and 7-Cent Tickets

How They Are Being Collected and Registered on the City and Interurban Lines of the Bay State Street Railway

THE Bay State Street Railway is rapidly introducing metal tickets in place of paper tickets and changing its system of collection in accordance with this plan. Its new fare schedule, which was described on page 161 of the issue of this paper for Jan. 18, is briefly as follows:

City fares

The cash fare is 10 cents.

Five tickets are sold for 35 cents.

Interurban fares

The cash fare for one or two zones is 10 cents and for each additional zone is 5 cents.

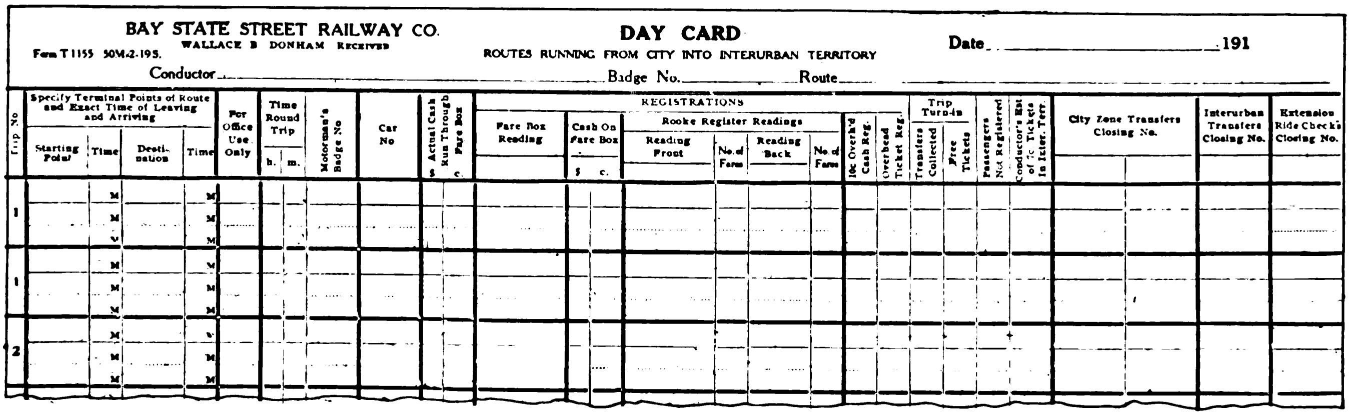
A 7-cent ticket is accepted for a ride within one zone.

Fare for combined city and interurban ride

A passenger traveling from the city zone into one interurban zone, or vice versa, pays 15 cents cash or a 7-cent ticket and 5 cents in cash. Succeeding interurban zones are at the rate of 5 cents each.

Limited commutation and school tickets

The company has abolished its former workmen's tickets, which were sold at reduced rates, but sells limited commutation tickets good for twenty rides. These tickets have separate coupons for the city and interurban rides, are non-transferable and can be used only during the hours at which wage-earners usually go to and from their work. These tickets and the school tickets which are sold at reduced rates are the only paper tickets issued by the company.



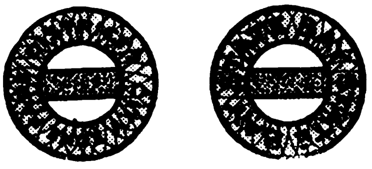
BAY STATE STREET RAILWAY CO.
WALLACE B DONHAM RECEIVER
Form T 1155 50M-2-19S.
DAY CARD
ROUTES RUNNING FROM CITY INTO INTERURBAN TERRITORY
Date ______ 191
Conductor ______ Badge No. ______ Route ______

Trip No	Specify Terminal Points of Route and Exact Time of Leaving and Arriving: Starting Point	Time	Destination	Time	For Office Use Only	Time Round Trip h.	m.	Motorman's Badge No	Car No	Actual Cash Run Through Fare Box $	c.	Registrations: Fare Box Reading	Cash On Fare Box $	c.	Rooke Register Readings: Reading Front	No. of Fares	Reading Back	No. of Fares	10c Overh'd Cash Reg.	Overhead Ticket Reg.	Trip Turn-in: Transfers Collected	Free Tickets	Passengers Not Registered	Conductor's Est of 7c Tickets in Inter. Terr.	City Zone Transfers Closing No.		Interurban Transfers Closing No.	Extension Ride Checks Closing No.
		M		M																								
1		M		M																								
		M		M																								
		M		M																								
1		M		M																								
		M		M																								
		M		M																								
2		M		M																								
		M		M																								

FRONT OF DAY CARD USED WITH THE NEW SYSTEM OF FARES ON THE BAY STATE SYSTEM. THE BACK IS SHOWN ABOVE

The method of collecting these fares is as follows:

Within the city the conductor may receive a 10-cent cash fare, a 7-cent metal ticket, a paper commutation or school ticket, or a transfer. The cash and metal tickets are collected by a Johnson registering fare box which registers coins of 1 cent, 5 cents and 10 cents and the 7-cent metal tickets, which are slightly smaller in diameter than a dime. The paper tickets are registered on an overhead register. The transfers are collected by hand and are not registered, and are placed in a trip turn-in envelope and deposited in a locked box in the car. This has to be done every half trip. On the interurban sections, all collections except those of paper tickets are made with a Rooke register which has been designed to take 5-cent pieces and 7-cent tickets. The fare box is also used on the interurban lines to collect nickel fares of passengers boarding the car. The paper tickets are registered on the overhead register.



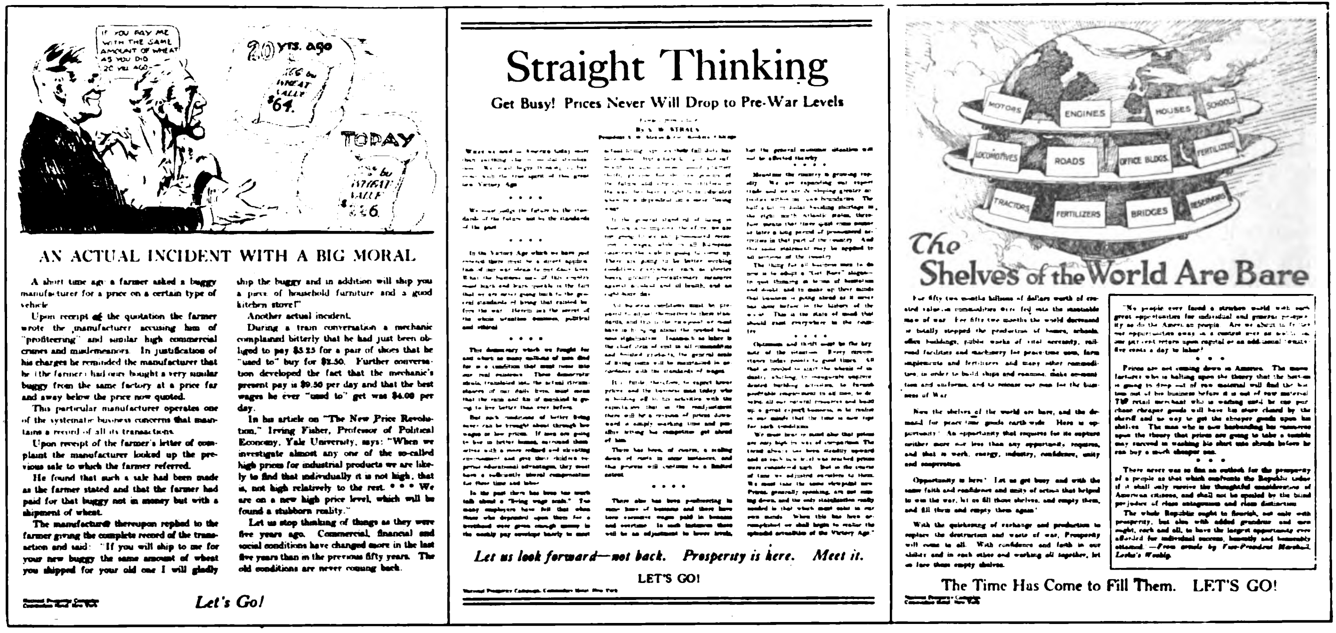
METAL FARE TOKENS USED BY BAY STATE STREET RAILWAY

The interurban cash fares of through passengers are collected, 10 cents at a time, this amount being inserted in the Rooke register as two 5-cent pieces. As this sum entitles a passenger to ride through two zones, each passenger paying this sum receives a hat check which he holds until the fare is collected for the zone in which he desires to alight. A passenger who boards the car in the last half of a 10-cent collection zone receives a hat check of a different color to show he is entitled to ride half way through the next 10-cent collection zone. Conductors check up their car every zone, and passengers not holding proper checks are required to pay regular fares.

The interurban zones average 2 miles in length, making the fare about 2½ cents a mile. There are no overlaps. The headings used on the front and back of the standard day card are shown in the blank. A reproduction of the metal ticket is also shown.

Publicity on Permanency of Prices

Three typical posters, issued by the National Prosperity Campaign, to direct public thought to the fundamental reasons for the present high prices, are published herewith. A notice of the organization of the committee in charge of this campaign was published in the issue of this paper for April 5. P. H. Gadsden, vice-president United Gas Improvement Company, is chairman, and the other members include many men prominent in business circles. Temporary headquarters have been taken at the Commodore Hotel, New York. The purpose of the campaign is to make more generally clear the changes which have occurred in conditions, commercially, economically and socially, since the war began, and the impossibility of any general return to pre-war prices. In this way, it is believed, business will be encouraged to go ahead, provided there is reasonable certainty that present prices are here to stay, at least so far as general price levels are concerned. Other publications contain excerpts from recent addresses by authorities on the subject of prices and finance.


IF YOU PAY ME WITH THE SAME AMOUNT OF WHEAT AS YOU DID 20 YRS. AGO
20 YRS. AGO
$64.
TODAY
$ 6
MOTORS
ENGINES
HOUSES
SCHOOLS
LOCOMOTIVES
ROADS
OFFICE BLDGS.
TRACTORS
FERTILIZERS
BRIDGES
RESERVOIRS

AN ACTUAL INCIDENT WITH A BIG MORAL

A short time ago a farmer asked a buggy manufacturer for a price on a certain type of vehicle.

Upon receipt of the quotation the farmer wrote the manufacturer accusing him of "profiteering" and similar high commercial crimes and misdemeanors. In justification of his charges he reminded the manufacturer that he (the farmer) had once bought a very similar buggy from the same factory at a price far and away below the price now quoted.

This particular manufacturer operates one of the systematic business concerns that maintains a record of all its transactions.

Upon receipt of the farmer's letter of complaint the manufacturer looked up the previous sale to which the farmer referred.

He found that such a sale had been made as the farmer stated and that the farmer had paid for that buggy not in money but with a shipment of wheat.

The manufacturer thereupon replied to the farmer giving the complete record of the transaction and said: "If you will ship to me for your new buggy the same amount of wheat you shipped for your old one I will gladly ship the buggy and in addition will ship you a piece of household furniture and a good kitchen stove!"

Another actual incident.

During a train conversation a mechanic complained bitterly that he had just been obliged to pay $5.25 for a pair of shoes that he "used to" buy for $2.50. Further conversation developed the fact that the mechanic's present pay is $9.50 per day and that the best wages he ever "used to" get was $4.00 per day.

In his article on "The New Price Revolution," Irving Fisher, Professor of Political Economy, Yale University, says: "When we investigate almost any one of the so-called high prices for industrial products we are likely to find that individually it is not high, that is, not high relatively to the rest. * * * We are on a new high price level, which will be found a stubborn reality."

Let us stop thinking of things as they were five years ago. Commercial, financial and social conditions have changed more in the last five years than in the previous fifty years. The old conditions are never coming back.

Let's Go!

Straight Thinking

Get Busy! Prices Never Will Drop to Pre-War Levels

By S. W. STRAUS

Let us look forward—not back. Prosperity is here. Meet it.

LET'S GO!

The Shelves of the World Are Bare

The Time Has Come to Fill Them. LET'S GO!

THESE POSTERS EMPHASIZE THE PERMANENCY OF PRESENT PRICE LEVELS

The campaign has a special interest to electric railways because a frequent argument made against fare increases is that the present economic condition is temporary only and that in a short time the old fares will again be adequate. This theory has no firm basis to support it and the publications of the committee for this reason may be of especial help to electric railways.

The city of Birmingham, England, is considering the erection of a power plant to care for future needs but is troubled by the difficulty of securing condensing water. The River Severn, 20 miles away, would only be capable of condensing steam from a 100,000-kw. station without cooling towers. An alternative is to erect the station nearer the city, with cooling towers, and to use either the drainage water from the Staffordshire mines or the sewage effluent at Minworth as cooling water. The conclusion has been reached to use the sewage effluent, which will be sufficient for a station of 900,000 kw.

Proper Storage Facilities Aid Salvage of Scrap Metal

The Illinois Traction System Stores and Segregates Its Scrap Metals at a Central Point for Proper Distribution

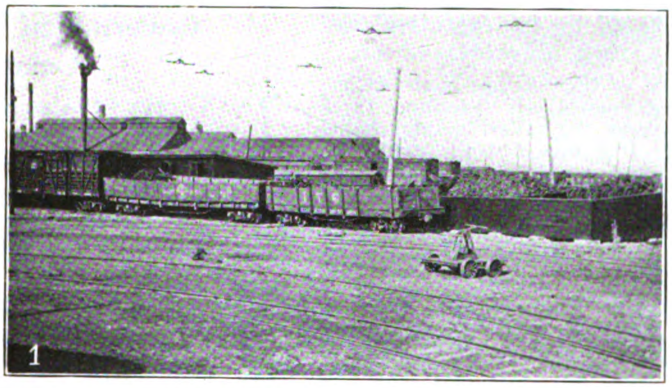
THE Illinois Traction System in the yards adjacent to the Decatur shops has recently erected storage facilities for all kinds of scrap metal. A 600-mile interurban system such as this necessarily accumulates a great deal of scrap metal, and rather than have this lying around scattered over various parts of the system it is now all brought to this central point and sorted. Any parts that are good for further use are reclaimed and the remainder is sold in carload lots for junk.

The facilities for handling this scrap material are shown in the accompanying photographs and consist primarily of a building 61 ft. long and 20 ft. wide with an adjoining platform the same width and 120 ft. long. This whole structure is built adjacent to a curved section of switch track.

One end of the building is devoted to the storage of coke, capacity being available for two 80,000-lb. capacity carloads. The coke is shoveled into the building through the four small doors shown in illustration No. 2, and is taken out through a door at the end of the building. Adjoining the coke room and inside the same building are three other storage bins, one each for steel shavings, foundry ashes and core sand. These materials are dumped into the bins from wheelbarrows through openings at the back as shown in the third view. As the floor of each of these three bins and of the platform beside the building is about level with a car floor, a very gradual incline about 40 in. wide is provided at the back of the building, and up this the barrows are pushed to a horizontal platform about 2 ft. above the bin floors.

The platform adjoining the building is divided by low partitions into five sections in which are stored respectively general scrap iron, all classes of scrap spring material, iron piping, old brakeshoes and broken or worn-out gears and pinions. These materials can be loaded into and unloaded from cars at the front and wheelbarrows at the rear. Holes have been bored in the plank flooring to drain off rain and snow, and a drain below the platform carries this off to the rear of the building. The platform is erected on concrete pier foundations and both the building and platform are side sheathed with matched lumber, the roof of the building being covered with a composition roofing paper.

VIEWS OF THE FACILITIES PROVIDED BY THE ILLINOIS TRACTION SYSTEM FOR THE STORAGE AND SALVAGE OF SCRAP METAL.



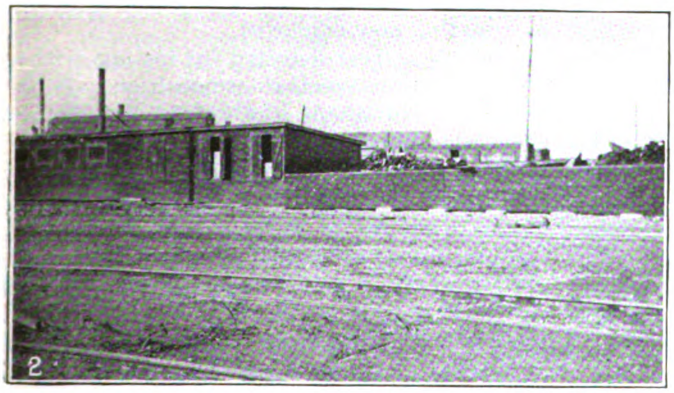
No. 1—Loading scrap materials into coal cars.

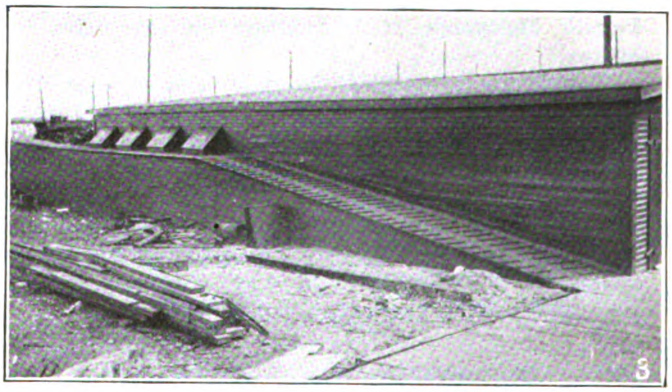
No. 2—Front of storage building and platform.

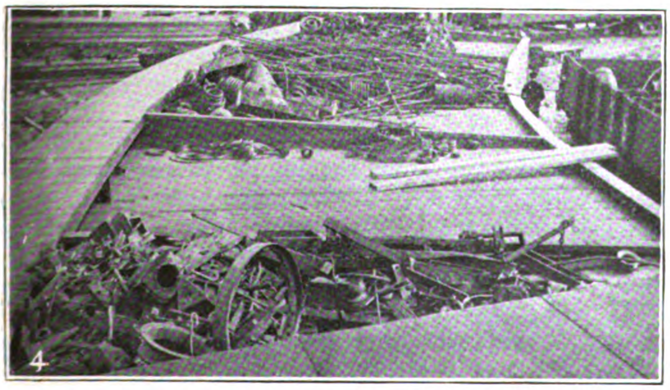
No. 3—Rear of building, showing incline by which the platform is reached with wheelbarrows.

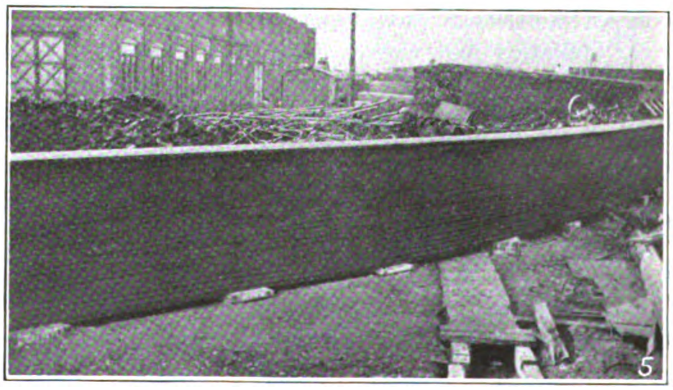
No. 4—Platform on which scrap metals are segregated and stored.

No. 5—Rear of storage platform, showing concrete piers and side sheathing.









AMERICAN ASSOCIATION NEWS

Representation at Chamber of Commerce Meeting

PRESIDENT PARDEE has appointed a committee of six delegates to represent the American Electric Railway Association at the meeting of the United States Chamber of Commerce next week in St. Louis and to act with Philip H. Gadsden, National Councillor. The members of the delegation are Walter A. Draper, Cincinnati, Ohio; Britton I. Budd, Chicago, Ill. Richard McCulloch, St. Louis, Mo.; Philip J. Kealy, Kansas City, Mo.; Horace Lowry, Minneapolis, Minn.; Edwin C. Faber, Chicago, Ill.; alternates, Thomas Finigan, Chicago, Ill.; Edward B. Meissner, St. Louis, Mo.; Henry W. Blake, New York. The alternate national councillor is H. H. Crowell, Grand Rapids, Mich.

Collection and Registration of Fares

THE Transportation & Traffic Association committee on collection and registration of fares met in New York on April 24 and "blocked out" its report to be presented at the fall convention. This report will cover the following points as selected by the executive committee (See E. R. J., Feb. 1, 1919, page 244):

> The subject selected for one of the sessions is the collection and registration of fares, particularly fractional fares or fares whose payment involves the collection and registration of two or more coins. It is hoped by the committee that this session will be made a joint session with the Accountants' Association, so that the topic may be considered from both the transportation and accounting standpoints. The committee will be instructed to consider the subject both as regards a uniform and a zone system of fares.

The meeting was attended by W. J. Harvie, Auburn, N. Y., chairman (appointed to take the place of R. R. Anderson, who was unable to serve); L. D. Pellissier, Holyoke, Mass.; C. W. Stocks, Boston, Mass., and L. H. Palmer, Baltimore, Md. (sponsor from executive committee).

The committee outlined the field to be covered, dividing it into two sections, one relating to the flat fare and the other to the fare based upon distance traveled. The former was the only one studied in detail at the meeting. In it were included the collection and registration of single coins, multiple coins, metal tickets and paper tickets by all practicable means. The committee aims ultimately to recommend the most approved plans for these purposes in general and special cases.

Illumination Meeting at Manila

FAUSTINO J. MASCARDO, chief clerk of the installation and meters department, Manila Electric Railroad & Light Company, was the speaker at the forty-ninth monthly meeting of the local company section held in Manila on March 4. The speaker outlined the general principles to be applied in indoor and outdoor illumination, traced the history of the art, and showed how electrical illumination is superior to others in many ways. A replica of the first electric lamp made by Mr. Edison, furnished by the General Electric Company, was exhibited.

The attendance at the meeting was unusually good, 250 persons being present, and President Van Hoven announced that a large hall would be secured for an early meeting at which a frolic would be the feature. The March 4 meeting was enlivened with music and humorous dialogs. At future meetings there will be a motion picture show, a pillow fight, a tug-of-war and a few boxing bouts. Mr. Van Hoven outlined a very attractive program for the coming month.

W. R. Holton Explains Employment Work at Chicago Meeting

W. R. HOLTON was the principal speaker at the April 15 meeting of the Chicago Elevated Railways company section, his topic being "The History and Functions of the Employment Department." The talk was illustrated by means of lantern slides. The attendance at the meeting was about eighty persons.

The report of the secretary showed a total membership of 191, sixteen having joined during the current year. There was also an enthusiastic talk on the wisdom and duty of subscribing to the Victory bond issue. Among entertainment features were some humorous recitations and songs and an exhibition of athletic work.

Government Report on Tests for Color Blindness

THE United States Public Health Service announces that color blindness of a degree dangerous in occupations requiring recognition of colored signal lights occurs in 3.1 per cent of the men and 0.7 per cent of the women in every-day life among healthy individuals in Amercia. It has also reached the conclusion that certain commonly used tests for detection are faulty. With a view of remedying this, a bulletin has just been published for distribution among railroads and steamship lines, setting forth the results of the investigations and recommending several important changes in methods of examination now employed.

Color blindness is best detected by testing with colored lights of known spectral composition. It is of great importance to divide the color blind into the dangerously color blind and the harmlessly color blind. This may be done satisfactorily and expeditiously with the Edridge-Green lantern after an understanding is gained of the principles of the test employed.

The Jennings test is criticised, although it is acknowledged to possess certain practical features which render it superior to other tests in certain lines of examination where great accuracy and classification of color defects are not essential. It should not be used for testing sailors or trainmen. Among refractive conditions of the eye, color blindness occurs least frequently in eyes apparently without demonstrable refractive error; it occurs most frequently in eyes showing mixed astigmatism.

Briefly, the report recommends that the following classes of color blind should not be permitted to be sailors or trainmen: (1) Those possessing a color perception containing three or less units; (2) those possessing a greater number of units than three who have the red end of the spectrum so shortened as to prevent the recognition of red light at a distance of 2 miles; and (3) those with a central scotoma for red and green.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Insist Upon Wage Payments

Providence Men Threaten to Go Out on Strike Unless Back Pay Is Forthcoming

After Presiding Justice Tanner in the Rhode Island Superior Court had decided during the week ended April 19 that State, town and city taxes had priority over the payment by the receivers of the back pay due the employees of the Rhode Island Company, Providence, under an award of the War Labor Board last October, so many complications arose that the justice reversed his decision in Court on April 23 and ordered the receivers to make payment.

Men Threaten to Strike

The original decision was not regarded as final, as May 1 was set as the date for a further hearing on the subject. As a result of the original decision, however, the street railway men's union decided to vote on the advisability of calling a strike in case the payment of the back wages was refused. At this referendum, taken on April 19, the men decided to empower the officers of the union to call a strike whenever it was deemed expedient.

In the meantime, the officers of the union urged the Governor to have the State waive its priority in payment of franchise taxes due. A similar request was made to Mayor Gainer of Providence. Other cities and towns in the State were also asked to waive their rights. Governor Beeckman placed the matter before the Legislature and a bill was passed waiving the State's rights. Similarly, the Aldermen of Providence went on record in like fashion.

The union officers then interjected another complication by insisting that the State and municipalities waive their rights to payments not only of franchise taxes but also to the payment of all real estate and personal property taxes.

Matter Referred to Court

Attorney General Rice and City Solicitor Chase of Providence expressed opinions that such action could be legally taken and they so advised Governor Beeckman, who had called a meeting of the representatives of all the towns and cities of the State for April 21. This opinion presented an unexpected phase to the dilemma, and the State and municipal authorities adjourned without taking any definite action, believing that the Court alone could solve the problem.

Although May 1 was the date set for a further hearing on the subject, in view of the circumstances which arose, Presiding Justice Tanner advanced the date to April 23. Clifford Whipple, attorney for the receivers; John J. Fitzgerald, attorney for the union; Elmer S. Chase, City Solicitor of Providence; Herbert A. Rice, Attorney General of Rhode Island; Eugene A. Kingman, of Edwards & Angell, representing the Pawtucket Street Railway, the Rhode Island Suburban Railway and the other companies whose lines were leased to the Rhode Island Company, and Richard B. Comstock, counsel for certain committees of bondholders, were all heard in behalf of the interests which they represent.

Presiding Justice Tanner then said that the taxes due the State were legally a paramount claim, yet the Court had an equitable power to preserve the property of the railway system as a going concern. He said that he believed it to be for the interests of all parties for the court to exercise that power to the extent of granting the petition of the receivers to pay the claims of back wages.

The total amount due the carmen approximates $144,000. The receivers will probably make payment by May 1.

Building Loans for Employees

In order to assist its office employees to build or acquire homes during the present scarcity, George Kidd, general manager of the British Columbia Electric Railway, Vancouver, B. C., has placed $50,000 at the disposal of the British Columbia Electric Office Employees' Association to be loaned at 6 per cent over a term of twelve years.

The scheme is believed to be one of the first of its kind to be launched in British Columbia, if not in the whole of Canada, and it is already being gladly accepted by the company's employees. In explanation Mr. Kidd said:

> My reason for making the proposal was to relieve, as far as possible, our employees from the pressure of high rents, give them homes of their own and thereby induce thrift and interest in their community. Many of them have been inconvenienced as are others, by having the homes they rent sold over their heads. Many others feel that paying out rent year after year without a permanent interest in their home is not desirable.
>
> Some of our employees already had lots, but had not the wherewithal to build on them unless at high rates of interest, when the monthly charge for principal and interest would be much heavier than rent. It was these that we hoped to help, and in view of the need for more houses we expect that it will induce some of our employees to build.

The disposal of the fund has been placed in the hands of a joint committee composed of representatives of the office employees' association and the management of the company and the committee has allotted the $50,000. The employees have named their committee through the association executive.

Highways Transport Plans

Eleven Regional Directors of New Committee Represent Business Interests Primarily

Grosvenor B. Clarkson, Director of the United States Council of National Defense, has announced a reorganization of the Highways Transport Committee to include direct representation from the office of public roads and rural engineering of the Department of Agriculture; the Bureau of Markets of the same department; the Post Office Department, and the Department of Commerce. With this reorganization it is said that close co-operation with the executive departments most vitally interested in matters of highways transportation will be brought about in such a way that the committee will be a clearing house of action for all federal interest concerned.

The committee as reorganized is as follows: John S. Cravens, of the Council of National Defense, chairman; James I. Blakslee, fourth assistant postmaster general; J. M. Goodell, consulting engineer, office of public roads and rural engineering; James H. Collins, investigator in market survey, bureau of markets; R. S. MacElwee, second assistant chief, bureau foreign and domestic commerce; Charles W. Reid, executive secretary; G. B. Clarkson, director of council, ex-officio.

The committee will be assisted by the Highways Transport Committee Advisory Board consisting of William Phelps Eno, Washington, D. C.; Prof. Arthur H. Blanchard, New York; C. A. Musselman, Philadelphia; Raymond Beck, Akron; J. T. Stockton, Chicago.

It is said that the council in addressing itself particularly to the problems growing out of the entrance of the motor truck into the commercial transportation field, will seek to determine just how the motor truck can best be fitted into the nation's existing transportation agencies. Also that it is the policy of the council through its committee to co-operate with all transportation agencies with the view of determining how transportation needs can be served most efficiently, speedily and economically, and to aid in the promotion of motor express lines through territory now served inadequately by the transportation agencies.

The council will, Director Clarkson states, co-operate with the United States Railroad Administration in the study of the short-haul problem, and will also give specialized attention to the relation of the rural motor express to interurban electric railways and waterways traffic, in the interest of all elements concerned.

Disappointing Legislative Session in New York

Principal Electric Railway Relief Measure Fails—Work of Legislature Not Satisfactory

The Legislature of New York has ended with a record of very little accomplished and much condemnation from all sides of that little. Nobody seems satisfied, the Democratic Governor least of all. On the one hand the Progressives express disappointment at the results and on the other hand, the Republicans, who were in control, profess not to be pleased. The Governor, aided by a few Republicans that he won over, made a bold fight for his program of social welfare measures, but he was outmaneuvered by the opposition, and won out on only one minor bill.

FARE BILL FAILS

There were several measures of much interest to the electric railways on the program, but the outstanding ones were the Carson-Martin fare bill and the plan for changes in Public Service Commission control. The Carson-Martin bill, the purpose of which was set forth in the report of the hearing on the measure in the ELECTRIC RAILWAY JOURNAL for March 15, page 542, passed the House, but failed in the Senate. Thus the prospect of relief for the electric railways by action by the Public Service Commissions with respect to increases in fares is precluded. There was much sentiment in favor of the bill, but at almost the closing hours came the charges by Senator Thompson, chairman of the public service committee of the Senate, about a so-called slush fund. These charges, though fully discredited by the testimony presented at the subsequent hearings, probably affected the fate of this measure. In fact, many of the Senators objected to voting on the Carson-Martin fare bill because of the charges.

ONE-COMMISSION MEASURE ENACTED

On April 18 the Assembly passed and sent to the Governor for his approval the bills of James F. Foley, Democratic leader of the Senate, providing for a reorganization of the Public Service Commission for the First District of New York into a single-headed commission and creating a rapid transit commissioner, whose duties will be to complete the building of New York's subways.

Governor Smith asked the Legislature to pass measures affecting both of the commissions, but it refused to comply with this request or to accede to the Governor's recommendation that the Public Service Commission for the Second District be reorganized. The Governor will not name the Public Service Commissioner and the Rapid Transit Commissioner until he signs the measures, so the names will not be sent to the Senate for confirmation. Next year, however, the appointments will have to be referred to that body.

Under an emergency message from the Governor the group of tax bills prepared by the Davenport special tax committee were passed. With the returns from these measures it is hoped to meet the deficit caused by the loss of excise revenue—some $24,000,000—and the growing cost of government. One of these bills imposes a State income tax, following closely the lines of the federal measure with respect to regulations but much less burdensome in its imposts.

MANY INTERPRETATIONS OF "BLUE SKY"

The Foley "blue sky" bill passed the Senate unanimously, but died in the Assembly. It provided that before any stocks or securities could be sold in the promotion of a corporation a verified statement must be filed with the Secretary of State setting forth all the money paid as commission and other information to prevent the launching of fraudulent ventures. It seems to be generally agreed that some measure of this kind is needed, but the task proved too great of reconciling all the divergent interests that would come within the purview of legislation of this kind. Everybody is agreed that there should be legislation of this kind wisely administered, but there are many kinds of thought on what is wise and what unwise. In view of the failure of this program the financial sharks appear to be in for another period of immunity in which to carry on their nefarious practices.

CONDUCTORETTE BILL DEAD

The Senate killed the "so-called" conductorette bill, leaving the measure regulating the employment of elevator women the only measure on the Governor's "social welfare" program to go through.

Los Angeles, Oakland and Sacramento Wages Increased

Wage increases were awarded by the National War Labor Board on April 11 to employees of the Los Angeles (Cal.) Railway Corporation, the San Francisco-Oakland Terminal Railways, Oakland, Cal., and the Pacific Gas & Electric Company, Sacramento. Requests of employees of the San Francisco-Oakland Terminal Railways, the San Diego Company and the Los Angeles Corporation for an eight-hour day, and of the workers of the Pacific Gas & Electric Company for a nine-hour day were refused by the board.

The board recommended that motormen and conductors of the Los Angeles company be granted wages of 41 cents an hour for the first three months' employed, 43 cents an hour for the next nine months, and 45 cents an hour thereafter.

The board awarded employees of the San Francisco-Oakland Terminal Railways a scale ranging from 43 cents to 50 cents an hour. The increase included in the scale is retroactive to Nov. 1, 1918, and payable before Sept. 1, 1919. Time and a half was awarded by the board to trainmen who are called upon to perform extra work.

For employees of the Pacific Gas & Electric Company the board recommended a new wage scale granting conductors and motormen wages ranging from 42 cents to 46 cents an hour with the stipulation that operators who are assigned by the company to run one-man cars should receive an additional 5 cents an hour.

The award is retroactive as of Jan. 1, 1919, with back payments under it due before next June 1. Trainmen are granted time and a half for overtime under the conditions of the award.

The raises granted amount to a 14 per cent wage increase for the platform men of the Traction and Key Route divisions of the San Francisco-Oakland Terminal Railways. The rate per hour for employees of the San Francisco-Oakland Terminal Railways under the award as compared with the old scale is:

TRACTION DIVISION

	Old, Cents	Award, Cents
First three months	38	43
Next nine months	40	46
Thereafter	42	48

KEY SYSTEM

	Old, Cents		Award, Cents
First year	43	First three months	45
Second year	44	Next nine months	48
Third year	45	Thereafter	50

Wheeling Proceeding to Reconstruction

The West Penn Traction Company, Pittsburgh, Pa., controlling the Wheeling Traction System, operating between Moundsville, W. a., and Steubenville, Ohio, will locate its central carhouse and machine shop in South Warwood, near Wheeling. The buildings will cover a space of 10 acres.

When the Wheeling lines were in the hands of the Kuhn interests, Warwood was under consideration as a site for the carhouses and shops. Ten lots were afterward purchased in North Warwood for the carhouse, but residents objected to the location of the plant and the shops were never erected.

The original brick structure housing the cars is at Beech Bottom. With the construction of the new carhouse and shops, Warwood will be a convenient home for the workmen in the shops and for the conductors and motormen on the Pan Handle line. The city of Wheeling, centrally located, will soon have suburban lines running in all directions and connecting with Columbus, Cleveland, Cincinnati and Pittsburgh.

Anticipating this development, it has been arranged to provide for larger carhouses and shops for the company. Hence the location of the new works at Warwood.

Wages Advanced in San Francisco

The Board of Public Works of San Francisco, Cal., on April 16 recommended an increase of pay for motormen and conductors of the Municipal Railway of 50 cents a day. That means an increase from $4 to $4.50 for eight hours. The new rate was made effective as of April 15. This recommendation was made with the understanding that if the net income of the railway is insufficient to meet this added expense the difference is to be made up from the depreciation fund. There is now about $1,000,000 in cash in the depreciation reserve fund. About $1,000,000 has already been extracted from this fund for extensions.

The United Railroads, San Francisco, with which the Municipal Railway is in competition, has just established a new wage scale for platform men, effective from April 13. This supersedes the old scale, which ranged from 37 cents to 45 cents. Both old and new scales involve a ten-hour basis. The new scale is as follows: First six months, 42 cents; second six months, 44 cents; second year, 46 cents; third year and thereafter, 48 cents.

Missouri Industries Organize

The Associated Industries of Missouri, representing the combined industrial and manufacturing interests of the State, was organized in Kansas City on April 14 for the protection of the interests of manufacturers and of the industries in general. It proposes to encourage new industries and capital. Railroad development will be one of the particular things advanced.

One of the prime considerations will be the promotion of co-operative relations between employers and employees. The chief interest of the association will be to make Missouri the strongest industrial state in the Union. The organization is based upon the plan of the Illinois Manufacturers' Association. P. J. Kealy, president of the Kansas City Railways, was one of the organizers.

These officers were elected: President, A. J. Davis, president of the St. Louis Employers' Association, St. Louis; first vice-president, Conrad Mann, president of the Kansas City Brewery Company; second vice-president, C. A. Battereall, wholesale shoes, St. Joseph; third vice-president, W. J. Dysart, Springfield; treasurer, John S. Green, St. Louis; secretary, W. C. Rogers, St. Louis.

Kansas City Elevated Doomed

The old west bottom elevated railway is doomed if the two Kansas Cities will agree to it. For years surface cars have run over it from Kansas City, Mo., to Kansas City, Kan., or what in former days was known as Wyandotte. It has been in service for years, but has deterioriated very much. Now the Kansas City Railways has asked the City Councils of the two cities to allow the section between Mulberry and the West line to be demolished. Kansas City, Mo., has acquiesced and it is now up to the Kansas side. The railway would like to tear the structure down because in its present condition it is considered a source of danger. That portion passing over the railroad tracks, however, would be retained. Should Kansas City, Kan., agree to the request, cars from Missouri would pass through the tunnel, and later drop easily to a surface track. The change would bring better service. The two cities would have better accommodations over the new Inter-City Viaduct.

What's in a Name?

The proposal of Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York, N. Y., to claim for his company the exclusive right to use the designation "subway" has provoked no end of comment in the daily press of New York. The merits of the issue aside, much that is petty and witty has been tossed off by the paragraphers. Mr. Hedley is in complete accord with Shakespeare in the sentiment that "he that filches from me my good name steals that which not enriches him and makes me poor indeed." The New York *Herald* said:

> Mr. Hedley proposes that his company shall have the exclusive right to the word "Subway," and that all other companies shall have an otherwise unrestricted choice from a voluminous dictionary. Could anything be more generous?
>
> All that the other traction chiefs need do is to lay hold of a phrase, introduce one or more capital letters, and the deed is done. Or, if so inclined, they might invent a word to suit their case and get a no-trespass copyright for it. For instance, the "Walloway," the "Lowline," the "Belowline," the "Underway," the "Holloway," the "Concavity," the "Trough," the "Dipway," the "Lacuna," the "Sink," and ever so many others might be suggested.
>
> But we warn Mr. Hedley and all the other nomenclators that the public frequently appropriates the right to give names to public utilities of everyday use. From its decisions there is no appeal. It will name the new Interborough lines and all the other lines according as it thinks they should be characterized.

Wages and Fares Coupled in Chicago

The attitude of the board of operation of the Chicago (Ill.) Surface Lines, as reported to the employees' organization on April 17, is that a continuation of the wage scale established by the War Labor Board is dependent upon the company procuring the increase in fares which has been asked of the State Utilities Commission. This statement was made in answer to an appeal of the employees for protection against a reduction in the wage scale at the end of the war.

L. A. Busby, president of the company, made it plain in his letter that the choice is between a higher fare, lower wages and a receiver for the properties. He said:

> We agree with you that it is unfair to ask you as employees to bear part of the unjust burden of attempting to maintain our transportation service at less than cost. We believe you will agree with us that it is also unfair to ask the companies to continue under present conditions to pay the present wage scale, which was granted upon the recommendation that an adequate increase in fares should follow.

There have been various rumors about the position to be taken by the State commission on the fare appeal. These were mostly to the effect that the commission would insist on reducing the capitalization on which a return is to be allowed. None of these reports has been confirmed.

Cleveland-Youngstown Line Assured

Bankers have announced that the Van Sweringen line, the Cleveland & Youngstown Railroad, will be completed between Shaker Village and East Thirtieth Street, Cleveland, Ohio, by early fall. Finances, they said, had all been arranged, but this could not be confirmed, as O. P. and M. J. Van Sweringen are out of the city.

The line will come down Kingsbury Run in the city and at East Thirtieth Street will connect with one of the Cleveland Railway lines, over which cars will be routed to the Public Square or some other turning point until the proposed new union station is completed.

The Cleveland Railway is now operating cars over what is known as the Shaker Boulevard line. One of the branches to be completed is the South Moreland. The new line will furnish rapid transit service to a large residence territory and make further real estate development possible on the heights southeast of the city proper.

New Investment Bankers' Committees

O. B. Willcox, vice-president Bonbright & Company, New York, and chairman of the committee on public service securities of the Investment Bankers' Association of America, has announced the appointment of the following sub-committees:

Street Railways and the Investor's Interest:

Russell Robb, chairman, Stone & Webster, Boston.
G. M. Dahl, Chase Securities Corporation, New York.
Claude K. Boettcher, Boettcher, Porter & Company, Denver.
R. Lancaster Williams, Middendorf, Williams & Company, Baltimore.

Canadian Public Service Securities:

R. B. Young, chairman, E. H. Rollins & Sons, Boston.
J. A. Fraser, Dominion Securities Corporation, Ltd., Toronto.
James C. Willson, James C. Willson & Company, Louisville.
Chester Corey, Harris Trust & Savings Bank, Chicago.

Public and Municipal Ownership from the Investor's Standpoint:

R. Lancaster Williams, chairman, Middendorf, Williams & Company, Baltimore.
F. E. Frothingham, Coffin & Burr, Inc., Boston.
James S. Riley, Perrin, Drake & Riley, Inc., Los Angeles.
Claude K. Boettcher, Boettcher, Porter & Company, Denver.

Credit and Financing of Public Service Companies, Including Cost of Money:

Chester Corey, chairman, Harris Trust & Savings Bank, Chicago.
James S. Riley, Perrin, Drake & Riley, Inc., Los Angeles.
Russell Robb, Stone & Webster, Boston.
F. E. Frothingham, Coffin & Burr, Inc., Boston.
G. M. Dahl, Chase Securities Corporation, New York.

News Notes

Newark Jitney Men Will Organize.—The jitney owners representing every line in Newark, N. J., and all lines to the suburbs, with the exception of Kearny, met in Newark on April 16 and, after a long discussion, decided to form an organization to protect their interests. A man from each of the lines was chosen to organize his fellows. Another general meeting will be held at which plans will probably be worked out looking toward a permanent organization.

Another Attempt at Norfolk Franchise.—The tentative draft of the new franchise to be submited to the Virginia Railway & Power Company has been completed by attorneys for the city of Norfolk, Va., and forwarded to the officials of the company at Richmond. The franchise will take the place of the various franchises under which the company is operating at present. It extends the time on all and is said to give the city authorities increased power of regulation. After officials of the company have had time to study carefully the provision suggested by the city a joint conference will be held.

Seattle Elevated Tested.—Thomas F. Murphine, Superintendent of Utilities of Seattle, Wash., recently authorized the operation of a street car over the new municipal elevated railroad, to test the structure. He did this following a request of City Engineer A. H. Dimock. The special work for the connection of the surface and elevated lines at First Avenue and Washington Street is now being made, and it is expected will be ready in two weeks. When completed, the west side cars will be routed over the elevated, cutting down the running time fifteen to twenty minutes.

Wants Municipal Line Taxed.—The Chamber of Commerce, Seattle, Wash., in a recent communication to the City Council, urged that the municipal railway system be charged with the taxes formerly paid on railway property by the Puget Sound Traction, Light & Power Company, pointing out that unless other arrangements are made, these taxes will be charged against the general property owner. It is suggested that the utility should be charged with $300,000 general and $90,000 gross revenue tax, the same as the private corporation. Members of the utilities committee and the City Council are said to be against the proposal as presented.

Dismissed for Lack of Jurisdiction.—The appeal of the employees of the St. Paul (Minn.) City Railway against the Twin City Rapid Transit Company for increased pay has been dismissed by the National War Labor Board for lack of jurisdiction. The decision read: "It appearing the complainants have failed and neglected for more than two months to take any steps toward final prosecution of this case and that their attention has been called to the necessity of taking active steps in the matter, and that reasonable opportunity was given them to do it, therefore it is hereby directed that said case be dismissed without prejudice for want of jurisdiction."

Preparing Wheeling Wage Demands.—The executive committee representing employees of the West Virginia Traction & Electric Company, the Pan Handle Traction Company, the City Railway and the Wheeling (W. Va.) Traction Company has been holding a series of meetings at Wheeling to consider wage and other conditions to be inserted in the contract to be presented to the management of the companies for joint action by the men and the railway officials. The men will probably ask for a considerable increase in wages. It is expected that the attitude of the railways will be that they must have additional revenue, to be derived from increased fares, if they are to be called upon to increase wages.

Portland Men Want More.—Trainmen of the Portland Railway, Light & Power Company, Portland, Ore., are reopening the question of wages, demanding increases that amount to about 10 cents an hour. The present wages are 46, 48 and 50 cents an hour. The new demands call for 55, 58 and 60 cents. When the question of wages for railway workers was adjudicated by the War Labor Board last October, it was stipulated that either the employing company or employees might reopen the matter at six-month intervals. April 1 marked the first date on which negotiations for a change in scale might be started anew. Franklin T. Griffith, president of the company, states that it cannot consider making wage increases at this time. It is said this will mean that the matter will again go before the War Labor Board for adjustment.

Pasadena Defeats Municipal Ownership.—Pasadena, Cal., seems to have had its fill of municipal ownership. It already owns the local electric light plant and the water system, and had in contemplation the construction of a high-speed municipal electric railway between the city and Los Angeles. That project, however, was abruptly halted by being voted down at the election on April 3. The project was ambitious. It called for an issue of $3,000,000 of bonds, with mere construction costs for the new line placed at $2,777,107. These were regarded as big figures for Pasadena. Proponents of the measure insist that the vote must be taken as a repudiation of this particular project and not as a rebuke to municipal ownership as such, particularly in view of the excellent facilities afforded by the Pacific Electric Railway for communication between the cities.

Appointments to Seattle Legal Department.—Walter F. Meier, Corporation Counsel of Seattle, Wash., has appointed several new members of his department, to assist in the municipal railway legal work. Every appointment has been given to men who have had overseas experience, or who have been engaged in war work. Capt. Ewing Colvin and Capt. Nelson T. Hartson have been appointed assistants to the Corporation Counsel, to fill vacancies caused by the transfer of two members of the department to handle the legal end of the railway claims and personal injury cases. Three appointments have also been announced by Counsel Meier to the railway claim department. Although the Council made appropriation for salaries for several other positions in the legal department, Corporation Counsel Meier said he will not make appointments until an increase in business necessitated them.

Sounds a M. O. Warning.—In a report of the bureau of taxation of the Seattle Chamber of Commerce and Commercial Club, attention is called to the obligation of the city government to conduct the municipal electric railway at a profit and turn into the general fund an amount sufficient to offset the loss of approximately $400,000 of taxes and franchise revenues which would be paid by the system under private ownership. In concluding its statement the bureau says: "Unless the railway system is so conducted as to furnish the necessary service without increasing the tax rate, the property owners of the city, including the owners of homes and industrial plants, will be called upon to help pay part of the transportation expense of the general public in addition to their own, and investment of outside capital in Seattle, essential to our rapid development, will be made more difficult to secure by increase in a tax rate already high."

M. O. Defeated in Sioux Falls.—With the re-election of Mayor G. W. Burnside, after serving sixteen years, the special submissions of purchase of the local railway lines and the gas company property were defeated. The attitude of Roger Mills, secretary and manager of the Sioux Falls (S. D.) Traction System, toward municipal ownership was noted in the ELECTRIC RAILWAY JOURNAL for April 19, page 807. There was no quibbling by the local railway as to where it stood. In one advertisement during the campaign the company, which by the way used space very liberally, said bluntly: "More lines, more cars, more paving and more frequent service are financially out of the question with us at the present time. If this is what the people of Sioux Falls demand, then you should vote 'Yes' at the coming election. Your vote against the proposition is an indorsement of the present management, the rate of fare and the service that we are giving you."

Financial and Corporate

Planning Spokane Merger

After Several Years of Discussion Ordinance Is Being Drawn with This End in View

The general terms of a proposed ordinance to be submitted to a vote in Spokane, Wash., for a franchise under which the local lines of the Washington Water Power Company and the Spokane Traction Company, which is included in the Spokane & Inland Empire Railroad, will be consolidated have been agreed upon by the officials of the companies.

MR. HUNTINGTON THE VEHICLE

Under the tentative plan approved by counsel for both companies, to be submitted to Mayor Fassett and the City Commissioners soon, the preamble will read: "To grant to D. L. Huntington, his heirs and assigns the right to build, equip, purchase, own and operate a single or double-track electric railway system upon certain streets in the city of Spokane."

Mr. Huntington in turn will agree to organize immediately a corporation to acquire the present railway systems of the Washington Water Power Company and the Spokane & Inland Empire Railroad, merge them and eliminate certain trackage.

It is further to be provided that the city charter will be so amended as to relieve the railway systems from certain burdens of expense in the way of paving, bridge taxes and other compensations to the city.

Mr. Huntington will be allowed a stipulated number of months in which to accept the ordinance and meet the requirements of its various provisions. The acceptance of the ordinance by Mr. Huntington will terminate all other ordinances and franchises previously granted both companies. In a general way the proposed ordinance will follow the provisions of the last franchise granted the Washington Water Power Company by the city in 1910.

FARES TO BE SUBJECT TO REGULATION

In the ordinance submitted by the companies, as now considered, there will be no reference to the precise streets upon which the franchise to operate cars will be granted, but the list of streets will be left to the City Council and the Mayor to designate in a supplemental ordinance as an amendment to the proposed ordinance of the carriers.

The rates of fare to be charged are to be fair, just and reasonable and subject to regulation in the manner provided by law.

The matter of universal transfers is to be stipulated free from extra cost except that the transfer will not be given on a parallel line less than six blocks away from the car upon which the passenger is riding. The charge for a transfer in this case, if one is demanded by the passenger, is to be fair, just and reasonable and subject to regulation in the manner prescribed by law. Members of the fire and police department in uniform are to be carried free.

The franchise will run for twenty-five years from the date of acceptance.

A rough draft of the proposed franchise has been prepared by Frank T. Post, counsel for the Washington Water Power Company, and Ben. F. Kizer, representing the Spokane & Inland Empire Railroad, and informal conferences have been held by the officials of the companies.

Looking Into Future

Frederick J. H. Kracke, a member of the Public Service Commission for the First District of New York, estimates that before 1950, New York City will require to transport its population a rapid transit and street railroad system four times as great as at present. Mr. Kracke bases his estimate upon a careful analysis of traffic figures covering the last fifty-nine years in New York, and upon municipal population statistics for a still longer period.

The population of Greater New York in 1950, Mr. Kracke estimates, will be 12,556,106 persons, and the passenger traffic upon elevated, subway and street surface lines, if some new transportation method is not devised in the meantime, will be more than 8,000,000,000 persons annually. These computations are based upon an estimated population of 5,525,497 persons in New York City at the close of the fiscal year 1917-1918 in which period about 1,975,511,709 passengers were carried on the traction lines. This would indicate that more than 2,000,000,000 passengers will use local transit facilities during the current fiscal year. The rate of growth of traffic is much greater than the rate of increase in population. While the population has grown 26 per cent to 39 per cent a decade, ratios for street railroad passengers have increased from 49 per cent to 200 per cent.

These conclusions are contained in an opinion by Commissioner Kracke, in which the Belt Line Railway Corporation is authorized to abandon certain of its unused or little used tracks. In authorizing this abandonment Mr. Kracke points out that if the vast and growing population in New York is properly to be cared for from the transportation standpoint, useless and outworn lines must be abandoned and the companies relieved of their maintenance in order that funds may be concentrated upon the development of facilities much more useful and beneficial.

Bay State Property Sold

955-Mile Electric Railway System Sold Under the Hammer to the Reorganization Committee

The property of the Bay State Street Railway, Boston, Mass., which company operates in ninety cities and towns in eastern and southeastern Massachusetts and extends into New Hampshire and Rhode Island, was sold at auction on April 21 at Salem, Mass., by order of the Federal Court, under the reorganization plan by which the property is eventually to be in the hands of the Eastern Massachusetts Railway, and managed by five public trustees provided for by a special act of the Legislature.

BANKER THE PURCHASER

The purchaser was Arthur I. Glidden, representing Lee, Higginson & Company, Boston, Mass., reorganization managers for the railway, and the price was $3,000,000, subject to the taking over of various obligations, including those of the Bay State receivership and mortgages of the Boston & Northern Street Railway and the Old Colony Street Railway.

The reorganization plan provides for $3,582,633 of new cash from stockholders and scaling down $20,000,000 of capitalization to conform to the public control act. Its terms were reviewed in the ELECTRIC RAILWAY JOURNAL for March 15, page 538. Briefly the total of securities of the successor company bearing fixed charges will be $29,352,700 while the grand total of capitalization will be $52,396,950, the difference between these sums being made up by $4,097,000 of preferred stock and sinking fund stock, $2,998,500 of new preferred "B" stock, $8,719,000 of new adjustment stock (cumulative) and $7,229,750 of new common stock.

The plan of reorganization, when put into effect, will permit the acceptance of the special legislative act of 1918. The trustees will have absolute power to fix fares sufficient to pay a return covering all interest requirements, the stated dividends on the preferred stocks and 6 per cent on the common stock of the new company. Based upon the Public Service Commission's appraisal of $40,282,340 in its decision of Aug. 31, 1916, plus subsequent additions, the property valuation will be about $46,000,000, on which $2,760,000 is the approximate amount of the permitted initial annual return.

STATE'S CREDIT PLEDGED

The credit of the State is pledged for the payment of the principal of not exceeding $4,000,000 of serial mortgage bonds of the new company maturing within ten years from the date of issuance. The act requires that $2,500,000 of these bonds be sold immediately so as to produce $2,500,000 cash, of which $2,000,000 must be used for future additions and improvements and $500,000 set aside as a reserve fund: and that $1,000,000 of cash additional must be realized from the sale of other securities of the new company and applied to the rehabilitation of the properties or to other corporate purposes. This makes a total of $3,500,000 of new cash which must be obtained, as a prerequisite to the formation of the new company under the act.

The proposed capitalization of the new company conforms to the act, so that the permitted return will always be sufficient to pay all fixed charges and regular dividends.

Readjustment in Indianapolis

Proposal Toward That End Now Before Committee of Stockholders of the Indianapolis Street Railway

The appointment of a committee of fifteen stockholders of the Indianapolis (Ind.) Street Railway to report on May 8 on a plan in harmony with the suggestions of the Indiana Public Service Commission's order of Dec. 28, 1918, in so far as the same may be practicable and feasible, is regarded as the first step toward the financial readjustment of local Indianapolis lines which the Indiana Public Service Commission directed to be made when it issued an order allowing the company to charge a 5-cent fare.

The order was made in the case of the Indianapolis Traction & Terminal Company, which holds a lease of and operates the property of the Indianapolis Street Railway. Following this order the Indianapolis Traction & Terminal Company postponed the payment of interest on the $6,000,000 of Indianapolis Street Railway bonds when the interest fell due on Jan. 1, 1919. It did, however, pay the semi-annual lease rental, or dividend of $150,000, to the Indianapolis Street Railway. Under the provisions of the mortgage securing the bonds there are six months of grace, which will end on July 1.

This committee was appointed at the annual meeting of the stockholders of the Indianapolis Street Railway held on April 10. The committee is composed of J. F. Wild, Edward L. McKee, Walter J. Ball, R. K. Willman, John W. Smith, Frank Donner, H. W. Bennett, Robert Elliott, George C. Hitt, W. A. Hough, Otto N. Frenzel, Samuel Reid, Samuel T. Murdock, M. J. Ready and H. H. Hornbrook.

The membership of this committee can be increased to include any large stockholder of the Indianapolis Street Railway. The directors were re-elected, as follows: Henry Jameson, Indianapolis; John W. Smith, Muncie; Harold J. Hibben, Indianapolis; Winfield T. Durbin, Anderson; Walter J. Ball, Lafayette; Charles M. Murdock, Lafayette, and Joseph A. McGowan, Indianapolis.

The above stockholders' committee has appointed a sub-committee, composed of Messrs. Wild, Willman, Frenzel, Murdock and Ball, to draft plans embodying the suggestions contained in the Public Service Commission's order of Dec. 28, 1918.

Statistics for January

Comparative Figures for 1919 and 1918 in a New Form Show How Cost of Doing Business Has Risen

Operating statistics of electric railways reporting monthly to the information bureau of the American Electric Railway Association are given in the accompanying tables in a somewhat different form than that used heretofore.

Table I shows the income statement and car-miles for fifty-nine companies for January, 1919, as compared with January, 1918. Formerly only the revenues, expenses, net taxes and operating income were shown. Table II is also an operating statement, but in this case the amounts per car-mile are given. The companies represented are the same as those in Table I.

Table III is a detailed statement of the operating expenses of fifty-five companies. In Table IV the amounts per car-mile of the operating expenses shown in Table III are presented.

Tables V, VI, VII and VIII correspond respectively to Tables I, II, III and IV and give the operating statement and detailed operating expenses, for January, 1919, of 105 companies. Tables V and VII give the actual totals, while Tables VI and VIII give the same amounts per car-mile. The companies shown include those appearing in the first four tables and in addition forty-six others for which the 1918 figures were not available.

BEST SHOWING IN SOUTH

As in the past, the returns from city and interurban electric railway companies have been classified according to the following geographical grouping: Eastern District—East of the Mississippi River and north of the Ohio River. Southern District—South of the Ohio River and east of the Mississippi River. Western District—West of the Mississippi River.

The operating statement in Table II indicates that the Eastern district was the only one to improve its condition. The good showing made in this district, however, was probably due more to the unfavorable conditions in 1918 caused by the heavy winter weather than to any actual improvement in operating conditions in 1919.

The Western district seems to be going from bad to worse. The balance after the payment of taxes and fixed charges dropped from a net income of 1.02 cents per car-mile in 1918 to a deficit of 0.10 cent per car-mile in 1919. An increase of 21.86 per cent in operating expenses and nearly 18.00 per cent in taxes were largely responsible for the poor showing made.

SOUTH LOSING GROUND

In the South conditions are slowly becoming worse. Operating expenses increased 31.82 per cent, and the net revenue fell off 3.82 per cent. Taxes increased 16.30 per cent, and although the fixed charges decreased 7.45 per cent the net income dropped from 3.77 cents per car-mile to 3.11 cents in 1919, a decline of 17.51 per cent.

Although the Southern district seems to be losing ground, as shown above, it still makes by far the best showing of the three districts. The net income of 3.11 cents per car-mile compares very favorably with 0.08 cents per car-mile in the East and a deficit of 0.10 cents per car-mile in the West.

OPERATING EXPENSES JUMPED

The details of operating expenses given in Table IV help to explain the depressing situation reflected in the previous tables. Practically every account shows a large increase since January, 1918. The decisions of the War Labor Board are reflected in the increase in conducting transportation, which for the country as a whole rose from 9.51 cents per car-mile in January, 1918, to 12.23 cents per car-mile in January, 1919, an increase of 28.60 per cent. The greatest increase in this item is shown in the South, 38.08 per cent, while the highest actual figure per car-mile appears in the East, 13.49 cents, and the lowest in the West, 10.58 cents.

The cost of power shows an increase for the country as a whole of 12.97 per cent, rising from 4.24 cents per car-mile in January, 1918, to 4.79 cents per car-mile in January, 1919. This, of course, reflects the rise in the price of coal and the higher wages of labor. The Western district shows the greatest increase in this account, 44.64 per cent compared with an increase of 2.90 per cent in the East and a decrease of 1.34 per cent in the South. The favorable showing of the East and South in this respect is probably due to the storms of 1918 in the East which reduced the output and increased the cost per car-mile, while the increased cost in the West is partially explained by the great amount of haulage necessary at the increased freight rates.

MAINTENANCE INCREASES HEAVY

The maintenance of way and structures and equipment shows heavy increases, reflecting the high cost of materials and also the high wages prevailing. For the country as a whole the way and structures account increased 12.98 per cent and the equipment account 25.18 per cent. The greatest increase in these accounts was in the South, being 50.62 per cent and 61.18 per cent respectively. The actual expenditure per car-mile for equipment was, however, less in the South than in the other districts, being 2.74 cents per car-mile as compared with 3.08 cents per car-mile in the West and 4.28 cents in the East. For way and structures the actual expenditure per car-mile was 3.84 cents in the East, 2.44 cents in the South and 2.22 cents in the West.

TABLE I—INCOME STATEMENT FOR FIFTY-NINE ELECTRIC RAILWAYS FOR JANUARY, 1919, COMPARED WITH JANUARY, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Railway operating revenues	$8,242,651	$7,220,956	$3,330,226	$2,983,510	$1,204,345	946,735	$3,708,080	$3,290,711
Railway operating expenses	6,464,859	5,398,330	2,766,909	2,471,011	860,183	611,505	2,831,767	2,315,814
Net operating revenue	1,777,692	1,822,626	563,317	512,499	338,062	335,230	876,313	974,897
Net revenue from auxiliary operations	17,412	4,927	480	....	....	....	16,932	4,927
Taxes	564,858	507,505	197,747	202,758	121,770	97,935	245,341	206,812
Operating income	1,229,246	1,320,048	366,050	309,741	216,292	237,295	647,904	773,012
Non-operating income	402,984	393,036	169,226	156,939	192,740	197,461	41,018	38,636
Gross income or loss	1,632,230	1,713,084	535,312	466,680	409,032	434,756	688,922	811,648
Deductions from gross income	1,524,019	1,522,600	527,988	525,990	296,708	300,430	699,323	696,180
Net income or loss	108,211	168,384	7,324	*59,310	112,324	134,326	10,401	115,468
Car-miles operated	23,560,028	23,404,022	8,482,909	8,606,460	3,789,862	3,551,712	11,287,511	11,245,850

TABLE II—INCOME STATEMENT IN CENTS PER CAR-MILE FOR FIFTY-NINE ELECTRIC RAILWAYS SHOWN IN TABLE I FOR JANUARY 1919, COMPARED WITH JANUARY, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase
Railway operating revenues	34.99	30.85	13.42	39.25	34.67	13.21	31.77	26.65	19.21	32.85	29.26	12.27
Railway operating expenses	27.44	23.07	18.94	32.62	28.71	13.62	22.70	17.22	31.82	25.09	20.59	21.86
Net operating revenue	7.55	7.78	*2.96*	6.63	5.96	11.24	9.07	9.43	*3.82*	7.76	8.67	*10.50*
Net revenue from auxiliary operations	0.07	0.02	250.00	0.01	....	....	....	....	....	0.15	0.04	275.00
Taxes	2.40	2.17	10.60	2.33	2.36	*1.27*	3.21	2.76	16.30	2.17	1.84	17.93
Operating income	5.22	5.63	*7.28*	4.31	3.60	19.72	5.86	6.67	*12.17*	5.74	6.87	*16.45*
Non-operating income	1.71	1.68	1.79	1.99	1.82	9.34	5.08	5.56	*8.73*	0.36	0.34	5.88
Gross income or loss	6.93	7.31	*5.20*	6.30	5.42	16.24	10.94	12.23	*10.55*	6.10	7.21	*15.40*
Deductions from gross income	6.47	6.51	*0.62*	6.22	6.11	1.80	7.83	8.46	*7.45*	6.20	6.19	0.16
Net income or loss	0.46	0.80	*42.50*	.08	*0.69	....	3.11	3.77	*17.51*	*0.10	1.02	*109.80*
Car-miles operated	23,560,028	23,404,022	0.68	8,482,909	8,606,460	*1.44*	3,789,862	3,551,712	6.70	11,287,511	11,245,850	0.36

TABLE III—OPERATING EXPENSES OF FIFTY-FIVE ELECTRIC RAILWAYS FOR JANUARY, 1919, COMPARED WITH JANUARY, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Operating expenses	$6,397,528	$5,293,975	$3,264,069	$3,282,288	$957,287	$677,563	$2,032,983	$1,690,601
Way and structures	695,633	617,275	387,334	404,433	103,546	67,333	204,753	145,509
Equipment	831,185	662,452	431,911	395,362	116,578	70,568	284,696	196,522
Power	1,128,013	996,671	679,078	672,716	62,651	61,701	386,284	262,254
Conducting transportation	2,876,983	2,234,926	1,359,810	1,082,179	538,965	381,704	978,208	771,043
Traffic	36,491	43,297	11,101	11,172	10,538	3,099	14,852	29,026
General and miscellaneous	827,364	739,354	394,899	359,949	125,009	93,158	307,456	286,247
Transportation for investment—Cr	141	34	64	34	....	....	77	....
Car-miles operated	23,524,443	23,499,362	10,082,296	10,271,496	4,249,170	4,152,960	9,242,977	9,074,906

TABLE IV—OPERATING EXPENSES IN CENTS PER CAR-MILE FOR FIFTY-FIVE ELECTRIC RAILWAYS SHOWN IN TABLE III FOR JANUARY, 1919, COMPARED WITH JANUARY, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per cent Increase	1919	1918	Per Cent Increase
Operating expenses	27.19	22.53	70.68	32.38	31.96	1.31	22.53	16.31	38.14	23.55	18.63	26.41
Way and structures	2.96	2.62	12.98	3.84	3.94	*2.54*	2.44	1.62	50.62	2.72	1.60	38.75
Equipment	3.53	2.82	25.18	4.28	3.85	11.17	2.74	1.70	61.18	3.08	2.17	41.94
Power	4.79	4.24	12.97	6.74	6.55	2.90	1.47	1.49	*1.34*	4.18	2.89	44.64
Conducting transportation	12.23	9.51	28.60	13.49	10.54	27.99	12.69	9.19	38.08	10.58	8.50	24.47
Traffic	0.16	0.18	*11.11*	0.11	0.11	....	0.25	0.07	257.14	0.16	0.32	*50.00*
General and miscellaneous	3.52	3.14	12.10	3.92	3.50	12.00	2.94	2.24	31.25	3.33	31.15	5.71
Transportation for investment—Cr	....	....	....	....	....	....	....	....	....	....	....	....
Car-miles operated	3,524,443	23,499,362	4.53	10,082,296	10,271,496	*1.85*	4,249,170	4,152,960	2.32	9,242,977	9,074,906	1.85

TABLE V—COMBINED INCOME STATEMENT OF ONE HUNDRED AND FIVE ELECTRIC RAILWAYS FOR JANUARY, 1919

	United States	East	South	West
Railway operating revenues	$19,684,757	$13,848,372	$1,347,003	$4,489,382
Railway operating expenses	15,583,167	11,152,007	971,420	3,459,734
Net operating revenue	4,101,590	2,696,265	375,583	1,029,648
Net revenue from auxiliary operations	302,175	151,264	125,554	25,357
Taxes	1,295,378	864,925	141,149	289,304
Operating income	3,108,387	1,982,704	359,982	765,701
Non-operating income	514,939	245,807	195,866	73,266
Gross income or loss	3,623,326	2,228,511	555,848	838,967
Deductions from gross income	4,060,078	2,836,224	333,860	889,994
Net income or loss	*436,752	*607,713	221,988	*51,027
Car-miles operated	50,642,071	32,593,495	4,326,290	13,722,286

TABLE VI—INCOME IN CENTS PER CAR-MILE FOR THE ONE HUNDRED AND FIVE COMPANIES SHOWN IN TABLE V

	United States	East	South	West
Railway operating revenues	38.87	42.49	31.13	32.72
Railway operating expenses	30.78	34.22	22.45	25.21
Net operating revenue	8.09	8.27	8.68	7.51
Net revenue from auxiliary operations	0.60	0.46	2.90	0.18
Taxes	2.56	2.65	3.26	2.11
Operating income	6.13	6.08	8.32	5.58
Non-operating income	1.02	0.76	4.52	0.53
Gross income or loss	7.15	6.84	12.84	6.11
Deductions from gross income	8.01	8.70	7.72	6.48
Net income or loss	*0.86	*1.86	5.13	0.37
Car-miles operated	50,642,071	32,593,495	4,326,290	13,722,286

TABLE VII—OPERATING EXPENSES OF ONE HUNDRED AND TWENTY-THREE ELECTRIC RAILWAYS FOR JANUARY, 1919

	United States	East	South	West
Operating expenses	$16,327,010	$11,599,504	$1,134,148	$3,593,358
Ways and structures	1,711,789	1,211,637	116,455	383,697
Equipment	2,068,983	1,467,716	135,041	466,226
Power	2,611,794	1,956,782	70,713	584,299
Conducting transportation	7,683,973	5,451,294	636,956	1,595,723
Traffic	72,407	32,500	11,514	28,393
General and miscellaneous	2,178,211	1,479,639	163,475	535,097
Transportation for investment—Cr	141	64	....	77
Car-miles operated	53,218,125	34,272,200	4,325,584	14,620,341

TABLE VIII—OPERATING EXPENSES IN CENTS PER CAR-MILE OF ONE HUNDRED AND TWENTY-THREE ELECTRIC RAILWAYS SHOWN IN TABLE VII FOR JANUARY, 1919

	United States	East	South	West
Operating expenses	30.68	33.85	26.22	24.58
Way and structures	3.22	3.54	2.69	2.63
Equipment	3.89	4.28	3.12	3.19
Power	4.91	5.71	1.63	4.00
Conducting transportation	14.44	15.91	14.73	10.91
Traffic	0.14	0.09	0.27	0.19
General and miscellaneous	4.09	4.32	3.78	3.66
Transportation for investment—Cr	....	....	....	....
Car-miles operated	53,218,125	34,272,200	4,325,584	14,620,341

NOTE—*Means loss; figures in *italics* indicate decrease.

Boston Still Losing

Cost Per Passenger in March, However, Cut to 8.92 Cents as Compared with 9.30 Cents in February

The financial report for the month of March, just made public by the trustees of the Boston (Mass.) Elevated Railway, shows that the cost was 8.923 cents for each passenger carried on the system. The net loss for the month was $224,920, as compared with a loss of $285,124 in February and a loss of $219,269 in January.

$1,178,436 A MONTH FOR WAGES

The total receipts from all sources for March, as shown in detail in the accompanying statement, were $2,331,614. Of this amount $2,279,683 came from fares, the revenue passengers numbering 28,652,645. The total cost of service for the month was $2,556,535, of which $1,178,436 was expended for wages.

RECEIPTS AND COST OF SERVICE OF BOSTON ELEVATED RAILWAY FOR MARCH, 1919

Receipts:	
From fares	$2,279,683
From special cars, mail pouch service, express and service cars	7,293
From advertising in cars, on transfers, privileges at stations, etc	24,438
From other railways for use of tracks and facilities	3,647
From rent of buildings and other property	5,510
From sale of power and other revenue	7,768
Total receipts from direct operation of the road	$2,328,342
Interest on deposits from securities, etc	3,272
Total receipts	$2,331,614
Cost of service:	
Maintaining track, line equipment and buildings	$232,766
Maintaining cars, shop equipment, etc.	244,884
Power, including 26,439 tons of coal at $5.917 or $156,440)	228,977
Depreciation	167,000
Transportation expenses (including wages of car employees, carhouse expenses, etc.)	821,989
Salaries of administrative officers	7,083
Law expenses, injuries, damages, and insurance	107,772
Other general expenses	74,687
Total operating expenses (of which $1,178,436 represents wages)	$1,885,160
Taxes, proportion	88,161
Rent for leased roads (exclusive of subways)	215,785
Proportion of rent of subways and tunnels to be paid to the city of Boston (exclusive of Cambridge Subway owned by company)	126,638
Interest on Boston Elevated bonds and notes	118,666
Miscellaneous items	2,142
Proportion of dividends under acts of 1918	116,997
Interest on unpaid taxes	2,982
Total cost of service	$2,556,535
Net loss	$224,920

RECEIPTS PER PASSENGER 8.138 CENTS

The receipts per revenue passenger were 8.138 cents. Of the cost of service per passenger, of 8.923 cents, 4.113 cents represented the cost of labor. The total of 8.923 cents in March compared with 9.304 cents in February, 8.970 cents in January, 8.055 cents in December, and 8.961 cents for the nine months ended March 31, 1919.

The receipts under the 8-cent fare in March, 1919, as compared with the 5-cent fare in March, 1918, show an increase of $677,658 or 42.30 per cent, as compared with 44.85 per cent in February (1919), 43.71 per cent in January (1919) and 36.28 per cent in December (1918).

Petition to Segregate Lines Denied

Judge Julius M. Mayer of the United States District Court was asked on April 19 to sever the Eighth Avenue Railroad and the Ninth Avenue Railroad from the New York (N. Y.) Railways. The petition was made in behalf of the stockholders of the two surface lines.

Both surface lines are operated by the New York Railways under leases that were negotiated in the early days of the Metropolitan Street Railway, the predecessor of the New York Railways. For the Eighth Avenue Railroad the New York Railways is obligated to pay an annual rental of $215,000 and all taxes; for the Ninth Avenue line the rental is $64,000 and taxes.

The petitioners asked the court to direct the receiver to "discontinue the use of your petitioner's said railroads, rights, privileges, franchises and other properties in said indentures or agreement prescribed and to return, surrender and deliver to your petitioners possession of the same." Corporation Counsel Burr had asked the Public Service Commission to take steps to protect the present transfer system.

Judge Mayer on April 21 denied the petition of counsel asking that the lines mentioned be severed from the system of the New York Railways. He made it clear that for the time being it was advisable to keep the system together. He announced that he had instructed the receiver to apply to him for permission to employ experts and accountants in order that the problem might be gone into in a fundamental manner.

$20,000,000 Needed in Brooklyn

The Brooklyn (N. Y.) Rapid Transit Company's present resources are not sufficient by $20,000,000 to bring the service to a state of efficiency, according to Lindley M. Garrison, receiver of the company, in a statement issued on April 18. He placed the responsibility for the deficiency largely at the door of the heavy increase in the workmen's pay. His statement follows in part:

> I am glad for all concerned that there was no strike. Now let us all forget it and get together to give Brooklyn the best transportation service in the country.
>
> This is not a time for anybody to "rock the boat."
>
> The problem directly concerns everyone, the financiers at large, the men whose money is invested in the road, those who work on the road, the State authorities, the city authorities and the general public.
>
> Our present income is not sufficient to pay our necessary expenses, a large part of which are due to the large wages which the majority of our employees now receive. To this must still be added the amount necessary to bring up to an equitable level the wages of those who did not receive a proportionate raise at the time of the recent increase.
>
> We are terribly hampered by the fact that the city has not completed the lines it is building, and we have not the benefit of what it was intended we should have had long before this.

Financial News Notes

Receiver for Small Massachusetts Railway.—George Spaulding, Canton, Mass., was appointed receiver of the Blue Hill Street Railway, Canton, Mass., on April 9 by Judge Loring of the Supreme Judicial Court of Massachusetts. The action was taken on the petition of the Old Colony Trust Company, trustee, representing holders of $250,000 of the company's first mortgage bonds.

Northern Ohio Company Would Issue Bonds.—The Northern Ohio Traction & Light Company, a subsidiary of the Northern Ohio Electric Corporation, has asked the Public Utilities Commission for authority to issue $5,995,000 of refunding bonds, of which $3,000,000 is to bear interest at 4 per cent and the balance at 5 per cent. The company also asks permission to issue $713,000 of first mortgage 5 per cent bonds.

Will Pay Deferred Interest.—F. D. Carpenter, president of the Western Ohio Railway, Lima, Ohio, has sent notices to the holders of the company's first mortage 5 per cent bonds that interest due on the bonds on Nov. 1, 1918, together with interest at 6 per cent on the deferred payment, will be paid on April 30. The same notice states that the company will not be in funds to pay the interest on these bonds due on May 1. As soon as funds are available, notice will be published and mailed to all known bondholders.

Scope of Protective Committee Increased.—The protective committee for the bondholders of the Rhode Island Suburban Railway, Providence, R. I., will serve in similar capacity for the bondholders of the Pawtuxet Valley Electric Street Railway and the Cumberland Street Railway, subsidiaries of the Rhode Island Suburban Railway. Deposits of bonds will be received up to May 15 at the National Exchange Bank, Providence, and the Bankers Trust Company, New York.

Big Gain in Dallas Over Last March.—The net earnings of the Dallas (Tex.) Railway for March amounted to $40,279, an increase of $20,116 or 99.7 per cent over the corresponding month of last year. Net earnings for March reached the highest point since operation commenced under the new franchise on Oct. 1, 1917. They were equivalent to a return of 6.42 per cent per annum on the property value. For the eighteen months the net earnings have been $482,699, equivalent to a return of 4.10 per cent per annum as compared to the allowable return of 7 per cent. The comparatively favorable showing for March was due to the increase of gross earnings by $58,964 or 44.43 per cent to a total of $191,662.

Traffic and Transportation

Six Cents in Atlanta

After Many Vicissitudes Company There Is Extended a Temporary Helping Hand

Atlanta's 6-cent fare went into effect on April 14. The Georgia Railway & Power Company in a public announcement asked the citizens of Atlanta to have as near as possible the exact change for their fare as the odd penny would cause no end of confusion if every passenger asked the conductor to change a bill or silver of large denomination.

The 6-cent fare went into effect all over the local territory with the exception of one line to Decatur and the lines to College Park. College Park and Decatur have both been asked by the company to accede to the 6-cent fare voluntarily, because in its recent decision on fares the Supreme Court held that the commission was without jurisdiction over the rates of fare prescribed in the franchise contracts of the company with College Park and Decatur, but that the commission did have jurisdiction over the rates of fare in Atlanta.

REVIEW OF RECENT HISTORY

It will be recalled that the Superior Court of Fulton County has previously held that a contract fixing fares existed in the case of all three places. The commission had previously recommended an increase in fare for the company, which instituted mandamus proceedings to compel the commission to assume jurisdiction. The county court refused the writ. The Supreme Court then reversed the county court in part. The company then reopened its fare case before the commission. On April 2 the commission prescribed a 6-cent fare. That body explained the basis of its decision in part as follows:

> In reaching the conclusion that a 6-cent fare was reasonable and just, the commission made no effort to provide a return on capitalization. The principal elements considered were the value of the service to the public and the cost of rendering it. In determining the last it was necessary to consider the value of the property used in the public service.
>
> No detailed appraisal of property values was attempted because of the character of the application, it being for temporary relief under unusual conditions, and the time necessary for a full appraisal.
>
> The city of Atlanta now asks an appraisal, and offers to bear such portion of the expense as the commission may deem proper. It also asks for an audit of the company's business—both to be made by experts chosen and appointed by the commission.
>
> The commission believes as was stated in its opinion that under normal conditions an appraisal was desirable. It now willingly avails itself of the offer of the city to bear part of the expense.
>
> Our belief is that a long time is necessary and will be consumed in a complete inventory, appraisal and audit. We do not feel under existing conditions that it is just to the company to deny the temporary relief we believe needed, until the appraisal and audit can be completed.
>
> In the order to be issued, prescribing a 6-cent fare, a proviso will be inserted that the increased fare shall not become effective until five days after the company shall have filed with the commission a written agreement to pay as called for by the commission, 60 per cent of the total cost of the appraisal and audit of all its properties and operations, the valuation of properties to be as of April 1, 1919, and the financial operations to be audited for the year 1918 and to April 1, 1919.
>
> After the filing of such an agreement, if the city of Atlanta shall file with the commission an ordinance or agreement by the Mayor and Council to pay 40 per cent of the total cost of the appraisal and audit, as called for by the commission, the commission will, as soon as possible, secure the services of expert engineers and accountants to do the necessary work, under its exclusive supervision and direction.
>
> After the completion of the work and a reasonable time to interested parties for examination and study, the commission will assign a date for formal hearing upon which the commission will open for consideration all the rates of the company, including railway fares, electric light and power, steam and gas rates.
>
> The city further asks that it may be allowed, through such experts as it may see fit, to have appraisals, inventories and audits made as to it may seem proper and submit the same to the commission.
>
> This commission is without authority or power to compel the company to allow an opposing party access to its records and books for such purposes.
>
> The order to be issued will provide that seventeen (17) tickets shall be sold for one dollar ($1).

Warning About Cleveland Fares

Fielder Sanders, Street Railway Commissioner of Cleveland, Ohio, on April 15 warned City Councilmen that unless expenditures of the Cleveland Railway are held down fares may have to be raised.

He issued this warning after he drafted a resolution for introduction in Council that will authorize the company to take $317,394.48 from the interest fund to pay off an over-expenditure of that amount for maintenance in 1918.

The measure, which will be offered in Council, authorizes the company to take $97,000 from the interest fund in March, and the remaining $220,000 in eleven months at the rate of $20,000 every thirty days.

The interest fund is the fare barometer, and when the balance falls below $300,000 the fare goes up. When the fund reaches $700,000 the fare is lowered. There is only $136,000 in the fund, but it is now increasing at the rate of $100,000 a month.

Commissioner Sanders also warned against making extensions and track renewals that can be dispensed with for the present. The company has asked for $760,000 this year, of which $550,000 is for track renewals.

Council will be asked by Commissioner Sanders to take $250,000 from the amount asked for track renewals, because, he said, rails on four streets can be used several years.

"Continued renewals of track suitable for traffic not only mean a postponement of fare reduction, but may bring a higher charge," said Mr. Sanders.

Wheeling Fares Readjusted

Five-Cent Unit Retained, but Number of Zones Has Been Increased Materially

The Wheeling (W. Va.) Traction Company, operating in Wheeling and between Wheeling and other points in West Virginia and Steubenville, Ohio, has been permitted by the Interstate Commerce Commission to change its passenger tariffs between certain points on its system.

DECIDE AGAINST ODD FARE

After long study it was decided to continue the "nickel" as a basis of fare between points within any one zone or community rather than to try to meet the conditions by applying an odd fare collection, such as 6 cents or 7 cents, to rides within any one zone or community.

Examination of the plan ordered into effect by the Interstate Commerce Commission shows that the railway has worked out a plan for making certain changes in its present zone limits and has so far as possible taken into consideration the natural loading and unloading points on the entire system so that regular riders between any two points on the system will be inconvenienced to the least possible extent.

The new zones are made as nearly the same distance as conditions make possible and the average length of each zone would be 2.73 miles as against 3.63 under the present zone system, and the average rate per mile would be 1.83 cents as against 1.38 under the present system. The company's entire system has consisted of twenty-four zones whereas under the new system it will consist of thirty-two zones.

With the new plan in effect it will still be possible for residents of Wheeling to ride anywhere within the present corporate limits of that city for 5 cents. Even taking the system as a whole most of the passengers will still continue to ride for a 5-cent fare.

STATEMENT OF FARES

As an example of the effect of the new zoning system, the following fares will be established: On the line from Wheeling to Bellaire the new fare will be 10 cents as against 5 cents at present. The rate from Wheeling to Martins Ferry will be 10 cents instead of 5 cents. From Wheeling to Steubenville the rate will be 50 cents instead of 40 cents. The rate from Wheeling to Bridgeport will remain at 5 cents. The rate from Moundsville to Bridgeport will be 25 cents instead of 20 cents and the rate from Moundsville to Martins Ferry will be 30 cents instead of 20 cents. These represent some of the principal changes under the new plan.

Included in the company's petition to the Interstate Commerce Commission was a considerable amount of very interesting data showing the general condition of the company's finances at the present time and the very large increase in its operating expenses during the past two years.

Columbus Settlement Plan

Fare Ordinance Passed Which May Form Basis of Settlement Grant —Proper Service Stressed

A. E. Griffin introduced an ordinance in the City Council of Columbus, Ohio, on the evening of April 14, which may form the basis for a settlement of the fare question. It provides for a rate of six tickets for a quarter for two years on the lines of the Columbus Railway, Power & Light Company, after which the rate will revert back to the present figures of eight for a quarter. Stress is placed upon proper service. On this account control of operation so far as the number of cars and their speed are concerned has been placed with the Council.

$500,000 FOR IMPROVEMENT

The ordinance provides that the company shall spend $500,000 for improvements and extensions during the remaining seven years of the grant, but it will be noted that this is very much less than called for by any of the programs heretofore laid out. In fact, it has been expected that $1,500,000 would be used for this purpose. The author of the franchise evidently feels that the character of the service is more important than the extensions, although the right is reserved to Council to order limited extensions.

The Griffin ordinance was passed on the evening of April 21 and the long controversy between the city and company may be considered closed for the present. In addition to six tickets for a quarter, the ordinance provides for universal transfers, but leaves the cash fare as it was. Charles L. Kurtz, president of the company, is now in Mexico, but members of Council think that the ordinance will be accepted by the company on his return. The instrument leaves a possibility for a resumption of strife at the end of two years, as the road must revert to the old rate at that time.

The decision of the Supreme Court of the United States with respect to the rights of the company in the matter of fares is reviewed elsewhere in this issue.

Service Improvements Planned

Modifications of the skip-stop system of operating street cars are being worked out by the Dallas (Tex.) Railway in co-operation with the city administration, to the end that the service may be improved in several respects. Mayor Wozencraft, the new Mayor, has held several conferences with Richard Meriwether, vice-president and general manager of the Dallas Railway, and J. F. Strickland, president.

Plans for the improvement of the service cover the following points:

The placing of additional stops in the downtown district.

Adoption of practical methods for decreasing the time incident to loading cars in the downtown district.

Rearrangement of stops in the residential district.

Stopping of cars in rainy weather on cross streets without sidewalks regardless of skip-stop signs.

Better service for the Mount Auburn and Park View additions, the residents of which have been working for the construction of extensions into their sections.

Mayor Wozencraft gave out the following statement:

> The conferences with Messrs. Strickland and Meriwether were very satisfactory. While we cannot go into details as to the various improvements contemplated for the present, they will be worked out as rapidly as possible and put into effect.
>
> As to the plan to decrease the loading time of street cars, I will say that more front-end collectors will be employed to facilitate the loading of cars in the downtown district. This plan is in limited operation here now. We hope to be able to educate the public to the value of rapid loading, as it saves considerable time in the aggregate.
>
> In the rearrangement of stops in the residential district, it is our intention to follow, in so far as it is practical, the method of staggering the stops. This will eliminate the so-called "bunch-stop" plan which is so objectionable at present. By staggering the stops, the street cars will stop, skip a block and stop again on the outbound trip, for instance, and on the inbound trip make stops at every intersection missed on the outgoing trip. Thus no person will have to walk more than one block out of the way than customary to board a street car for the outgoing and incoming trips.
>
> Regardless of the arrangement of the stop signs, during rainy weather all cars will stop at all cross streets where there are no sidewalks parallel to the car line on the same street, or where patrons of the line are forced to wade through mud and slush.
>
> While no plans have been formulated, as yet, for the improvement of the service in Mount Auburn and Park View, we are at work on this question and expect to be in a position to make needed improvements for those sections at an early date.

7-Cent Fare Opposed in Jersey

The Public Service Railway, Newark, N. J., has had before the Public Utilities Commission an application for an increase in fare to 7 cents from the 6-cent fare restored by the commission on April 1. Hearings on this application were under way during the week beginning April 20. These are distinct from the hearings on the zoning plan, which are also in progress.

After two adjournments requested by municipalities affected by the proposed fare increase the case was taken up on April 23. On that day Mark Wolff and Dr. Delos F. Wilcox were questioned as to the results of their examination of the company's financial statements, the purpose being to show, on behalf of the municipalities, that the proposed increase is not justified by the reports filed by the company with the commission. The endeavor was made, by means of various assumptions and calculations, to prove that the temporary fare increase which the company had been permitted to make previous to April 1 had produced more than the increase in income estimated by the company.

H. C. Eddy, senior inspector for the commission, was put on the stand by the commission to present an analysis of operating costs of the railway over a term of years. R. E. Danforth, general manager, and M. C. Boylan, auditor of the railway, were also examined as to details of these costs.

As to the zoning plan hearings, these were scheduled for resumption as this issue of this paper goes to press.

Indianapolis Doing Better

With Return of Peace-Time Conditions Company There Seems to Have Turned the Corner

With the restoration of peace, changes in conditions of travel have resulted in a material increase in the earnings of the Indianapolis Traction & Terminal Company, Indianapolis, Ind. For the months of January, February and March the average increase has been more than $2,000 a day, or approximately 23 per cent. This is regarded as particularly gratifying considering the very unfavorable conditions under which the company was forced to operate during the war-time period.

COMPANY'S STRUGGLE REVIEWED

After a decision of the Supreme Court of Indiana on July 30, 1918, ruling that the Public Service Commission had jurisdiction in the matter of the petition for increased fares, the commission on Oct. 12, 1918, granted a straight 5-cent fare, with a charge of 1 cent for each transfer, this 1 cent to be refunded to the passenger when the transfer was used.

In a later order the commission cancelled the charge for transfers. The commission's order further provided for a 50 per cent increase in the wage budget of platform men, which more than absorbed the increase obtained by the company through the granting of the 5-cent fare.

A petition was entered on Dec. 14, requesting the right to charge a 6-cent fare with certain zone charges. This petition was refused by the commission and in its order of Dec. 28, 1918, certain improvements in the service, changes in capitalization, and elimination of the sinking funds were suggested in order to reduce fixed charges.

BOND INTEREST PASSED

As a result of this order the Indianapolis Traction & Terminal Company on Jan. 1, 1919, did not pay the bond interest on the $6,000,000 of the Indianapolis Street Railway 4 per cent bonds. A committee of stockholders was accordingly appointed at the annual meeting of the company on April 10 to consider the changes in capitalization and sinking funds, which will be submitted at a further meeting of the stockholders which will be held on May 8.

In compliance with the suggestion of the Public Service Commission, work was started some time ago on the conversion of the standard type of closed car for prepayment fare collection and the majority of the cars have already been converted. The company had contemplated doing this work previously, but the reconstruction had to be suspended on account of conditions brought about by the war.

The situation with respect to the plans being matured for the financial readjustment of the Indianapolis Street Railway is reviewed on page 840 in this issue.

Kansas City, Kan., Increase Denied

The Public Utilities Commission of Kansas has decided that there is not sufficient cause for raising the fare in Kansas City, Kan., as asked by the Kansas City Railways. The rate will therefore continue at 5 cents.

The commission took the stand that conditions in Kansas City, Kan., are different from those in Kansas City, Mo., where the fare is 6 cents. In Kansas, the decision pointed out, the haul is much shorter than in Missouri, the longest rides in Kansas being only about 5 miles.

The commission also took cognizance of the fact that Kansas passengers are paying 6 cents now when they enter Missouri, the extra penny being collected at the State line.

The company's troubles, the ruling said, appear to be principally from the fact that the same fare is charged regardless of the distance a person rides. It predicted indirectly that some time in the near future the company would have to install a zone system.

The commission retained jurisdiction that it may rule on a zone system or a rate increase in the future if another ruling should seem necessary.

The company, by the decision, loses a fight of more than a year, six months of that time being spent in a court struggle with the city administration of Kansas City, Kan., which brought suit to prevent the State commission from hearing the company's application for a higher fare than that stipulated in its franchise.

A Labor Man on the Five-Cent Fare

The Bridgeport *Evening Post* of April 4 quoted John J. O'Neill, of the State Labor Union, as follows in regard to the attitude of organized labor with respect to fares of more than 5 cents:

> From the standpoint of a workman the charge of any fraction over 5 cents will never be popular. This trolley fare has been discussed in an informal way, time and time again, by members of the trade unions, after the formal meetings. Men will walk rather than ride where the tax is more than 5 cents. From the sentiments expressed, I actually believe that the average man would rather pay 10 cents than 6 or 7. There is something in that extra cent that men rebel against.
>
> The trolley people, in my opinion, made a great mistake when they raised the fare over 5 cents instead of introducing the one-man car. I know this is my actual experience and observation. I was induced to move to the North End of the city where I built a home because it was represented to me that the trolley accommodations were ample. After I got actually settled in my new home the trolley raised its rate to 6 cents, and so, rather than pay the extra cent I walk or take a jitney.
>
> My case is one of a thousand. I could give names of many people living in the North End who do just as I do, and if there are hundreds in my section of the city how many more are there in the other sections of the city?
>
> If the solution of the local problem is the one-man car, the company should install the one-man car all over. In time the one-man car will run the jitney out of business.
>
> My opinion is that the people will patronize the trolley car rather than the jitney. Many jitneys are operated by men who lack consideration for their customers. I have been in them when I wished that my accident insurance was larger. I don't like smoke, and when another passenger is puffing tobacco smoke in my face I refrain from protesting, as they would call me a crab or a crank, and all that. So if the small trolley cars were in operation, and the fare was down to 5 cents, I am sure that the women of the city would desert the jitney for the trolley. I have no objection to the railway rearranging fares for the longer rides outside of the city and establishing a new system of fare zones, if that is necessary.

Six Cents in Steubenville

At a special meeting of the Council of Steubenville, Ohio, recently, the proposal agreed upon by the Council for extending a measure of relief to the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, was presented to the company. After a trial of three months the arrangement will be in force for a period of two years. The necessary ordinance which will permit the company to make a uniform charge of 6 cents will be passed by the Council. A fifteen-minute schedule during certain hours on the La Belle View line of the railway company has also been agreed upon.

By way of confirming the understanding, C. L. Williams, city solicitor of Steubenville, has written to the company that the Council has decided to permit the company to charge a 6-cent fare and sell nine tickets for 50 cents; that service shall be increased in accordance with plans previously advanced; that the matter of one-man cars apparently does not come within the limits of the ordinance under which the company operates and must be settled by the company with its employees; that the company must discontinue the skip-stop system of operation, and that the fare increase is only an emergency measure to continue for not more than two years.

Mr. Lowry Favors a 10-Cent Fare

In an address before the Minnesota section of American Institute of Electrical Engineers at the University of Minnesota, Horace Lowry, president of the Twin City Rapid Transit Company, Minneapolis, Minn., discussing electric railway conditions, put himself on record as follows:

> Personally, I am for a straight 10-cent fare, with tickets at the rate of four for a quarter or on some such basis.
>
> We are going to have a lot of trouble with change if we get mixed in this penny business. Few passengers would suffer from a 10-cent fare if we sold tickets cheaper, as I have suggested. Everybody would have a chance to buy tickets which would cost approximately 6 cents each.
>
> Personally I am opposed to charging for transfers. I believe such a system could not help making for discrimination between those who happened to live on a certain car line and those who did not.
>
> Everybody has a kick at the electric railway service at least once a year. It may be our fault in many instances. In many more it is not. Owing to inadequate funds our service during the past winter has been poorer than in former years. A lot of people have said we were trying to force an issue, but we will submit our books to anyone who wants to see. We have offered every concession we possibly could. We have offered to do everything anyone asked us to do. We have only asked for an opportunity to finance the company adequately and to build extensions and improve our service.

Zone Fares Fixed for Fishkill Electric Railway

The Public Service Commission for the Second District of New York under an order passed on March 28, has authorized the Fishkill Electric Railway operating between Fishkill and Beacon, to charge passengers as follows:

Zone 1, terminal in Fishkill to Mulholland's gate, 1.2 miles, 5 cents.

Zone 2, Mulholland's gate to Glenham switch, 1.1 miles, 5 cents.

Zone 3, Glenham switch to Beacon terminal, 3.7 miles, 6 cents.

Through fares established are: between points in zones 1 and 2, 8 cents; between points in zones 2 and 3, 11 cents; between points in zones 1 and 3, 14 cents.

Commutation fares, fifty-four trip tickets good to purchaser only if used within thirty days, between points in zones 1 and 3, $5.40; between points in zones 2 and 3, $4.85.

School tickets, strip tickets, ten coupons each between points in zone 1 and Beacon, 70 cents a strip; between zone 2 and Beacon, 55 cents a strip.

The commission further directs the railroad to maintain the same service between Beacon and Fishkill as given during December, 1918, and to report monthly to the commission a record of passengers carried within each zone and between the different zone divisions with the revenue received.

The commission has denied the company's petition for approval of a declaration of abandonment of its line west of the Glenham switch.

The order of the commission became effective on April 1.

Interurban Would Penalize City Riders

The petition of the Interstate Public Service Company to increase its rates for passengers within the city limits of Indianapolis from 5 cents to 10 cents has been continued for two weeks by Commissioner Charles A. Edwards. Robert G. Gordon, attorney for the interurban company, said that the increase was asked because it would tend to keep local passengers off the interurban cars. This, of course, is one of the things that the interurban company desired.

Merle N. A. Walker, appearing for the property owners in the southwestern part of the city, suggested that the commission grant the increase on condition that an agreement be made with the Indianapolis Traction & Terminal Company for the leasing of the interurban railroad tracks within the city limits for a nominal rental and for the city company to provide city service on this line.

Samuel Ashby, Corporation Counsel of the city, opposed this suggestion. He said that the city could not compromise itself by agreeing to permit one interurban to increase its city fare 100 per cent and not permit all other interurban electric railways that operate into the city to make similar increases.

Transportation News Notes

One-Man Cars in Kansas City.—One-man cars were placed in operation on the Sunset Hill Line by the Kansas City (Mo.) Railway on April 20.

Recommends Return to Five-Cent Fare.—The City Council of Ottumwa, Ia., has passed an ordinance recommending the return to the 5-cent fare on the lines of the Ottumwa Railway & Light Company, the 6-cent fare having been allowed on Dec. 23.

Five-Cent Fare Restored.—Five-cent fares were restored in Battle Creek, Mich., on April 22 as the result of action taken by the City Commission on April 21, voting to rescind the 6-cent fare resolution passed in favor of the Michigan Railway nearly ten months ago.

Seven-Cent Zones Authorized.—The Tyler Traction Company, operating between Sistersville and Middlebourne, W. Va., has been allowed by the Public Service Commission to increase its passenger rates from 5 cents to 7 cents for each of the six zones, making the new fare between the towns 42 cents. Half-fare rates are to be allowed for students.

Six Cents in East St. Louis.—The East St. Louis (Ill.) Railway has been granted permission by the Public Utilities Commission of Illinois to continue until July 3, the increase in adults' single cash fare to 6 cents each and those of children to 3 cents each. Transfers are to be free, but may be so restricted as not to permit a round trip for one fare. The company had asked for an increase to 7 cents for adults.

Amended Petition at Lincoln.—An increase in fares and the establishment of three zones is asked by the Lincoln (Neb.) Traction Company in an amended petition filed with the State Railway Commission of Nebraska. Under the tariff now proposed the company would charge 9 cents a trip between Lincoln and Havelock and 7 cents between Lincoln and other surrounding towns.

Arranging for Fare Increase.—The Yonkers (N. Y.) Railroad has postponed for a few days putting into effect the fare increase recently allowed by the Board of Aldermen. Certain changes in operation in connection with the fare advance must be made. As noted in the ELECTRIC RAILWAY JOURNAL for March 29, the Aldermen on March 22 voted to permit the Yonkers Railroad to charge an extra 5-cent fare beyond the city limits.

Six-Cent Fares in British Columbia.—The advent of the 6-cent fare on the lines of the British Columbia Electric Railway, Vancouver, B. C., has complicated somewhat the fare-collection system used there. In conformity with Canadian custom, the company has used a fare box which could be carried through the car and which took the small Canadian 5-cent coins and tickets. Under the present system tickets are sold, and only tickets are put in the fare box.

Resumption of New York State Hearings.—The Public Service Commission for the Second District of New York has set April 30 as the probable date for the resumption of the hearing on the financial condition of the New York State Railways. At this hearing Benjamin B. Cunningham, corporation counsel of Rochester, N. Y., will cross-examine upon the figures recently submitted by an expert employed by the railway to make a physical valuation of its properties.

Jitney Regulated in Bloomfield.—By a vote of six to one the Town Council of Bloomfield, N. J., on April 21 passed on final reading a jitney ordinance which provides for payment of a yearly license fee of $100, filing of a liability insurance bond in the sum of $5,000, and appointment of an inspector by the officials. Because the Council refused to agree not to issue more than sixty licenses, jitney service was withdrawn on the Newark-Bloomfield route several weeks ago.

Vehicle Turns in Vancouver.—The city of Vancouver, B. C., is considering a change from the rule of passing to the left, which has been followed for many years, in favor of the turn to the right, as in the United States. If the city makes this change, the local company, the British Columbia Electric Railway, will have to change its car platforms and cross-overs. The proportion of this expense to be paid by the city and the province will probably have to be settled by legislative enactment at the next session.

Increase in Train Service.—The Monongahela Valley Traction Company, Fairmont, W. Va., has put on two trains between Clarksburg and Fairmont. The trains are composed of four of the new interurban cars—two to each train. In addition the third train is composed of the old-type interurban cars. The company will, in the near future, place more new equipment in use. Four additional new interurban cars have arrived from the manufacturer and just as soon as they can be fitted out, two of these cars will be utilized to form the third train between Fairmont and Clarksburg.

Protest Against Indiscriminate Use of Word "Subway."—Frank Hedley, general manager of the Interborough Rapid Transit Company, New York, N. Y., objects to the Brooklyn Rapid Transit Company using the word "subway" in connection with its underground line in Manhattan. Mr. Hedley told members of the Public Service Commission recently that he believes the Interborough is the only company entitled to call its underground line a subway. The acting chairman of the commission suggested it might be wise for both the companies to eliminate the use of the word "Broadway." The commission decided to defer action.

Paying Increase in Fare Voluntarily.—At the present time the New York & North Shore Traction Company, Roslyn, N. Y., is averaging about 400 voluntary 7-cent fares daily. When the voluntary movement was at its height, the company received around 800 7-cent fares daily. The railway carries between 3000 and 4000 people inside the city limits of Greater New York daily, so that the percentage paying a 7-cent fare is small. The interests not identified with the company who fostered the voluntary increased fare plan hope to be able to revive the voluntary movement soon. The New York City administration still turns a deaf ear to the plea of the company for permission to exact an increase in fare from its patrons.

No Free Rides Upheld.—Supporting the principle laid down by Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., and head of the railway system recently acquired by the city, that no person shall be allowed to ride on the municipal lines without paying the usual 5-cent fare, the public safety committee of the Council recently approved the ordinance appropriating money from the general fund to the car fare of members of the Police and Fire Departments when obliged to ride on the cars in performance of their duties. The ordinance provides for an appropriation of $20,000, or so much of that sum as may be necessary. Other city departments have always provided for this expense, appropriations running from $50 to $500 a year. Carfare will be provided only for transportation on duty, and does not include rides to and from homes. The protests against making everybody pay were referred to in last week's issue.

Commission Upholds Increase.—The Public Service Commission of Pennsylvania in an opinion rendered by Commissioner John S. Rilling has dismissed complaints filed against the rates of fare of the Bangor & Portland Traction Company, Bangor, Pa., but directing that the company file a detailed statement of its receipts and operating costs for the year ending Jan. 1, 1920, furnishing a copy also to counsel for the complainants who may have the right to renew the complaint. The evidence, says the commissioner, indicates that the increase in fares and zones will not produce more revenue than the company has a right to collect. Its territory is limited and the commissioner holds that "what was a fair rate for an electric railway became inadequate by reason of increased prices brought about through war conditions," and, therefore, "the public must expect to pay increased rates for the services it accepts from a utility in like manner as it pays increased prices for other needs."

Personal Mention

Changes in Puget Sound Personnel

A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has announced a partial reorganization of the personnel of the company, with the statement that complete reorganization will be effected about May 1. The changes effective immediately are as follows:

The position of manager of auxiliary operations is created, and the position of assistant to the president abolished. W. J. Grambs, who has held the abolished position, becomes manager of auxiliary operations, and under the new plan will report to W. H. McGrath, vice-presdent. The auxiliary operations department will include the following subsidiary companies: Diamond Ice Company, Renton Coal Company and Washington Auto Bus Company.

The position of chief electrical engineer is created. G. E. Quinan has been promoted to this position. Mr. Quinan has been electrical engineer for the Seattle division. That position will now be filled by S. C. Lindsay, formerly assistant engineer of the Seattle division.

Following the resignation of General Manager G. A. Richardson, H. R. Leigh, Jr., has been appointed superintendent of the Washington Auto Bus Company. Until the reorganization of the Seattle division of the Puget Sound Traction, Light & Power Company is completed, all heads of departments will report direct to Vice-President McGrath.

Richard McCulloch, president, has been retained as operating head of the United Railways, St. Louis, Mo., by Rolla Wells, the receiver.

Philip Dawson, M.Inst.C.E., M.I. Mech.E., M.I.E.E., has been created by Albert, the King of the Belgians, "Chevalier de l'Ordre de Leopold," in recognition of his services as a member of the Belgian Royal Commission on the electrification of the Belgian State Railways.

L. E. Stibbe, formerly editorial representative of this paper, first in New York and later in Chicago, has joined the advertising department of the General Electric Company. During the war Mr. Stibbe served overseas with the Engineers' Corps with the rank of sergeant.

Allen C. Davison, who before the war was on the editorial staff of this paper, has become managing editor of *Let's Go*, a military publication, which "emanates weakly" from Hill 772, Verneauil, France. Mr. Davison is corporal of the Motor Transport Reconstruction Corps, of which *Let's Go* is the official organ.

H. J. A. Gerard, who has been chief engineer of the Alton, Granite & St. Louis Traction Company, now is in charge of the power house of the East St. Louis Light & Power Company at Alton and the line and meter distribution departments of the Alton Gas & Electric Company and the Hartford, Piasa & Granite City substations of the Alton, Granite & St. Louis Traction Company.

A. L. Kempster in New York

A. L. Kempster has been called to aid in the present study of the New York Railways and Brooklyn Rapid Transit lines under the receivers of these properties.

Mr. Kempster was manager of the Seattle division of the Pudget Sound Traction, Light & Power Company before the system was acquired by the city of Seattle. Mr. Kempster will first assist Frederick P. Royce, general manager for the receiver of the Brooklyn Rapid Transit Company, and will then give his time to the receiver of the New York Railways.

A. L. KEMPSTER

Mr. Kempster entered the employ of the consolidated street railways of Seattle, Wash., as an office boy on Nov. 10, 1891. He went from that place to the position of accountant, then became auditor and secretary of the consolidated properties in the city of Seattle, both being progressive steps in his advancement. When the Seattle Electric Company was organized, in 1899, he entered the operating department as trainmaster of the system. Later he became superintendent of transportation, then general superintendent and finally manager of the Seattle division of the Puget Sound Traction, Light & Power Company.

The study that is now being made of all the lines in the borough of Manhattan under the receiver is being carried on by Stone & Webster, engineers, and Price, Waterhouse & Company, accountants.

C. W. Kellogg, of Stone & Webster, is in charge of the study of the Manhattan lines. Soon after Mr. Royce went to the Brooklyn Rapid Transit Company he called G. A. Richardson to assist him. Mr. Richardson was superintendent of the Seattle division of the Puget Sound Traction, Light & Power Company, of which Mr. Kempster had been manager, in Seattle. Mr. Richardson was with Mr. Royce for a few weeks and then went to Philadelphia, where he is now superintendent of transportation of the Philadelphia Rapid Transit lines.

Obituary

George E. Claflin, a vice-president of the Electric Bond & Share Company, New York, N. Y., died suddenly on April 18 at Atlantic City, where he had gone for the Easter holidays. Mr. Claflin was born in Providence, R. I., in 1866, and was graduated from the Massachusetts Institute of Technology in 1888. He was connected with some of the earliest electric power and electric railway installations in the country. He was later a member of the firm of Lewis & Claflin, consulting engineers, Providence, R. I. In 1904 he became associated with the United Electric Securities Company, Boston, and in 1913 he was elected a vice-president of the Electric Bond & Share Company.

Samuel E. Smith, formerly general manager of the Reading Transit & Light Company, Reading, Pa., died of a complication of diseases on March 24 in Reading. It was while filling a position in Mobile, Ala., that Mr. Smith was taken ill. In the hope of regaining his health he returned to Reading to live with his parents. Mr Smith was born in Womelsdorf, Pa., in 1877. He resided in Reading nearly all his life. He attended the schools in Womelsdorf and was graduated from the Interstate Commercial College in Reading. Early last November, 1918, Mr Smith was appointed general manager of the Mobile Light & Railroad Company, Mobile, Ala. On Nov. 23, he was taken ill at Mobile and soon returned to Reading. Mr. Smith began his career with the Reading Transit & Light Company more than ten years ago as purchasing agent and soon was advanced to claim agent. With rapid promotion he passed to the superintendent's office, which he filled for a brief time, and then became general manager. Mr. Smith at one time was purchasing agent for the Trenton Brick Company. After several years with this firm he joined the Montello Brick Company's force, where he remained until the concern went into bankruptcy. It was after this that Mr. Smith entered the employ of the Reading Transit & Light Company.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Rail Bond Purchasing Slow

Little Track Work Being Done—Operators Waiting for Readjustment of Conditions

It is apparent that very little track work is being done so far this year, for the manufacturers of rail bonds report that the buying of this equipment is hardly up to the normal purchases of the past two years. The building of track for the last few years has, of course, been considerably below the normal of former years. The figures compiled by the Electric Railway Journal and published in the issue of Jan. 4, show that, exclusive of the additions to new rapid transit lines in New York City, there were 233 miles of new track built and 130 miles rebuilt during the past year. This represents an increase in mileage of less than one-half of 1 per cent and shows that only about one-quarter of 1 per cent of the total mileage was rebuilt.

Readjustment to Stimulate Buying

There has been a steady decrease in the amount of track extensions for the past five years, or since the beginning of the war, and the present conditions indicate that the signing of the armistice has had no material effect upon electric railway work. New work can hardly be undertaken extensively until the signing of peace and a complete readjustment of conditions, which will give the railway operators the funds which they have sorely needed for several years. At present, the roads are holding out for price reductions although they fully realize that the immediate possibility of such is remote. When the readjustment comes there will be buying and work a plenty, for much track has been allowed to decline to an extent the necessity for which is to be regretted.

Due to the lack of buying by the electric railways the manufacturers of rail bonds are carrying very little stock on hand. Six months ago the demand of the mining industry for rail bonds exceeded that of the electric railways. The program of the Fuel Administration was such that the electrification of coal mines became essential and the buying of rail bonds for this purpose made up for the lack of construction in the railway field and necessitated that the manufacturers carry some supplies on hand. Some of the mines are now shut down entirely, the majority of the others are operating only 50 per cent time and those needing bonds are supplied well ahead. While one manufacturer can promise deliveries inside of ten days, others state that practically any type and quantity can be furnished in three weeks.

About March 1, the discount on rail bonds was increased from 20 to 25 per cent. No change in prices has taken place since that time, but as the copper market is uncertain, a fluctuation in the price of this staple may bring a further revision in the cost of the rail bonds at any time.

Wheel Market Marking Time

Steel Wheel Buyers Apparently Waiting for Cut in Price—Manufacturers Anticipate No Change

The market for steel car wheels seems to be widely affected by the belief that prices will soon take a tumble. Why this belief should have taken such deep root is not readily explainable, for it would seem very apparent that the cost to the manufacturer is just as great now as it was before the armistice was signed. It is true that the price of steel has dropped and that there is plenty of raw material to be obtained, but the cost of the raw material amounts to a very small part of the cost of the finished product. From the ore field to the finished car wheel the item of labor probably amounts to 85 per cent of the total cost. There is no indication that the cost of labor will be reduced very soon.

Considerable interest is being shown in so far as inquiries are concerned, but buying continues hardly normal just at present. A large per cent of the purchases are repeat orders.

Due to the light demand, manufacturers of steel wheels are carrying little stock and this is confined to the standare A. E. R. E. A. 33-in. wheel. Deliveries on this wheel can be made in from three weeks to thirty days and on other special types in from forty to sixty days. Prices still remain the same although one manufacturer indicates that there might be a slight drop in the next month. This would be due to the fact that it is realized wages and high cost of materials must gradually come down together. Some manufacturers feel that they should take the first step down and that labor will then feel safe to follow.

Conditions of steel wheel buying are practically the same in the steam railroad field as in that of the electric railways, although the former business of course constitutes a considerably larger percentage of the total. The manufacturers look forward very optimistically, however, to the increased buying which they expect from the electric railways as soon as these companies can obtain sufficient capital to finance purchases.

Fender Market Active

Favorable Export Demand With Domestic Sales Largely for Rolling Stock Now in Operation

Current sales of car fenders and life guards are found by one of the prominent producers to be in a very satisfactory condition. Of course, there is not the market that there was five years ago, owing to the greatly decreased number of new cars being built. There is, however, the regular maintenance market to take care of accidents which wreck fenders and a certain market for equipments for new cars. In addition there is the market for replacement. Some of this is caused by the wearing out of the old equipment, but not a small part is due to the replacement of existing equipments by others which appear to be better adapted to traffic conditions.

Inquiries in the domestic market are caused largely by local regulations requiring the installation of life protection devices. Where such are not required road managers are not so apt to purchase these devices on their own initiative, owing primarily to their belief in the safety to the public of their own road. In such places the manufacturers are making efforts to interest the operators in protective devices.

In addition to the domestic market activity is growing in the export field. Inquiries are coming in for American equipments and favorable business is coming out of them. Such protective devices, it is stated, are being applied to the rolling stock in virtually every civilized country.

Some Track Equipment Shows Life

Activity Reported in Domestic and Foreign Fields for Rail Joints—Bond Testers Normal

It is gratifying to note that there is a favorable market in a few articles of track supplies and maintenance. This is borne out in the increased activity shown in the inquiries received for rail joints and the number of orders resulting from these inquiries.

It is not only in the States that these orders have originated but many also have come from foreign fields. This export trade is the particularly bright spot in the market. Canada stands out especially in this respect, and the South American countries are also a satisfactory outlet for this material.

The market for rail bond testers has been found normal.

War Cost of Electric Railway Equipment

For the information of the Liquidation Commission, the office of the Chief of Engineers has prepared an estimate of the costs of railroad equipment shipped to the A. E. F. computed on the basis of 1914 prices. The government actually paid from two to two and a half times the pre-war costs, as shown by the table.

UNIT COST OF STANDARD GAGE RAILWAY EQAUIPMENT COMPARED WITH PRE-WAR COST

	Shipped to A.E.F.	Unit Price Pre-War	Unit Price Actual	Actual Cost in Per Cent of Pre-War Cost
Locomotives:				
Consolidation..	1,306	$17,500	$42,966	245
Gasoline......	10	9,350	22,000	235
Saddle tank....	30	4,500	9,700	216
Total.......	1,346	......	......	....
Cars:				
Tank.........	675	1,367	3,397	248
Gondola, l. s...	3,429	1,090	2,340	215
Flat..........	1,900	982	2,107	215
Box..........	7,299	1,290	2,755	214
Refrigerator.....	950	1,649	3,489	212
Gondola, h. s..	2,650	1,155	2,430	210
Dump........	500	1,026	2,108	206
Ballast........	400	1,454	2,987	205
Box, with cab..	500	1,366	2,770	203
Total.......	18,303	......	......	....

COST OF STANDARD GAGE RAILWAY EQUIPMENT COMPARED WITH PRE-WAR COST

	Pre-War Cost	Actual Cost	Actual Cost in Per Cent of Pre-War Cost
Locomotives....	$23,083,500	$56,624,870	245
Cars...........	22,346,745	48,822,100	214
Total......	$45,430,245	$104,446,970	230

New Firm of Advisory and Purchasing Engineers

Wheeler, Mechlin & Rhea have formed a firm of advisory and purchasing engineers with headquarters in the West Street Building, New York City. It has been organized to furnish service to foreign and domestic clients purchasing machinery and engineering materials in the United States, and also to construct, maintain and operate properties. Among the products which the company is prepared to purchase are general construction materials and plant, electric railway materials, equipment and supplies and electric light and power apparatus and supplies.

The service to be rendered includes overseeing of shipments, inspection of bills of lading and goods, and forwarding.

The personnel comprises Earl Wheeler, formerly treasurer and general manager of the Electric Speedometer Company and local manager of the General Electric Company, Washington, D. C., and Lieut. Colonel of Engineers, U. S. A.; O. A. Mechlin, formerly of Mechlin and Starr, architectural engineers, Washington, D. C., Lieut. Commander, civil engineering corps, U. S. N.; Frank Rhea, formerly supervisor of track of the Norfolk and Western Railway, division engineer of the Pennsylvania system, and commercial engineer of the railway engineering department of the General Electric Company.

Franchises

Montgomery, Ala.—The Montgomery Light & Traction Company has asked the City Commissioners of Montgomery for permission to construct a 1-mile extension to Wright Field.

Miami, Fla.—The Miami Beach Electric Company has received a franchise from the City Council to construct an electric line at Miami Beach. Carl G. Fisher, president.

Recent Incorporations

Selma (Ala.) Electric Company.—Articles of incorporation have been filed by the Selma Electric Company to own, operate and conduct a general traction business in the city of Selma and vicinity. It is understood that the new company is formed for the purpose of protecting the interests of the largest stockholders in the Selma Traction Company, which will be sold at auction in May. Incorporators: Charlotte L. Waters, Gertrude E. Abbott, D. L. Gerould and Hugh Mallory. D. L. Gerould, Warren, Pa., is named as president and Hugh Mallory as secretary-treasurer and general manager.

Carolina & Georgia Railway, Asheville, N. C.—Incorporated to construct a line from Andrews to Hayesville, about 25 miles. Officers: John C. Arbogast, president and general manager; S. F. Chapman, secretary and treasurer, and L. Chapman, vice-president, all of Asheville, N. C.

Track and Roadway

St. Petersburg, Fla.—It is reported that plans are being considered by W. D. McAdoo, St. Petersburg Beach, for the construction of an electric railway from Davisti to Pass-a-Grille, about 7 miles.

Quincy (Ill.) Railway.—Work will be begun soon by the Quincy Railway on the complete rehabilitation of its system. A large number of new switches and crossings will also be installed.

Iowa Railway & Light Company, Cedar Rapids, Iowa.—It is reported that the Iowa Railway & Light Company has under consideration the construction of an extension to the Old Soldiers' Home.

United Railways & Electric Company, Baltimore, Md.—Arrangements are being made by the United Railways & Electric Company for the erection of a new two-story reinforced concrete signal tower to be located at its properties at Sparrows Point.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—Permission has been granted the Trenton & Mercer County Traction Corporation by the City Commission to place all its heavy transmission lines in conduits which now run overhead along Lincoln Avenue from the power station. When the work is finished the many trolley poles will be removed.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has awarded to Terry & Tench, New York, N. Y., at $586,700, the contract for the construction of the Westchester Avenue elevated extension of the Pelham Bay Park branch of the Lexington Avenue Subway. Construction is to begin shortly, upon the approval being obtained of the Board of Estimate and Apportionment. Arrangements have been made by the Commission that in so far as possible the track laying and station finish work shall be constructed simultaneously with the general construction work, so that the line can be completed and placed in operation bit by bit east of the present terminus of operation, namely Hunts Point Avenue. The Commission has reason to believe that the general construction will be completed as far as the terminus of the elevated portion, namely, Pelham Bay Park, by the end of the year, and that a considerable additional portion of the line will be in operation by that time.

Durham (N. C.) Traction Company.—A report from the Durham Traction Company states that it plans to reconstruct 1½ miles of track.

Cleveland (Ohio) Railway.—Work has been begun by the Cleveland Railway on the construction of a new crosstown line on East Thirtieth Street from St. Clair Avenue to Pittsburgh Avenue, a distance of 2 miles. The cost of construction will be about $250,000.

Oklahoma (Okla.) Railway.—An interurban line from Tulsa to Oklahoma City is being promoted by John Shartel, vise-president and general manager of the Oklahoma Railway.

Tulsa (Okla.) Street Railway.—An extension will be built by the Tulsa Street Railway on Pearl Street.

Berlin & Northern Railway, Kitchener, Ont.—The Berlin & Northern Railway has asked the Ontario Legislature for permission to change its name to the Waterloo-Wellington Railway and to extend the time in which to construct an extension from Bridgeport to Elora and Fergus.

Peterborough (Ont.) Radial Railway.—It is reported that the Peterborough Radial Railway has under consideration the construction of an extension on Park Street from Albert Street to Lansdowne Street and an extension from Peterborough to the summer resorts on the Kawartha Lakes.

Buffalo & Lake Erie Traction Company, Erie, Pa.—Work has been begun by the Buffalo & Lake Erie Traction Company on the construction of an extension up State Street to Twenty-sixth Street and on Twenty-sixth Street to American Avenue. Further improvements are also planned.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—The City Council has awarded the South Carolina Light, Power & Railways Company a contract for lighting the city for a period of ten years. Under the terms of the new contract the company will install an ornamental lighting system in the business district.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—Alterations will be made at once to the waiting station of the Puget Sound Traction, Light & Power Company at 601 Olive Street, estimated to cost $5,000.

Power Houses, Shops and Buildings

British Columbia Electric Railway, Vancouver, B. C.—Plans are being made by the British Columbia Electric Railway for the construction of a station at Langley Prairie.

Pacific Electric Railway, Los Angeles, Cal.—A new passenger and freight station will be built by the Pacific Electric Railway at Harbor City.

Georgia Railway & Power Company, Atlanta, Ga.—The sixth turbine and generator at the Tallulah station of the Georgia Railway & Power Company will soon be placed in service. The work has been in progress about one year and will cost about $500,000.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.—Terminal improvements to cost $1,250,000 will be made this year by the Washington, Baltimore & Annapolis Electric Railway, $750,000 of this being for a large combined freight and passenger terminal at the corner of Howard and Lombard Streets, Baltimore, and $500,000 for a new passenger terminal to be erected on New York Avenue between Eleventh and Twelfth Streets, Washington. The contract for the Washington terminal will be let this summer.

Philadelphia, Pa.—Sealed proposals will be received by William S. Twining, director of the Department of City Transit of Philadelphia until April 29 for the following work appurtenant to the Frankford Elevated Railway: Contract No. 551—Erection of brick, steel and reinforced concrete station buildings at the northeast and southwest corners of Kensington and Allegheny Avenues, including the removal of existing buildings on these sites, and Contract No. 552—Erection of brick, steel and reinforced concrete station buildings at the southwest and southeast corners of Kensington Avenue and Somerset Street, including the removal of existing buildings from these sites. Copies of plans and specifications may be had upon deposit of $10 for each set of plans, which will be refunded upon return of plans.

Texas Power & Light Company, Dallas, Tex.—The Texas Power & Light Company, which furnishes energy to the Texas Electric Railway, contemplates the construction of an addition to its plant at Waco to cost about $200,000.

Trade Notes

Reciprocating Electric Tool Company, Louisville, Ky., has increased its capital from $10,000 to $100,000.

Mitchell-Rand Manufacturing Company, 99 John Street, New York City, has removed to larger quarters at 18 Vesey Street.

J. H. Deppeler of the Metal & Thermit Corporation was on April 11 elected a director of the American Welding Society.

Independent Lamp & Wire Company, York, Pa., manufacturer of wire products, will build a one-story addition at a cost of $6,500.

Page Steel & Wire Company, with its main plant at Monessen, Pa., has put all departments on an eight-hour day basis in order that more men may be employed.

Power Specialty Company, Dansville, N. Y., manufacturer of Foster superheaters, is arranging for the manufacture of a new fuel-saving device now being developed.

B. H. Ahlers, formerly sales manager of the circuit breaker division of the Condit Electrical Manufacturing Company, has since March 1 taken up sales work with the insulated-wire division of the Marlin-Rockwell Corporation, New Haven, Conn.

C. E. Hague, formerly production engineer of the Mid-West Engine Company, Indianapolis, Ind., has been appointed sales manager of the American Steam Conveyor Corporation, Chicago, manufacturer of steam ash conveyors and other ash-handling equipment.

Chicago Insulated Wire & Manufacturing Company, Sycamore, Ill., suffered loss by fire in the neighborhood of $150,000. Several buildings and some stock were damaged. The plant was one of the largest in the Central West for the manufacture of insulated copper wire.

Van Dorn Electric Tool Company, Cleveland, Ohio, will soon erect a four-story addition to its plant. The new plant, like the present factory, will be devoted entirely to the making of portable electric drills and grinders. All parts of the specially designed motors are made in the plant.

A. P. Green Fire Brick Company, of Mexico, Mo., has opened an Eastern district sales office in New York City at 30 Church Street. Howard C. Thayer, formerly field mechanical engineer for the J. G. White Engineering Corporation at the United States nitrate plant No. 2, is in charge.

Metal Statistics for 1919.—The American Metal Market and Daily Iron and Steel Report, New York, has issued its twelfth annual edition of "Metal Statistics." The preface states that "there is now so much interest in what occurs during and after wars that attention may be directed to the long span of some of these tables."

Chicago (Ill.) Pneumatic Tool Company announces the discontinuance of its offices at Wichita, Kan. F. V. Sargent has been appointed district manager of sales in the Boston territory, succeeding F. S. Eggleston with headquarters at 182 High Street Boston. The company also announces the removal of its Milwaukee office from Room 1305 Majestic Building to Room 1418 in the same building, where more convenient quarters necessitated by the growing business of the company in that district have been obtained.

Standard Refractories Company, Claysburg, Pa., manufacturer of silica brick, and other refractories, recently issued $500,000 ten-year 6 per cent first mortgage bonds for the purpose of refunding a small bond issue now outstanding, also for permanently funding additions made to the plant during the war period, to purchase a ganister property which the company is now operating and to add to the plant a complete machine shop and warehouse. It is not the intention of proceeding at once, however, with the building of the new machine shop and warehouse, but this will likely be done later this year.

Holden & White, Inc., Chicago, report a constantly increasing sale of Perry-Hartman side and center bearings. As indicative of the activity among railways in purchases of these lines, recently orders for these bearings have been received from the following railways: Chambersburg, Greencastle & Waynesboro Street Railway; West Helena Consolidated Railway; Lehigh Valley Transit Company; Eastern Texas Traction Company; Southern Cambria Railway; Evanston Railway; Easton Transit Company; Douglas Traction & Light Company; Lynchburg Traction & Light Company; Harrisburg Railways; Orange County Traction Company; Conestoga Traction Company; Oakland, Antioch & Eastern Railway; Eastern Pennsylvania Railways; Burlington County Transit Company. It is stated that these bearings have been purchased largely because of the reduction in flange and wheel wear which they effect.

New Advertising Literature

Corliss Carbon Company, Bradford, Pa.: Bulletin No. 6 giving data on motor and generator brushes.

Condit Electrical Manufacturing Company, South Boston, Mass.: Bulletin No. 440, describing type N-2 fused oil switches.

International Steel Tie Company, Cleveland, Ohio: A folder on "Crossing Frog Costs," attaching a blue print inquiry sheet for quotations.

Schweitzer & Conrad, Inc., Chicago, Ill.: Catalog entitled "High Voltage Protective and Switching Equipment," divided into five sections covering fuses and switches, circuit breakers, cutouts, lightning arresters and relays.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, May 3, 1919 *Number* 18

Electric Railway Gets Its Case Before Chamber of Commerce of United States

AT THE meeting of the United States Chamber of Commerce held in St. Louis this week a distinct advance was made in acquainting the commercial interests of the country with the deplorable condition of the electric railways. The presentation was not merely or principally a plea for help for an important industry suffering on account of conditions not of its own making. It was a straightforward business argument based upon the essential nature of the service rendered to the industrial and commercial life of the country.

Many of those in attendance at the convention had undoubtedly never before realized the destructive effect which the depreciation of the dollar has had upon an industry unable to advance its charges. Or if they knew about the conditions in their own towns they did not appreciate the fact that the condition is universal. Under the direction of Mr. Pierson's committee all of these facts were brought out and a national campaign was outlined by which it is hoped that some relief will be obtained.

When a railway asks only for higher fares the public may be excused sometimes for thinking the request unjustified, but when the same request is urged by interests outside of the railway as well, as being for the direct welfare of all, the application has far greater weight. We hope, therefore, that the St. Louis conference and the resolutions that it has formulated will mark an economic turning point for electric railways.

Don't Wait for Henry Ford to Solve Your Problems

BECAUSE of the enormous amount of publicity given to Henry Ford's proposed gas-drive car, our readers will be glad to have the definite first-hand statement which appears elsewhere in this issue. From this statement based on interviews with both Mr. Ford and C. E. Sorensen, the general manager of his tractor plant, it is clear that it would be decidedly unwise for any electric railways to delay the ordering of light-weight safety cars in the hope that something very much better is to be had within a short time. As a matter of fact, Mr. Ford has not even decided whether he will build such cars commercially. A policy of waiting would be particularly futile in the case of the many electric railways which can give a greatly increased service without spending an extra dollar for power equipment and coal if they replace their present 30,000-lb. to 50,000-lb. track pounders by the 15,000-lb. anti-friction bearing safety cars. It is doubtful whether Mr. Ford would even have thought it worth while to try his hand at light-weight car design if he had not in his own experience run across so many obvious examples of power-wasting and track-ruining rolling stock. Let Mr. Ford go ahead in his praiseworthy endeavor to save fuel and metal; but instead of hanging about waiting for a miracle let the electric railway operator also get busy and pay serious attention to the splendid results which are being attained with the light-weight car already available for "more service at less cost."

Taking a Chance With Grave Civic Dangers

THE refusal of the Illinois commission to grant an increase in fare to the Chicago Surface Lines leads one to wonder where the security holders "get off" when a distinction amounting to about $44,000,000 is drawn between valuations for city purchase and for rate-making. It is strange that the commission arbitrarily struck out several important items on which the investors had been led to expect a reasonable return.

One of these items, for instance, is $8,192,750 which was added to capital account under the ordinances for "superintendence and conducting construction." The Illinois commission has from time to time approved for the Chicago companies bond issues which included 10 per cent for this item. Such approval must have been given with the knowledge that the companies would have to pay interest on the full amount of the securities issued. The subsequent action in eliminating these allowances must be at least confusing to investors.

The commissioners figure out to their satisfaction that business is picking up so well for the Chicago Surface Lines that a return of 7 per cent may be looked for on the reduced valuation. They concede that the management is not responsible for the small receipts for certain months in 1918, and that, on the contrary, the affairs of the company "appear to have been prudently and efficiently managed." This admission will not pay a return on the large amount of capital which the commission says is not used in public service.

We might dwell on the point that several other items which make up this $44,000,000 represent money actually paid for property once used for the benefit of the car riders. If cable lines and power houses became obsolete and the management on the arbitrary demand of the city scrapped this property so that its patrons might have a more modern system, fairness would seem to indicate that the invested capital which that property represented is still entitled to a return.

But what's the use? The case has been decided and the companies must struggle along until. perhaps, another valuation is made. If it should happen that this later valuation would show the system to be worth even more than the total existing capital account, we wonder if the Illinois commissioners will be bold enough to allow a reasonable return on the new total?

At a time when commission rule is on trial and when the solvency of utility corporations is so essential to the welfare of the nation, the Illinois commission might have given heart to the industry by some such temporary measures as Commissioner Lucey suggests in his minority opinion. Even a 6-cent fare would have given courage to capital while a thorough valuation of the properties was being made. Such emergency relief "would at least have justified itself as an insurance against possible grave civic and financial dangers." as one of the leading Chicago newspapers put it.

High Prices Will Remain—Face the Facts and Act

STOP looking backward, and do business! Such is the vital message of the National Prosperity Campaign to the American business man—a message which undoubtedly signalizes the best leadership of the day. This campaign, to which we have referred several times, is of national significance and essentiality, and short-sighted will be the business man who does not support it to his last ounce of energy.

Electric railways should not hesitate to join enthusiastically in the campaign, for not only does it possess among its leaders a prominent electric railway man, P. H. Gadsden, but also it has a basic principle—regarding the prolonged maintenance of the present high-price level—which is of peculiar interest to such carriers. The argument often made against fare increases has been that higher costs were only temporary and that security holders could with justice be compelled to bear present losses. This argument has been repeated with added emphasis since the armistice was signed, many seeming to believe that the cessation of hostilities should mean a sudden decline in prices to the pre-war level.

Regulatory bodies do not go so far astray in their economic thinking as does the general public, but even the commissions are inclined to be too hopeful regarding lower prices. For example, the Wisconsin Railroad Commission in recently denying a fare increase in Milwaukee stated that the last six months of 1918 included the period of highest operating costs and that reductions rather than further increases were likely to come. Similarly the Illinois commission in the Chicago Surface Lines case has just expressed the opinion that estimates of material costs "will not have that degree of permanency which entitles them to be considered as fixed elements in adjusting rates." But such predictions, even if accepted without qualification, should not suffice in rate cases. The time element should be more carefully considered.

When will the general price level drop near to the pre-war. mark? If this drop is a matter of a few months, the electric railway industry may survive without increased revenues—its crippled capacity for service and its diminished credit being, of course, negligible factors. The public may be too short-sighted to see, and commissions too optimistic to seek to prevent, such impairment of the industry, but neither the public nor the commissions can be so utterly stupid as to fail to realize that inadequate revenues and continued high prices for fifteen, twenty or more years would mean absolute ruin for the electric railway industry. Yet such an elapsed time for the continuance of the present high-price level is exactly what is in the mind of practically all leading economists.

The danger which they and the leaders of the National Prosperity Campaign would have every commissioner, railway operator and business man avoid is false reasoning from the particular to the general. Since the signing of the armistice the cost of living for American wage earners has declined 2.8 per cent; copper has dropped to the pre-war level, and pig lead is only 17 per cent above it. These, however, are reactions due to special causes, and, as pointed out elsewhere in this issue by Mr. Holden, the general course of prices since November bears out the theory that a new price level has been established which will not fall in the near future. The scarcity demand for commodities, the high cost of labor and the enormous inflation in the currency supply have operated to cause price increases similar to those during the Civil War. It was thirteen years after this war that prices returned near the pre-war level, and the differences between that situation and the present one are considered by reputable authorities to be such as will increase rather than lower the number of years required for price deflation.

The conclusion, therefore, is twofold. First, the commissions must face economic facts and substitute for a reverence of former prices a practical fare reckoning based on present costs. They must not sacrifice a vital industry to a baseless hope. Second, the electric railways, as rapidly as they are enabled to do so, should go ahead full speed with construction and production. Unified enthusiastic activity should be the watchword of all business.

High Price of Labor Should Stimulate the Use of Labor-Saving Devices

THERE are many devices in use and coming into use on electric railways that have demonstrated their ability to save labor. The present is the time for putting these devices to even more extended use than before, for labor is expensive and is going to remain so for a considerable time to come. It is therefore useless to defer the purchase of needed equipment in the hope that this equipment is going to be cheaper soon, because it is largely the high cost of labor that keeps up the cost of equipment, and by the time labor comes down in price the equipment will have more than paid for itself, if wisely selected.

These conditions pertain with respect to standard equipment, and even more so with regard to apparatus still in process of development. Take for example the automatic substation. While this has now reached a fair degree of standardization, still users are constantly devising improvements which are, when worthy of general adoption, incorporated by the manufacturers. This constant condition of improvement will naturally have a tendency to keep up the cost. A more general adoption of the automatic control principle will operate to bring down the price because parts can be manufactured in larger quantities. Of course the chief factor in keeping up the price of automatic substations, like everything else, is the high cost of labor. On the other hand labor is a large item of expense in manually-operated railway substations and will always remain so. Hence, the higher the cost of labor the more opportunity there is for the automatic substation to save operating costs. This explains why automatic control has made such satisfactory headway even under the stress of war-time opposition.

British Electrification as a National Project

THE creation of a Ministry of Ways and Communications for the United Kingdom is one of those bold departures and conceptions accelerated by the Great War and characteristic of Britain's new spirit of enterprise. Indeed, it is planned as one of the great steps toward making up for some of the dreadful wastage of the past four and one-half years. Duplication and unnecessary services are to be eliminated in one place and better means of transport and communication are to be introduced into other places. As a political experiment its success, apparently, will depend upon finding a succession of despots who are both benevolent and able, for the bill gives unprecedented power to the new minister.

However it is not with the political aspects of this change that we are now concerned, but with the effect of this concentration of transport control upon the fortunes of British steam railroad electrification. To all appearances, this effect will be more than good. Sir Eric Geddes, the proposed minister, is a friend of electrification. The bill drawn under his direction calls for a truly grandiose scheme of electric generation, distribution and use. In fact, if one were to judge from the popular newspapers, the electric foot-warmer will soon displace the habit of getting one's pre-breakfast tea in bed. In all seriousness, we would rather expect too little than too much from a greatly enhanced use of electricity, whether in transportation or other fields. It is hardly conceivable that all of the power stations and distribution systems are so inefficient as compared with the coming super-stations that they need be consigned to the scrap heap forthwith. In addition to the existing large turbine plants, it will no doubt be found desirable to tie in with a number of older ones that will be good for stand-by service for some years to come. It is indeed a ravishing dream to see a chain of stations, say with units of 50,000 kw., running within a radius of 30 miles everything from a main-line train to a cheese-paring machine; but it is not likely to prove so attractive when it is found that the difference in pounds of coal per kilowatt-hour efficiency will not cover the additional fixed charges. In brief, engineering must go hand in hand with common sense.

These thoughts on power generation and transmission are closely related to the most ticklish question of all—what system should be used? There will be delay enough in the temporary or permanent discarding of the plans of individual railroads without wasting years in argument as to what system should be universal, if so chimerical an idea is contemplated. Electrification cannot begin too soon or under more favorable conditions because, as the result of the war, considerable reconstruction of the permanent way is necessary in any event. It would be deplorable if the partisans for different systems were to repeat our own errors, all the more so as there is no longer any question about the reliability of any of the systems over which so many arguments have been fought.

At a distance of 3000 miles it may seem presumptuous to offer counsel. It is true that we lack all the facts, but we are at least as non-partisan as the man who said: "I'm neutral. I don't care who licks Germany, so long as she's licked." We don't care what system, or systems, are used to electrify Britain's railroads, so long as they are electrified. And it is this disinterestedness, based upon our experiences, that leads us to say: "Don't try to electrify everything to one pattern. There is a degree of bigness beyond which standardization can be a curse instead of a blessing. Do not fear to use one system for your great suburban areas, a second for your long main lines, a third for your long heavy grades. Perhaps you will find that, today, high-tension direct current meets a wider range of conditions than any other. Do not, therefore, despise the alternating-current systems whose pioneering made the raising of direct-current voltage imperative if it was to stay in the field. As electrical engineers and business men who have been given a great responsibility, you will ask but two questions: Is electrification of this particular track going to pay, and if it is, what kind of electrification will do the work at the lowest over-all cost?"

Supreme Court Rather Minimizes the Burdens of War-Time Operation

THE ruling of the United States Supreme Court in the Columbus case, noted in last week's issue, is a disheartening blow to electric railways in Ohio which had hoped for judicial relief from war burdens. The decision, however, is of local application on account of the peculiar limitations of governmental powers in that State.

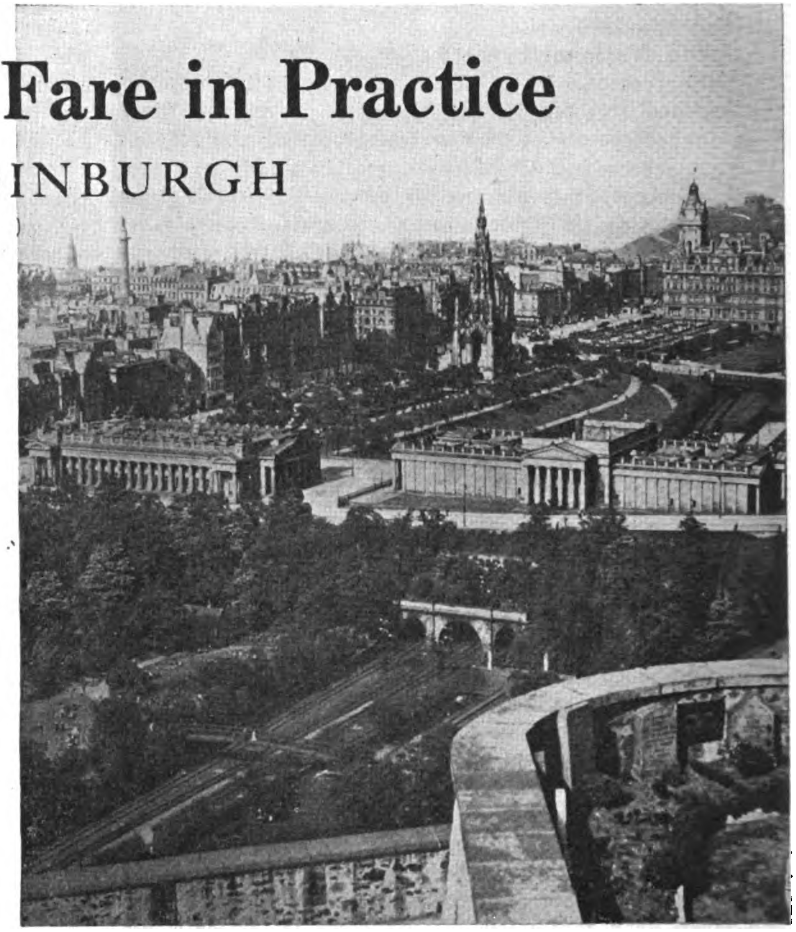
The Columbus Railway, Power & Light Company, confronted with seemingly impossible burdens of operating costs, desired to surrender its franchises because of the inadequacy of the stipulated fare. The court holds, however, that the contracts between the company and the city became mutually binding for the ordinance period notwithstanding the unforeseen difficulties which arose. The court maintained that the war and the resulting higher costs of operation did not constitute the *vis major* which judges frequently recognize as excusing non-performance because of impossibility. It admitted that the case involved a hard bargain but averred that "equity does not relieve from hard bargains simply because they are such."

Many may doubt that the contracting parties should reasonably be expected to have foreseen the difficulties arising out of operation under war conditions with a fixed fare. The court has ruled, however, and the company must seek another way out. Under the Ohio Constitution the jurisdiction of the Public Utilities Commission is limited by home-rule provisions, but the city of Columbus should lose no time in redrafting its contract with the company in accordance with far-sighted and constructive principles.

The decision, as regards its general applicability, concerns merely the right of surrender of the direct parties to a franchise, and not the right of the state to intervene. It in no way affects the principle, which has been enunciated by the United States Supreme Court in a number of cases, that rate-making, unless unmistakably given away, is part of the police power of the state to be exercised through the Legislature or its agent. In seven states the question of legislative or commission jurisdiction over franchise rates has not been determined. In the other cases of commission control, except in Ohio, New York, Michigan, Georgia, Colorado and Alabama, where the regulatory laws are defective or constitutional difficulties regarding home-rule are said to arise, the state can intervene to alter a franchise rate. The plight of the Columbus company is surely eloquent evidence of the wrongs that may ensue from an abridgement or imperfect use of the police power.

The Zone Fare in Practice

EDINBURGH



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EDINBURGH, LOOKING TOWARD PRINCE'S STREET AND SCOTT MONUMENT

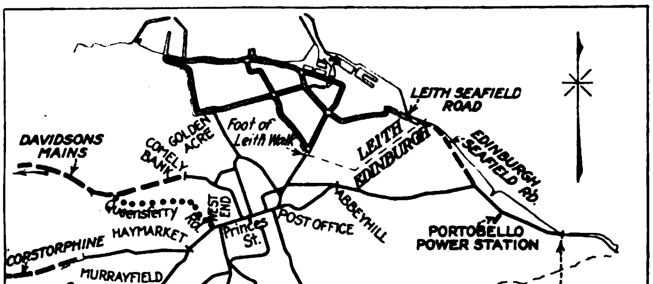
Edinburgh Is the Only British City that Can Vie with New York in Capacity of Tenements, These Buildings Being a Relic of the Time When the Ancient Capital of Scotland Was a Citadel Town—Delay in Extending the Suburbs in Modern Times Is Due Largely to the Limitations of the Cable System, which Shortly Will Be Electrified

BY WALTER JACKSON

ALMOST from the Middle Ages Edinburgh, so famous for its beautiful location, has had a less desirable degree of note because of its tall tenements, the highest and largest in the United Kingdom. The origin of these tenements is assignable to two chief influences: (1) The growth of the old-time city on the slopes and top of the hill on which the citadel or castle of defense was, and still is, located; (2) the imitation of the French "flats" idea at a time when Scotland and France were closely associated. At first many of the houses clustered between the Castle and Holyrood Palace were the homes of the nobility, and to this day some of the structures bear the ancient coats-of-arms. With the passing of a separate royal court, the original tenants gradually drifted away until the mansions of the wealthy had degenerated to the hovels of the poor.

It would be easy to find in the novels of Sir Walter Scott—almost the patron saint of Edinburgh—many an interesting description of the housing conditions in the city. It is doubtful, however, that anything more typical of its dwellings in the eighteenth century has been written than the following quotation from *Humphrey Clinker* by Tobias Smollett:

> The water is brought in leaden pipes from a mountain in the neighborhood to a cistern on the castle hill, whence it is distributed to public conduits in different parts of the city. From these it is carried in barrels on the backs of male and female porters up two, three, four, five, six, seven and eight pairs of stairs for the use of particular families.
>
> Every story is a complete house occupied by a separate family, and the stairway being common to all is generally left in a very filthy condition.


DAVIDSONS MAINS
GOLDEN ACRE
COMELY BANK
Foot of Leith Walk
LEITH SEAFIELD ROAD
LEITH
EDINBURGH
EDINBURGH SEAFIELD RD.
Queensferry Rd.
WEST END
Princes St.
POST OFFICE
ABBEYHILL
PORTOBELLO POWER STATION
HAYMARKET
CORSTORPHINE
MURRAYFIELD
GORGIE
SLAUGHTON
Junction with Musselburgh Tramways
CHURCHILL
SLATEFORD
NETHER LIBERTON
COLINTON
REDFORD BARRACKS
BRAID HILLS
BRAIDS
LIBERTON
COLINTON
Existing Edinburgh Tramways
Proposed Extensions
Existing Leith Tramways
Proposed Leith Extensions
Queensferry & Colinton Extns.

MAP OF EDINBURGH CORPORATION TRAMWAYS AND PROPOSED EXTENSIONS UNDER ELECTRIFICATION PLAN

Plenty of these structures are still standing, as will appear from the illustration on page 857 of a group of seven-story tenements on High Street. But it is no longer necessary for either male or female porters to carry water up the stairs. Nor are the stairways in a filthy condition, for they are now electrically lighted by the municipality, which also imposes a special tax for their periodical cleaning by an outside caretaker.

FLAT-LIVING HABIT LONG INGRAINED

According to J. A. Williamson, city architect, Edinburgh, the old habit of living in flats became so ingrained that it has continued down to the present day. The narrow closes and wynds (alleys) of olden times had no place in the new scheme, but four and five-story buildings *a la Glasgow* were still the customary thing. A specimen of these styles, as built in the Gorgie section of Edinburgh, is reproduced on page 857.

In a discussion on Jan. 8, 1919, Mr. Williamson said that for four and one-half years not one house for workingmen had been built because of the scarcity of labor and the high cost of material due to the war. Present labor and material conditions were such that private enterprise would not touch the building business except for costly private homes. Asked as to prewar conditions, he said that it would have been cheaper to live in the suburbs, making all due allowance for cost of transit, if the people could have been tempted to move by the provision of comfortable houses not too far out.

Unfortunately, however, little had been done in that direction. Years ago some model cottages had been put up by Mr. Cox, the gelatin manufacturer. A workmen's co-operative building society had also built some two-flat houses with separate entrances and located twenty-nine to the acre. The efforts of the municipal government itself during the past decades had centered on relieving the old buildings of their worst features.

GENERAL POST OFFICE AND WATERLOO PLACE, EDINBURGH

The city, Mr. Williamson continued, now owns 130 acres in the Gorgie district, which is now used chiefly for public markets but has ample space available for other purposes. It is intended to set aside a portion for manufacturing purposes with direct connection to steam railroad trackage and to use an area of about 50 acres on which to build fourteen two-flat houses to the acre in groups of four with gardens and other open spaces. A playground of 3 acres would separate the residential section from the markets and slaughterhouses. Diagrams relative to the proposed housing are presented on page 858.

Another site of 50 acres is in contemplation on the north side, negotiations with the owners now being under way. On the whole, the housing scheme is developing so extensively that the city is in negotiation for ground equivalent for the provision of about 3500 houses, the intention being to aim at about 10,000 altogether in the immediate future. This will involve about £6,000,000 of capital expenditure.

Land is acquired usually on the basis of a perpetual annual rental termed "feu," a survival of fuedal times. Land leased for farming purposes carries a very low rental compared with that for the same land to be improved with buildings. To prevent holders of such lands from charging a rental that would give them this unearned increment, Scottish municipalities are seeking the enactment of a law which would enable them to acquire existing open land without stating the purpose to which they intend to put it. Such freedom would be the first step in erecting houses at a total cost that would permit a reasonable return on the investment.

DIFFERENTIAL FARES HAVE NOT HINDERED SUBURBAN DEVELOPMENT

According to circulars of the Scottish Local Government Board, quoted by Mr. Williamson, it is agreed by the government to limit the expenditure on the part of the local authorities to 1d. per pound of the local taxes, the State making up the rest of the annual loss on housing schemes. In Edinburgh the 1d. in the pound produces on the assessable value of the city about £12,000 to £13,000, so that Edinburgh would be required to build houses up to this limit before government aid was available at all. The government plan provides that not more than twelve houses shall be placed on an acre and that each shall have at least three rooms.

The matter of housing has been discussed in the foregoing wealth of detail to bring out the fact that there are other factors than rate of fare or amount of transportation to cause or continue congestion. In the case of Edinburgh, there are grounds for believing that the adoption of a cable system and failure to electrify it years ago have had a discouraging influence on building development. Nevertheless, the majority of the Council, judging by their recent (January, 1919) rejection of the universal fare plan of Councillor MacLaren, as mentioned later, do not hold the system of differential fares responsible to any tangible degree.

The relations of the city with the present operating company, the Edinburgh & District Tramways, have not been particularly cordial during the past decade or so. The company knew that the twenty-one-year lease, which expires on June 30, 1919, would not be renewed because of dissatisfaction with the service. Hence the property has been allowed to deteriorate. This is the case not only with the cars, which are owned by the company, but also with the right-of-way and track, which are owned by the city. Because of the latter circumstance, arbitration proceedings are being held to fix the extent of the reimbursement to which the city is entitled when the new municipal management, the Edinburgh Corporation Tramways, takes over the property on July 1. Aside from the conditions arising out of the franchise termination, the war made it impossible to get new cables, so that in some instances lines had to be shut down for a week at a time while repairs were being made.

All in all, Edinburgh with a population of 300,000 and an area of 19 square miles had only 48 miles of single track or 25¾ miles of line. All is cable except

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To R. STUART PILCHER has come the unique opportunity of constructing and operating a street railway system *de novo* in the year 1919! As the reasons for the supersession of Edinburgh's antiquated cable system by electric cars and gas buses are set forth in the accompanying article, one need mention only why Mr. Pilcher is exceptionally qualified to deliver the goods. As general manager of the Aberdeen Corporation Tramways, with which he was connected for twelve years, he introduced a number of car comforts that are associated more with American than British practice. As an operator, he had great success with a combination of short-distance stage and full-route universal fares that appears well suited for towns of medium size; and he demonstrated that the prepayment system is by no means impracticable where more than one class of fare is charged. His memorandum on fares, quoted in the article, is ample evidence that he is a keen observer of American practices and tendencies. Mr. Pilcher visited the United States and Canada shortly before the war. One other direction in which he has been a leader is the use of power-checking instruments on cars, Aberdeen having been one of the first to install them as early as 1908. All in all, one may rightly expect that the Edinburgh Corporation Tramways within the next two or three years will become the embodiment of the best practices in the inter-operation of tramways and buses.

for 2 miles of electric overhead construction built, between Ardmillanter and Slateford, because of the refusal of the city to permit any further cable extensions. At best, the cable system had reached the limit of its usefulness.

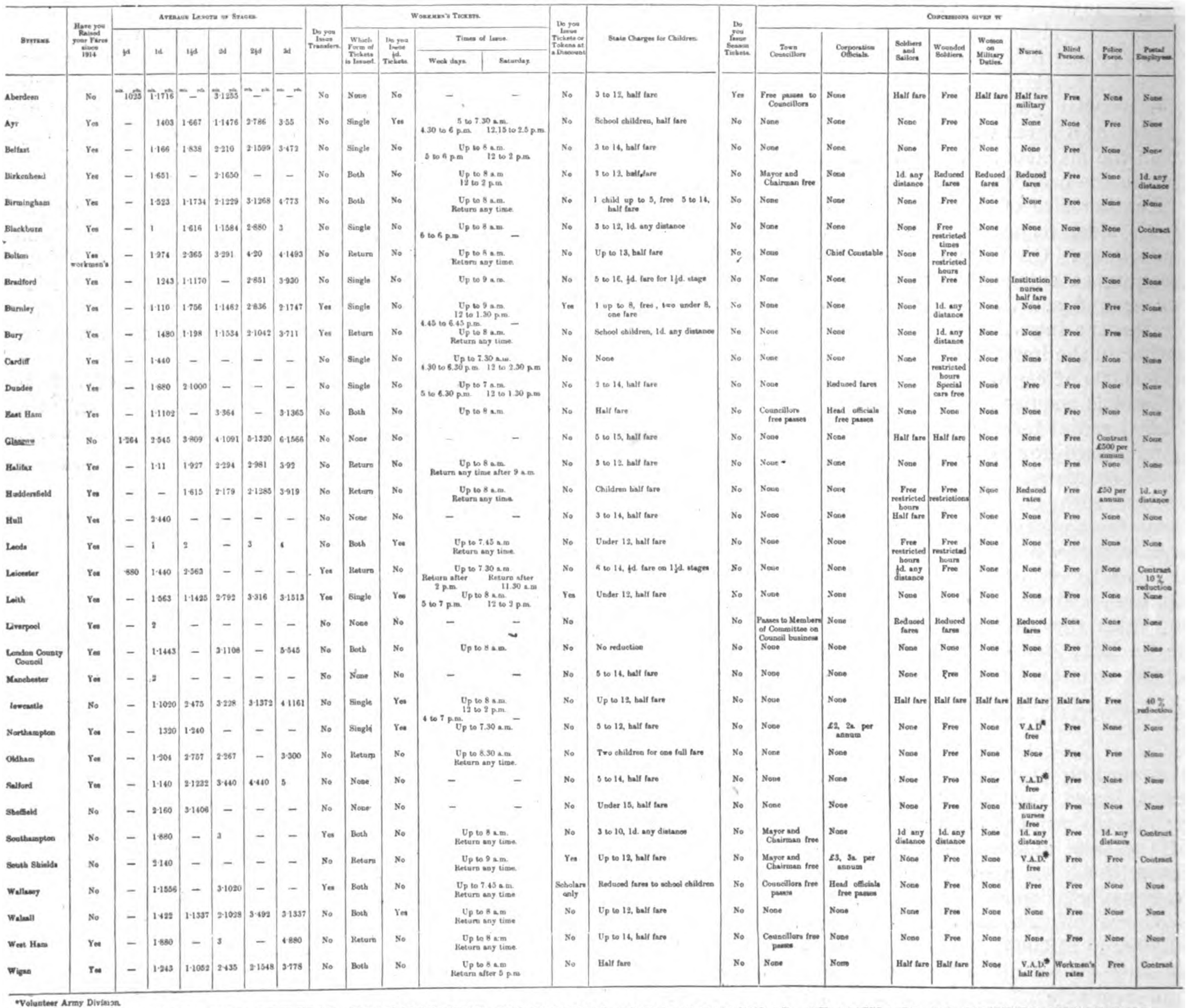
With all the handicaps imposed upon transportation, it is remarkable that the tramways should have carried 70,687,148 passengers with 6,139,368 car-miles or eleven and one-half passengers per car-mile for the year ended Dec. 31, 1917. The receipts were £375,987, and the operating expenses £228,759. The city's share of this, equivalent to 7 per cent of the capital expenditure, was £113,010. The receipts per car-mile during 1917 averaged 14.69d., and the expenses per car-mile 8.93d. The estimated gross earnings for 1918 are £400,000.

The original zone fares were raised in 1916 by from 20 to 50 per cent by converting the 1½d. fare to 2d., the 2½d. fare to 3d. and some of the 2d. fares to 3d. The penny fare was not touched. Through this increase in fares, revenue jumped £60,000 to a total of £317,869 as compared with 1915. Even the number of passengers increased, at least apparently, from 61,000,000 to 70,000,000. The term "apparently" is used advisedly because careless conductors would issue two 1d. tickets instead of a single 2d. ticket, etc., thus obscuring the number of passengers. The present rates are as follows: For 1d., 1.29 miles; for 2d., 2.47 miles, and for 3d., 4.22 miles.

Universal Fare Not Favored for Edinburgh

It would be unfair to state that the United Kingdom does not contain believers in the American universal fare. One of them is Councillor W. J. MacLaren, who is an earnest advocate of better housing and who believes that a universal fare, say 1½d., would be a powerful influence in spreading the Edinburgh population. In a discussion which the writer had with Councillor MacLaren, he referred to Winnipeg as an example of what a universal fare had done to distribute the population over a wide area. Despite the fact that the Councillor lived in Winnipeg for several years, it may be respectfully submitted that the rapid and widespread growth of that great prairie city was due to more powerful causes than the universal fare. Likewise, the contracted area of Edinburgh can hardly be blamed on the zone fare in view of its topography and history

Fares, Stages, Etc., Answers to Queries from Thirty-four Municipal Undertakings



Systems.	Have you Raised your Fares since 1914	Average Length of Stages.						Do you Issue Transfers.	Workmen's Tickets.				Do you Issue Tickets or Tokens at a Discount	State Charges for Children.	Do you Issue Season Tickets.	Concessions given to								
		½d	1d.	1½d	2d	2½d	3d		Which Form of Tickets is Issued.	Do you Issue ½d. Tickets.	Times of Issue. Week days.	Times of Issue. Saturday.				Town Councillors	Corporation Officials.	Soldiers and Sailors	Wounded Soldiers.	Women on Military Duties.	Nurses.	Blind Persons.	Police Force.	Postal Employees.
		mls. yds.	mls. yds.	mls. yds.	mls. yds.	mls. yds.	mls. yds.																	
Aberdeen	No	1025	1·1716	—	3·1255	—	—	No	None	No	—	—	No	3 to 12, half fare	Yes	Free passes to Councillors	None	Half fare	Free	Half fare	Half fare military	Free	None	None
Ayr	Yes	—	1403	1·667	1·1476	2·786	3·55	No	Single	Yes	5 to 7.30 a.m. 4.30 to 6 p.m.	12.15 to 2.5 p.m.	No	School children, half fare	No	None	None	None	Free	None	None	None	Free	None
Belfast	Yes	—	1·166	1·838	2·210	2·1599	3·472	No	Single	No	Up to 8 a.m. 5 to 6 p.m	12 to 2 p.m.	No	3 to 14, half fare	No	None	None	None	Free	None	None	Free	None	None
Birkenhead	Yes	—	1·651	—	2·1650	—	—	No	Both	No	Up to 8 a.m	12 to 2 p.m	No	1 to 12, half fare	No	Mayor and Chairman free	None	1d. any distance	Reduced fares	Reduced fares	Reduced fares	Free	None	1d. any distance
Birmingham	Yes	—	1·523	1·1734	2·1229	3·1268	4·773	No	Both	No	Up to 8 a.m. Return any time.		No	1 child up to 5, free 5 to 14, half fare	No	None	None	None	Free	None	None	Free	None	None
Blackburn	Yes	—	1	1·616	1·1584	2·680	3	No	Single	No	Up to 8 a.m. 6 to 6 p.m	—	No	3 to 12, 1d. any distance	No	None	None	None	Free restricted times	None	None	None	None	Contract
Bolton	Yes workmen's	—	1·974	2·365	3·291	4·20	4·1493	No	Return	No	Up to 8 a.m. Return any time.		No	Up to 13, half fare	No	None	Chief Constable	None	Free restricted hours	None	Free	Free	None	None
Bradford	Yes	—	1243	1·1170	—	2·851	3·930	No	Single	No	Up to 9 a.m.		No	5 to 16, ½d. fare for 1½d. stage	No	None	None	None	Free	None	Institution nurses half fare	Free	None	None
Burnley	Yes	—	1·110	1·756	1·1462	2·836	2·1747	Yes	Single	No	Up to 9 a.m. 4.45 to 6.45 p.m.	12 to 1.30 p.m. —	Yes	1 up to 8, free, two under 8, one fare	No	None	None	None	1d. any distance	None	None	Free	Free	None
Bury	Yes	—	1480	1·198	1·1534	2·1042	3·711	Yes	Return	No	Up to 8 a.m. Return any time.		No	School children, 1d. any distance	No	None	None	None	1d. any distance	None	None	Free	Free	None
Cardiff	Yes	—	1·440	—	—	—	—	No	Single	No	Up to 7.30 a.m. 4.30 to 6.30 p.m.	12 to 2.30 p.m	No	None	No	None	None	None	Free restricted hours	None	None	None	None	None
Dundee	Yes	—	1·880	2·1000	—	—	—	No	Single	No	Up to 7 a.m. 5 to 6.30 p.m.	12 to 1.30 p.m	No	3 to 14, half fare	No	None	Reduced fares	None	Special cars free	None	Free	Free	None	None
East Ham	Yes	—	1·1102	—	3·364	—	3·1365	No	Both	No	Up to 8 a.m.		No	Half fare	No	Councillors free passes	Head officials free passes	None	None	None	None	Free	None	None
Glasgow	No	1·264	2·545	3·809	4·1091	5·1320	6·1566	No	None	No	—	—	No	5 to 15, half fare	No	None	None	Half fare	Half fare	None	None	Free	Contract £500 per annum	None
Halifax	Yes	—	1·11	1·927	2·294	2·981	3·92	No	Return	No	Up to 8 a.m. Return any time after 9 a.m.		No	3 to 12. half fare	No	None *	None	None	Free	None	None	Free	None	None
Huddersfield	Yes	—	—	1·615	2·179	2·1285	3·919	No	Return	No	Up to 8 a.m. Return any time.		No	Children half fare	No	None	None	Free restricted hours	Free restrictions	None	Reduced rates	Free	£50 per annum	1d. any distance
Hull	Yes	—	2·440	—	—	—	—	No	None	No	—	—	No	3 to 14, half fare	No	None	None	Half fare	Free	None	None	Free	None	None
Leeds	Yes	—	1	2	—	3	4	No	Both	Yes	Up to 7.45 a.m Return any time.		No	Under 12, half fare	No	None	None	Free restricted hours	Free restricted hours	None	None	Free	None	None
Leicester	Yes	·880	1·440	2·563	—	—	—	Yes	Return	No	Up to 7.30 a.m. Return after 2 p.m.	Return after 11.30 a.m	No	6 to 14, ½d. fare on 1½d. stages	No	None	None	½d. any distance	Free	None	None	Free	None	Contract 10 % reduction
Leith	Yes	—	1·563	1·1425	2·792	3·316	3·1513	Yes	Single	Yes	Up to 8 a.m. 5 to 7 p.m.	12 to 2 p.m.	Yes	Under 12, half fare	No	None	None	None	None	None	None	Free	None	None
Liverpool	Yes	—	2	—	—	—	—	No	None	No	—	—	No		No	Passes to Members of Committee on Council business	None	Reduced fares	Reduced fares	None	Reduced fares	None	None	None
London County Council	Yes	—	1·1443	—	3·1108	—	5·545	No	Both	No	Up to 8 a.m.		No	No reduction	No	None	None	None	None	None	None	Free	None	None
Manchester	Yes	—	2	—	—	—	—	No	None	No	—	—	No	5 to 14, half fare	No	None	None	None	Free	None	None	Free	None	None
Newcastle	No	—	1·1020	2·475	3·228	3·1372	4·1161	No	Single	Yes	Up to 8 a.m. 4 to 7 p.m.	12 to 2 p.m. —	No	Up to 12, half fare	No	None	None	Half fare	Half fare	Half fare	Half fare	Half fare	Free	40 % reduction
Northampton	Yes	—	1320	1·240	—	—	—	No	Single	Yes	Up to 7.30 a.m.		No	5 to 12, half fare	No	None	£2, 2s. per annum	None	Free	None	V.A.D* free	Free	None	None
Oldham	Yes	—	1·204	2·757	2·267	—	3·300	No	Return	No	Up to 8.30 a.m. Return any time.		No	Two children for one full fare	No	None	None	None	Free	None	None	Free	Free	None
Salford	Yes	—	1·140	2·1232	3·440	4·440	5	No	None	No	—	—	No	5 to 14, half fare	No	None	None	None	Free	None	V.A.D* free	Free	None	None
Sheffield	No	—	2·160	3·1406	—	—	—	No	None	No	—	—	No	Under 15, half fare	No	None	None	None	Free	None	Military nurses free	Free	None	None
Southampton	No	—	1·880	—	3	—	—	Yes	Both	No	Up to 8 a.m. Return any time.		No	3 to 10, 1d. any distance	No	Mayor and Chairman free	None	1d any distance	1d. any distance	None	1d. any distance	Free	1d. any distance	Contract
South Shields	No	—	2·140	—	—	—	—	No	Return	No	Up to 9 a.m. Return any time.		Yes	Up to 12, half fare	No	Mayor and Chairman free	£3, 3s. per annum	None	Free	None	V.A.D.* free	Free	Free	Contract
Wallasey	No	—	1·1556	—	3·1020	—	—	Yes	Both	No	Up to 7.45 a.m. Return any time		Scholars only	Reduced fares to school children	No	Councillors free passes	Head officials free passes	None	Free	None	Free	Free	None	None
Walsall	No	—	1·422	1·1337	2·1028	3·492	3·1337	No	Both	Yes	Up to 8 a.m Return any time		No	Up to 12, half fare	No	None	None	None	Free	None	None	Free	None	None
West Ham	Yes	—	1·880	—	3	—	4·880	No	Return	No	Up to 8 a.m Return any time.		No	Up to 14, half fare	No	Councillors free passes	None	None	Free	None	None	Free	None	None
Wigan	Yes	—	1·243	1·1052	2·435	2·1548	3·778	No	Both	No	Up to 8 a.m Return after 5 p.m		No	Half fare	No	None	None	Half fare	Half fare	None	V.A.D.* half fare	Workmen's rates	Free	Contract

*Volunteer Army Division.

FARES, STAGES AND SPECIAL CONCESSIONS ON THIRTY-FOUR MUNICIPAL TRAMWAYS IN UNITED KINGDOM.

DECEMBER. 1918

as outlined earlier in this article. It is safe to assert that any houses built by the city or anyone else will be rented fast enough provided good transportation is furnished to reach them—and such additional transportation is a part of the electrification plans of the city, as will be seen.

The suggestion of Councillor MacLaren for a universal fare with transfers was considered carefully in a memorandum of Nov. 18, 1918, prepared by R. Stuart Pilcher, general manager of the new Edinburgh Corporation Tramways. In this, Mr. Pilcher pointed out the following:

The universal fare system is based upon giving the greatest advantage to the regular and long-distance passenger. On the other hand, the short-distance passenger is not encouraged to ride by this system. The cash fare of 5 cents is distinctly heavy, and even with the discount it does not induce short-distance traffic. Persons who do ride for short distances—and they are considerable—have to pay for the long-distance rider. In fact, that is the principle of this system of fares. It is generally recognized that passengers can travel only so far for a particular fare, after which they are carried at less than cost price and thus at a loss.

The latest developments in America with reference to the fare systems are very interesting and have a direct bearing upon the question under consideration. Of recent years, and particularly since 1914, the American undertakings have been in financial difficulties. The working costs in different directions have been increasing, but the revenue has not been increasing in the same ratio. It has been found that the 5-cent basis for the universal fare was insufficient, and efforts were made to raise the basis. In some cases the public service commissions, which control the fares, agreed to the fare being raised to 6, 7 and 8 cents, but this is naturally most unpopular, especially with the short or intermediate distance passengers, whom it directly discourages. Efforts were also made to charge for transfers, and in many cases transfers are now charged for at the rate of 2 or 3 cents.

OLD STYLE SIX- AND SEVEN-STORY FLATS IN HIGH STREET, EDINBURGH

MODERN STONE FOUR-STORY FLAT IN GORGIE SECTION, EDINBURGH

These expedients, however, were not sufficient to meet the rise in working costs. In order to overcome this difficulty, and to adopt a reasonable way of raising additional revenue, zones are now being introduced, the first zone in the center of the city being on the general fare basis of 5 cents. Additional zones are created toward the suburbs and into the outlying districts, the charge usually being at the rate of 2 cents for each zone entered. The introduction of zones in conjunction with prepayment means that the passengers going beyond the first zone must either have tickets provided showing the particular zones to which they are entitled to travel, or have the fares collected again as the car enters each new zone. I believe that the introduction of zones will mean the adoption of tickets, and this will do away with much of the advantage of the pay-as-you-enter system.

The universal system has been found to be wanting in flexibility, and it has also been realized by the tramway authorities that a large proportion of the passengers residing in the suburbs are being carried under cost price. The recent modifications in the system of fares in America, which I have described, make their system very similar to the European system, except that it does not provide for short-distance traffic by smaller cash fares than 5 cents.

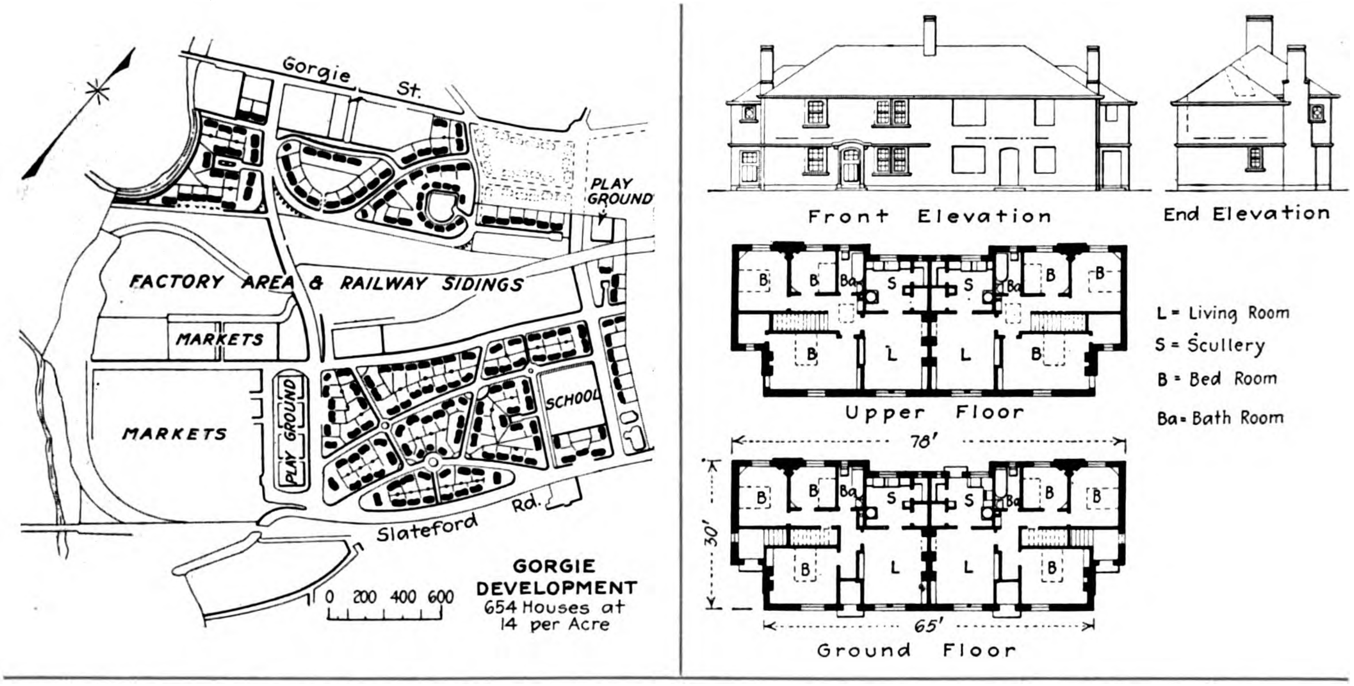
The system of fares known as the zone system is in universal use in this country. The tramway systems are divided up into 1d., 1½d. and 2d. stages, the principle of these fares being that passengers shall pay for their ride in proportion to its length. As a rule, the longer the ride the cheaper the rate of travel becomes. In pre-war days ½d. fares were introduced on most of the tramway undertakings; these covered rides varying in length from 600 to 1700 yd. Tramway managers are not in agreement as to the wisdom of introducing ½d. fares, but when restricted to distances which do not interfere with the revenue from penny fares, these fares bring in extra revenue and are an undoubted public convenience. Half-penny fares have been abolished on most systems during the period of the war. In some undertakings the zone fares are rather complicated owing to the multiplicity of stages, which are likely to baffle both the public and the conductors. On the other hand, the stages can be arranged on a simple plan to meet the requirements of both short and long-distance passengers.

The universal fare system could be applied to Edinburgh as suggested in Councillor MacLaren's memorandum, by arranging for the cash fare to be 1½d., ordinary tickets to be sold at five for 6d. or ten for 1s. It would, however, be necessary to give greater discounts to workmen and children than to the ordinary passenger as is done in the American system. I have taken the figures for the Winnipeg undertaking given in the memorandum mentioned. If similar discounts were given in Edinburgh, the average fare obtained would only be 1.19d. per passenger, whereas in 1917 the average fare for Edinburgh was 1.27d. per passenger. This is a difference of 0.08d. per passenger, and it would be equivalent to a decrease in receipts of £23,562,7s.7d. in the year.

In order to obtain the same revenue, it would therefore be necessary either to reduce the discount to workmen and children below that given in Winnipeg or to raise the cash fares higher than 1½d. Under this system of fares, workmen and children would be required to pay the same cash fare as ordinary passengers. There is no doubt that most of the regular passengers would provide themselves with discount tickets, but what of the poorer classes, many of whom ride infrequently? Would they be prepared to buy books of tickets for themselves and their children?

On the assumption that the 1½d. rate was sufficient and was adopted for the cash fare, there would be, however, some important difficulties in operating it. In the first place, a 1½d. fare is very inconvenient, as about 70 per cent of the cash tendered by passengers would require change. Secondly, a duplicate set of tickets would have to be kept by conductors, one set for cash payments and the other set for discount tickets. This would complicate the conductor's work considerably. Pay-as-you-enter cars with a universal system would, of course, do away with the necessity for tickets, but prepayment would require considerable alteration in the existing rolling stock, and this is assuming that the public would be so pleased with the new system of fares that they would give the necessary co-operation which the prepayment of fares requires.

I am in complete agreement with the objects which Councillor MacLaren aims at, viz., the provision of cheap, rapid and comfortable transit facilities to the outskirts of the city. I fully realize the importance of this question in relation to the provision of suitable dwellings away from the present congested city, but I believe that these facilities can be best obtained by adhering to the zone system of fares, rather than by changing to the universal fare system, which in America is being modified on the zone principle. At the same time I do not suggest that the present scheme of stages in use in Edinburgh is suitable to develop long-distance traffic. The scheme would need to be simplified by reducing the number of stages, and aiming rather at a cheap penny fare radiating from the center. This would not preclude the provision of facilities to give encouragement to short-distance traffic, which, I believe, the Edinburgh public will require in the near future.



LAYOUTS FOR PROPOSED EDINBURGH HOUSING DEVELOPMENT AND SPECIMEN FOUR-ROOM, TWO-FLAT HOUSE EACH FLAT HAVING AN INDEPENDENT DOOR

Mr. Pilcher, it may be added, has had considerable personal experience with the prepayment system applied to zone-fare collection, having worked out a plan which was in use at Aberdeen for several years. In that city the method of fare charging is practically a combination of the zone and universal fare principles. As described in the April 26 article on Aberdeen, a universal fare of 1d. is charged for a ride from the center of the city to the end of any line, but in addition thereto a smaller fare (½d.) is in vogue for rides of stages up to 0.6 mile. The table given on page 856 prepared by Mr. Pilcher, gives a valuable summary of fares and stages on thirty-four municipal tramways in the United Kingdom.

During February, 1919, Mr. Pilcher presented to the tramways committee of the Council a report covering electrification and extensions of the present lines, following their acquirement for operation after June 30. After showing that the cable system is too inefficient to be retained, the report discusses the merits of span-wire, center-pole, side-pole and bracket-arm construction, it having already been stated by Messrs. Brodie, Hamilton and Campbell, consulting engineers, that the overhead electric system was generally better for Edinburgh and its suburban area than conduit or surface-contact systems or self-propelled vehicles like motor buses. Except for Leith Walk and Princes Street, span-wire construction, attached to rosettes where possible, is recommended. For Leith Walk, with is 69 ft. wide, it is suggested that the existing lighting poles be replaced by a center pole construction which will carry both lighting and railway circuits. For Princes Street, which is one of the great "show" streets of Europe, Mr. Pilcher recommends artistic side poles with bracket arms.

Conversion and reconstruction should be carried out in sections to avoid prohibitive expense and to permit utilization of all existing buildings. About 250 new cars would be required, and these should average say sixty seats each. The cars should be vestibuled for the protection of the motormen, and they should be provided with extra entrances and exits for use during busy times. Magnetic track brakes should be provided on all cars, but cars for heavy grades should also have special mechanical brakes. A double-deck car seating sixty passengers does not need double trucks. A single truck with a wheelbase of 7 ft. to 8 ft. would give steadiness and would traverse the curves with perfect freedom. It would run with less noise, incur less wear and tear, and demand less energy than double trucks. These advantages offset the easier running of double trucks over curved track.

The present cable routes are entirely within the city limits, but in two cases parliamentary sanction has been obtained for extensions beyond the boundaries and additional powers will be requested, particularly for through running with the Leith Tramways. Leith is the harbor of Edinburgh, although a separate municipality. The extensions proposed are shown on the map on page 854. They total 7.24 miles of line, aside from later extensions for districts like Colinton.

As the proposed tramway extensions could not be constructed for two years at the earliest, Mr. Pilcher recommends their temporary operation with motor buses. To that end, and the possible development of other bus services, it is desirable that the city should apply for parliamentary powers to operate motor buses in conjunction with the tramway system outside the boundaries. Powers to operate within the city already exist. The immediate purchase of a few motor buses is urged as a supplement to the existing inadequate and unreliable cable service. Plans have also been approved for the enlargement of the Portobello Station (lighting, power and railway) from 10,000 kw. to 30,000 kw. capacity.

From the foregoing résumé of the plans for Edinburgh's electrification, it is obvious that a reasoned effort will be made to give the people the best possible service in the most efficient way, whether by the electric car or the petrol omnibus, and all under one management to secure proper co-ordination.

Desirable Characteristics in Tramway Men

IN A PAPER delivered before the Institution of Electrical Engineers of Great Britain an analysis of the characteristics of tramway engineers and others is given. The estimate of qualities needed by certain grades of tramway officials follows:

	Faculties					
	Percentages in All Cases					
Grade	Financial	Commercial	Technical	Custodianship	Bookkeeping	Administrative
General manager	10	5	25	5	5	50
Chief engineer	2½	5	40	2½	5	45
Power station engineer	..	5	40	10	10	35
Assistant power station engineer	..	5	45	10	10	30
Charge shift engineer	..	2½	82½	5	5	5
Foreman	..	..	85	5	2	8
Traffic manager	5	10	10	15	15	45
Development superintendent	5	35	5	..	30	25
Operation superintendent	5	15	10	25	10	35
Divisional traffic superintendent	5	15	10	25	10	35
Permanent way engineer	5	10	35	10	5	35
Assistant permanent way engineer	5	5	30	20	5	35
Foreman	..	5	50	20	..	25

American Engineering Standards Association Proposed

Dr. E. B. Rosa Explains Plan and Purpose of the Engineering Standards Committee and Its Projected Expansion

In the May 1 issue of *Engineering News-Record*, Dr. E. B. Rosa, chief physicist, United States Bureau of Standards, gives at considerable length the first public explanation of the reasons for the widening of the organization of the American Engineering Standards Committee into the proposed American Engineering Standards Association. Some of the principal points in the article are covered in the following paragraphs. This association, if formed, will provide for representation of all societies interested in engineering standards, as well as the appropriate governmental bureaus.

NO INTERFERENCE WITH SOCIETY INITIATIVE IS PROPOSED

The cardinal principles of the proposed American Engineering Standards Association are fair play and co-operation. Each society retains its integrity and initiative, and yet recognizes the existence and the rights of others; each society or government body manages certain work of research and standardization itself as now, but with the co-operation of representatives of other agencies invited to participate because of their interest in the subject and the information they can furnish.

The authority of the societies, which they enjoy by virtue of the representative character of the men composing their committees and the quality of their work, will remain undisturbed by the new organization. The Engineering Standards Committee, which will attend to the detail work of the Standards Association, will approve a standard because it is certified by some sponsor society and its co-operating committee, not because the central committee has itself examined it and passed an independent judgment upon it, which that committee will not attempt to do. The quality standards of the American Society for Testing Materials, the electrical standards of the American Institute of Electrical Engineers, the codes and standards of the Bureau of Standards, will derive their authority largely from the reputation of the sponsor bodies that prepare and certify them. They will, however, possess the added advantage that the Engineering Standards Committee, made up of representatives of all engineering and commercial interests and the government, will certify that the procedure of the committee has been complied with, that all interests concerned have been heard and there is every reason for accepting the standard and putting it into general use.

ASSOCIATION WOULD ACT AS A STANDARDIZATION CLEARING HOUSE

In addition to a few conspicuous societies and government departments concerned in the making of standards, there are scores of others that co-operate and to some extent initiate such work. Heretofore each has had to find out for itself what work other societies were doing or contemplating, and establish connections as best it could for co-operation or for adjusting matters of conflict. There has been no central agency to keep a record of all standardization work in progress or being organized, to assist in securing the proper degree of co-operation and to avoid conflict and duplication of effort. The need for such a central co-ordinating agency has been felt for years; it was only a question of how it should be realized. The present committee has not yet attempted to meet this need. The reorganization proposed looks toward accomplishing this important result in an adequate manner.

The present Engineering Standards Committee is composed of fifteen men of the highest standing who represent five leading engineering societies; it was planned also to have representatives of the government. To provide a still broader representation it is now proposed to provide for representation of all organizations and government departments interested in the preparation of engineering and industrial standards. The larger societies should, of course, have a larger number of representatives than the smaller. Since there are many scores of societies and governmental agencies that may be expected to desire representation in such an organization, it would obviously soon become too large for a working standards committee. The evident procedure was to call the large representative body an association instead of a committee, and let there be formed within the association a standards committee.

ONE SUGGESTION FOR A WORKING ORGANIZATION

One plan for the new organization provides for ten divisions of engineering and industrial organizations and two representing the government, as follows:

1. Electrical engineering and electrical industries.
2. Mechanical engineering and allied industries.
3. Mining and metallurgy and allied industries.
4. Civil engineering, architecture and building.
5. Chemical engineering and chemical industries.
6. Materials of construction (A. S. T. M. division).
7. Miscellaneous manufacturers.
8. Steam and electric transportation.
9. Automobiles, aircraft and other automotive vehicles.
10. Fire protection and safety engineering.
11. Federal bureaus and commissions.
12. Associations of state and municipal agencies.

The divisions would contain in some cases five to ten and in other cases as many as twenty or more national societies and manufacturers' organizations having a certain common interest.

Most of the business of the Standards Committee would probably be done by an executive committee and the paid general secretary and assistant secretaries acting under it. The various sections of the Standards Committee would be advisers to the executive committee on matters pertaining to their respective subjects. The Standards Committee would report annually to the American Engineering Standards Association, which, as a great self-determining national body, would authorize changes of procedure, provide for the selection of the Standards Committee and approve its budget and plans. Such an organization would be businesslike and effective, and as simple as that of any large national organization. The office staff should include some competent editors and draftsmen to assist in putting standards into good form for publication, in as uniform style as possible.

It would be desirable for the association to publish all standards prepared under its supervision in a uniform edition, fully indexed, and thereby make them readily available at small expense to the general public. In connection with such publication, they would be carefully studied to see whether there were conflicts or inconsistencies among them, and useful references would be made from one code or standard to another. Such publication in uniform style, with explanatory footnotes and cross-references, would be of enormous value. It would be the greatest step ever taken toward general acceptance and national uniformity in engineering and industrial standards. This would, of course, not interfere with the publication by each society of its own work in its proceedings.

BUDGET OF THE COMMITTEE

The American Engineering Standards Association should have an annual income of not less than $50,000, in addition to the cost of publishing standards, which work would be self-supporting. This income would be derived from a large number of memberships in the association. These memberships would not be personal, but every member would represent some engineering or industrial organization or government department. If one member were appointed for every 500 members of an engineering society, and a membership fee of $50 were paid, this would amount to 10 cents per year per member of such society, and would not be a heavy tax for so important a matter. It would yield $1,000 (with twenty members appointed to the association) from a society of 10,000 members, and would give $50,000 per year when the association had 1000 members. As yet, however, no provision has been made for a large membership, and this proposal is only a suggestion for future consideration.

PROPOSED ENGINEERING STANDARDS BODY SHOULD BE STUDIED IN DETAIL AND AS A WHOLE

The matter is of great and far-reaching importance, and there is no need for haste in coming to a conclusion. Full and sympathetic consideration should be given to the question. If anyone doubts the wisdom of the proposed plan, he should attempt to formulate a better one for accomplishing the end in view. Fortunately, there is no conflict of interest to confuse the issue. Everyone desires to see engineering and industrial standardization promoted. Everyone desires to see a large degree of co-operation in such work among the various societies and between such societies and governmental agencies. Everyone wishes to see fair play, with the recognition of the rights of all, and to discourage the spirit of autocracy either in engineering societies or in government departments. Since we are in full accord as to all the ends in view, it is only a question of method; and when the circumstances are understood alike by all, it is believed that full agreement will readily be reached. The members of the American Engineering Standards Committee have recognized the logic of the situation, and have proposed a wise and generous action.

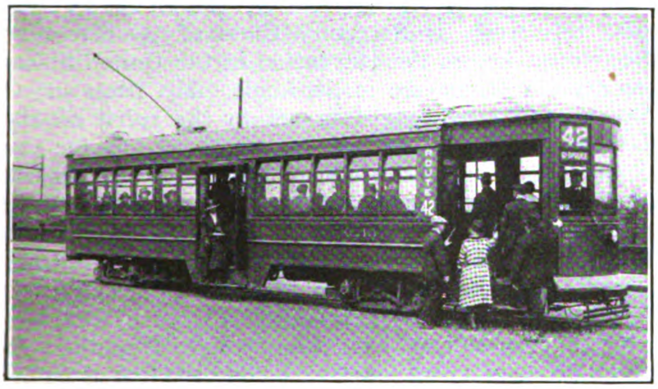
They have outlined a plan, for presentation to the founder societies, whereby the present organization can proceed with business at once but take in new organizations as they apply and qualify (when the constitution is amended), and when the membership has increased sufficiently to justify it, divide up into divisions and create a smaller Standards Committee with a central executive committee. It will thus gradually become the great national body it should be.

Post-Payment Center-Exit Car in Philadelphia

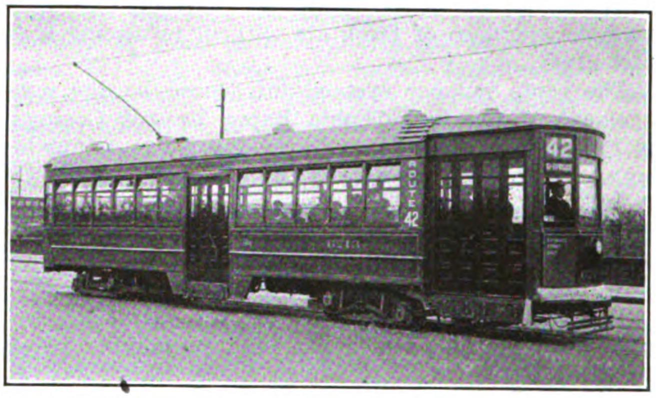
P. R. T. Is Trying Out "Public Service" Car Preliminary to Remodeling 1500 Near-Side Cars to Center-Exit Type

THE Philadelphia Rapid Transit Company has in experimental operation a new type of near-side car in which passengers enter by a double passageway on the front platform and leave by a double-door center exit. The conductor's position is at the center exit and all fares are paid as passengers leave. The new type has been christened the "public service" car.

The use of the near-side car, which was introduced as the Philadelphia standard in 1911, practically eliminated boarding and alighting accidents, as both entrance and exit were by the front platform directly under the supervision and control of the motorman. The perfection of automatic door-control devices, however, by means of which premature starting is prevented until all doors are safely closed, has led the Philadelphia management to consider the practicability of changing the exit to the center and putting the control of the exit doors in the hands of the conductor.



ENTERING AND LEAVING PASSENGERS DO NOT IMPEDE EACH OTHERS' MOVEMENTS



CONSPICUOUS ROUTE SIGNS CONDUCE TO PASSENGER CONVENIENCE

NEW CAR IS A QUICK LOADER

The preliminary operation of the car on a heavy business district line has demonstrated the new public service car with post-payment fare collection to be more than 10 per cent faster in loading and unloading, and there is the added advantage that the times of loading and unloading per average passenger are more nearly equalized. That is to say, under the prepayment plan more time was required to take on passengers than to let them off. By the new method passengers enter in two continuous streams without the interuption due to fare collection and without conflict with outgoing passengers.

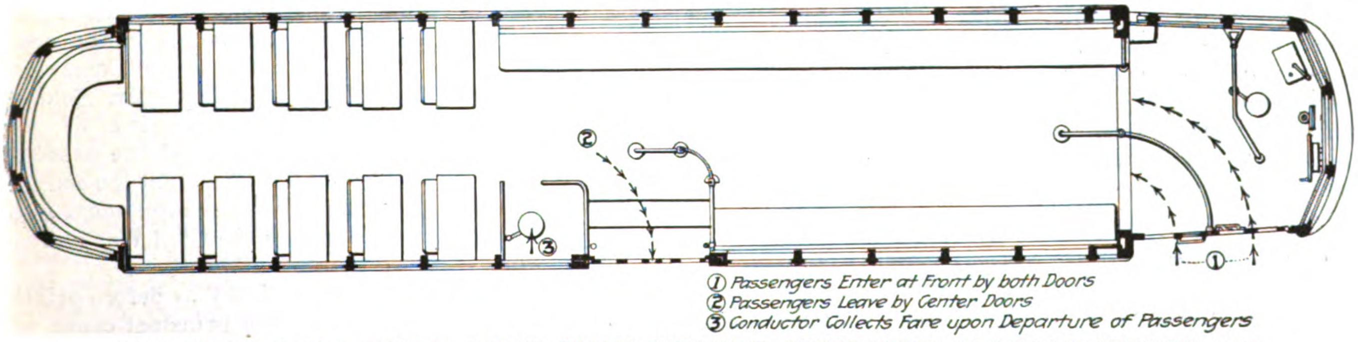
Many observations conclusively show that under the pay-leave plan, seven out of nine passengers have paid their fares to the conductor and stand at the exit door ready to alight before the car actually comes to a stop. The plan also offers greatly increased convenience to the passengers who now, instead of waiting to get their fares ready while exposed to the weather, are enabled at once to pass within the car and have opportunity to get their fares ready and obtain change and transfers while the car is approaching their destination stop.

PASSENGERS DISTRIBUTE THEMSELVES WELL

Moreover long-distance riders now find it convenient to occupy the cross seats at the rear of the car, leaving the front for the short-distance riders who occupy the longitudinal seats. The indications are that this will encourage short-distance riding and largely overcome the tendency to crowd around the exit.

The saving in time in loading and unloading will be of direct advantage to the public, as it will enable the company to give increased service with the same number of cars equivalent to the addition of 200 cars because of the saving made possible by the continuance of the skip-stop system.

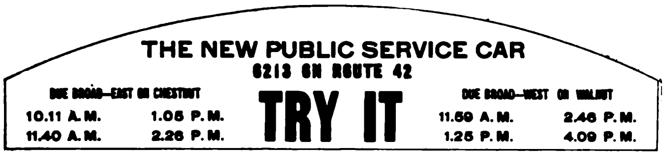
The exterior of the new public service car is painted a soft Quaker gray, and the interior color scheme is


②
③
①
① Passengers Enter at Front by both Doors
② Passengers Leave by Center Doors
③ Conductor Collects Fare upon Departure of Passengers

PLAN OF THE P. R. T. POST-PAYMENT, FRONT-ENTRANCE, CENTER-EXIT OR "PUBLIC SERVICE" CAR being worked out to give the effect most satisfactory to the passengers. The car is equipped with wooden seats shaped to give maximum comfort to the passenger of average build.

MANY FEATURES OF NEAR-SIDE CARS ARE RETAINED

Ventilation is secured by the method originally introduced in the near-side car, in which the upper sash of the windows are hinged, so that the passengers themselves can open the sash inward at an angle, permitting the entrance of fresh air without producing a direct draft.



THE NEW PUBLIC SERVICE CAR
8213 ON ROUTE 42
DUE BROAD—EAST ON CHESTNUT
10.11 A. M. 1.05 P. M.
11.40 A. M. 2.26 P. M.
TRY IT
DUE BROAD—WEST ON WALNUT
11.59 A. M. 2.46 P. M.
1.25 P. M. 4.09 P. M.

THIS CARD IS USED IN SECURING CONSTRUCTIVE CRITICISM OF THE NEW CAR

The route number system, introduced by the management of the Philadelphia Rapid Transit Company in 1911, is also retained, and a changeable route number sign is carried on the side of the car as well as on the front.

The new car seats fifty passengers and is practically of the same weight and dimensions as the near-side car.

The sample car is kept in regular operation on a prescribed schedule which has been thoroughly advertised in the newspapers and in a bulkhead sign (reproduced herewith) posted in all of the company's cars. The management is inviting the public to inspect the car and make constructive suggestions, prior to the remodeling of the present 1500 near-side cars, which will be undertaken as soon as the new type has been thoroughly tried out and the need for any further changes determined.

CONDUCTOR HAS EXCELLENT SUPERVISION OF PASSENGERS ALIGHTING

Trackless cars in Stockport, England, are reported not to have been a success, the municipal tramways committee having under consideration the substitution of motor buses for them.

Price Level Will Stay Up

General Course of Prices Since Signing of Armistice Points to Establishment of New Price Level

IN ITS EFFORT to give to the public a clear conception of the changed economic conditions of the world and the basic reasons why the country should not hold back in the expectation of a sudden recession of the general price level to the pre-war mark, the National Prosperity Campaign is meeting with a marked response on the part of many leading men. This campaign, as previously noted in these pages, has as chairman of its executive staff P. H. Gadsden, vice-president United Gas Improvement Company. The headquarters are in the Commodore Hotel, New York.

INDORSEMENT BY GOVERNMENT LEADERS

An enthusiastic indorsement of the campaign was made this week by Secretary Glass of the Treasury Department before the convention of the United States Chamber of Commerce in St. Louis. Mr. Glass urged that every American citizen act in the spirit of the National Prosperity Campaign, whose efforts for the stimulation of business and confidence have been spread broadcast throughout the country, over the slogan of "LET'S GO." Secretary Glass continued: "We should start right away. We should break in upon this unnatural, abnormal suspension of commercial activities, for there is a world to be rebuilt."

Messages of support have been received from the governors of many states. Activity along the line of public improvements to help the industrial and labor situation is now under way, and there are unmistakable evidences of an earnest desire to assist in stabiliment and adjustment. In the opinion of J. P. Goodrich, governor of Indiana, the country is permanently on a higher price level, and it is idle to talk about getting back to pre-war conditions.

Simon Bamberger, governor of Utah and formerly president of the Salt Lake & Ogden Railway (now the Bamberger Electric Railroad), states that existing prices have not in any way handicapped the State's activities, for the administration keenly appreciates the necessity for prompt action in matters providing employment. "Results," Governor Bamberger says," are what we are taking into consideration, rather than the matter of a few dollars and cents."

HIGH PRICE LEVEL WILL CONTINUE

The sound economic basis for the work of the National Prosperity Campaign has been attested by many leading economists. To what has previously been presented in these pages, however, it seems worth while to add a few of the comments on the price situation recently made by T. S. Holden, investigator in the economics section, Division of Public Works and Construction Developments, Department of Labor. Mr. Holden directs attention to the fact that a comparison of the course of prices during the Civil War and the present war shows many points of similarity, but that the course of prices during the present period of readjustment and the corresponding period following the Civil War shows more points of difference than of similarity.

It was thirteen years after the Civil War before prices returned to the pre-war level. The principal cause of this return was the fact that there was such abundant opportunity for the development of new and more economical methods of production in the shape of new forms of machinery and new kinds of business organizations. These opportunities, however, are not present now in any measure comparable to the previous period.

From Oct. 1, 1918, to the present time, commodity prices have been going through an orderly process of readjustment. *Dun's Review*, says Mr. Holden, shows that although there have been many declining prices, others have been advancing at the same time. Of 313 commodities quoted on March 8, 1919, 140 were priced lower than a year before and 126 higher, the index figure indicating a reduction in the price level for the year of only 4.8 per cent. The commodities quoted lower consisted of certain foodstuffs, drugs and chemicals, wool, woolen and cotton textiles, metals and oils. With the exception of steel products, no building materials were quoted at prices lower than those last year. The principal commodities priced higher on March 8, 1919, than a year before were certain foodstuffs, lumber and other building materials, drugs and chemicals, hides, naval stores, oils, paint and tobacco.

The most marked declines since the armistice, Mr. Holden notes, have occurred in the case of lake copper and pig lead. In November copper was 69 per cent above the pre-war price, but since then it has dropped to the pre-war level. Pig lead in November was 79 per cent above the pre-war price, but now it is only 17 per cent above it. In both cases the cessation of the war left very large stocks on hand. Both commodities are usually exported in large amounts and there has been no export demand. Consequently, in Mr. Holden's opinion, the considerable decline in prices for these two commodities is not surprising.

Mr. Holden believes, therefore, that in general the course of prices since the armistice seems to bear out the theory that a new price level has been established. In conclusion he says:

> After a somewhat extended study of prices, it is the opinion of the Division of Public Works and Construction Developments that a new price level has been established by economic conditions attending the world war; and that economic forces appear to have already acted to stabilize prices at a level below which they are not likely to fall by any appreciable amount in the near future.
>
> It is believed that the growing confidence in the future of business in this country, evidence of which is seen on all sides, is well justified by the facts that have been learned through the study of the price situation.
>
> At the present time there is less concern over high prices than there is with regard to the stability of prices. It appears that the wisest business men are those who decide now to go ahead with the construction of buildings and the production of goods. The need for both forms of activity is more imperative now than ever before.

Cost of Living Off Only 2.8 Per Cent Since Signing of Armistice

THE cost of living for American wage-earners declined 2.8 per cent between the signing of the armistice and the first week of March, 1919, according to a preliminary statement just issued by the National Industrial Conference Board. In March, 1919, the cost of living was still approximately 60 per cent to 65 per cent above the pre-war level, as contrasted with an increase of 65 per cent to 70 per cent in November, 1918, and of 50 per cent to 55 per cent in June, 1918, according to the board's two previous studies of the subject.

Changes since November, 1918, in the average cost of the different items entering into the budget were:

All items	2.8 per cent decrease
Food	4.4 per cent decrease
Shelter	1.7 per cent increase
Clothing	6.2 per cent decrease
Fuel, heat and light	1.3 per cent increase
Sundries	No change

For the entire period July, 1914, to March, 1919, the changes in the respective items were:

All items	61.3 per cent increase
Food	75 per cent increase
Shelter	22 per cent increase
Clothing	81 per cent increase
Fuel, heat and light	57 per cent increase
Sundries	55 per cent increase

In estimating the change in the budget as a whole the constituent items have the following relative importance: food, 43 per cent of the total; shelter, 18 per cent; clothing, 13 per cent; fuel, heat and light, 6 per cent and sundries 20 per cent. These percentages are averages of the actual expenditures of several thousand families, based on the results of investigations by authoritative agencies. While families differ in the apportionment of their incomes among the separate budget items, the distribution for normal families does not vary widely from these averages. Hence, with any reasonable allocation of items in the budget, changes in the total cost of living are fairly uniform, and an estimate of 60 per cent to 65 per cent as the increase between July, 1914, and March, 1919, is representative.

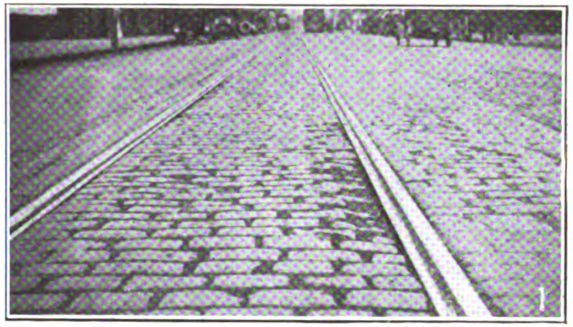
New England Electric Freight Men Meet at Worcester

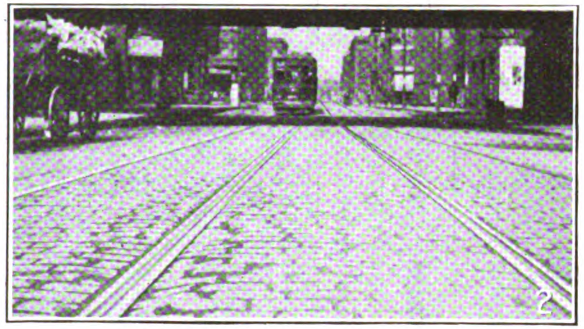
THE annual meeting of the New England Electric Freight Association was held at Worcester, Mass., on April 10, at the freight terminals of the Worcester Consolidated Street Railway. R. E. Cosgrove, freight and passenger agent Worcester Consolidated Street Railway, was re-elected president, and F. C. Lewis, general freight agent Boston & Worcester Street Railway, was re-elected secretary.

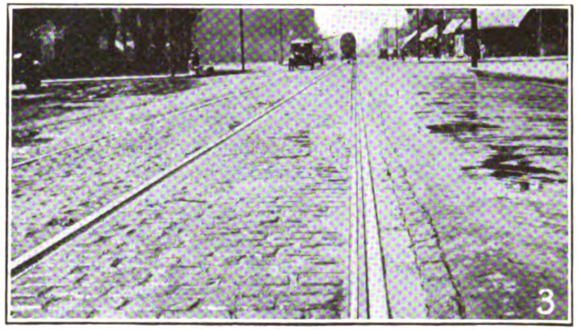
A committee was appointed to report at the next meeting upon the advisability of extending the scope of the organization to include local agents and representatives of auditing departments. This comprises P. P. Crafts, Bay State Street Railway; A. E. Paddock, Rhode Island Company, and H. R. LaMontagne, Worcester Consolidated Street Railway. It was also decided to hold the monthly meetings in Boston on the same days as those on which the New England Street Railway Association meets, in order to enable members to attend the meetings of both associations.

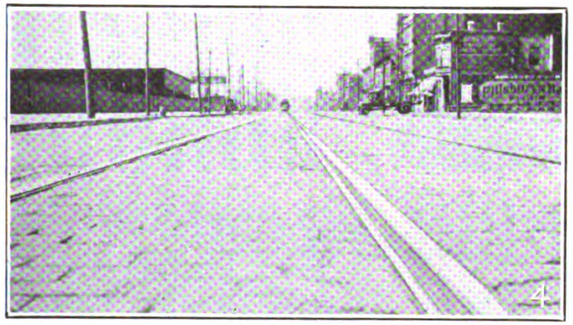
Among the topics discussed at the meeting was that of further development of the freight business by use of through tariffs with connecting carriers. As this involves the matter of auditing as well as that of operation the discussion will be resumed at the next meeting with auditing specialists present. Another topic was that of automobile truck competition, which was covered by B. F. Curtis, traffic manager Norton Company, Worcester, who demonstrated that the trucking business on the basis of freight rates is a losing proposition. Mr. Curtis believes strongly in trolley freight transportation. H. C. Page, general manager Worcester Consolidated Street Railway, and A. E. Stone, general manager Boston & Worcester Street Railway, expressed their belief that one of the rays of hope in the future of the electric railway business is the possibility of obtaining additional revenues from freight transportation.

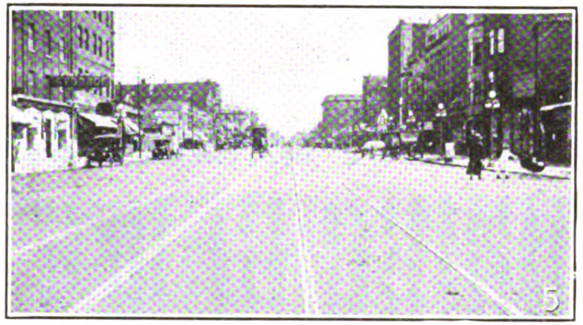
Appearance of Street Surface With Various Types of Track in Chicago

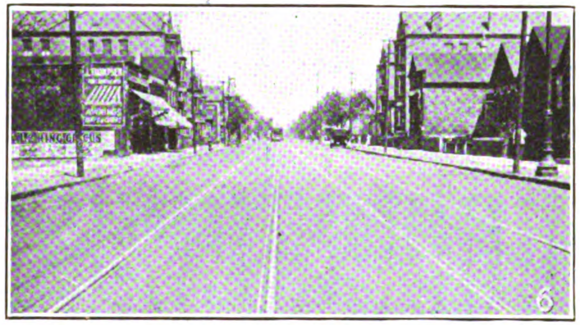


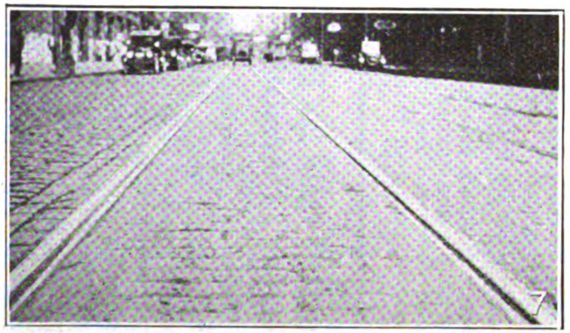


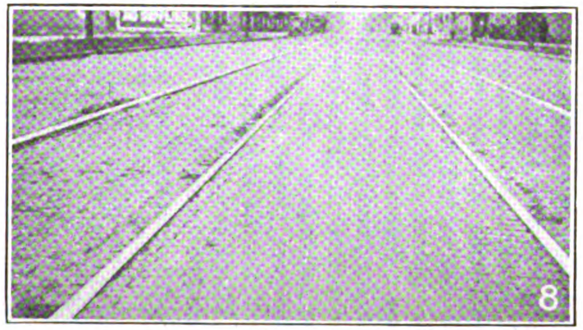


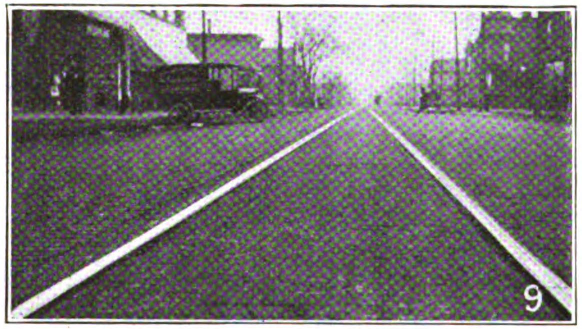












No. 1—Type No. 1, track laid in 1907 with sand cushion.
No. 2—Left track type No. 2A, right track type No. 1 both laid in 1907 with sand cushion.
No. 3—Type No. 2A, laid with sand cushion in 1907, ties spaced 4 ft.
No. 4—Type No. 2A, track laid with sand cushion in 1909, ties spaced 3 ft.
No. 5—Type No. 2A, track laid with mortar cushion in 1911, ties spaced 3 ft.
No. 6—Type No. 3, track laid in 1910, ties spaced 2 ft., outlying district.
No. 7—Type No. 3, track laid in 1909, ties spaced 2 ft., Loop district.
No. 8—Type No. 4, track laid in 1910 with sand cushion.
No. 9—Type No. 4, track laid in 1917 with mortar cushion.

Chicago Rehabilitation Track Standards Prove Successful

Five Standard Types Adopted in 1907 and 1909 Promise to Give Long Life and Good Service—Study Made of Rail Corrugation as Influenced by the Several Types of Track Construction—Ninety-two Per Cent of Track Now Standard Construction

UPON reference to old track records of 1905 for the various electric railway lines of the city of Chicago, it will be found that the track foundation at that time was the natural soil consisting of sand and clay and a combination of the two, divided in about the proportions 28 per cent, 16 per cent and 56 per cent respectively. The rail sections were chiefly 6-in., 7-in. and $7\frac{3}{16}$-in. Johnson Company, with 7-in. "trilby," 9-in. Cambria and 9-in. Wharton in a few locations. In the paving granite block, asphalt, cobble and cedar block was used in about the proportions 22 per cent, 3 per cent, 15 per cent and 60 per cent respectively. Oak ties were used in all cases. These might be said to represent Chicago standards in 1905.

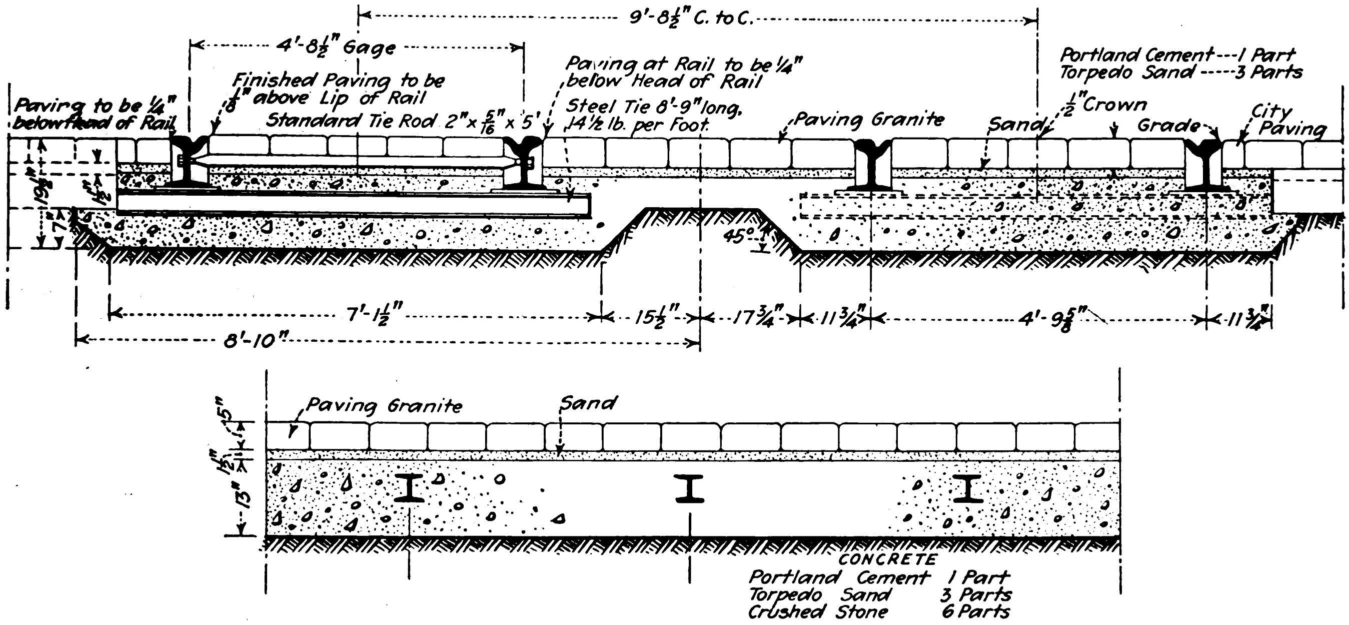

9'-8½" C. to C.
4'-8½" Gage
Finished Paving to be ⅛" above Lip of Rail
Paving at Rail to be ¼" below Head of Rail
Portland Cement---1 Part
Torpedo Sand-----3 Parts
Paving to be ¼" below Head of Rail
Standard Tie Rod 2"x 5/16" x 5'
Steel Tie 8'-9" long, 14½ lb. per Foot
Paving Granite
Sand
½" Crown
Grade
City Paving
19¾"
7"
45°
7'-1½"
15½"
17¾"
11¾"
4'-9⅝"
11¾"
8'-10"
Paving Granite
Sand
15"
13"
CONCRETE
Portland Cement 1 Part
Torpedo Sand 3 Parts
Crushed Stone 6 Parts

FIG. 1—CHICAGO STANDARD TRACK TYPE NO. 1; CONCRETE FOUNDATION AND STEEL TIES

NOTE—In accordance with Resolution No. 1251 passed by the Board of Supervising Engineers on June 29, 1909, all new tracks built hereafter, unless otherwise specifically ordered, shall be 10 ft. 2 in. center to center; and all other dimensions on this drawing that will be affected by this increased track center must be changed accordingly.

Outside rails to be ¼-in. lower than inside rails.

Pavement to be granite block as specified in the ordinance of Feb. 11, 1907, unless otherwise ordered.

On cable construction space ties to the same centers as cable yokes.

On all other work space ties on 4 ft. centers.

Pavement to be swept with dry gravel only.

The era of rehabilitation in Chicago began about the year 1907, when a city ordinance was passed providing for a board of supervising engineers. This was to be a non-political body created for the purpose of administering the ordinances by which it was created, which also included provision for the complete rehabilitation of the Chicago railway properties.

As the board desired to begin at the source, or so to speak at the ground, and to work up, the subject of foundation and ties was the first to receive consideration. An exhaustive study was made of this question and the ideal seemed to be a permanent foundation upon which the superstructure could be placed and renewed from time to time as is done with a bridge structure. At about that time the cities of Toronto and Montreal, Canada, had laid some concrete foundation and were placing the rails directly upon this foundation without the use of ties. To maintain the gage, the rails were fastened together with tie rods and the paving was depended upon to hold the track in place. Detroit, St. Louis and other cities had also been experimenting with various forms of concrete beams. None of these appeared to the Board of Supervising Engineers of Chicago to be a type of construction which would insure permanency. Many large cities were visited, including Toronto and Montreal, and the various types of construction were studied. After convincing itself that steel incased in concrete suffers no corrosion the board adopted as its first choice for standard construction steel ties 4¼ in. deep, spaced on 4-ft. centers and imbedded in concrete slab foundation 13 in. thick of which 6 in. is below the ties.

Investigation also developed the fact that a wood tie in the best condition is greatly preserved when incased in concrete, and the second choice adopted as a standard was construction involving thoroughly dry, sound, 90 per cent heartwood yellow pine, untreated ties, 6 in. thick, spaced at first on 4-ft. centers and later reduced to 3 ft., and incased in concrete to a total depth of 14⅜ in., 6 in. of which is below the ties. To protect the wood tie from the wear of the rail, tie plates were incorporated in the standard construction, as was also the screw spike, to facilitate renewal of rails and plates.

At this time the subject of tie treatment also received broad consideration. The zinc chloride process was recommended by authoritative engineers, in consequence whereof a length of test track was constructed incorporating this class of treated tie. It was found, after the track had been in service some time, that many of the rail spikes had been eaten away until they were no larger in diameter than a pencil. This trouble was studied carefully with the assistance of chemists and it was found that the moisture in combination with the zinc chloride produced a chemical galvanic action with the liberation of hydrochloric acid and the formation of free chlorine. Thus the decision was reached that for a moist climate the treatment of ties with chloride of zinc was a failure and during the first year of the existence of the board all such treatment was dispensed with.

For various reasons a solid concrete foundation is not always desirable nor even feasible, so another standard foundation to be used in conjunction with that of solid concrete was sought. As it was desirable to retain the permanency feature, it was practically necessary to use concrete in the surface of the foundation for tie protection and to provide a paving base. Thus the third standard is 8 in. of crushed stone ballast rolled on a rolled earth subgrade. The same standard wood tie is placed upon this, spaced on 2-ft. centers, and concrete is placed between and above the tie to a total depth of 8⅞ in. About 27 per cent of the present track construction is of this type.

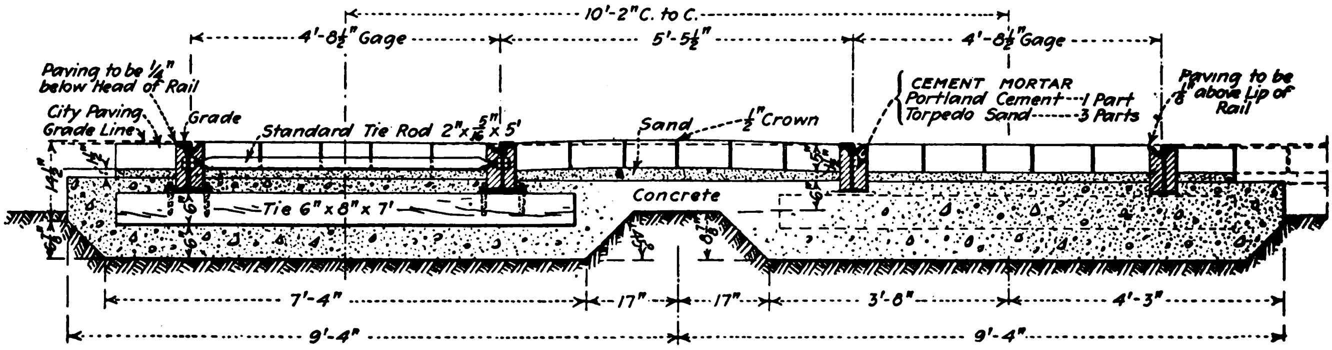

10'-2" C. to C.
4'-8½" Gage
5'-5½"
4'-8½" Gage
Paving to be ¼" below Head of Rail
City Paving Grade Line
Grade
Standard Tie Rod 2"x5/16"x5'
Sand
½" Crown
CEMENT MORTAR
Portland Cement---1 Part
Torpedo Sand-------3 Parts
Paving to be ⅛" above Lip of Rail
14⅜"
Concrete
Tie 6"x8"x7'
6"
7'-4"
17"
17"
3'-8"
4'-3"
9'-4"
9'-4"

FIG. 2—CHICAGO STANDARD TRACK TYPE NO. 2A; CONCRETE FOUNDATION AND WOOD TIES

The above are the three main standards of foundation and ties used in Chicago. In some of the outlying districts where all improvements, such as sewer, water and gas have not been installed, two other types of track are permitted. The first is 8 in. of slag ballast with wood ties laid upon it and concrete placed between and over the ties to a total depth of 7⅞ in. The second is 12⅞ in. of slag ballast in which wood ties are imbedded to a depth of about 5 in., with 8 in. under the tie, and over which is placed 4 in. of limestone. These two types of foundation are very little used. In addition to these five standard types of foundation the concrete slab sub-ballast type has been used in a special case to overcome conditions created by necessity for construction over a new deep and wide fill. This was described in the ELECTRIC RAILWAY JOURNAL for March 30, 1918, page 609.

The rail section adopted as standard for the first three types of foundation described was a 9-in., 129-lb. grooved girder rail. This type is used in nearly 90 per cent of the track in Chicago. For the slag concrete foundation a 7-in., 91-lb. T-rail is used, and with the slag limestone foundation, a 7-in., 80-lb. modern improved girder rail.

PAVING LAID ON DRY MORTAR CUSHION

The greatest element that contributes to the destruction of paving is water. Consequently that pavement which has the longest life and which is best for the public use is that most nearly water-tight. In Chicago, therefore, the granite-block pavement has been adopted wherever its use is possible, and it is standard for all types of construction and foundation. In some of the construction in outlying districts, on streets where improvements are not made and where vehicular traffic is light, the use of vitrified brick paving or granite screenings for surfacing is permitted.

With the granite block paving the city specifications

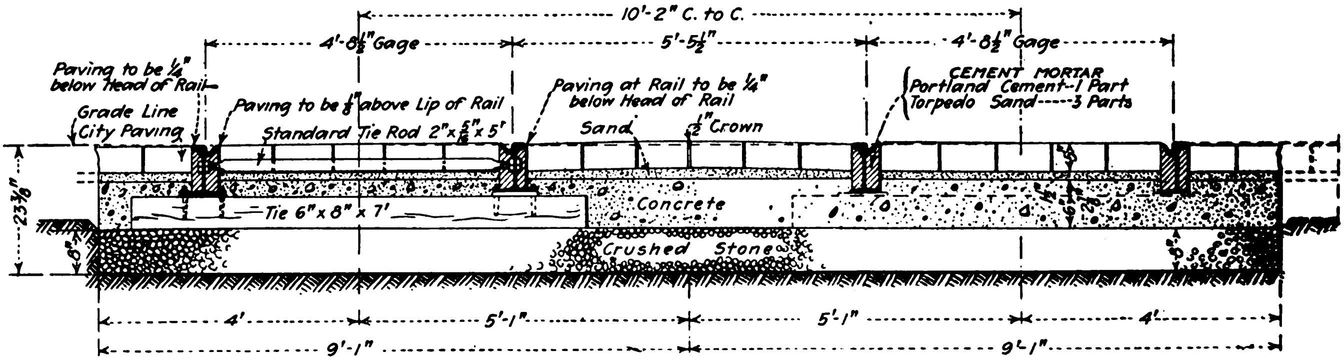

10'-2" C. to C.
4'-8½" Gage
5'-5½"
4'-8½" Gage
Paving to be ¼" below Head of Rail
Grade Line
City Paving
Paving to be ⅛" above Lip of Rail
Standard Tie Rod 2"x5/16"x5'
Paving at Rail to be ¼" below Head of Rail
Sand
½" Crown
CEMENT MORTAR
Portland Cement--1 Part
Torpedo Sand-----3 Parts
23⅜"
8"
Tie 6"x8"x7'
Concrete
Crushed Stone
4'
5'-1"
5'-1"
4'
9'-1"
9'-1"

FIG. 3—CHICAGO STANDARD TRACK TYPE NO. 3; CRUSHED STONE WITH WOOD TIES IMBEDDED IN CONCRETE

called for a sand cushion and joints to be filled with pitch, the space under the head of the rail and next to the web being filled with cement mortar. Much trouble was at first experienced with this paving, as it very often fell along the edge of the rail. After a rain the water seeped into the paving, passing traffic produced a pumping action, and the sand was forced up through air holes, leaving rings of sand around the holes on top of the pavement. After enough sand had been forced out, the paving naturally fell. The railways had advocated grout instead of sand and pitch as a joint filler, but because of the difficulty of renewing the pavement the city specifications had eventually been adopted. A grout filler was soon tried out, however, and at the same time a new cushion, composed of a mortar, including one part of Portland cement and three parts of torpedo sand, spread dry upon the surface of the concrete foundation to a depth of 1½ in., was used. The granite blocks were laid upon this and the joints filled with a wet grout. Just enough water from the grout passes through to the cushion to form a cement mortar. Thus the advantage of a sand cushion is obtained for laying the blocks and at the same time all disadvantages are removed after the paving is laid, as the cushion hardens and rigidly holds the blocks in place. This type of paving cushion is now used almost entirely with both granite block and brick paving.

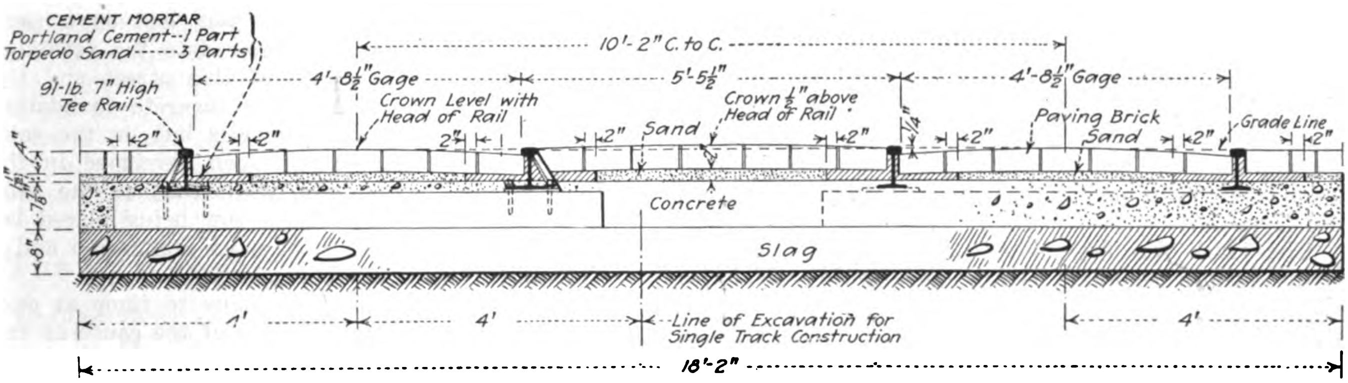

CEMENT MORTAR
Portland Cement--1 Part
Torpedo Sand------3 Parts
91-lb. 7" High Tee Rail
4'-8½" Gage
10'-2" C. to C.
5'-5½"
4'-8½" Gage
Crown Level with Head of Rail
Crown ½" above Head of Rail
Paving Brick
Sand
Sand
Grade Line
2"
2½"
¼
Concrete
Slag
4'
4'
Line of Excavation for Single Track Construction
4'
18'-2"
8"
7⅞"

FIG. 4—CHICAGO STANDARD TRACK TYPE NO. 4; SLAG FOUNDATION WITH WOOD TIES IMBEDDED IN CONCRETE

At locations where the remainder of the street is to be paved with wood block, the specifications permit wood block to be used on the railway pavement area. The blocks are laid on the sand and cement cushion, 1½ in. deep, and the joints are filled with cement grout or pitch.

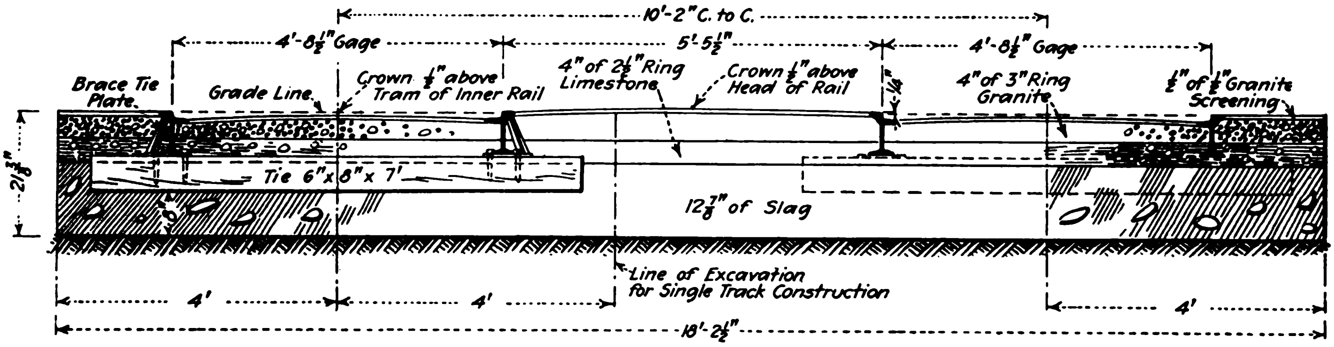

10'-2" C. to C.
4'-8½" Gage
5'-5½"
4'-8½" Gage
Brace Tie Plate.
Grade Line.
Crown ½" above Tram of Inner Rail
4" of 2½" Ring Limestone
Crown ½" above Head of Rail
¼
4" of 3" Ring Granite
½" of ½" Granite Screening
21⅜"
Tie 6" x 8" x 7'
12⅞" of Slag
Line of Excavation for Single Track Construction
4'
4'
4'
18'-2½"

FIG. 5—CHICAGO STANDARD TRACK TYPE NO. 5; SLAG WITH WOOD TIES IMBEDDED IN SLAG AND CRUSHED LIMESTONE

Following is a summary of the standards as illustrated in Figs. 1 to 5: Type No. 1 (Fig. 1) consists of 9-in., 129-lb. Chicago standard grooved girder-type rail supported on Carnegie steel ties, 6 ft. 9 in. long and weighing 14½ lb. per foot, spaced 4 ft. apart, laid with the 6-in. face up and imbedded in concrete consisting of one part Portland cement, three parts sand and six parts crushed stone to a total depth of 13 in., 6 in. of which is below the tie. Upon the tie under each rail is a tie plate, 6 in. x 10 in. x ½ in., fastened to the tie by the wedge and clip device, and the rail joints are electrically welded by the Lorain method. Gage is maintained by forged or rolled tie rods with 1-in. terminals, spaced on 6-ft. centers. Upon the top of the concrete is 1½ in. of dry mortar, composed of one part Portland cement and three parts of torpedo sand, upon which are laid dressed granite paving blocks, 4 in. to 5½ in. wide, 7 in. to 12 in. long, 5 in. to 5½ in. deep and the joints filled with cement grout filler composed of equal parts of sand and Portland cement.

After some time had elapsed, tests were made to discover whether the steel ties and concrete were doing full duty. It was soon found that the concrete did not retain a good contact under the base of the rail between the steel ties, and for this reason the ties were required to transmit the full load until the rail deflected under load to a bearing on the concrete. To overcome this a reduction in spacing to 3 ft. would have been necessary. This would have been expensive with steel ties and for this reason in Type 2A wood ties were adopted and spaced on 3-ft. centers. There is only a small amount of Type No. 1 construction, and a reduction to a 3-ft. spacing of steel ties for any further construction of this type is being considered.

In Type 2A (Fig. 2) the track consists of the same rail section as in Type 1, supported on 90 per cent heart longleaf yellow pine ties, untreated, 6 in. deep by 8 in. wide by 7 ft. long, spaced 3 ft. apart, imbedded in concrete of the same proportions as in Type 1, to a total depth of 14⅜ in., 6 in. of which is below the tie. Upon the tie, under each rail, is a shoulder tie plate, 7½ in. wide, 9½ in. long and ½ in. thick, fastened to the tie with two ⅜-in. x 2½-in. fetter thread lag screws. The shoulder of the plate against the outside edge of the rail base and the rail joints are electrically welded as in Type 1 and the rails fastened by screw spikes. Tie rods and paving for Type 2A are the same as for Type 1.

In Type 3 (Fig. 3) the track consists of the same rail section, ties, tie plates, rail fastenings and tie rods as in Type 2A, but the ties are spaced on 2-ft. centers and rest upon 8 in. of 1½-in. run of crushed stone foundation rolled on a rolled earth subgrade. Concrete of the same proportions as in Type 2A is placed between and above the ties to a total depth of 8⅜ in. The paving for Type 3 is the same as for Type 2A.

The track for Type 4 (Fig. 4) consists of 7-in., 91-lb. modern Shanghai T-rail, supported on wood ties as in Types 2A and 3, resting upon 8 in. of furnace slag broken to pass through a ring 6 in. in internal diameter, covered with fine slag, limestone screenings, cinders, rolling-mill ashes or foundry sand to fill all interstices and rolled with a 10-ton roller. Concrete is placed between and over the tie to a total depth of 7⅞ in. Upon every other tie and under each rail is a tie plate, 6 in. x 9½ in., fastened to the tie, when used with screw spikes, by the same lag screw as in Types 2A and 3, and when used with track spikes with two ⅜-in. x 2½-in. hook spikes. Upon every other tie and under each rail is placed a 7½-in. x 10-in. malleable-iron brace tie plate fastened to the tie by either lag screws or hook spikes as above. These tie plates and braces have an inclined upper face which cants the head of the rail slightly toward the center of the track for the purpose of causing the wheels to bear nearly over the centers of the webs. Rail joints are electrically welded by the Lorain process as in other standards. Upon the concrete is placed the dry mortar as in previous types, except that the cement mortar rail filler also extends back from the rail some 10 in., and upon this are placed repressed vitrified paving brick not less than 8 in. long, 4 in. deep and 2½ in. thick, with grouted joints.

In Type 5 (Fig. 5) the track consists of 7-in., 80-lb. modern improved girder rail, supported on the same tie as Types 2A, 3 and 4, imbedded to a depth of 4⅞ in. in 12⅞ in. of the same class of slag as in Type 4. The same flat tie plates and brace tie plates are used as in Type 4, with hook spikes. Rail joints are bolted for temporary construction, but if the construction is more or less permanent, they are electrically welded. Upon the slag is placed 4 in. of 2½-in. ring limestone, covered with limestone screenings to fill the interstices. Upon this is placed, between rails, 3⅜ in. and between tracks and outside tracks 4 in., of 3-in. ring granite covered with ½-in. of ½-in. granite screenings flooded and rolled.

Study Is Made of Rail Corrugation

In connection with the above standards an extensive study has been made of rail corrugation, as described in the ELECTRIC RAILWAY JOURNAL for Nov. 21, 1916, page 1012. Many authorities attribute corrugation to a rigid foundation, but this is certainly not the full explanation, for in Chicago corrugation has developed on both the concrete and the crushed-stone foundations. The crushed stone might be termed a semi-rigid foundation, as it would be less resilient than sand or gravel or even slag, but no concrete is placed beneath the ties and that between them does not always give rail support. Also, in the same stretch of track on a concrete foundation, part of the rail will show corrugation and part will not.

On the other hand there has been an interesting test of a sand foundation. At a certain location in Chicago, due to the sewer program of the city which called for early improvements, some track was laid on a sand foundation only. At a little later date the sewerage work was completed on part of this street and the adjoining track was placed on a concrete foundation and paved while the remainder was left on the sand foundation. Some corrugation soon developed in the track placed on the concrete, while that on the sand continued immune. Concrete is now being placed between and over the ties on the sand foundation and a careful study of results is being made.

This experience would cause many to jump at once to the conclusion that the mystery of the cause of rail corrugation had been solved, but such is not the case. In fact, the Chicago authorities are inclined to believe that the relation of the tread of the wheel to the contour of the rail head, truck nosing, off-center gear drive, etc., are contributing factors in the formation of corrugation. Study is being made on the effect of changing the contour of the wheel. Investigation is also being carried on in respect to new track to detect the first indications of corrugation.

If in the end it should be determined that corrugation is caused by a rigid foundation, the question still remains as to which is the greater of two evils—no corrugations and a poor foundation which will not hold up the paving and will thus allow water to leak in and soon destroy the paving altogether, or a rigid foundation with firm smooth grouted paving which is watertight, but which creates a necessity for handling the corrugations in some other manner.

Standards Give Long Life at Low Cost

As far as can be determined, the Chicago standards have proved very successful and the indications are that a comparatively long life will be obtained from the track. Of course on practically any track that has been in service for any considerable length of time certain locations can be found where on the face of the appearance the construction might appear to be a failure. A study of these particular instances may show that unforeseen local conditions have contributed to the failure and that the standard in principle is satisfactory. The fact that during the past eleven years it has not been found necessary to change these standards is proof in itself that to the Chicago authorities at least the standards seem highly satisfactory. As mentioned in the foregoing text, some little trouble was experienced with the paving, but the adoption of a dry mortar cushion and filling of the interstices with grout seems to have eliminated this difficulty.

The standard used in any piece of construction depends largely upon the local equation, the condition of the subsoil, *e.g.*, whether wet, dry, firm or sandy, the type and amount of traffic both car and teaming, the possibilities of excavation being necessary in the near future, etc. A great deal of the construction in the Loop district, the main business center of Chicago, is Type 3. The reasons for this are two. The first is that for many years a subway construction in this district has been an imminent possibility and in the track reconstruction made necessary, it would be much easier to break up a bed of concrete 8¾ in. thick than one 14¾ in. thick. The second is the difficulty of constructing Type 2A under traffic.

Altogether since 1907 about 719 miles out of 803 miles of track have been rehabilitated and 192 miles of new track constructed. This shows that 92 per cent of the total surface mileage outside of yards is now standard construction. Of this standard construction the percentage of each of the five standard types now in use is about as follows: Type 1, 1 per cent; Type 2A, 58 per cent; Type 3, 27 per cent; Type 4, 9 per cent; Type 5, 5 per cent.

The photographs on page 864 show the present condition of track of the various standards.

The Proposed Ford Light-Weight Car

No Likelihood That It Will Be Out of the Test Stage for at Least a Year — No Decision Even as to Commercial Manufacture

WHEN Henry Ford announced early in April that he was prepared to build an extremely light-weight car for gas drive, a representative of the ELECTRIC RAILWAY JOURNAL immediately called upon him and upon Charles E. Sorensen, general manager of Henry Ford & Son's tractor plant at Dearborn. In this interview, as reported in the April 19 issue, Mr. Ford expressed his belief in a greater field for transportation on rails if city railways would use light cars operated at more frequent intervals and, where feasible, make use of a graduated fare. He also stated in this interview that the same principles of light-weight construction proposed for his gas car could be incorporated in an electrically-driven car.

Since the foregoing discussion Mr. Ford has given further proof of his purpose by securing franchises for the operation of a street railway to connect his tractor plant at Dearborn with his blast furnaces and shipbuilding plant on the Rouge River, a distance of 5 to 6 miles. The plants, of course, are gradually being surrounded by the homes of the workers, but more of the men would settle near their work if better transportation were furnished. The terms of the franchise call for operation with either gas or electrically-driven cars within one year. In any event, this undertaking to build a railway is most significant as coming from a man who has done more than any other individual to make the automobile cheap and popular.

CAR ITSELF IS STILL IN THE GASEOUS STATE

While the statements made by Mr. Ford to the public of Detroit and the franchise application described indicate that Mr. Ford is in earnest, it is a matter of vital importance to the street railway industry to know that there is no early prospect that the car itself will be available. What follows on this subject is based in part upon the interview with Mr. Ford on April 15 and with Mr. Sorensen on April 23.

In the first place, Mr. Ford has no present intention of going into the business of building street cars. His chief desire is to prove that a car of extremely low weight but powerful construction can be built by using high-grade steels and alloys similar to those developed for the severe conditions that have to be met by a tractor. He proposes to take his time to make any necessary experiments so that the completed car will not have to be tinkered with. Once he has attained his ideal, he may be willing to turn over the mass production of the car to any "live wire" in the business who has the faith to produce in large quantities at low prices.

In discussing the matter with Mr. Sorensen it was brought out that one-man operation would be an essential if the car was to be an economic success. Further, the moment it was operated as a one-man car, it would necessarily have to be equipped with a variety of automatic safety appliances that would meet the approval of the railways themselves, the car operatives and the regulatory bodies. As an example, the history of the Birney safety car was cited. That car had been the first to deserve the name "standard" because of the very feature, lightness, that was to be so important a characteristic of the Ford car. Yet despite its manifest advantages and great success, much opposition had to be overcome since the car had been brought out four years ago. After Mr. Sorensen had examined views of a number of safety car installations he said that if the Birney car could be made of material still lighter and better it would never be able to catch up with the orders.

ANY DRIVE CAR WOULD HAVE TO BE OF SAFETY TYPE

With regard to the Ford street car development, which would supplement rather than injure the good work done in electric car design in recent years, Mr. Sorensen said that this company would certainly look into the use of every device that would promote both safety and economy, such as the inter-operation of brakes, doors and steps. He knew that Mr. Ford would insist upon the best even down to such a detail as air-brake piping because the best piping was not merely the lightest but also the piping that could be made airtight most readily. Absence of leakage meant a smaller compressor. Matters like that were not to be left to the choice of the purchaser. It was up to the manufacturer to see that the customer was started right instead of being permitted to use something that was costlier in the long run.

The Ford car would have ball bearings everywhere. At the same time the company realized that such bearings are subject to severe conditions in electric railway service so that it deems better balls a necessity. Mr. Sorensen showed some balls of outside and home manufacture which had been tested to see how good a ball it really is possible to produce. He maintained that neither for the tractor nor for an electric car could ball bearings be any too good. They would be particularly valuable to insure low resistance in starting.

At the present writing not even the size of the car has been fixed.

There would probably be from fourteen to sixteen double seats, or a little less than the Birney. To make the proposed high rates of acceleration and braking comfortable, these seats would be more like automobile than car seats. The trucks would probably be made of pressings. All axles would be driving axles, driven by the engine through worm gearing. The size and character of the engine was still a matter of doubt, although Mr. Sorensen pointed out that the engine of the Fordson tractor uses gasoline only for starting, kerosene being the fuel used in running.

Chamber of Commerce Shows Appreciation of Electric Railway Situation

At Meeting Held in St. Louis on April 28 to May 1 the Plight of This Utility Was Clearly Set Forth and an Appropriate Resolution Was Adopted—P. H. Gadsden Was Elected a Director

THE outstanding feature of the meeting of the Chamber of Commerce of the United States, held this week on April 28 to May 1 in St. Louis, from a public utility point of view, was the presentation of the needs of the electric railways of the country. The attendance of representative business men from all sections was large, and the evidence presented of the necessity of the electric roads for greater income if they are to supply the needs of good service was convincing. At the same time there was convincing testimony of the vital connection between good local transportation facilities and the industrial life, comfort and prosperity of the communities served.

The public utility program at the convention was initiated by a report to the council of its committee on public utilities. This committee, whose appointment was mentioned in the issue of the ELECTRICAL RAILWAY JOURNAL for Apr. 19, 1919, page 792, consists of the following:

Lewis E. Pierson, Irving National Bank, New York, (chairman); Henry G. Bradlee, president Stone & Webster Management Corporation, Boston, Mass.; Arthur W. Brady, president Union Traction Company of Indiana, Anderson, Ind.; F. B. DeBerard, director of research, Merchants' Association, New York; P. H. Gadsden, vice-president United Gas Improvement Company, Washington, D. C.; E. K. Hall, Electric Bond & Share Company, New York; Albert W. Harris, president Harris Trust & Savings Bank, Chicago; Charles L. Harrison, Chief of Ordnance, Cincinnati District, Cincinnati, Ohio; J. W. Lieb, vice-president New York Edison Company, New York; P. W. Myers, president St. Paul Association of Public and Business Affairs, St. Paul, Minn.; James S. Havens, Eastman Kodak Company, Rochester, N. Y.

The report of the committee on public utilities follows in full:

REPORT OF SPECIAL COMMITTEE

"The public utilities which you have asked this committee to study have a fundamental place in the communities of the United States. They furnish the very requisites of business activity and of community life—heat, light, industrial power and local transportation. The dependence of our towns and cities upon these public services for all the processes of production and distribution, as well as for the activities of modern daily life, is so complete that the national welfare is at stake when a condition which threatens entire paralysis spreads throughout the units of any of these utilities.

"Such a condition inimical to the whole public now exists as to street railways. The emergency is so immediate that the committee at once makes this report with respect to street railways.

"Subject to peculiar limitations which do not apply to the same extent in the regulation of other utilities, street railways have been unable to increase their income to conform with the growth of their expenditures. Private industries have found a way to increase prices to meet their increased costs for wages and materials and changed conditions of credit. Public utilities do not possess this freedom of action. This has developed a critical situation in the street railway industry.

"This problem is common to every community in all parts of the country and therefore has become national in importance. It is a most urgent problem of the readjustment period. The danger increases day by day. In March 10 per cent of the mileage of the street railways of the country was in the hands of receivers. By the middle of April the proportion had already increased to 12½ per cent. Furthermore, many companies not yet formally declared bankrupt are in fact insolvent when gaged by any ordinary business standard.

"Wholly apart from the interests of street railway companies themselves, such a situation threatens disaster to every community. It means that a public service around which homes and industries have been built lacks means to provide the service which these communities require for their daily life. It means, too, that employers of a large body of workers cannot without relief continue to pay an adequate wage in a period of great increase in the cost of living. It means also that some of the largest users of the products of manufacture are without the ability to make purchases necessary to their maintenance and extension at a time when such purchases are vital to the resumption of our manufacturing industries.

"To your committee it appears that the time has come for a thorough examination of the functions of street railways, of the relations street railways bear to the public, and of the measures which should be adopted to guarantee the public an adequate service. An entire reconsideration is needed. In such a re-examination it may appear that a remedy is not to be found merely in an increase in fare, but that there may be other ways of reaching a solution of the problem.

"Whatever the causes leading up to present conditions, the remedy can now be found only if there is a widespread knowledge respecting the proper relations between street railways and the communities they are called to serve. At present there is no such general information and understanding of these problems which affect the daily life of every citizen, whether he be an employer or an employee, a merchant or a manufacturer, a city resident or a dweller in a suburban home.

"Upon considering the importance of this subject, and ascertaining the circumstances which we have attempted to suggest briefly in outline, we have concluded to present to you three recommendations in contemplation of the immediate action which is necessitated by the emergency:

"1. This committee should be continued and authorized to hold hearings at which it may invite information and suggestion from persons representing different interests and diverse points of view and who can contribute toward solution of the problem.

"2. After holding hearings and completing studies as expeditiously as possible, this committee should be authorized to present to the board of directors a report setting out recommendations with respect to the principles which should be adopted in undertaking to solve the street railway problem; this report might then serve as the basis for a referendum vote among all the organizations in the membership of the Chamber of Commerce of the United States.

"3. Meanwhile, organizations in the membership of the Chamber of Commerce of the United States should be requested to co-operate with this committee in developing information which the committee may need in reaching its conclusions."

ADDRESSES ON TUESDAY AFTERNOON

The Public Utilities Group held its first meeting on Tuesday afternoon at the Missouri Athletic Club. Lewis E. Pierson, chairman committee on public utilities, Chamber of Commerce of the United States, presided and explained that at the meeting on Wednesday afternoon the committee would be glad to hear from any persons interested in the subject, or to receive any questions which any person might desire to hand in. He then introduced as the first speaker Samuel W. Fordyce, Jr., St. Louis, Mo., former counsel of the War Finance Corporation.

Mr. Fordyce first gave a brief history of the work of the War Finance Corporation, so far as it related to electric railways. He said that much had been expected of the corporation when its organization was first announced, but a closer inspection of the act showed that public utilities could take advantage of it only under Section 9 and had (1) to prove that they were unable to get funds through the regular banking channels or from the public and then (2) they had to give adequate security for the loan. The former was not difficult, but the latter was a stumbling block. The value had been there, but it had gone. The corporation made some loans, but several of the companies to which it had made these loans had since gone into the hands of receivers, like the properties in Brooklyn, St. Louis and New Orleans. Under the law, bankers could also borrow to assist utilities, but the conditions were so arduous as practically to preclude this assistance. The thought was then considered of organizing a banking corporation with $100,000,000 capital, but as it was held that this corporation could not lend more than 50 per cent of its capital to one industry, a system of a group of banks was considered. The armistice ended this work.

From his experience gained with this corporation Mr. Fordyce had concluded that the street railways were "broke" and had been for some time, and he did not think that any extended financing could be done. Every economy had been put into effect and he did not consider that over-capitalization was the cause. Help must now come from the outside, but it was questionable how far utilities could compete in the sale of their bonds with municipal and government bonds. For the large lenders, the tax exemptions features of the government securities made a strong appeal so that the utilities could compete only for the loans of those with small means. He believed a possible solution would be a congressional act by which utility bonds would be put on the same basis of tax exemption as municipal bonds. This is one way in which the federal government could help, as the United States now has no power to fix rates. The conditions of the last few years have shown the necessity of a flexible rate and that could be granted only by the municipal or state bodies. During the war the corporation had made a loan to the New Orleans property with the provision that a 6-cent fare should be granted but had been unsuccessful in similar interviews with the officials of other cities. Another effort of the corporation had been to persuade present holders to renew their loans in whole or in part on maturing issues, but this had been successful only in part. He said that the corporation had received very few applications from companies using hydroelectric power.

He thought it would be very helpful if the President would appoint a commission containing representatives of the Departments of Commerce, Labor and the Treasury, the utility commissioners, the mayors and the railway owners, with power to make an investigation into the causes of the present conditions. Findings from such a commission could be used with municipalities to prove to them that the situation was of national importance and also to destroy the psychology of the nickel. This he suggested as preparatory to a possible change in the income tax law. He also suggested that if the War Finance Corporation could be continued as a peace agency it would be helpful, although this could be accomplished only by congressional act. The only other alternative was to sell out to the municipality.

In answer to a question, he said that the service-at-cost plan was a good one, but it took time to work it out and would not meet the present situation. He referred to the extensive holdings of utility securities by insurance companies, savings banks and other investing institutions as emphasizing the importance of national action.

TELEGRAM FROM INVESTMENT BANKERS

At the close of Mr. Fordyce's address, the chairman read a telegram received by the committee from William G. Baker, Jr., president of the Investment Bankers' Association of America. After regretting that it was impossible for the association to have a representative present at the meeting, Mr. Baker said: "So that your body may be advised as to the position of our association on the problems confronting the street railways, I would advise that we have recommended to the Department of Labor the early appointment by the President of a federal board on street railway conditions, on which there would be representatives of the United States Department of Labor and other interested departments of the government, of the street railway companies, of the American Bankers' Association, of the Investment Bankers' Association of America, of the Chamber of Commerce of the United States, and of the National Association of Public Utility Commissioners, with adequate statistical and clerical assistants, for the investigation of the facts concerning street railways and the reasons for their present condition, and with instructions to state the principles which should govern the proper relations between the street railways, their employees, the car riders and the public generally, in order that the people may have adequate transportation at fair rates, the rights of the people may be fully protected, the investors in street railways may be protected against loss and new capital may be provided to meet the increasing demands upon the transportation systems in the interest of industrial growth of the communities served and the health and welfare of urban populations."

After the appointment of a committee on resolutions, Chairman Pierson introduced the next speaker, Hon. William D. B. Ainey, chairman Public Service Commission of Pennsylvania. An abstract of his paper will be found elsewhere in this issue.

ADDRESS BY MR. WADE AND RESOLUTIONS

The final speaker was Festus J. Wade, president Mercantile Trust Company, St. Louis, who said that forty-two years ago he had been a driver on a bobtail street car when a "long" day consisted of eighteen hours and a short day of "twelve" hours and his daily wage was $1.75. He criticized the early financial history of many of the electric roads and believed that because of it the investors had lost faith. He thought that the employees could be a great help in explaining the present situation to the public. He also suggested that railway mortgages should provide a fund by which they would be retired within a reasonable term of years. He also suggested the distribution in the cars of leaflets to patrons telling about the existing railway problems. In answer to an objection that his plan of amortization would cast the burden of amortizing the property on the present riders, he thought that the plan would make up to some extent for allowances for depreciation. In a reply to an inquiry as to whether valuations did not overcome the criticism of overcapitalization, he believed that rates based on a fair valuation were proper.

At the conclusion of Mr. Wade's remarks the committee on resolutions of the public utility group drafted a set of resolutions which under the procedure of the Chamber were duly submitted to the main committee on resolutions.

ELECTRIC RAILWAY FACTS ARE PRESENTED

The proceedings on Wednesday afternoon took the form of a hearing at which all of the members of the Public Utility Committee of the Chamber of Commerce presided. Those who presented extended evidence included Harlow C. Clark of the American Electric Railway Association staff; R. A. Leussler, general manager Omaha & Council Bluffs Street Railway; Ralph S. Bauer, of Lynn, Mass.; a banker from Seattle, Wash.; a member of a city improvement association in St. Paul, Minn., and A. L. Faber of the Westinghouse Electric & Manufacturing Company. Walter A. Draper, Cincinnati, Ohio; Horace Lowry, Minneapolis, Minn., and H. H. Crowell, Grand Rapids, Mich., also spoke. The testimony brought out the necessity of greater income for the electric lines. A more extended report of this hearing will be published next week.

CHAMBER PASSES IMPORTANT RESOLUTION

On Thursday morning the full Chamber unanimously adopted the following resolution presented by its committee, as referred to above in the report of the Tuesday session:

"Street and interurban railways have such a fundamental place in all important communities, and conditions of war have disclosed such acute situations in the affairs of this class of public utilities that the Chamber's committee on public utilities should proceed with its hearings and studies to the end that it may soon place before the board of directors a report with commendations respecting the procedure which should be followed to place these important facilities upon a basis which will assure their efficient service."

At the Thursday session, which closed at one o'clock instead of the end of the afternoon, as planned, P. H. Gadsden was elected a director of the Chamber from Charleston, S. C., and Lewis E. Pierson was re-elected a director.

Railways Cannot Afford to Lose Riders*

No More Fruitful Subject for Local Study Than That of "Selling" Rides Along Modern Merchandising Lines — Operating Improvements Should Not Be Ignored

BY WILLIAM D. B. AINEY
Chairman Pennsylvania Public Service Commission

I CONFESS to a deep interest in the problems confronting electric railways. It is not that I am armed with an answer satisfactory to myself that leads me to speak now. If I shall succeed in giving assurance that I approach these problems sympathetically, that I am cognizant of their serious character and that as a member of one of the state regulatory bodies I earnestly desire to render helpful assistance to the railway interests of my State, I shall have established in part, at least, a working basis justifying my address.

We can agree that the soaring costs of labor and materials have imposed a heavy additional burden upon the revenues of electric railways, and that this has occurred simultaneously with the closing of the ordinary avenues of credit, financing thus being made difficult if not impossible. Net earnings have often disappeared between the upper and lower millstones of a most serious situation. That this has caused these companies grave anxiety of mind and perturbation of spirit was and is a necessary consequence of these conditions.

We are informed that the operating returns for electric railways for 1918, as compared with 1917, showed an increase of but 6.45 per cent, while the expenses for the same period increased 16 per cent. In December, 1918, their operating expenses had increased 23 per cent over the same month in 1917, with a resultant falling off in net revenues of 4 per cent. These figures are without doubt startling.

The accentuation is no less when we remember that these figures cover a period when many railways had increased their fares from 5 to 6, 7, 8 and in some instances 10 cents. So largely do these increased rates enter into the computation just submitted that thoughtful people are beginning to doubt whether, in general, these fare increases will give the relief which the companies must have.

PARTICULAR CASES MUST BE STUDIED

I venture now the suggestion that there is no general answer to be found applicable to all companies, to all localities and to all operating conditions. The sooner we get away from too much generalization and devote our time to the study of particular cases, the quicker we shall find our separate answers, when satisfactory answers are possible.

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*Abstract of address presented before the public utility group of the United States Chamber of Commerce, St. Louis, April 29, 1919.

If our minds are to pursue the channels of right and logical thinking, we are bound to recognize the truth of the following:

First: That electric railway service, particularly urban service, differs fundamentally from that of railroads, and certainly from all water, gas, etc., utilities It is a service in which a large share of the customers have the right of election as to whether they will walk or ride, with the jitney and automobile as alternatives. Railroads are not so subject. There is then a much closer relationship between the rate of fare and the riding habit than is found with other forms of transportation. The revenues of electric railways are to a very appreciable extent dependent upon a public willing to pay the imposed rates.

Second: To speak particularly of Pennsylvania, no two companies have the same corporate history. In rare instances have their lines been constructed under similar conditions. There are wide differences when we consider the localities served. There are topographical and geographical variants and differences with respect to congestion of population, and even with respect to the riding habits of particular localities.

When the people of Scranton oppose an 8-cent fare, they are likely to point to Philadelphia with a 5-cent rate; when the Pittsburgh company desires a 7-cent rate, it is easy to point to Boston. It is neither logical nor scientific to predicate a rate schedule upon such comparisons, unless the conditions are shown to be similar, and they are rarely comparable. If there ever was a time when each electric railway needs the most careful self-analysis, it is now.

RATE OF FARE SHOULD ATTRACT TRAFFIC

There are certain essential factors to be considered. In the first place, there is an intimate relation between the fare and the riding habit. I am sure we are agreed that the public is entitled to receive adequate service at a rate generously sufficient to meet operating expenses, provide a reserve for depreciation and yield a fair return. You might be inclined to state the proposition conversely, but the result would be the same.

We might place the primary emphasis on service and you upon revenues. Either is correct unless the other is ignored. Here, then, is a fair balance which we must strive to maintain. A rate of fare should be high enough to provide adequately for the company's needs and low enough to attract car riders to produce that revenue. The over or under emphasis of either of these postulates distorts the vision and disturbs accurate thinking. A rate of fare so high as to cut off a material part of the patronage will result ultimately in disaster to a company just as certainly, if not so immediately, as a rate of fare too low to produce the required revenue.

SOME CHOSE "THE EASIEST WAY"

In many instances a higher fare to provide increased revenues has been prescribed, based upon a purely mathematical hypothesis, ignoring the psychological and other considerations which enter very largely into the question as to whether it would be paid by the car riders. The results have not followed arithmetic and have been serious and perhaps disheartening. May it not be that under the pressure of immediate necessity some companies have chosen the easy pathway of least resistance.

I cite you an instance. A company, with an annual riding patronage of approximately 29,000,000 two years ago, increased its rates from 5 cents to 8 cents with loss in car riders of at least 6,000,000 fares. A total of 23,000,000 riders at 8 cents yields slightly more than 26,000,000 at 7 cents, or 29,000,000 at 6¼ cents.

In one of our large cities a railway had an annual patronage of 263,000,000 carried at 5 cents. To increase its revenues it increased its fares to 5½ cents (two tickets for 11 cents), and shortly after readjusted its rates by establishing an inner zone in which it anticipated no increase in riding habit, but in which its studies predicted patronage on a 5-cent fare at the rate of 63,000,000 annually. An outer and overlapping zone was created, this containing industries from which an increase in riding habit might have been expected. There was applied to it a 7-cent rate applicable also to riders between the two zones. It was anticipated that there might be a falling off of 10 per cent from the total of 200,000,000 theretofore riding in it. Actual experience, over perhaps not sufficient length of time to furnish a conclusive answer, showed in the inner zone (5 cents), a material increase in riding (73,000,000 riders) per year, while in the 7-cent zone the loss exceeded that anticipated by sixteen to seventeen millions (163,000,000 riders).

The social, industrial, financial and economic wellbeing of our country is ineradicably interwoven with the prosperity of the electric railways. Hence I view with great anxiety any plan which results in a large proportion of the public ceasing to patronize these roads. Such a situation is not wholly different from that which would arise if merchants were to burn up 15 to 25 per cent of their stock of goods and attempt to recoup on the 75 to 85 per cent of goods remaining. Surely there is a sense in which the car riders in any community are the railway's "stock of merchandise." As the curve of loss in patronage heightens appreciably as the rate of fare mounts from 5 to 10 cents, we must determine as best we may in each locality where and when the danger point is reached.

LACK OF MERCHANDISING IS INEXCUSABLE

In the second place, the old-time policy of electric railways was based upon the conclusion that the profits were in the fully loaded cars, but the modern conception seems to be a lessening of the number of car riders at an increased rate. The railways cannot afford to surrender these car riders. The success of the railway business is to be measured in terms of the retention of such riders.

Electric railways should give more attention to merchandising in order to increase the carriage of passengers. With car rides to sell, every empty seat is a potential loss. To my mind there is no more fruitful subject for local study than is involved in this suggestion. Why it is not more generally followed, I cannot conceive. That satisfactory results would flow from a judicious handling of the situation in this respect would seem to be as certain as the sequence between advertising and the sale of goods by merchants. To attract car riders, whereby the unfilled cars may be filled, is a business proposition which the electric railways cannot afford to ignore. How and when and where must be answered by each company in the light of local conditions and opportunities.

The value of public approval is a merchandising asset to the railway as it is to the business man. In a peculiar sense retailers are dependent upon the railways, and these merchants should possess sympathetic ears. But can their friendly interest be obtained when such large proportions of car riders are lost to them as potential customers? They are, however, in a very influential position in influencing, directly and indirectly, public sentiment. They have ready access to the newspapers, to whose success they materially contribute and which in turn mould the public opinion.

Local Chambers of Commerce, if they will investigate and fearlessly announce their views and positions, are in places of strategic importance in shaping that opinion. And if electric railways will unite with them on a policy which involves two propositions balanced against each other (retention, yes increase of car riders, and adequate revenues to meet each company's needs) much of the local difficulty will be removed.

It is true that railways have difficulties which merchants have not. But it is true, it is imperative, that railways should take, with wisdom, a page from the methods and experience of merchants and build up a part at least of their requisite increased revenues out of patrons now being lost to them and out of others which the growth of the country would under different circumstances probably provide.

ZONING A FRUITFUL FIELD FOR STUDY IN LIGHT OF LOCAL CONDITIONS

It has come to my attention that one company is putting experts on the streets to observe the movements of the people and to devise methods of attracting passengers to the cars. To that end special tickets or commutation tickets are being considered.

The zoning problem, particularly in interurban service, is a fruitful field for local examination, but zones should be so arranged that car riders will be attracted rather than repelled. In some instances the present zones for single fare areas are entirely too long. I have noted one instance of 16 miles for a single fare. Whenever it costs more to carry a pasesnger than is paid by him, a burden is placed not only upon the company but upon other riders whose rates must be higher to make up the deficiency

It cannot be denied that a flat increase of fare loses the short distance rider and retains the rider whose ride is less remunerative, or perhaps not remunerative at all. The experiment of zoning with an initial rate for the first zone traveled and a less rate for each succeeding zone, has elements of justice and equality to support it. But here, too, the answer must be found in the light of local conditions, and not in the prescription of a uniform policy.

DO NOT OVERLOOK OPERATING IMPROVEMENTS

I shall not undertake to speak specifically of operating studies, lighter cars, one-man cars, etc., but in the light of pressing conditions, such subjects cannot prudently be overlooked by operating officials of electric railways.

I am not at all convinced that we can afford to dispense with electric railway service. No other, better or more certain method of local passenger transportation has been devised. Such a service is entitled to have the fullest public support and to receive, at the hands of the public, revenues sufficient for its efficient maintenance.

I have not attempted to enunciate a commission policy, for I firmly believe that commission regulation cannot be a success or be of permanent public benefit if it interferes overmuch with the right of initiative which must and ought to be lodged with the utilities of the country.

The foregoing observations are those of one who from the outside has noted with some anxiety the trend of certain policies, and among them that increased rates of fare have not in all or in many instances resulted in anticipated increases in gross revenues. These observations relate more particularly to urban service, for the conditions surrounding suburban and interurban lines may approximate more closely to steam railroad than to electric railway problems.

HINTS FOR THE WISE

Let me summarize:

(a) A rate of fare which seriously interferes with the riding constituency of any company will lead in the long run to financial ruin of that company.

(b) We cannot return too quickly to the former policy of building up increased revenues by resorting to the merchandising side of the business, whereby empty seats will be filled.

(c) Re-zoning in particular cases should be considered.

(d) Commutation tickets should be adopted where the results through the attraction of traffic at timely hours and to convenient localities would justify their use.

(e) Operating conditions should be studied and lighter cars or perhaps one-man cars be installed where conditions warrant.

Differences of opinion, honestly expressed, are not so antagonistic as formerly they were thought to be. They are but the triangulation of ideas. They represent merely the divergence of the view points upon which different observers stand. We have discovered that the man traveling due east and the one traveling due west ultimately meet. The meeting point in this place, I am sure, is that the wellbeing of the electric railways as efficient public servants, supported by adequate revenues without which they cannot continue that service, must be assured to them, and thus their service to the public.

Ambitious Japanese Electrification Project

Application has been made to the Japanese government for permission to construct a high-speed electric railway between Tokyo and Osaka, a distance of 287 miles. It is estimated that an expenditure of about $100,000,000 will be necessary for the purpose. The proposed line is about 69 miles shorter than the existing steam railroad. Doubt is expressed in Japan as to the willingness of the government to permit the construction of an electric line competing with its own steam line, but the promoters are counting on the changed commercial, financial and transportation conditions brought about by the war to cause the government to consider the project favorably.

Side Lights on the Zone Fare—Car Capacity

British Cars Have More Seats Than American Cars and Their Conductors Make a Much Larger Number of Collections per Car-Mile

By WALTER JACKSON

THE statement that the practicability of zone fare collection in British cities is due to the use of small cars has been made so often that a great many people believe it. No later than this year it was gravely repeated in an admirable analysis of a fare situation. As nobody could have any ulterior motive in circulating a tale like this, it is probable that the misconception arose from the half knowledge that most British cars are of the single-truck type. The fact is that nearly all of these cars have two decks. It is only on the Continent that single-deck cars smaller than ours prevail.

So far from having a smaller seating capacity than American cars, the British cars are generally larger. This is what we ought to expect when we read that systems like Liverpool and Glasgow average sixteen to twenty passengers per car-mile. Even with their better all-day riding, one would hardly imagine that British tramways enjoyed anything like a 50 per cent load factor, which would have to be the case if their capacity ran only from thirty-two to forty seats. British cars actually have from fifty-six to seventy-eight seats each. The following comparison with large American city cars built during recent years tells the tale.

SEATING CAPACITY OF BRITISH AND AMERICAN CARS

United Kingdom		United States	
London County Council	78	Brooklyn Rapid Transit	58
West Ham	78	New York City Railways	51
Aberdeen	54	Third Avenue Railway	51
Glasgow	62	Youngstown	56
Belfast	60	Chicago	40
Dublin	58	Milwaukee	52
Leeds	60	Philadelphia	54
Reading	72	Allentown	57

As a further example it may be mentioned that the standard car suggested for the Edinburgh Tramways electrification would be a single-truck vehicle seating sixty people.

Nevertheless, it is probable that during the rush hours the American cars average a greater total seating and standing load than the British cars do. This does not mean that the British car has no room for standees, inasmuch as the lower deck is generally fitted with longitudinal seats. The paradox arises from the fact that as so much of the British riding is short haul, it is necessary to limit the number of standees. Short riders will not patronize heavily loaded cars. For example, although the seating capacity of the standard Glasgow car is sixty-two, the number of standees permitted in normal times is only six. In spite of this limitation Glasgow probably has the highest number of passengers per car mile in the world.

If the all-day load, rather than the peak load, is taken as the governing factor, British tramways are far more justified in their choice of large-capacity cars than are those of the United States and Canada. Actually, the double-deck car gives the required rush-hour reserve capacity at less cost in propelling surplus weight than do the "jumbos" in so many of our cities. However, it is not the reserve capacity feature of the double-deck car that is the topic in hand but rather the physical possibility of collecting graduated fares on such a car.

Several British operators hold the opinion that prepayment is "a consummation devoutly to be wished." It is readily apparent that the British double-deck car is handicapped for prepayment because so large a part of the platform is occupied by the stairway to the upper deck. The best that can be done is to request passengers who are proceeding to the upper deck to pay as they enter. This request has received additional emphasis since the coming of female conductors. Most of the fares, necessarily, are collected after the passenger takes his seat.

Practically all of these cars are of one general type, namely, the bodies have end doors but there are no vestibule doors. In recent years the upper deck has been inclosed in whole or in part, and sash has been added over the dashers. Since the platforms are open, the step accident is still a prominent feature in operation.

The first question asked about the zone fare is: Does the conductor get all of the fares? Of course, he is bound to miss some fares, but such oversights are minimized by the rule that each passenger must be prepared to show to either the conductor or the ticket inspector a receipt for fare paid on the current trip. The possibilities of the zone fare can best be appreciated from the amount of revenue collected for the treasury from a given number of passengers per car-mile. For example, in the year 1918 the conductors of Liverpool turned over an average of 18.91d. (38 cents) for every car-mile operated. This corresponded to an average of sixteen passengers per car-mile, 80 per cent of whom paid the minimum fare of 1d. During the 1918-1919 Christmas and New Year holidays the conductors on some lines of the West Ham Corporation Tramways turned in as high as 24.86d. (more than 49 cents) per car-mile from a traffic of twenty passengers per car-mile. On the Paisley Road and Alexandra Park line in Glasgow, conductors average almost twenty-three fare collections per car-mile!

If it is possible for a British conductor to carry on so many fare transactions per car-mile, American operators with their more convenient single-deck, big platform cars should have little to fear. A short-distance fare is far more likely to increase the off-peak hour traffic than the rush-hour traffic. If the peak-hour cars are already filled with regular long-distance riders, they will not attract anybody who has the choice of walking. During the much larger number of off hours the case is different. It is then that many short riders can be added without putting an extra burden upon the conductor; and this can be done also without adding any cars, if a short headway service is already in vogue. It follows that in comparing the great difference in passengers per car-mile here and abroad, allowance must be made for two things—first, that the average ride in Great Britain is shorter; second, that the loading on British tramways during off-peak hours is more favorable than here.

To conclude; there is certainly no truth in the assumption that the zone fare has proved workable in the United Kingdom because British cars are smaller than our own. On the contrary, their seating capacity is nearly always greater and their conductors must carry on a greater number of fare collections per car-mile than under the universal fare system. Hence, if British street railways have made the zone fare workable, American roads ought to be able to do still better in adapting either prepayment or postpayment to the roomier platforms and aisles of our cars. The will will find the way.

Regulation with Teeth

British Columbia Has New Law Providing Unusual Means for Enforcing Orders

THE public utility act recently passed by the Legislative Assembly of the Province of British Columbia possesses several novel features. Not only is the regulatory work centralized in one commissioner, appointed by the lieutenant-governor in council for a period of ten years, but the commission has unusual power of regulation and enforcement.

FULL CONTROL OVER RATES

No mention will be made of the customary powers of the commission over the issuance of securities, amalgamation, sales, supervision over track connections and service in general. With regard to rate making, however, it may be pointed out that except by the direction of the commission or with its approval first obtained, no utility may establish any new rates, and every change in rate shall come into force only on a date fixed by the commission. The power of the commission over rates applies whether they are fixed by or subject to an agreement or otherwise and whether the agreement has been incorporated in or made binding by any general or special legislative act or otherwise.

In fixing rates the commission is required to have due regard, among other things, to giving the utility a fair and reasonable return upon "the appraised value of the property" and to the protection of the public from rates that are excessive as being more than a fair and reasonable charge for service of the nature and quality furnished by the company. The commission must consider all matters proper to be considered as affecting the rate, including the circumstances existing at the time any former rate was made or fixed as well as the circumstances existing at the time of the inquiry. In any case where the commission deems it expedient, it may make the alteration or continuance of any rate conditional upon the performance of some particular act.

Pending the determination of a fare for the British Columbia Electric Railway in Vancouver, the act requires the company from April 9, 1919, to keep in trust the amount of fare charged above 5 cents but not exceeding 6 cents. If the rate fixed by the commission is less than the rate charged during the period, the excess must be paid by the company to the Vancouver General Hospital, any remaining amount going to the company. If the rate fixed by the commission exceeds the rate charged during the period, then the whole of the amount collected shall go to the company.

In regard to appraisals the act states that the commission may "inquire into every fact which in its judgment has any bearing upon value, including the condition and value of the undertaking as a going concern and the amount of money actually and reasonably expended in that undertaking in order to furnish service reasonably adequate to the requirements of the community served as that community exists at the time of the appraisal."

POWER OVER SERVICE AND DEPRECIATION

The commission has general power over service, and it may make regulations prescribing the conditions for all agreements entered into by companies in respect to service. The commission is given power to order "reasonable and expedient" extensions within municipalities and to apportion the cost as it deems equitable, and to order extensions generally in cases where it believes that sufficient business exists to justify construction and maintenance of the extension and that the financial condition of the company reasonably warrants the expenditure.

Whenever the commission after inquiry considers that it is necessary and reasonable that a depreciation account should be carried for the protection of security holders and creditors, it may order a company to keep an adequate depreciation account. The commission shall from time to time after inquiry fix proper and adequate rates for depreciation sufficient to provide the amounts required in addition to the expenditures made for maintenance.

The utility shall conform its depreciation account to rates fixed by the commission and shall set aside all money of this character in a depreciation fund, the income from which shall be added to the fund. The depreciation fund shall not be expended except for depreciation, improvements, new construction, extensions or additions.

Where the commission is of the opinion that the appointment of a supervisor or inspector is necessary and expedient for the purpose of supervising or inspecting, continuously or otherwise, the property or service of any company with a view to prescribing and carrying out measures for the safety of the public and the patrons or for the adequacy of service, the commission may appoint a supervisor or inspector over the company and prescribe his duties. The amount of his salary and expenses may be placed upon the municipality served or apportioned in such manner as the commission deems proper.

ORDERS CAN BE ENFORCED

Three direct means of enforcing its orders are given to the commission. In the first place, the commission may forcibly or otherwise seize and take possession of the whole or any part of the property of any company and manage the business in the interest of the security holders, the creditors and the public, exercising all functions of the directors and officers until its orders have ben enforced. In the second place, any order made by the commission may be made an order of the Supreme Court through certification and filing and shall be enforceable in like manner as any order or judgment of that court. In the third place, when it is believed that no effectual means exists for compelling a company to comply with its orders, the commission may transmit to the attorney general a certificate setting forth the default of the company. Upon publication in the official bulletin of a public notice regarding the receipt of this certificate by the attorney general, the default of the company so established is ground for an action to dissolve the company.

The finding of the commission upon any question of fact within its jurisdiction, of course, is binding upon all parties and in all courts, but an appeal to a judge of the Court of Appeal may be taken upon any question as to law or jurisdiction. A stay of any order may be granted during the pendency of the appeal. The act contains three pages of detailed penalties running from $20 to $1000 for a single day's refusal to obey orders, making of false returns, willful default in giving information and general violations.

Comparative Census Data for Electric Railways

THE table below divides geographically the 1912 and 1917 census figures published in the ELECTRIC RAILWAY JOURNAL of April 26, 1919. Inasmuch as the table is in preliminary form, having been prepared from the tentative 1917 returns for individual states and from the unadjusted totals of the 1912 census report, no extended analysis seems advisable now.

The percentage changes in the data, however, seem to indicate that the largest growth in single track, cars and power output was in the West North Central and West South Central sections. Wages generally increased more rapidly than employees, to the least degree in the Mountain section. The passenger gains were heavier in the East than in the West; the car miles, *vice versa*.

In all sections the operating expenses increased faster than the gross income, and in the West and the South this was true of income deductions. The best showing financially was made by the South Atlantic States, and the worst by the New England, Mountain and Pacific groups. The effect of jitney competition in these latter sections is thus visible. The state groupings follow:

New England: Me., New Hamp., Vt., Mass., R. I., Conn.; *Middle Atlantic*: N. Y., N. J., Penn.; *East North Central*: Ohio, Ind., Ill., Mich., Wis.; *West North Central*: Minn., Ia., Mo., N. D., S. D. Nebr., Kan.; *South Atlantic*: Del., Md., D. C., Va., W. Va., N. C., S. C., Ga., Fla.; *East South Central*: Ky., Tenn., Ala., Miss.; *West South Central*: Ark., La., Okla., Tex.; *Mountain*: Mont., Col., New Mex., Ariz., Idaho, Wyo., Nev., Utah.; *Pacific*: Wash., Ore., Cal.

GEOGRAPHICAL DISTRIBUTION OF 1917 AND 1912 CENSUS STATISTICS FOR ELECTRIC RAILWAYS IN UNITED STATES

(1917 Figures in Roman; 1912 Figures in Italics)

	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
Number of companies....	114	515	255	90	109	50	70	40	66	*1,309
	_119_	_436_	_253_	_90_	_123_	_46_	_83_	_42_	_68_	_1,260_
Operating............	86	241	225	85	94	49	68	39	60	947
	_91_	_246_	_222_	_85_	_107_	_45_	_79_	_40_	_60_	_975_
Lessor...............	28	274	30	5	15	1	2	1	6	*362
	_28_	_190_	_31_	_5_	_16_	_1_	_4_	_2_	_8_	_285_
Miles of line...........	4,345.91	7,203.73	9,650.17	2,527.11	2,397.39	1,073.47	1,338.23	963.26	3,058.34	*32,557.61
	_4,216.26_	_6,980.09_	_9,170.53_	_2,129.73_	_2,199.21_	_948.45_	_1,105.62_	_793.96_	_2,894.01_	_30,437.86_
Miles of single track.....	5,558.19	10,548.41	12,670.86	3,665.42	3,277.86	1,450.20	1,682.37	1,301.30	4,689.64	*44,844.25
	_5,294.55_	_10,043.03_	_11,809.69_	_3,098.62_	_2,962.28_	_1,287.26_	_1,376.23_	_1,007.32_	_4,185.84_	_41,064.82_
Cars..................	14,232	31,196	24,069	9,484	7,387	2,725	2,895	1,673	8,942	102,603
	_13,845_	_30,507_	_21,686_	_6,405_	_6,923_	_2,675_	_2,493_	_1,526_	_7,956_	_94,016_
Passenger............	11,800	27,278	17,452	5,793	6,277	2,317	2,518	1,163	5,316	79,914
	_11,618_	_26,821_	_16,286_	_5,291_	_6,061_	_2,286_	_2,246_	_1,064_	_4,489_	_76,162_
All other.............	2,432	3,918	6,617	3,691	1,110	408	377	510	3,626	22,689
	_2,227_	_3,686_	_5,400_	_1,114_	_862_	_389_	_247_	_462_	_3,467_	_17,854_
Electric locomotives.....	21	38	62	51	22	6	6	22	130	*358
	_22_	_39_	_56_	_32_	_11_	_3_	_5_	_10_	_99_	_277_
Number of persons employed................	32,606	97,452	69,742	24,048	22,872	8,576	9,771	4,868	24,891	294,826
	_34,224_	_93,811_	_66,721_	_20,930_	_19,958_	_9,375_	_8,393_	_4,498_	_24,551_	_282,461_
Salaries and wages.......	$31,600,948	$87,460,013	$65,252,535	$21,028,682	$17,600,864	$6,509,520	$7,805,552	$4,496,608	$25,485,640	*$267,240,362
	_23,285,975_	_66,387,065_	_47,607,646_	_15,986,008_	_12,501,028_	_5,824,724_	_5,717,503_	_3,997,836_	_19,583,154_	_200,890,939_
Total horsepower........	502,559	961,375	954,849	403,816	570,317	149,980	153,924	5,918	436,244	*4,192,192
	_421,888_	_977,703_	_824,707_	_327,470_	_382,924_	_138,607_	_111,236_	_91,938_	_388,578_	_†3,661,385_
Steam engines:										
Number...............	253	361	467	155	206	90	108	27	77	*1,744
	_325_	_542_	_602_	_185_	_282_	_93_	_110_	_38_	_87_	_*†2,258_
Horsepower........	457,893	935,663	921,954	373,391	368,597	149,980	152,324	56,264	120,139	*3,536,205
	_384,178_	_951,088_	_778,194_	_301,895_	_313,400_	_138,607_	_110,561_	_70,868_	_120,763_	_†3,165,888_
Internal combustion engines:										
Number...........	1	14	4	12	11	....	7	1	....	*50
	_5_	_21_	_6_	_8_	_6_	....	_2_	....	....	_48_
Horsepower........	100	5,330	4,250	5,925	10,335	....	1,600	464	....	*28,004
	_2,700_	_7,375_	_4,590_	_3,575_	_5,275_	....	_675_	....	....	_24,190_
Water wheels:										
Number...........	56	36	41	21	80	....	....	8	74	316
	_52_	_36_	_67_	_48_	_87_	....	....	_19_	_74_	_383_
Horsepower.........	44,566	20,382	28,645	24,500	191,385	....	....	2,400	316,105	627,983
	_35,010_	_19,240_	_41,923_	_22,000_	_64,249_	....	....	_21,070_	_267,815_	_471,307_
Kilowatt capacity of dynamos...............	354,845	706,917	653,920	297,619	393,983	109,505	109,996	40,435	268,240	*2,935,460
	_305,739_	_668,323_	_579,840_	_237,171_	_269,546_	_91,305_	_84,248_	_56,057_	_215,837_	†2,505,316
Output of stations, kilowatt-hours............	806,862,258	1,672,355,678	1,775,205,270	677,668,614	842,368,045	203,465,858	305,539,270	99,754,432	857,283,364	7,240,502,789
	_676,541,943_	_1,822,647,864_	_1,467,194,047_	_496,764,104_	_394,171,487_	_248,485,679_	_191,355,019_	_135,247,730_	_620,291,135_	†6,002,659,036
Current purchased, kilowatt-hours............	193,076,125	1,632,794,419	1,430,410,881	275,527,139	423,096,706	207,868,700	70,449,880	82,155,833	631,958,359	4,947,338,042
	_95,560,776_	_895,318,072_	_796,769,999_	_199,632,010_	_248,907,329_	_41,862,642_	_53,724,320_	_71,594,567_	_563,949,066_	_†3,017,358,753_
Passengers carried.......	1,694,779,084	5,027,469,984	3,741,785,407	1,244,121,243	943,592,756	361,052,306	385,275,805	191,917,415	916,920,573	14,506,914,573
	_1,380,035,701_	_4,125,221,246_	_2,968,575,745_	_1,063,762,274_	_791,277,464_	_342,143,945_	_330,702,628_	_185,383,120_	_948,239,593_	_12,135,341,716_
Revenue..............	1,242,076,786	4,225,287,064	2,712,624,699	902,368,927	747,561,816	292,004,689	313,203,554	162,222,128	705,310,819	*11,302,660,482
	_1,051,161,737_	_3,513,720,591_	_2,159,620,746_	_787,301,146_	_616,724,741_	_268,785,533_	_270,745,675_	_154,224,248_	_723,270,250_	9,545,554,667
Transfer..............	434,239,701	761,951,265	952,503,426	334,299,693	184,691,325	62,642,847	65,519,964	26,734,632	187,291,574	*3,009,874,427
	_311,827,039_	_577,219,067_	_756,840,810_	_264,945,769_	_163,321,953_	_66,038,851_	_53,552,763_	_27,730,485_	_202,441,287_	_2,423,918,024_
Free..................	18,462,597	40,231,675	65,393,774	7,452,623	11,339,615	6,404,710	6,552,287	2,960,655	22,318,180	181,116,116
	_17,046,925_	_34,281,588_	_52,114,189_	_11,515,359_	_11,230,770_	_7,319,561_	_6,404,190_	_3,428,387_	_22,528,056_	_165,869,025_
Revenue car mileage.....	209,504,233	705,861,026	542,934,741	173,865,881	142,657,669	64,293,663	76,935,852	34,110,452	189,059,413	2,139,222,930
	_191,451,066_	_663,588,817_	_474,239,256_	_152,346,875_	_124,591,004_	_58,056,424_	_61,616,556_	_30,149,835_	_165,580,241_	1,921,620,074
Railway operations—revenues.................	$68,804,330	$230,354,775	$162,091,962	$52,734,834	$42,426,736	$15,882,474	$20,276,724	$10,617,288	$48,091,991	*$651,281,114
	_55,440,449_	_190,690,069_	_128,042,006_	_43,140,584_	_32,556,965_	_14,420,129_	_15,549,746_	_8,486,312_	_47,669,862_	_535,996,122_
Auxiliary operations—revenues..............	1,560,085	3,844,737	16,779,782	5,107,624	14,109,938	4,764,395	2,771,278	1,197,839	8,408,300	*58,543,978
	_1,074,634_	_986,755_	_7,233,153_	_1,740,740_	_6,901,540_	_2,664,354_	_1,480,764_	_2,616,307_	_6,817,335_	_31,515,582_
Non-operating income....	757,916	8,636,784	4,035,707	412,609	3,369,310	246,883	1,082,901	885,806	1,275,602	*20,703,518
	_907,934_	_6,362,082_	_3,985,314_	_297,899_	_1,910,463_	_477,776_	_1,823,251_	_848,117_	_1,805,978_	_18,418,813_
Income from all sources	$71,122,331	$242,836,296	$182,907,451	$58,255,067	$59,905,984	$20,893,752	$24,130,903	$12,280,363	$57,775,893	$730,108,040
	_57,423,017_	_198,038,906_	_139,260,473_	_45,179,223_	_41,368,967_	_17,562,259_	_18,853,761_	_11,950,736_	_56,293,175_	_585,930,517_
Operating expenses......	$53,003,099	$140,318,521	$115,734,439	$38,511,939	$32,148,429	$12,537,999	$13,927,537	$7,489,797	$39,141,924	*$452,813,684
	_37,316,197_	_108,656,704_	_78,747,118_	_27,363,397_	_21,591,731_	_9,867,378_	_10,390,837_	_6,426,225_	_32,536,769_	_332,896,356_
Deductions from income (including taxes)......	16,237,757	84,062,232	48,660,431	14,217,822	18,440,255	6,438,489	6,636,163	4,371,483	21,768,517	*220,833,149
	_14,008,296_	_73,462,284_	_43,794,405_	_11,102,268_	_13,115,863_	_4,643,653_	_4,941,541_	_3,341,700_	_16,484,262_	_184,894,272_
Net income...........	$1,881,475	$18,455,543	$18,512,581	$5,525,306	$9,317,300	$1,917,264	$3,567,203	$419,083	‡$3,134,548	*$56,461,207
	_6,098,524_	_15,919,918_	_16,718,950_	_6,713,558_	_6,661,373_	_3,051,228_	_3,521,383_	_2,182,811_	_7,272,144_	_68,139,889_

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* These totals, compiled from the preliminary individual state reports issued by the government, do not quite check with the totals presented in the government's own summary as shown in Table I in the *Electric Railway Journal* of April 26, owing probably to slight changes since the preliminary returns were issued.

† These totals as now given for 1912 represent slight readjustments of the divisional figures, taken from the 1912 census report. ‡ Deficit.

Cleaning Twelve Cars a Day with Three Men

The East St. Louis & Suburban Railway Accomplishes This Work by Means of Special Washing Equipment

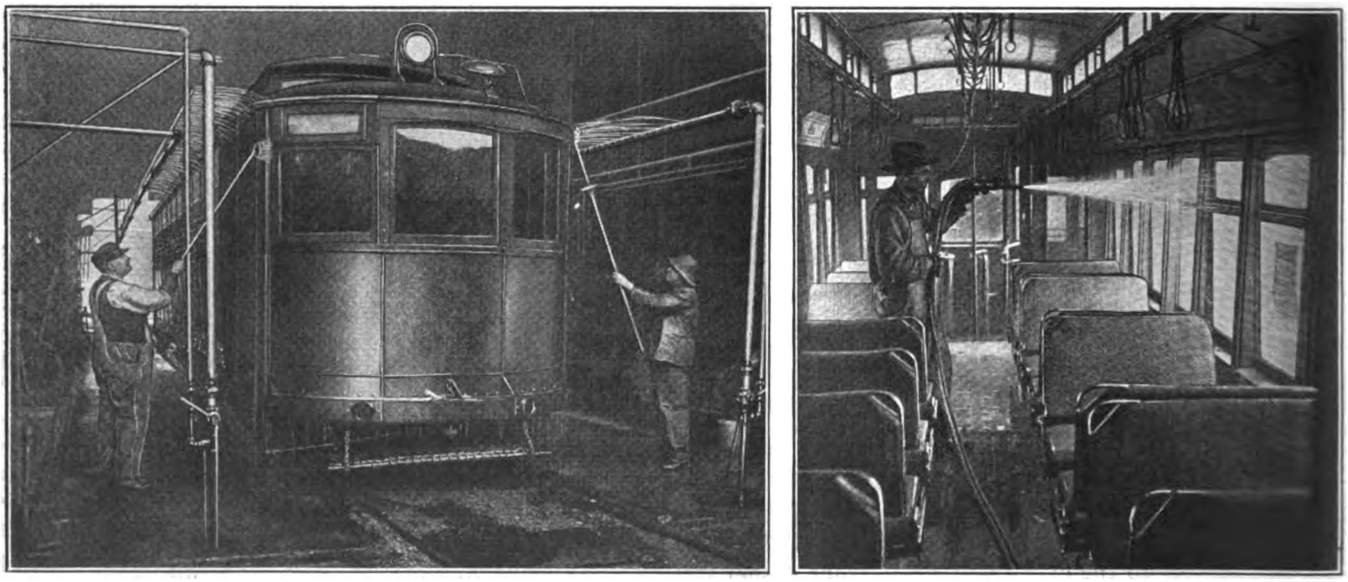
CAR washing by the East St. Louis & Suburban Railway is a thorough-going operation. The work is done in a washing room containing two tracks of two-car capacity each. The equipment used to wash the outside of the cars includes a length of 1½-in. iron pipe extending along the full length of these tracks and at the height of the car roof. This pipe is perforated about every 4 in. with a 1/16-in. hole. Each pipe is connected at one end to a main water line by a flexible joint, and a handle lever is provided so that the car washer can rotate the pipe to throw the stream against the side of the car at any desired height from the ground. The stream is, of course, started at the highest point on the car side, the washer scrubbing the side of the car with a long-handled brush and gradually working down the side to the bottom with both stream and brush. Each pipe is sectionalized by means of a valve in the middle so that either one car can be washed alone or two cars on each track can be washed simultaneously.

In addition to the outside cleaning the cars are washed inside from roof to floor, including seats, by means of a double hose line. Air is brought into the water line at 100 lb. pressure, both air and water being controlled at the nozzle. On the ceilings, seats, etc., much air and little water are used, giving a fine spray, sufficient for washing purposes without too thoroughly soaking the parts. On the floor and lower walls considerable quantities of water are used and the cars are flushed out as one would flush off a sidewalk.

The cars are washed according to mileage and just previous to inspection which for the city cars averages about every 1500 miles. They are run directly from the washing shed to the inspection pits.

The floor of the washing shed is of concrete and slopes toward the outer side of each rail. In order to prevent flooding of the rails, however, an abutment several inches high extends along the outside of each rail the full length of the track, and the water is conveyed to underdrains.

This washing plant has been in service about one year. Previous to its installation three men could thoroughly clean not more than four cars a day. Under the present arrangement an average of about twelve cars a day are thoroughly washed. With only three men working as at present not more than two cars are ever being cleaned simultaneously and as in general all three men work together on the same car.

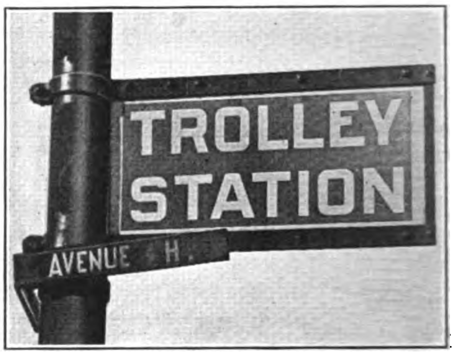


AT LEFT, WASHING CARS ON THE OUTSIDE WITH SPECIAL SPRINKLING SYSTEM AT EAST ST. LOUIS. AT RIGHT, METHOD OF CLEANING CAR INTERIORS

Trolley Station Signs Used in Brooklyn

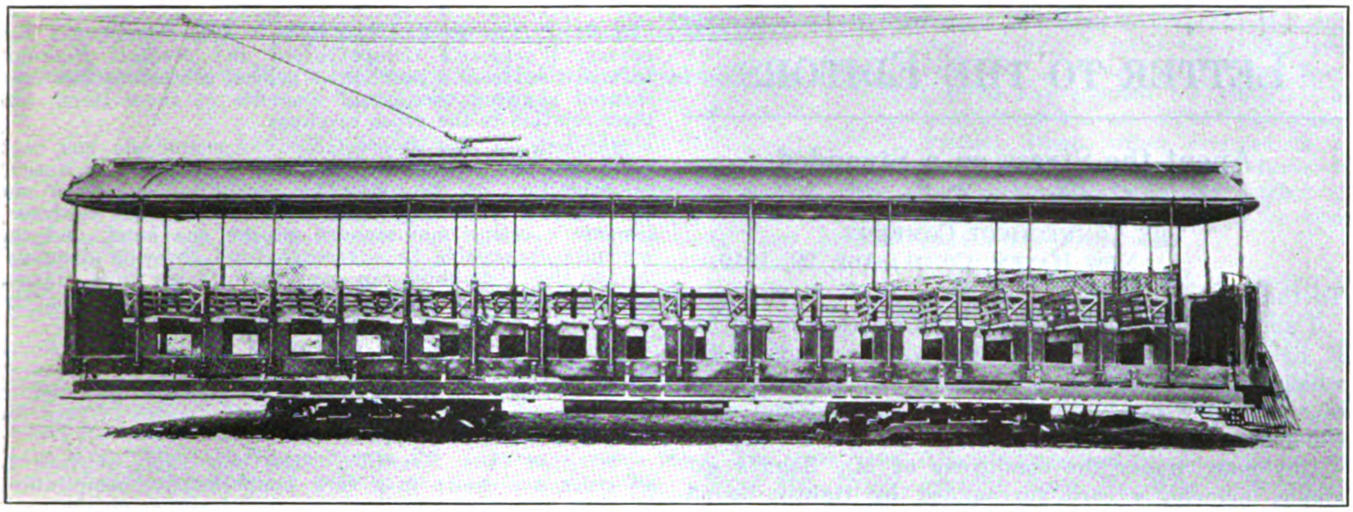
IN WALTER JACKSON'S article in the March 8 issue of the ELECTRIC RAILWAY JOURNAL on the electric railways of Glasgow there was included a drawing of a trolley station sign used in that city. The drawing was complete enough so that anyone desiring to make up a similar sign could do so.

The accompanying illustration shows a sign used in Brooklyn for the same purpose which would seem to be just as pleasing to the eye and should be considerably cheaper to make if both signs are made in this country and under the same conditions. Only a single double-faced sign is required if the plan shown here is used, the sign being enameled and the letters white on a blue background. The dimensions of the Brooklyn sign are 18 in. x 36 in. and the sign is of No. 16 B. W. G. iron.



BROOKLYN TYPE OF TROLLEY STATION SIGN

Enameled signs of good quality are more expensive in first cost than are painted ones but they cost much less to maintain. Unless the enamel is chipped off by a blow, which is not likely to happen to such a sign, it is practically permanent and if the surface becomes dusty and dim it can always be freshened up by merely wiping off the dirt. And such attention is needed only at intervals of several years.

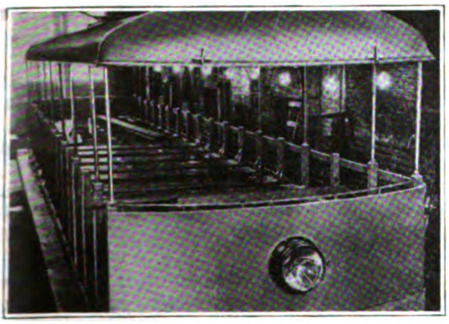


ONE OF THE OLD "MOONLIGHT" CARS

Light Open Cars for Amusement Park Traffic

United Railways of St. Louis Builds Type with Special Arrangement for Train Operation

THE term "moonlight car" in St. Louis has been handed down from the time when the company used to operate on pleasure trips and for special park traffic a type of car constructed with a canvas roof which could be rolled back. The fact is the canvas was seldom rolled back and later twenty cars—ten leaders and ten trailers—of similar construction were built with a permanent roof. Some time ago ten of these cars, nine trailers and one leader, were destroyed by fire and the company is now building ten new cars and making a few improvements over the older equipment.



THE FIRST NEW CAR NEARLY COMPLETED

The underframe construction consists of 8-in., 6½-lb. channel side sills, 3½-in. x 5½-in. wooden cross sills except over the trucks where 3¾-in. x 1⅞-in. wooden sills are used with 2½ in. x 1¼-in. x ¼-in. T-iron longitudinal members. The over-all length is 47 ft. 3 in. and the over-all width 7 ft. 10¼ in. In the new body design an 11-in. x ⅜-in. reinforcing plate has been added to each side beam by fastening a 4-in. x 3-in. x ⅜-in. angle to the base of the 8-in., 11¼-lb. channel. These plates extend practically the entire length of the car. Since the original cars were built Tomlinson couplers have been adopted as standard and this has necessitated some change from the original design. In addition to these changes the wheelbase has been increased from 22 ft. to 24 ft. 2 in. The weight of the car is 34,000 lb.

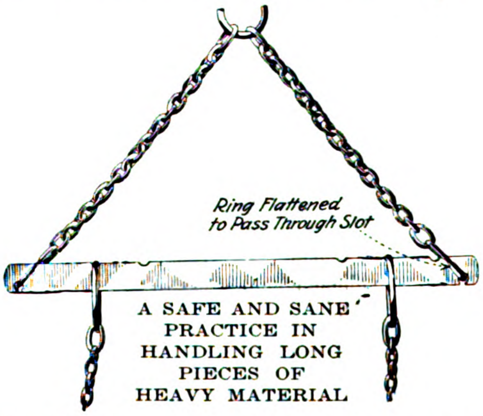
Views of one of the old cars and the first of the new ones nearing completion are shown. The seats are of wood construction throughout and the side posts are also of wood. Owing to the curvature of the front dasher it is necessary to shorten the first seat on the car for convenience of the passengers occupying this seat. The steps fold up and it will be noted that the cars are single end operated so that the left side is permanently closed and without steps. The arches supporting the roof are 1-in. iron pipe extending continuous from side to side. The roof is of wood covered with canvas with a footboard and trolley base support as shown. The two brackets at the lower edge of the end of the roof shown in the illustration are flag brackets.

These cars are equipped with United Railways No. 27 maximum traction trucks and two Westinghouse No. 56 motors. Ten of the cars have control equipment for operation either singly or as leaders in two-car trains, while the other ten can be used only as trailers in two-car operation. The leaders are equipped with K-35-W-2 control while the trailers have K-11-A control.

All cars are equipped with General Electric Company straight air brakes with an emergency feature and Golden Glow No. TR-128 headlights. The motor cars will seat ninety-six and the trail cars 100 passengers.

Spreader for Use with Cranes

IN A RECENT executive series poster the National Safety Council advocates the use of a spreader of some such form as that shown in the accompanying sketch for use when lifting bars or other long material



A SAFE AND SANE PRACTICE IN HANDLING LONG PIECES OF HEAVY MATERIAL

by means of a crane. Such work is dangerous with makeshift spreaders because the load is apt to fall if the spreader slips. This spreader is a one-piece steel bar designed so as not to require the use of bolts. It cannot become disengaged and the sling chains hang vertically from the notches in the spreader.

LETTER TO THE EDITORS

Anent the Stress on a Stranded Conductor Core

THE CONNECTICUT COMPANY
NEW HAVEN, CONN., Apr. 29, 1919.

To the Editors:

I am very much interested in the article by Paul A. B. Sahm on page 786 of the JOURNAL for Apr. 19, in which he raises the question as to whether the core of stranded wire is proportionately stressed and cites experiments to show that it is not.

Obviously, under the conditions of Mr. Sahm's example, namely, a core surrounded by tightly bound wires which do not change their relative position, the stresses in all wires will be substantially identical, but the question in my mind is, do these conditions obtain in the case of a long span? I am frank to say that I have never made any experiments to determine the facts. A test on a short section would probably show little variation, but there is a very general belief, emphasized by the use in a considerable number of large spans of a hemp-core cable, and in the American Telephone & Telegraph classification of strands the employment of the breaking strength of six wires for the rating, that in service conditions there is not that rigidity of relation assumed in Mr. Sahm's example. I am sure that all interested in line construction would be glad to learn from Mr. Sahm, or anyone else, of any actual tests which would establish the facts, whatever they may be.

CHARLES RUFUS HARTE,
Construction Engineer.

AMERICAN ASSOCIATION NEWS

Bureau of Information and Statistics

SECRETARY E. B. BURRITT has issued to member companies a statement of the activities of the Bureau of Information and Statistics which is now administered by J. W. Welsh, special engineer. After an introductory explanation he says:

Among the more recent reports and compilations prepared by the bureau, since the March 1 report on this subject, are the following:

Table of Valuations of a Number of Electric Railway Properties, based on appraised and negotiated valuations, and showing in general amount and kind of property included.

Rates of Insurance covering workmen's compensation for all states conducting such business. Information has just been received showing in general the rates of insurance for the various classes of occupational risks involved in electric railway operation and construction.

Effect of Time in Fare Increase Cases on Percentage Increase in Revenue Obtained. Information has been secured from a number of medium-size properties showing the comparative change in passengers carried and railway operating revenue received for a consecutive period of six months after changes in fare occurred showing the tendency to secure the theoretical rate as time advances.

Compensation for Carrying United States Mail. At the request of the association, F. W. Doolittle has prepared a form of exhibit for the guidance of companies in presenting their testimonies at the regional hearings which will be conducted at various points in the country by the Interstate Commerce Commission commencing in Washington on June 9.

Cost of Injuries and Damages, Claim Department Expenses, Workmen's Compensation and Medical Bureaus. Information from a number of typical companies has been secured showing the actual amounts of these items and their relation to the gross revenues.

Maintenance and Depreciation. An analysis has been made based on reports of public utility commissions, special investigations of properties by consulting engineers and court decisions showing the charges made against operating expense covering maintenance on the one hand, and the amounts chargeable to a reserve fund covering depreciation on the other hand. In some recent cases these charges are fixed in the franchise agreements. In all cases, the authority and date of the determination are indicated.

Methods of Interurban Companies for Increasing Fares Whether by Shortening the Five-Cent Zones or Increasing Rates Per Mile or Otherwise. This consists of a list of companies showing the present increased rates of fare for each of the above classes.

Increased Fare Situation. The new rates of fare in all cities are shown in a very comprehensive compilation, in which the cities have been grouped together on the basis of the rates of fare and giving also the name of the operating company, the former rate of fare and effective date of fare increase.

Effect of Increased Rates of Fare on Operating Revenues. A tabulation of typical cities of over 100,000 population, having increased rates of fare and showing the effect of this increase on operating revenues compared with the theoretical expected increase. This is based upon replies received to letters sent out by the association during the last few months.

Income Accounts and Operating Expenses. A comparative statement of the principal income accounts and operating expenses for a group of approximately 300 companies representing 84 per cent of the operating revenues of the country has been prepared.

Taxes and Other Requirements. A compilation of approximately 150 companies showing a classified list of tax burdens and other requirements such as paving costs, bridge charges, public park and police expenses, etc., has been prepared. This is on a comparative basis for the years 1912 to 1916, inclusive.

Bulletin on Wages and Working Conditions of Trainmen. The second edition of this bulletin covering about 300 companies summarizing the situation up to April 15, and including those companies formerly reported in edition No. 1 has just been issued. This is a very complete and comprehensive comparison by means of elaborate tables, showing wages, various working conditions and labor situations in various parts of the country classified on the basis of the miles of track of the operating companies.

One-Man Car Operation. A questionnaire on the above subject has been sent out by the committee on one-man car operation of the Transportation & Traffic Association, and a very general response to this inquiry has been received. The association also has a corrected list of cities using one-man cars and it is in a position to furnish, in individual cases, the most recent statistics available regarding the operating economies of one-man cars on the basis of the above replies.

Skip-Stop Bulletin. This is a printed compilation showing the skip-stop situation in a number of typical cities together with a statement of operating economies which have been secured by this means.

Preliminary Work on Code of Traffic Principles

AS THE result of the meeting of the committee on code of traffic principles of the Traffic and Transportation Association, held in New York City on April 25, a program of work in connection with this subject was drawn up and the basis laid for outlining the essentials to be covered. The members present were H. B. Flowers, Baltimore, Md., chairman; A Gaboury, Montreal, Can.; P. E. Wilson, Cleveland, Ohio, and J. H. Stephens, Washington, D. C. L. H. Palmer, E. B. Burritt and J. W. Welsh also attended the meeting. The date for the next meeting was tentatively set for May 21.

Recent Happenings in Great Britain

Considerable New Work in Prospect—Railways Gradually Returning to Pre-War Basis

(From Our Regular Correspondent)

One of the absurdities of the present situation in regard to motor omnibuses, and one which it may be hoped the proposed Ministry of Ways and Communications will end, was emphasized during March by the action of the London County Council. In the last two or three years before the war several town councils in England obtained permission to run motor omnibuses into areas outside the municipal boundary. When Parliament gave the authority it accompanied with it the condition that the municipality should pay to the outside local authority three-eighths of a penny per omnibus-mile run on the "outside" roads, this money being for road maintenance. Companies which run omnibuses, however, do not require any statutory powers to enable them to do so, and the opportunity to put a corresponding charge on them has not arisen except on one occasion. The exception was that when the Middlesex County Council obtained Parliamentary powers to construct a great new highway it succeeded in obtaining a clause authorizing such a charge to be made on any company running omnibuses on the new road. Owing to the war the latter, by the way, has not yet been built.

OMNIBUS AUXILIARY TO TRAMWAY

The London County Council is now proposing to apply for powers to work omnibuses as an auxiliary to its tramways. The Council, however, unlike the municipalities throughout the country, are not the road authority in London. The councils of boroughs into which London is divided have the charge of maintaining the streets and roads. The highways committee of the County Council proposed that three-eighths of a penny per mile run shall be paid, partly, it would appear, to the borough councils and partly into the tramway funds. This proposal was opposed at a meeting of the Council, and it was withdrawn. When the bill comes before a Parliamentary committee the provision may, of course, be reinserted. Should that come about, agitation will arise for the London General Omnibus Company to pay a contribution for road maintenance.

A most interesting report has been presented to the London County Council on the shortage of cars and the difficulty of maintenance owing to the war. The present time-table requires 1244 electric cars (amounting with 20 per cent spares, to 1493 cars) and 114 trailers (amounting with 5 per cent spares, to 120 cars). On Feb. 20 only 1049 electric cars and 114 trailers were in service; there being, therefore, 195 electric cars short of immediate needs. The total numbers of cars held by the Council are 1662 electric cars and 158 trailers, so that the electric cars out of service for repairs exceed 600—approximately 40 per cent of the total number. The shortage from present time-table requirements has developed recently as a result principally of an unexpectedly large number of breakages of axles. During 1914—when the average number of cars in service was larger than now—only 127 axles broke. During the short period from Jan. 1 to Feb. 12, 1919, the number of axle breakages was 288. The rate was particularly high during the frosty weather, and the high average during this period is attributed partly to the overloading of cars under present conditions at times of heaviest traffic, and partly to the poor physical condition of the rolling stock, as a result of the heavy use to which it has been subjected over nearly five years—in which period abnormal conditions caused by the war have made it impossible to maintain the former high standard in connection with car repairs and renewals. If the promises made by the contractors are fulfilled, this condition will soon be relieved. During the war many cars have had to be depleted of available parts unobtainable from outside sources to replace broken or worn-out parts on service cars. All manufactures for civil purposes were practically discontinued during the war, except for munition purposes, but the making of malleable iron and steel castings and forgings is being resumed. As all undertakings are pressing for materials of this kind, deliver is slow.

It now seems probable that Edinburgh, the only tramway undertaking of any size in Britain which has not been electrified, will soon adopt the trolley system. More than twenty years ago, when other towns were electrifying their tramways, Edinburgh adopted the cable system, principally because it was felt that cable haulage was specially suitable for the heavy gradients in the city and because the city authorities were opposed to the overhead wires, and the conduit system had not been developed. Financially the undertaking has been successful, but the trouble with the cable system at junctions and the difficulty of extending it through the outer suburbs are drawbacks which have been keenly felt. The undertaking is owned by the city, but it has been worked on lease by a private company. The lease is now expiring, and soon the Town Council will take over the operation.

In view of these things, the municipality obtained reports by experts some time ago as to the future working and the recommendations were in favor of converting the system to electric traction. Another report is now issued, this time by R. S. Pilcher, recently appointed Edinburgh municipal tramway manager. Mr. Pilcher strongly favored the trolley system, and a committee of the Town Council has adopted his views. The question of the use of the conduit on Princes Street, often referred to as one of the finest thoroughfares in Europe, is still open for settlement. Mr. Pilcher favors the use of the overhead wires throughout.

FAVORABLE UNDERGROUND REPORT

Lloyd George Hamilton, chairman of the Underground Electric Railways, London, presented a very favorable report at the annual meeting of the shareholders in March. The 6 per cent income bondholders receive 5 per cent. The Underground Company derives its revenue from the four underground railway companies, the omnibus company and other concerns, a large proportion of whose shares it holds. The improved position of the operating company is thus reflected in the accounts of the Underground Company. Apart from any question of nationalization or of strikes the operating companies, however, have difficult times to face owing to the accumulation of arrears of work during the war. The London General Omnibus Company needs to renew most of its vehicles, but it has large reserve funds which will help materially. The chairman warned the shareholders against haste in cutting reserves or raising fares.

PROGRESS ON MINISTRY OF WAYS MEASURE

A good deal of the main opposition to the Ministry of Ways and Communications bill was eliminated during the debate on the second reading of the bill in the House of Commons on March 17 and 18. The proposal in the measure that the new Ministry should have power by means of orders in Council to buy up railways and other means of transportation was dropped. The result will be that when such steps are proposed the Government will have to carry bills through Parliament to authorize them. Another point made by Sir Eric Geddes (the Minister-designate) was that municipally-owned tramways are not to come within the scope of the bill. Sir Eric pointed out that municipal tramways on the whole are prosperous, their average earnings on capital being 7 per cent. He said nothing about company-owned tramways, but, according to the bill, they, like railways, are to be controlled by the Ministry. There is no doubt that during the committee stage of the bill there will be much opposition on details, and many changes will be proposed. But so far as the main principles are concerned it is significant that the second reading was agreed to without a division.

In the end of March a forty-eight hour working week, arranged after long negotiations, came into force on all British tramways. At the same date further increases of fares on the London underground railways and the London omnibuses were announced.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Down to Business

Buffalo Appraisal Commission Told Local Railway Should Be Allowed a Return on $44,654,436

Evidence is being taken by the board of arbitration selected by the International Railway, Buffalo, N. Y., and the city of Buffalo to determine the valuation of the property of the company within the city to be used as a basis of an agreement between the company and the city whereby the International lines will be placed under municipal control.

It will probably take three weeks to hear the evidence. The board will then determine upon a figure upon which the company shall be allowed an 8 per cent return. As the result of a law passed by the State Legislature and approved by Mayor George S. Buck, the city and company will then enter into negotiations for a service-at-cost agreement in which a rate of fare will be specified. This agreement must be submitted to the voters for their approval.

ENGINEER WITNESS EXPLAINS

Among the witnesses already called by the railway is Jay H. Perkins of the United Gas & Electric Engineering Corporation, New York, consulting, contracting and operating engineer for the electric railways at Buffalo. Mr. Perkins placed the total figure upon which the International Railway should be allowed a return as $44,654,436. An analysis of these figures follow:

Bare physical as of June 30, 1915	$18,013,808
Real estate, June 30, 1915	887,659
Contractors' profit, June 30, 1915	1,211,035
Stipulated as of June 30, 1915	$20,112,502
Capital additions as of June 30, 1915, to Dec. 31, 1918	2,562,550
Stipulated as of Dec. 31, 1918	$22,675,052
Omissions and contingencies	972,965
Bare construction cost	$23,648,017
Engineering and superintendence during construction	647,854
Law expenditures during construction	98,283
Injuries and damages during construction	177,945
Miscellaneous construction during construction	187,519
Taxes during construction	119,636
Interest during construction	670,525
Working capital not included in first item	284,026
Total fixed physical capital (including promotion and reorganization)	2,075,845
Superseded property	2,764,125
Total	$30,673,775
Cost of financing	612,475
Going value	8,612,750
Capital entitled to return	$39,900,000
Bond discount	4,754,435
Grand Total	$44,654,435

Under the caption of "A Suggestion to the Public," the *Service Spot Light*, the official organ of the railway, says:

> The company, by reason of financial burdens and lack of immediate funds, is in no position to back unreasonable claims. It follows then that the appraisal proceedings must partake of the nature of "triangular conciliation" if we may call it that. It must be the genuine effort of three men to meet an emergency equitably, justly, with intelligence and with fairness to all concerned. The city is in no mood to trifle or submit to methods that are outside the spirit of the present service-at-cost plan.

In explaining various items in the figures he submitted to the board, Mr. Perkins said that the going value of the company should be put at $12,000,000. Accumulated deficiencies, he placed at $8,000,000. Expenses of organization of the company, he said, totaled $900,000, and covered expenses of the Crosstown line, the Buffalo Street Railroad, the Buffalo West Side, the East Side lines and others which were absorbed in the organization of the International Railway. Expenses of consolidation were totaled at $500,000.

Newspaper readers of Buffalo are advised by the railway through the *Service Spot Light* as follows:

> From headlines and other articles—with the exception of editorials—do not draw wrong conclusions. We make an exception of editorials for this reason. Editorials are the medium through which newspapers speak their policy. Every newspaper is entitled to its own opinion in any public matter. Therefore, we exempt editorials.
>
> But from headlines and newspaper articles wrong inferences may be drawn. Remember the reporter writes, the editor edits and the headliner writes the headlines. Each performs to the best of his knowledge and ability. Yet, in a technical matter, like the appraisal of millions in property, errors, misconceptions and faulty judgment may creep in.
>
> For that reason we counsel you not to form judgment of the appraisal proceedings and their probable success or failure on what you glean from transient headlines.

Commission Measure Passed in Michigan

Railway and public utility legislation for the session of the Legislature of Michigan of 1919 was reported to have been completed on April 25 by action of the House and Senate. Minor amendments to the Smith railroad and interurban rate bill were concurred in by the lower branch and the Upper accepted the House change in the Lemire-Wiley public utilities commission bill, making the commission consist of five members instead of three, and salaries $7,000 a year instead of $5,000.

The compromise utilities bill gives the new commission jurisdiction over every utility corporation in the State, except urban street railways. The railroad rate bill transfers control of interurban railways to the present State Railroad Commission, and the Lemire-Wiley bill transfers all power of the present commission to the new public utilities commission. The measures are now before the Governor.

Relief Measures Killed

Connecticut Legislature Votes Down Electric Railway Bills Recommended by State's Special Commission

The Senate of Connecticut on April 28 killed two of the most important measures planned to extend relief to the electric railways of the State and was reported to be ready to vote against the third. The measures defeated were the bridge payment and pavement payment reliefs included among the eight recommendations for legislation made by the special legislative commission appointed to investigate the condition of the carriers.

OTHER PROPOSALS LOST

The bridge proposition lost by a vote of twenty-three to eight. The pavement proposition was defeated by a vote of twenty-four to eight. Two members of the special commission, Senators Dillon and Hough, led almost alone the fight for the bills.

In the House the special commission had some little satisfaction. The bill to allow the Hartford & Springfield Street Railway to use the tracks of the steam line was passed without opposition. But as the measure is useless in the face of federal opposition, the action of the House was not of any account.

Finally, in the Senate, the finance committee came in with a majority report against the proposition to grant the electric railways relief from taxation for two years, the companies to pay but 5 per cent interest instead of 9 per cent, as everybody else pays for arrears. The unfavorable report on this bill is regarded as a death blow to the hopes of the special commission to get through one important measure, as it seems certain the Senate will support the committee's unfavorable report.

COMMISSION FINDINGS WERE FAVORABLE

The findings of the special legislative commission authorized to inquire into the status of the electric railways were summarized in the ELECTRIC RAILWAY JOURNAL for April 5, page 707. Following the presentation of the report of this commission, bills were introduced into the Legislature carrying out all the recommendations. In addition, an act was introduced providing that the State might lend not more than $2,000,000 to the electric railways, if necessary, and further providing for bond issues to raise the money, with the stipulation that the electric railways pay one-half of 1 per cent more interest to the State than the State would pay on the bonds.

Washington Railway & Electric Explains

President Ham Answers Questions Before Civic Bodies—Sees Zone Fares Ahead

The Washington Railway & Electric Company, Washington, D. C., advertised in the *Star* of that city recently suggesting a conference with representatives of civic bodies. The company said that its policy of publicity meant more than mere talk. In fact, said the company, "it means a willingness and a desire to furnish the public with full information concerning our affairs in order that they (the public) may act intelligently upon the problems confronting us." The company further said that it would be pleased to meet representatives of trade or civic associations and explain the facts and figures presented by it to the Public Utilities Commission during the recent hearing on its application for additional revenues.

MEETING HELD APRIL 18

Acting upon this offer, W. B. Westlake, president of the Federation of Citizens' Associations, on April 11 asked that the board room in the District building be reserved on the evening of April 18 for a meeting under the auspices of the Federation of Citizens' Associations, at which representatives of the company were given a proper opportunity to furnish information to a gathering of representatives of civic organizations and others. Mr. Westlake, in communicating this information to W. F. Ham, president of the company, said:

> In my opinion this meeting should inaugurate a period of more cordial relations between your company and the public, which in this crisis is a most desirable thing to accomplish. There exists in the public mind a certain distrust and prejudice with regard to your company, which leads to intemperate discussion, and the purpose of the federation is entirely in line with its established policy of using its influence to expedite a just and fair conclusion in every matter affecting the relations between the people and the utility corporations.

Mr. Ham promptly accepted the invitation. Mr. Westlake then set about the matter in business-like fashion. With a view to expediting the work of the meeting he transmitted to Mr. Ham on April 16 a series of questions framed at a conference of representatives of the civic bodies and so drawn as to bring before the public meeting the information upon which to base an opinion. These questions were fifty-nine in number. Some typical questions taken from the list follow:

> Has the company during the past six years ever been penalized or fined for disobeying any order, rule or regulation made by the Public Utilities Commission?
>
> Does the company say it has furnished, and is now furnishing, the character of service required by said act of Congress?
>
> What reasons does the company assign for the seeming popularity in service and management of the Capital Traction Company over that of the Washington Railway & Electric Company?
>
> How can the people best co-operate with the company to secure "adequate, safe and reasonable service"?
>
> Could the District of Columbia be best served by one street railway company?
>
> Has the public been unreasonable in its attitude toward, or inordinate in its demands upon, the company?
>
> Do you consider that the capitalization of the Washington Railway & Electric Company represents actual value upon which the stockholders should receive dividends?
>
> If not, what amount do you consider does represent actual value?
>
> If the capitalization were reduced to an amount representing actual value as determined by a physical valuation fairly made and agreed to by the Public Utilities Commission and the company, and if a dividend of 7 per cent upon that capitalization were guaranteed by law, would not the road be upon a much better and more stable financial basis?
>
> Are you familiar with the principles of the so-called service-at-cost system which has been adopted in certain other cities?
>
> Do you know of any electric railway company which has put a zone system of fares into effect before trying an increase in the flat fare over 5 cents? This applies to city properties and not to companies which are chiefly or exclusively suburban or interurban.
>
> What guarantee will the company give as to increased service if its rates are increased?
>
> What were the strike losses in 1917?
>
> How many platform men have been in service of the company less than a year?
>
> How many in service more than five years?

At the meeting Mr. Ham said he was glad to submit to questions of every kind in a wholesome desire to bring about co-operation between his company and the public. He said he recognized the public as one of the three factors in railway operation, the other two being the employees and the investors in the property. Good service to the public, fair wages to employees, and reasonable returns to investors were all, he said, that fair-minded men desired.

HE'S homeward bound, HIS job gloriously done.

But WE are not through. We must go over the top again before we wear the smile of victory.

Our government has an unpaid balance of several billions of war debts. This is the foe we must "mop up."

We can't come out of our battle loaded with Hun helmets—but WE CAN and SHOULD come out of it loaded with notes of the

Victory Loan

Mr. Ham answered many of the questions which had been prepared in advance and also replied to many informal questions asked by citizens present in the audience.

The trend of the questions indicated the greatest hostility to a zone system for Washington. Mr. Ham said his company was not wholly committed to this plan, but owing to the difference in the financial conditions of the two competing companies in the District, he saw no other equitable method of authorizing the further revenue, which it was imperative his company should have, if it is to continue giving service to the public. Personally he believed that a zone system would become general in this country. It was the only way of measuring the service given.

President Westlake said the federation wished to get all the information possible that it might take proper action and make fair recommendations to the utilities commission.

A BELATED CONCESSION

Earl Godwin, writing in the Washington *Times*, called the effort of the company "a concession that is a belated recognition of the rights of the people." He said in part:

> While this concession to voteless Washington would have been more valuable to the company if made two or three years ago, it is, nevertheless, a belated recognition of the fact that in the operation of public utilities the people generally have a most vital interest, not only in what they pay for the service they get, but the character of that service.
>
> The time has passed, never to return, when utility corporations may disregard the good-will of the public or rightful requests of their employees. So has the time gone when organizations of employees may run things their way without consideration for the public or the rights of their employers.
>
> While it is well to develop the past history of this company, the issue now is whether the company is entitled to further revenues. Money squandered in the past will not improve service now or in the future. However prejudiced the public may be over the bad record of the days gone by, it is perfectly willing to do justice. It wants to know for itself, though, just what all the facts are, so that it can measure the justice.

Overtime Pay an Issue

The City Council of Seattle, Wash., has under consideration the demand of the motormen and conductors on the Seattle Municipal Railway for overtime at a rate equal to one and a half times the regular wage. Members of the railway union are forcing the matter. The right to pay overtime has been recognized by other departments of the city government, and employees have been paid at the rate of time and a half, heads of departments stating that it has been necessary to do this to induce men to put in extra time. Corporation Counsel Walter F. Meier, in an opinion to the finance committee, states that the city has authority to pay overtime, holding that overtime may be paid employees on a day wage or monthly salary under such limitations as the City Council would deem advisable for the protection of the interests of the public.

San Francisco Injunction Denied

Supreme Court Upholds Paralleling of United Railroad's Lines But Leaves Open Without Prejudice Question of Damages

The United Railroads of San Francisco has lost its application before the United States Supreme Court for an injunction against municipal railway competition until damages are paid. The decision, however, leaves the company free to seek damages. The privately-owned company claims $6,870,130 of damages because of the construction of parallel outside tracks on Market Street and Church Street.

CITY CAN COMPETE

In regard to the provision of the Civil Code of California that in no case must two railroad corporations use the same street for more than five blocks, the Supreme Court on April 21 held that this section of the code would seem to be a limitation of the powers conferred upon the Board of Supervisors by that and the adjoining sections, and not a contract by the State, or an authority to the board to contract, against a larger use of the streets. It most naturally is read as merely a general law declaring the present legislative policy of the State. (Wheeling & Belmont Bridge Company *vs.* Wheeling Bridge Company, 138 U. S. 287, 292; Williams *vs.* Wingo, 177 U. S. 601; Wisconsin & Michigan Railway *vs.* Powers, 191 U. S. 379, 387; San Jose-Los Gatos Interurban Railway *vs.* San Jose Railway, 156 Fed. Rep. 455, 458.)

But however this may be, the court continued, neither that section of the code nor the order of the Board of Supervisors granting the company's franchise purports in terms to prevent the city from itself establishing a parallel road. It is decided by Knoxville Water Company *vs.* Knoxville, 200 U. S. 22, that a covenant by a city not to grant to any other person or corporation a privilege similar to that granted to the covenantee does not restrict the city from itself exercising similar power, and it is assumed in that case that the principle already is established as to legislative grants. The city now is given power to establish and operate transportation service, and the United Railroads took the risk of judicial interpretation of its franchise and of this possible event.

DAMAGE QUESTION LEFT OPEN

Therefore, the court concluded, so far as the harm to the company is an inevitable consequence of the city's doing what the former's franchise did not make it unlawful to do, the infliction of that harm is not a taking of the company's property that requires a resort to eminent domain. Regarding damages, the court then said:

> We understand that the municipal road now has been built, and the question is whether to retain the bill for a claim of damages. But as that would require new evidence and practically would present a new case, and as further, with such light as we now have, the right to damages seems at least doubtful, we deem it sufficient if the rights of the plaintiff, if any, in that regard, are reserved. The question is raised pointedly by Article I, Section 14, of the Constitution of 1879. That provides that "private property shall not be taken or damaged for public use without just compensation having first been made."
>
> The plaintiff seems to argue that this section entitles it to preliminary compensation for any considerable pecuniary detriment that the city can inflict by the establishment of the new road, however lawfully it may act. Courts and judges have differed widely in their interpretation of this class of provisions in statutes of different sorts; but we should suppose, until otherwise instructed by the Supreme Court of the State, that the damage referred to in this section of the State Constitution in the main would be damage resulting from conduct that, like taking, would be tortious unless in proceedings under eminent domain or some law authorizing it on condition that damages be paid.
>
> As to crossing the plaintiff's tracks we are inclined to agree with the District Court that the plaintiff's franchise must be understood to be subject to this incident and that a taking by eminent domain was not necessary. (Market Street Railway *vs.* Central Railway, 51 Cal. 583. Consolidated Traction Company *vs.* South Orange & Maplewood Traction Co., 56 N. J. Eq. 569, 574, *et seq.* 3 Dillon, Municipal Corporations, fifth edition, Section 1241, p. 1983.) If we are wrong and if the crossings or the manner of operating the parallel tracks should give or has given rise to any claim, the decree will be without prejudice to such claim. We assume in accordance with the company's evidence and argument that the damage may be considerable and we think it just to leave open whatever can be left open, but at present we cannot say that the loss is or will be of such a character that it must be paid for, and we are satisfied that it is not such as to call for equitable relief.

The arguments presented in the briefs submitted by the company and the city in this case were noted in the ELECTRIC RAILWAY JOURNAL of April 12, page 750.

Illinois Public Utilities Wake Up

Go to the Public in Bold Publicity Program—Invite the Spotlight—Big Capital Investments Planned

The public utilities of Illinois—traction, electric, gas, water and telephone companies—are to place their "after-war" case directly in the hands of their customers to whom they are responsible and let the public be the judge and jury.

Adopting as their slogan "There can be no prosperity in Illinois unless the public utilities are prosperous," the utilities have issued an invitation to the public to "put the spotlight on us." Their composite "case" is to be made known through the Illinois Committee on Public Utility Information, whose organization has just been announced. This committee, with offices in the Bedford Building, 203 South Dearborn Street, Chicago, is to operate "under the auspices of the Illinois Electric Railway Association, Illinois Gas Association, Illinois State Electric Association, and other public service organizations, and in the interest of their customers, investors and employees."

ASK ONLY JUST TREATMENT

With the budgets of Illinois public utility companies, from Cairo to the Wisconsin border, calling for $70,000,000 of after-war rehabilitation work and extensions this year—a program which will do much to relieve business hesitation—the utilities will be unable to go ahead unless their credit, which means ability to obtain the necessary funds, is unimpaired. Their expenditures this year, alone, would mean the spending of $60,000,000 in excess of the $10,000,000 which the State plans to spend in its great good roads project. And in the five-year period of road making, during which the State will spend $50,000,000, the public utilities' plans call for the expenditure of $450,000,000, or nearly eight times as much. They are asking only for "sane scientific, non-political and just treatment," such as will enable them to perform the services imposed by their intimate relationship with the every-day life of every man, woman and child in the State and the communities in which they operate.

The purpose of the committee, is outlined in a public statement in part as follows:

> The committee proposes to do now for the public utilities what the railroads failed to do until they were almost strangled, namely, to put before the people of Illinois, by every possible means, the economic facts of the public utility industry, as an industry. This takes in the small town light plant as well as the big city electric company or electric railway system: "independent" and "farmer" telephone companies, as well as the Bell interests.

EVERY CITIZEN IS INTERESTED

> Every person who uses a telephone, rides on a street car or cooks or reads with gas or electricity is entitled to know the facts concerning these companies.
>
> Without efficient utilities, cities and towns cannot prosper, and utilities cannot be efficient without prosperity. They must pay their bills like people. Labor is vitally concerned, probably more than any other element, because it knows that the high wage scales necessitated during the war by high living costs cannot be maintained unless the utilities are given just treatment
>
> The public utility companies have been seriously affected by the war. With tremendous wage increases necessitated by the high cost of living, which shows but little, if any, abatement, and prices of materials up not less than 100 per cent and in some instances three times that, they have not had consideration commensurate with their dues.
>
> Upon their ability to earn a just wage depends their ability to spend money for wages, for improvement of service and for new building, the result of which means improvement of the community in which they operate. It is to the interest of every citizen that the public utility companies, upon which he depends so much, shall be fairly treated and that their facilities shall be developed to the utmost. It is only through this that he can obtain the service which should be his.

WANT PUBLIC TO KNOW FACTS

> Affecting the credit of the light, heat, railway, power or telephone companies in any city or town immediately means inferior service. It cannot be otherwise. The company cannot furnish something it has not the money to buy for the customer. No reasonable man will contend that capital is not entitled to a fair wage, as well as labor, or that the investments which go to build up and make a community should not

be as well protected as the home a man and his wife have bought with their savings.

The situation is not a pleasant one, but is one which must be met squarely in a calm, scientific, non-political and just way, without prejudice or demagogery.

If the utilities are not to be strangled, the best preventive is public knowledge of the economic facts which go to make the tremendous factor they are in the State's industrial and economic life. Unless they prosper, there will be no prosperity in Illinois. Just treatment is essential to the maintenance of good service and to the protection of investors. The undermining of the credit of the utilities cannot fail to have far-reaching effects upon general credit and business prosperity, for their credit cannot be placed in jeopardy and the effect localized or even restricted to these companies.

The utilities believe open and above-board exploitation of the economic facts of the industry is sound policy for now and the future. They are content to submit their case to their customers, believing that to be the road to just treatment and freedom from unwarranted burdens that would prevent adequate service and forestall the great development program which must be carried out to meet the State's needs.

Public Ownership Dead

Thirteen Electric Railway Bills Reported Adversely to Massachusetts House by Legislative Committee

Adverse reports on thirteen electric railway bills have been made in the Massachusetts House by the legislative committee on street railways, the most important bills being those relating to public ownership.

The bill providing for public control of all electric railways except the Boston Elevated Railway and the Bay State Street Railway having $300,000 capital or more which was the subject of long and continued hearings before the committee was referred to the next General Court. Leave to withdraw was reported on the petition that cities and towns may acquire and operate electric railways.

Reference to the next Legislature was reported on the bill providing state ownership of electric railways, and leave to withdraw was given on the petition for a referendum on the same question. The committee still has the bill relieving companies of paying taxes before it, as well as the so-called "50-50" bill providing for municipal aid for electric railways, to be extended through a tax levy.

Leave to withdraw was also reported on the following bills: To provide a 5-cent fare within a 5-mile radius of the State House; to discontinue the public operation of the Boston Elevated Railway; to authorize the Bay State Street Railway to acquire the rights of the Boston Elevated Railway in East Boston and the East Boston tunnel; to prohibit companies from carrying more passengers than can be seated; to take dividends on common stock of the Boston Elevated Railway as a basis for fares; to provide a single electric railway fare within the city limits of Boston; to provide further legislation in regard to the transportation of school children in Metropolitan Boston.

The bills for improved transportation in the Metropolitan district and for the incorporation of the Boston Rapid Transit Company have also been referred to the next Legislature.

Detroit Conference May 9

Mayor, Street Railway Commission and Railway Representatives Asked to Discuss Railway's Future

The Common Council of Detroit, Mich., will invite Mayor Couzens, the members of the Street Railway Commission and representatives of the Detroit United Railway to a conference on May 9 to consider the local electric railway situation, which has again become an issue as the result of the defeat of the municipal ownership proposal at the recent election.

Subsequent to this conference it is purposed by the Council to hold a public hearing on the matter of electric railway transportation at which citizens will be invited to suggest ways and means to get adequate service for Detroit.

The Street Railway Commission has recently received replies from Henry Ford, Detroit, and Fielder Sanders, Street Railway Commissioner of Cleveland, both of whom had been asked for information on transportation affairs. Mr. Sanders says he will visit Detroit prepared to explain the Cleveland service-at-cost plan. Henry Ford, however, in his letter expressed his hesitancy at co-operating with the Street Railway Commission until he shall be sure that it "can claim to represent Detroit." Mr. Ford's letter read in part as follows:

> It is my belief that the commission has taken upon itself a great responsibility in assuming that the recently submitted purchase plan was defeated because of statements made by Charles E. Sorenson, which would indicate that the people of Detroit are not capable of deciding matters of such importance for themselves.
>
> Repudiation by the voters of the railway plans as submitted makes it seem questionable in my mind whether or not you can claim to represent the people of the city of Detroit.
>
> When you are able to furnish me with reasonable assurance of this fact, I will be glad to co-operate with you in working out the development of a new type of gas or electric car for street railway purposes.
>
> However, the question of whether or not we will co-operate with you or any other accredited representative of the city of Detroit will not deter us in any way from carrying out what we have already undertaken in such development, and when we are ready to demonstrate the merits of the new type of car it will be left for the judgment of the citizens of Detroit.

In connection with Mr. Ford's letter there is need for relating a little local Detroit history in order that events may be set in the proper perspective. The announcement about the new Ford street car was made almost on the eve of the municipal ownership election. There are some that professed to see in this a move by Mr. Ford against his old associate, Mayor Couzens. No one will probably ever know what the effect was of the agitation about the car on the election result, but there is no room left for guessing about the rebuke to the commission contained in Mr. Ford's letter to that body. On the other hand it would seem that the commission has rendered it imperative for Mr. Ford to make plain just what an anxious world may expect from the new Ford car. So far there has been little more tangible about the car than words.

News Notes

Receivers Refuse Wage Request.—The receivers of the Pittsburgh (Pa.) Railways have refused the request of motormen and conductors for an advance of 12 cents an hour in wages. They assert the financial condition of the company will not permit the increase in wages. Concessions were made in improving working conditions and other regulations that would not involve wage costs. All employees of the company are to be transported free on its own lines.

Paying Back Wages in Buffalo.—The first payment of $50,000 of the $225,000 due the employees of the International Railway, Buffalo, N. Y., as back wages as the result of the award of the War Labor Board was made on April 28. In addition to the union platform employees, officials of the company and other employees in the offices are represented in the payments of the back wages. The second installment of $50,000 will be paid on Nov. 14, 1919; the third installment of $25,000 on Dec. 21, 1919, and the last installment of $100,000 on Jan. 28, 1920.

A Union Plea for Leniency.—Efforts by representatives of the local railway union to obtain mitigation of the punishment imposed upon employees of the Seattle (Wash.) Municipal Railway who joined in the recent general strike, has brought a promise from Mayor Ole Hanson that he will take the matter up at an early date and give the men an opportunity to be heard before a conference of heads of various city departments. Employees in the railway department who quit their jobs during the strike were penalized, by losing their annual two weeks' vacation and being suspended for fifteen days. The union is seeking to substitute the two weeks' vacation for the fifteen day lay-off.

Strike in McAlester Settled.—Settlement of labor troubles which threatened to cut off light, power and transportation from the people of McAlester, Okla., and neighboring towns, is reported in a telegram to the Labor Department by Commissioner Robert McWade of the Adjustment and Conciliation Service. The trouble arose over discharge of certain skilled workers. A section of the local union of railway men on the Pittsburg County Railway took up their cause and formed a new organization, later going on strike. The trouble was spreading to workers in other fields when it was agreed to submit all differences to a board of arbitration. In its decision the board supported the Amalgamated Association of Street & Electric Railway Employees of America.

Financial and Corporate

Receivership Is Limited

Temporary Appointments at Chattanooga Cover Only Railway Lines—Further Argument May 17

John S. Graham, Philadelphia, Pa., and Percy Warner, Nashville, Tenn., as noted very briefly in the ELECTRIC RAILWAY JOURNAL for April 19, page 800, have been appointed by Judge E. T. Sanford as temporary receivers of the Chattanooga Railway & Light Company, Chattanooga, Tenn. A decree entered at Knoxville limits their scope as such pending a hearing before Judge Sanford on May 17.

DECREE A COMPROMISE

For the time being the receivership extends only to the railway system, properties connected with the light department being expressly excepted pending litigation on that phase of the original petition. The preliminary decree is the result of a compromise agreement which makes the matter of including the light department of the company as subject to mortgages covering the railway properties dependent upon a decision after that question has been fully argued and testimony heard on that point.

The original application of the Commercial Trust Company, Philadelphia, Pa., the petitioner, sought to have all resources of the Chattanooga Railway & Light Company included in the receivership. The light department is closely allied with the Tennessee Power Company, which even in normal times furnished power to the railway.

The Chattanooga Railway & Light Company was in its inception a consolidation of the railway system and the light system and on that account the holders of the mortgages, now sought to be foreclosed, are seeking to have the light and power equipment included in the receivership. Resistance to that feature of the original petition has been most determined and in the hearing to come it will probably be the chief question for argument.

CONSOLIDATION IN 1909

The Chattanooga Railways, which was the successor of the Chattanooga Electric Railway, was owned by the Grahams of Philadelphia. The Chattanooga Electric Company was a separate corporation and under an entirely different ownership. When the E. W. Clark interests went to Chattanooga in 1909 they made their investments on the theory that the two should be consolidated, and that was effected before the new corporation was organized. The name of the new organization thus became the Chattanooga Railway & Light Company.

As a part of the compromise under which the temporary receivers are named and their scope limited to the railway system, Judge Sanford protects them by issuing an injunction requiring the Chattanooga Railway & Light Company to continue to provide the power for operation of the cars.

Change in Control in Iowa

Minority Interests in Iowa Southern Utilities Company Take Over Control

David G. Fisher & Company, Davenport, Ia., public utility engineers and holders of a minority interest in the Iowa Southern Utilities Company, which furnishes electric power to thirty Iowa towns, operates 33 miles of interurban railway and runs the Centerville railway, gas, heating and electric light plants, have purchased the holdings of Frank S. Payne and D. C. Bradley in the company. Mr. Payne, who has been general manager, will remain with the company as director and general counsel. It is understood that the transaction involved in the neighborhood of $450,000.

The formal transfer of control will be made on May 15. J. C. Johnson, now secretary and treasurer of the Fisher Company, will be the new general manager of the properties. Before becoming affiliated with the Fisher Company he was superintendent of the Fiske Street station in Chicago. Ernst Jacobsen, vice-president of the Fisher Company, will have a prominent part in the active administration of the company.

The Fisher Company was organized in Davenport in 1909 and soon began to purchase and operate public utility plants. Most of the company's holdings are located in Iowa. The Interurban lines, from Centerville to Albia and Mystic, are important coal carriers, delivering the output of thirty mines to the Burlington, the Rock Island and Minneapolis & St. Louis Railroads.

The Iowa Southern Utilities Company was formed by a consolidation of Payne, Bradley and Fisher interests in the fall of 1916. The companies which it controls include the Centerville Light & Traction Company, Centerville Electric Company, Centerville Gas Company, Leon Electric Company, Mount Ayr Light & Power Company, Lennox Electric Company, Clearfield Electric Company and the Blockton Light & Power Company.

The interurban line from Centerville to Mystic was built in 1909. The interurban from Centerville to Albia, the successor of the old Albia & Centerville Railway, was opened for operation in the year 1914.

Deficit in New Jersey

Public Service Railway Went Behind $302,115 in March Over Same Month a Year Ago

The net income of the Public Service Railway, Newark, N. J., for March showed a deficit of $302,115, as set forth in a statement filed by the company on April 17 with the Board of Public Utility Commissioners. The net income for March, 1918, was $73,325, so that the variation between the two months amounts to $375,440 in income account.

Revenues from transportation during March amounted to $1,600,734, as compared with $1,523,796 in March, 1918. The passenger revenue increased from $1,519,792 in March, 1918, to $1,596,965 last month. The total operating revenue, as between the two months, increased from $1,561,198 to $1,641,076. Railway operating revenue deductions increased from $1,060,736 to $1,511,335, so that railway operating income was reduced from $500,461 to $129,741, and total operating income from $501,129 to $129,860.

Gross income was reduced from $506,005 to $135,123, and income deductions increased from $432,679 to $437,239. Income deductions in detail for last month were as follows: Leased roads, $237,022; miscellaneous rents, $8,960; interest on funded debt, $179,005; interest on unfunded debt, $7,333; amortization of discount on funded debt, $1,342, and miscellaneous debits against income, $3,596.

SURPLUS DECREASED $302,115

In March, 1918, the surplus of the company showed a net increase of $74,128, while last month it showed a net decrease of $302,115. The percentage of operating expenses to operating revenues, which was 59.5 for March, 1918, was increased to 83.1 last month, and the percentage of operating expenses (including taxes) to operating revenues, increased from 67.9 to 92.1.

A comparative statement of operating revenue deductions for March, 1918, and last month shows the following increases: Ways and structures, from $114,961 to $154,271; equipment, from $91,969 to $221,412; power, from $183,478 to $224,140; conducting transportation, from $409,137 to $601,640.

Total operating expenses increased from $929,303 to $1,362,954, and total operating revenue deductions from $1,060,736 to $1,511,335.

The company carried a total of 27,388,360 passengers last month, of whom 22,283,107 were revenue passengers and 5,105,253 transfer passengers. The passenger revenue amounted to $1,547,832 from cash fares and $49,133 from revenue transfers.

Passenger traffic figures for March, 1918, were not given in the company's March report for the reason that in March of this year a six-day strike disrupted the service and figures as to traffic for that month would be in no way comparable to figures covering traffic in March, 1918.

Net Income Almost Doubled

Chicago-North Shore Line Enjoys Sixty-five Per Cent Gain in Revenues, Partly Due to War Traffic

During the year ended Dec. 31, 1918, as compared to the one preceding, the Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., gained $255,619 or 91.5 per cent in net income. This unusual showing was brought about largely by the fact that the percentage advance in operating revenues kept practically on even terms with that in operating expenses.

INCOME STATEMENT OF CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD FOR CALENDAR YEARS 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Operating revenues:				
Passengers and special car	$2,678,693	92.4	$1,629,306	93.0
Freight and express	151,729	5.2	105,801	6.0
Miscellaneous	69,553	2.4	16,266	1.0
Total	$2,899,975	100.0	$1,751,373	100.0
Operating expenses:				
Way and structures	$302,525	10.5	$161,994	9.2
Equipment	172,183	5.9	81,999	4.7
Conducting transportation	650,042	22.4	395,455	22.6
Power	354,173	12.2	250,549	14.3
Traffic	35,100	1.2	27,657	1.6
General and miscellaneous	342,015	11.8	196,858	11.2
Total	$1,856,038	64.0	$1,114,512	63.6
Net operating revenue	$1,043,937	36.0	$636,861	36.4
Taxes assignable to operations	185,821	6.4	95,680	5.5
Operating income	$858,115	29.6	$541,181	30.9
Non-operating income	9,469	0.3	4,858	0.2
Gross income	$867,584	29.9	$546,039	31.1
Deductions from income	332,506	11.4	266,580	15.2
Net income	$535,078	18.5	$279,459	15.9

In 1918 the total operating revenues showed a gain of $1,148,602 or 65.6 per cent, the largest amount coming from passenger and special car revenues, which rose $1,049,387 or 64.4 per cent. The freight and express revenues also displayed the very substantial gain of $45,928 or 43.4 per cent, while the miscellaneous revenues advanced $53,287 or 327.6 per cent.

The jump in operating expenses amounted to $741,526 or 66.5 per cent. All the items in the operating-expense group shared in the rise, the respective amounts and percentages being as follows: Maintenance of way and structures, $140,531 or 86.7 per cent; maintenance of equipment, $90,184 or 109.9 per cent; conducting transportation, $254,587 or 64.6 per cent; power, $103,624 or 41.3 per cent; traffic, $7,443 or 26.9 per cent, and general and miscellaneous, $145,157 or 73.7 per cent.

The effect of the nearly equal percentage increase in operating revenues and expenses was a gain in net operating revenue of $407,076 or 63.9 per cent. Taxes increased at a greater rate, by $90,141 or 94.2 per cent, but income deductions at a less rate, by $65,926 or 24.7 per cent. The net income for the year, therefore, rose $255,619 or 91.5 per cent. The surplus balance on Dec. 31, 1918, was $855,811 as compared to $320,732 the year before.

The heavy increase in gross operating revenues was partially due to the large amount of traffic produced by the war activities in the various cities and also at the government posts served by the company. The operating expenses rose because of the large increases in wages and materials. The advance would have been accentuated if the increased price of coal had been figured in the cost of power consumed, but fortunately the major portion of the power, which was purchased under contract with the Public Service Company, was not advanced in price. On the Wisconsin end of the road the power was furnished by the Milwaukee Electric Railway & Light Company, which owing to the increased cost of labor and coal made a substantial advance in accordance with the order of the Wisconsin Railroad Commission.

During 1918 the Chicago, North Shore & Milwaukee Railroad expended for additions and betterments and for reconstruction the sum of $511,639. The balance sheet total for cost of road equipment and property was $13,902,262 at the end of 1918.

In spite of the big increase in traffic, the 1918 accident record showed marked improvement. Employee accidents in 1918 decreased 17.4 per cent as compared with those of 1917; employees' disability accidents decreased 38.3 per cent; lost time on account of employee accidents decreased 34.3 per cent; public accidents decreased 45.4 per cent, and property damage (public) decreased 44.8 per cent. The total accidents fell off 34.1 per cent.

Lease Abrogation Hearing on May 14

Presiding Justice Tanner in the Superior Court has designated May 14 as the date for a hearing on the petition of Edwards & Angell, counsel for the Union Street Railroad, the Pawtucket Street Railway, the Rhode Island Suburban Railway and the United Traction & Electric Company, asking the court to declare the leases of their properties to the Rhode Island Company to have expired on April 21 because of default in payment of rentals due. The total rentals and payments now due and payable to the petitioning lessor companies under the terms of the leases are said to amount to $331,925.

The prayer of the petition is for a decree of the court declaring the leases expired on April 21 by the default of the Rhode Island Company; that the lessor petitioners be declared entitled to possession of all premises and properties involved in the terms of the leases and that the receivers be directed forthwith to make payment in full of all sums named as due the lessor petitioners; that the receivers be directed forthwith to pay in full all sums due under the war revenue act of 1918 and all taxes to the proper persons. The court is also asked to direct the receivers to pay the petitioners for the use of their railway property until it is turned over into the possession of the lessors.

Pittsburgh Results Improve

In its issue of May 1 the *Wall Street Journal* reviewed briefly the operations of the Philadelphia Company, Pittsburgh, which includes the Pittsburgh Railways among its subsidiaries. That paper said:

> Earnings of Pittsburgh Railways are not included in current statements. The traction company is still in the hands of receivers. The Philadelphia Company operates several traction lines, aside from the last mentioned company, and earnings of these companies show a substantial increase over 1918. The Pittsburgh Railways is charging a 7-cent fare on all its lines, an advance of 2 cents over the 5-cent rate in effect a year ago. It is believed that the company will shortly be able to work out of its difficulties, due to the increase in fares. Bondholders who contended that the Philadelphia Company was liable for interest on underlying bonds of the railway company in receivership, received a setback recently when the court ruled that no liability attached to the parent company.

Providence Company Doing Better

The deficit of the Rhode Island Company, Providence, R. I., for January, February and March was $263,055, a decrease of $4,535 from the deficit for the corresponding period in 1918. Figures filed at the office of the Pubilc Utilities Commission indicate that the deficit for the month of March was $91,463, the total operating revenue for the month being $552,029, as compared with $507,727 for February. The statement filed by the company notes a further decrease in car service, 148,290 fewer car-miles being run than in March, 1918. The net operating income showed a decrease of $6952 and the total net income a decrease to the extent of $6,453.

Chairman Bliss of the Public Utilities Commission explained that the company's statement indicated that the increase in fares permitted had reduced what would otherwise have been an appreciable increase in the company's deficit and if it were not for the increased operating expenses due primarily to the advance in wages of employees, the company would be operating at a profit.

Indianapolis Operating Net Drops Nearly 20 Per Cent

The gross earnings and operating expenses of the Indianapolis Traction & Terminal Company, lessee of the Indianapolis Street Railway, for the years 1918 and 1917, and the changes for this period, were as follows:

	1918	1917	Change
Gross earnings...	$3,573,499	$3,654,633	—$81,134
Operating expenses......	2,417,407	2,212,012	+205,394
Net earnings from operation......	$1,156,092	$1,442,620	—$286,528

The decrease of 2.2 per cent in earnings and the increase of 9.3 per cent in operating expenses shown in the foregoing figures were the result of war prices and the inability of the company to secure an increase in its rate of fare until October, 1918. The combined effect was a loss of 19.9 per cent in net earnings from operation for 1918 as compared to 1917.

The statement of maintenance of way and structures and of maintenance of equipment is given below:

	1918	1917	Change
Maintenance of way and structures...	$298,434	$377,384	—$78,950
Maintenance of equipment....	329,144	233,889	+95,255
Total maintenance.......	$627,579	$611,273	+$16,305

Thus, while there was a decrease of 20.9 per cent in expenditures for maintenance of way and structures in 1918 as compared with 1917, there was an increase of 40.7 per cent in expenditures for maintenance of equipment, owing in a large measure to the increased cost of labor and material. The total expenditures for maintenance in 1918 exceeded the expenditures in 1917 by 2.67 per cent. The decrease in expenditures on account of maintenance of way and structures was due, to some extent, to the scarcity of labor and the difficulty in securing the needed materials.

New York Subway Deficits Grow

Figures compiled by the Public Service Commission for the First District of New York show that the total deficit of the Brooklyn Rapid Transit Company under the dual contracts providing for rapid transit to March 1 last was $2,729,147 and that the city's deficit was $9,255,934. These deficits have been growing since the contracts were made on Aug. 4, 1913, and in the case of the city the deficit cannot be reduced until that of the company is entirely wiped out. In both instances the deficits are cumulative.

A comparative statement of the figures for February of 1919 and 1918 discloses that the total reductions for rents, taxes, depreciations, etc., for 1919 were $1,155,000, and for 1918 they were $960,000; the total revenues for the same month in 1919 amounted to $1,154,000 and in 1918 to the sum of $968,000.

It is pointed out that the city's interest due on the subway fund for February, 1919, was $211,000 and in 1918 it was $117,000. The total deficit for February, 1919, in revenues necessary to take care of all the charges was $390,000, and in 1918 it was $248,304. In February, 1919, the revenues increased over the same month the year before $186,000.

The poor results are attributed directly to the additional costs due to the war.

Another Rhode Island Reorganization Step

The Rhode Island Legislature in its closing hours passed the bill chartering the United Electric Railways. When the bill came up for consideration in the House of Representatives, the Democratic minority opposed the passage of the measure, characterizing it as loosely drawn. The Republicans, however, voted down the opposition and the bill was sent to the Senate. In the latter body it was held as a weapon to secure concessions of a political character from the House, but was finally passed without opposition.

The bill makes possible a reorganization of the Rhode Island Company by the establishment of one company owning all its properties in place of the present leasing arrangement.

When the reorganization plans have matured sufficiently to warrant the surrender of the charter, the incorporators, the Governor, Commissioner of Banking and Tax Commissioner will turn the charter over to the reconstituted company.

Success of Enactment

The residents and cottagers of Ocean City, N. J., are greatly pleased with the signing by Governor Edge of a bill that gives relief to the town in the way of railway service during the coming summer. In consequence the line of the Ocean City Electric Railroad will again be put into operation.

The new law authorizes municipalities of the fourth class in case of the abandonment or refusal of a railway to operate, to present a petition to the Court of Chancery for the appointment of a trustee to run the lines upon the terms and conditions that may be imposed by the chancery court. Such cities have a right to advance a sufficient amount of money for the operation, the municipality to be repaid the money advanced, together with taxes.

The person appointed to act as trustee is to furnish a bond for the faithful performance of his duties and to render an account of all money received and expended by him.

Some time ago the committee representing the Ocean City Electric Railroad notified the city that it was unable to meet operating expenses and offered to sell the road for $84,000. Mayor Champion was unable to raise the necessary amount among the residents of the town and the bill in the Legislature was the result. The terms of operation will be made known soon by Mayor Champion.

Preparing for Inland Empire Foreclosure Sale

The Hill interests, controlling the Great Northern, Northern Pacific and other railway systems, may buy the Spokane & Inland Empire Railway at the receiver's sale some time in June or early in July.

This is the possibility advanced by George H. Taylor, vice-president of the investment house of E. H. Rollins & Sons, Chicago, representing bondholders of the Inland system. Mr. Taylor and H. D. Whitehouse, the firm's engineer, arrived in Spokane recently to inspect the Spokane & Inland Empire property. The former is a member of the bondholders' protective committee, which holds $3,300,000 of the company's bonds. He is reported to have said:

> The Hill interests will possibly buy the property at the auction. They have $12,000,000 invested in it, and own 55 per cent of the stock, I believe. The sum of $6,697,556 is due the Great Northern and its subsidiary company, the Northwestern Investment Company. I have not heard that they have sent any men here to investigate, but in view of these facts, it is possible that they will be the purchasers.

Mr. Taylor declared that the bondholders would not attempt to operate the system.

Financial News Notes

Jackson Wants Local Ownership and Control.—Business men and prominent citizens of Jackson, Miss., are reported to be organizing for the purpose of submitting a bid for the property of the Jackson Light & Traction Company, which went into the hands of receivers recently.

Wants to Abandon Interurban.—The Union Savings Bank & Trust Company, as trustee for the note issue of the Cincinnati & Columbus Traction Company, Cincinnati, Ohio, on April 17 filed an application with the Ohio Public Utilities Commission for authority permanently to abandon and dismantle the company's entire interurban line from Cincinnati to Hillsboro, 54 miles.

Change in Name by Maine Company.—On April 1, the name of the Rockland, Thomaston & Camden Street Railway was changed to Knox County Electric Company. All directors and officers of the corporation remain the same, the name only undergoing change. The affairs of the company will be managed and carried along as previously, but under the new name.

Successor Company at Selma.—A certificate of incorporation of the Selma (Ala.) Electric Company has been filed by Charlotte L. Waters, Gertrude E. Abbott, D. L. Gerould, and Hugh Mallory, with D. L. Gerould, of Warren, Pa., named as president. Hugh Mallory is named as secretary-treasurer and general manager. It is understood that the new company is formed as the successor to the Selma Traction Company, the property of which will be sold at auction in May.

Dividend on Common Stock Passed.—The directors of the Twin City Rapid Transit Company, Minneapolis, Minn., have decided to pay no dividends on the common stock of the company for the first quarter of 1919, according to announcement by Horace Lowry, president of the company. Net income for the month of March, 1919, shows a decrease of 49.17 per cent as compared with March, 1917. For the three months of 1919, the decrease is 58.12 per cent as compared with the 1917 period.

Hearing on Funding Issue.—Testimony was taken by the Board of Public Utility Commissioners on April 29 on the application of the Trenton & Mercer County Traction Corporation, Trenton, N. J., for authority to issue $40,000 of bonds for the purpose of funding the cost of the Trenton Junction extension of its line. The application was taken into conference and a decision will be announced later. The company is now building a shorter line to Trenton Junction and will continue the road through the village. At the present time the line runs to the outskirts of the town.

Holding Company Not Responsible.—Judge Charles P. Orr in the United States District Court at Pittsburgh, Pa., on April 10 dismissed the suit brought to hold the Philadelphia Company responsible for the interest due upon bonds of the United Traction Company, a subsidiary of the Pittsburgh Railways, which is in the hands of receivers. The plaintiff wished the court to make the bonds an obligation of the Philadelphia Company, which controls the Pittsburgh Railways and is in turn controlled by the United Railways Investment Company.

Estimating Municipal Line's Requirements.—Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., has filed an estimate with the City Council of cost of operating the Seattle Municipal Railway during the month of May. He places the sum at $362,645. The total is approximately $60,000 more than the April estimate, the difference including an increase in the transportation department, due, it is claimed, to the operation of more cars, and expense of making improvements in the property. According to Mr. Murphine's report, the increase in car-hours compared to April, 1918, will be about 1000 a day. This will increase the wage cost approximately $1,000 a day.

Abandonment Authorized.—The Public Service Commission for the Second District of New York on April 17 granted the petition of the Yonkers Railroad for permission to abandon that portion of its lines within the village of Hastings. The appeal made by the railroad for the abandonment of the Hastings line was contained in the petition filed by the company some time ago in which the railroad sought to abandon portions of several of the Yonkers lines. On April 14 counsel for the railroad filed a request with the commission to withdraw its petition, but only as regards the Yonkers lines and excepting the Warburton Avenue line, north of the Yonkers city line. Corporation Counsel Walsh of Yonkers filed a formal consent to the discontinuance of these abandonment proceedings.

Consolidation of Receivership Suits Opposed.—Attorneys Ephraim Caplan and Randolph Laughlin, representing petitioners in two of the receivership suits against the United Railways, St. Louis, Mo., are opposing the attempt of litigants against the company to consolidate the four actions pending for the appointment of a permanent receiver. They contend the appointment of a receiver in one of the petitions carries with it a receivership in all the cases pending. Rolla Wells recently was appointed temporary receiver in the suit of Samuel W. Adler, a bondholder. Attorneys for the United Railways joined in the request for the appointment of a receiver in that suit. They resist the naming of a receiver in the other suits, however. In opposing the motion for a blanket receivership Attorney Priest for the company declared the suits pending against the railway company are diverse in nature, and have for their object widely different purposes.

Commission Approves Abandonment.—The California Railroad Commission has granted the request of the Pacific Electric Railway for authority to abandon service and remove tracks and overhead on its Brockton Avenue line in Riverside, but the abandonment is limited to that part of the line southerly of Jurupa Avenue. General use of privately-owned autos is held by the railway people to have caused a marked falling off in the patronage of the line. Investigation by the commission's examiner showed that in the territory north of Jurupa Avenue served by the Brockton line, 42 per cent of the homes possessed autos. In the homes without autos there are 178 adults and ninety-three school children. In the homes with autos there are 167 adults and fifty-five school children. For the reason that 271 patrons of the line would be seriously inconvenienced by the cutting out of service in this section, the commission denies the company's application so far as it concerns this district, but without prejudice to a future application provided future patronage, coupled with economical operation by the railway company through the use of one-man cars, shows the need for reopening the case.

Electric Railway Monthly Earnings

BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$28,440	*$17,129	$11,311	$3,949	$7,362
1m., Feb., '18	19,847	*10,644	9,203	3,717	5,486
12m., Feb., '19	286,145	*159,179	126,966	46,952	80,014
12m., Feb., '18	234,074	*122,512	111,562	43,071	68,491
CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.					
1m., Feb., '19	$42,963	*$33,900	$9,063	$6,667	$2,396
1m., Feb., '18	36,294	*28,999	7,295	6,534	761
12m., Feb., '19	530,436	*401,011	129,425	78,832	50,593
12m., Feb., '18	471,213	*317,849	153,364	78,618	74,746
COLUMBUS (GA.) ELECTRIC COMPANY					
1m., Feb., '19	$86,676	*$47,975	$38,701	$34,842	$3,859
1m., Feb., '18	96,461	*38,811	57,650	32,255	25,395
12m., Feb., '19	1,184,435	*593,879	590,556	402,823	187,733
12m., Feb., '18	1,130,911	*436,953	693,958	366,316	327,642
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., Feb., '19	$103,194	*$63,412	$39,781	$13,973	‡$25,932
1m., Feb., '18	80,408	*44,520	35,888	12,851	‡26,183
12m., Feb., '19	1,181,044	*701,205	479,839	165,833	‡315,781
12m., Feb., '18	950,583	*529,923	420,660	143,591	‡303,137
EL PASO (TEX.) ELECTRIC COMPANY					
1m., Feb., '19	$120,067	*$85,741	34,326	$6,879	$27,447
1m., Feb., '18	103,875	*66,475	37,400	6,513	30,887
12m., Feb., '19	1,287,428	*905,222	382,206	81,949	300,257
12m., Feb., '18	1,274,162	*813,815	460,347	69,477	390,870

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$222,153	*$179,790	$42,363	$40,431	$1,932
1m., Feb., '18	181,822	*125,615	56,207	38,977	17,230
12m., Feb., '19	2,779,968	*1,953,031	826,937	475,332	351,605
12m., Feb., '18	2,152,766	*1,425,212	727,554	455,470	272,084
HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.					
1m., Feb., '19	$25,504	*$17,142	$8,362	$4,999	$3,373
1m., Feb., '18	26,644	*19,126	7,518	5,075	2,443
12m., Feb., '19	313,958	*212,082	101,876	60,151	41,725
12m., Feb., '18	345,198	*219,814	125,384	61,042	64,342
JACKSONVILLE (FLA.) TRACTION COMPANY					
1m., Feb., '19	$78,365	*$69,658	$8,707	$18,014	†$9,307
1m., Feb., '18	66,003	*47,244	18,759	170,030	1,729
12m., Feb., '19	978,241	*763,004	215,237	201,261	13,976
12m., Feb., '18	716,590	*488,380	228,210	190,752	37,458
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY					
3m., Mar., '19	$8,217,080	*$5,882,376	$2,334,704	$2,418,064	‡$58,763
3m., Mar., '18	7,225,940	*4,723,570	2,502,370	2,401,517	‡262,913
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.					
1m., Feb., '19	$686,911	*§$398,649	$288,262	$184,189	$104,073
1m., Feb., '18	577,581	*§327,385	250,196	177,792	72,404
12m., Feb., '19	7,890,219	*§5,299,376	2,590,843	2,232,500	358,343
12m., Feb., '18	6,240,740	*§3,745,515	2,495,225	2,145,385	349,840

* Includes taxes. ‡ Includes non-operating income. § In February, 1919, $20,607; February, 1918, $17,322; twelve months, 1919, $546,010; twelve months, 1918, $215,600, included for depreciation. † Deficit.

Traffic and Transportation

Los Angeles Wants Help

Commission Has Increased Fare Applications Before It From Both Companies There

The applications of the Pacific Electric Railway to increase fares at Los Angeles, Cal., to increase local fares in certain communities outside of Los Angeles, and to increase the minimum fare between interurban points, was scheduled to be heard by the California Railroad Commission, at Los Angeles, on April 29.

WANTS EIGHT-CENT FARE

In lieu of the present 5-cent fare in Los Angeles, the company wants to establish a downtown zone, the extremities of which shall not be more than 1½ miles from the Pacific Electric's Main or Hill Street Stations, with a cash 5-cent fare and a blanket 8-cent cash fare to, from and within the balance of the present 5-cent zone. The company also requests authority to issue a coupon book of twenty tickets to be sold for $1, the book to be transferable, limited to ten days from date of sale and to provide two trips daily during such period.

Glendale, Long Beach, Pasadena, Pomona, Redlands, Redondo Beach, Riverside, San Bernardino, San Pedro-Wilmington, Santa Ana, South Pasadena and Santa Monica-Ocean Park-Venice-Playa del Rey are the outside communities that have street-car zones. At these points the company proposes to substitute for the present 5-cent fare a cash 7-cent fare and to place on sale a twenty-coupon book for $1, subject to the same provisions as at Los Angeles.

The railway has also asked permission to advance the present minimum for interurban fares from 5 cents to 7 cents a single trip, and from 10 cents to 14 cents for round trips. This change, if brought about, will have the effect of correspondingly increasing the local fares within certain cities and communities where these minimum fares now prevail.

It is also proposed to increase forty-ride school tickets from $1 to 1.40.

INTERURBAN AND CITY APPLICATIONS DISTINCT

The present applications are the outgrowth of a recent petition on the part of the Pacific Electric to make general increases in its interurban and local fares. In a decision rendered on Sept. 4, 1918, the Railroad Commission granted authority to make certain changes in the interurban fares, but no action was taken on the situation at Los Angeles or the outside communities, owing to the fact that the attorneys for the city of Los Angeles and the other communities objected to any change in fares until the entire situation could be studied and corrected on a uniform and non-discriminatory basis.

In support of its applications, the company has filed with the commission a statement of operations for the calendar year 1918, showing a net loss to the company of $1,695,143. It is declared that revenues realized by the advances in fares recently granted, together with increased revenue for freight service authorized by the California Commission and the Interstate Commerce Commission, are insufficient to meet the company's fixed charges and operating expenses and the statement is made that the increases proposed from fares will be applied to meeting annual fixed charges and operating expenses, which have greatly advanced, due to increased costs of operating materials and by reason of advances in wages to employees.

The Los Angeles Railway Corporation now has before the commission an application to increase fares over its lines. The combined applications, therefore, place the entire situation of fares within the city of Los Angeles before the commission for adjudication.

Public Service Explains Zoning Plan

Beginning on April 25, at the conclusion of the 7-cent fare hearings, the Public Utilities Commission of New Jersey continued the hearings on the proposed zone system of the Public Service Railway. To expedite the matter, counsel for the commission, the railway and the municipalities agreed that the entire report, which was abstracted at length in earlier issues of this paper, should be admitted as a single exhibit, only fragmentary details being explained by witnesses.

Portions of the report were explained by Thomas N. McCarter, president of Public Service, and Dr. Thomas Conway, Jr., who had been retained by the zoning committee as expert adviser. M. R. Boylan, general auditor of the company, told how the results of the traffic check had been compiled and described the accounting system evolved to care for the preliminary and final classifications.

On April 30, Dean Mortimer E. Cooley, was recalled to the stand for cross-examination. He explained the basis of the appraisal of the property made by him in 1915. He said that in fixing unit costs he had, as was customary with him, averaged costs of material and labor over a five-year period. The figures were taken from the company's books and from vouchers showing actual expenditures.

Seven Cents in Scranton

Company There Has Been Charging Eight Cents—Inventory as Basis for Future Charge

In a decision rendered by the Public Service Commission of Pennsylvania on April 23 the Scranton Railway is directed to establish a 7-cent fare on its lines, with a 6½-cent fare when four tickets are purchased.

The 7-cent fare is to continue in force for one year and the 6½-cent rate for six months, and then to be modified according to the results in revenue, which actual experience demonstrates. W. D. B. Ainey, chairman of the commission, wrote the opinion. He finds that the Scranton Railway is in all probability greatly over-capitalized.

The company has been charging 8 cents since last September. It established a 6-cent fare in March, 1918. The order of the commission provides:

> The Scranton Railway is to file with the Public Service Commission, not later than May 7, 1919, a tariff schedule, effective on one day's prior notice providing for a 7-cent rate of fare to remain in force for the period of one year, and concurrently for a period of six months; a 6½-cent rate of fare where coupon tickets in blocks of four are purchased, which tickets shall be put on sale by respondent at its offices and with its conductors, and at the expiration of the six months' period the same to be modified, continued or abandoned by the order of the commission as the intervening experience of the company may warrant; to file with the commission monthly reports of the receipts, expenditures and traffic data.

A valuation of the company's property is to be made. If a valuation conference can be agreed upon between representatives of complainants and the company the commission has announced that it will designate an engineer to sit with them for the purpose of determining the reproduction cost, new and original cost, their report to be submitted to the commission for further consideration.

The commission found that the annual operating expenses were approximately $1,452,932, excluding any items for deferred maintenance; that the number of passengers carried per annum based on the present patronage would be about 23,000,000 and that neither a 5 nor a 6-cent rate of fare would produce sufficient revenue to pay these operating expenses and yield any return to the stockholders. The commission held that the company appeared to be greatly over-capitalized, there being outstanding $2,000,000 of stock and $7,395,500 of bonds, and declined to accept this as a basis for fair return.

Commissioner Ainey said in his opinion accompanying the order:

> It is not disputed that the company is entitled to earn a fair return upon its property devoted to public use. The complainants suggest that if the rate of return be computed upon an estimated value of $4,000,000 at 6 per cent it would allow $240,000 for that purpose. Were we to adopt this basis, although as pointed out the complainants do not attempt to establish it as being the correct amount, it would yield at 7 per cent $280,000, or total required revenue or $1,732,952. The 1917 earnings at $1,529,856 left a deficit of $203,095. Manifestly a larger revenue is required. Under all the evidence an annual passenger revenue of $1,831,000 is not too much to maintain service and solvency.

Chicago Surface Fares Five Cents

Seven-Cent Rate Refused by Illinois Commission, Which Anticipates Deficit of Few Hundred Thousand Dollars at Five Cents

Surface car fares in Chicago are likely to remain at 5 cents. This was indicated by a decision of the Public Utilities Commission of Illinois on April 25 denying the application of the Chicago Surface Lines for a 7-cent fare. The decision held that an increase of even 1 cent would compel the public to pay from $3,500,000 to $4,000,000 more a year for transportation, whereas the commission anticipates a possible deficit of only a few hundred thousand dollars. This amount, it holds, can be met by a cut in the city's profits and a readjustment of allowances for renewals and depreciation.

ONE COMMISSIONER DISSENTED

The commission retains jurisdiction of the case so that it may be reopened at a future date if emergency action be found necessary. Four members of the commission joined in this opinion. Commissioner Lucey dissented. He urged a temporary 6-cent fare to permit needed improvements of the service in the face of existing financial difficulties and suggested that a valuation of the entire system be made in the meantime.

The commission based its decision on the theory that the war-time emergency no longer exists and that any increase in rates must arise from the right to relief under the established rules of law. It held, in brief, that the valuation of $156,481,860 cited by the company represents only the amount which the city would have to pay if it took over the properties as of Aug. 1, 1918, under the terms of the 1907 ordinances.

The 5-cent fare was specified in the 1907 ordinance with this valuation in view, and "if the condition as to fares is disregarded, the provisions as to valuations are not controlling, and the value of these properties, for rate-making purposes, must be determined precisely as if there were no provisions in the ordinances as to the prices at which the city or its licensee may require the properties. The companies will not be permitted to repudiate the condition as to fares and at the same time to insist on this valuation."

MAY OVERRULE 1907 ORDINANCE FARE

While the commission upheld the city's plea for a 5-cent fare, the city's contention that the rate of fare provided in the 1907 ordinances could not be disturbed was specifically overruled. On this point the commission said:

> It is well settled that a municipality cannot, by a contract in franchise ordinances respecting rates of fare, foreclose the exercise of the police power of the State, unless clearly authorized to do so by the supreme legislative power. * * * There is nothing in the statutes conferring authority upon municipalities of this State, with reference to street railroads, which amounts to a renunciation of the sovereign power of the State, by terms so clear and unequivocal as to remove doubt as to their proper construction.

It is stated that the recent ruling of the United States Supreme Court in the Columbus, Ohio, case has no bearing on similar disputes under the Illinois laws.

PRESENT OUTLOOK NOT SO BAD

Taking up the question of valuation for rate-making purposes, the commission then eliminates from the purchase price figures, certain items amounting to $44,100,762, which it says "do not represent property useful and actually used in the public service." These deductions include $9,016,971 of old franchise values; $8,000,000 for paving allowances under the settlement ordinances; $14,794,666 for tangible property replaced during the period of rehabilitation and reconstruction; $8,192,750 allowed under the ordinances for superintendence of construction, and $4,096,375 which has accumulated from allowances specified in the ordinances for bond discount or brokerage. No deduction was made for depreciation, and no allowances were made for goodwill or going value.

In discussing the question of earnings and expenses, the commission pointed out that conditions had changed since the company's petition was filed last November and that the outlook is not nearly so bad at the present time. The companies, for instance, had estimated that their gross earnings for the year ending July 31, 1919, would not exceed $34,000,000. At that time it could not be foreseen that business would pick up as it has in the past few months. The commission believes that "notwithstanding the abnormal conditions of the months of the autumn of 1918," the gross earnings will be about $35,350,000. It says on this point:

> The small receipts for certain months in 1918 did not result from any mismanagement of the properties of these companies; on the contrary, the affairs of the companies appear from the evidence in this case to have been prudently and efficiently managed.

The commission also expresses the opinion that estimates of cost of materials "will not have that degree of permanency which entitle them to be considered as fixed elements in adjusting rates." While cognizance is taken of this outlook, as well as the present high cost of labor under the War Labor Board award, the commission estimates that the companies should be able to operate on a ratio of 76.2 per cent. This would leave net earnings of about $8,500,000. The commission says:

> In determining what is a fair rate of return upon these properties, consideration must be given to the fact that the investment is safeguarded by the provisions of the Mueller law and of the settlement ordinances, which make it necessary for any other company obtaining franchises from the city at the expiration of franchises of the petitioners to take over the properties at the valuation fixed in case the city purchases them.

Taking the estimate of $8,600,000 of net earnings for the current year, the commission says this represents a return of 7 per cent upon $123,000,000 and of 5½ per cent upon the $156,000,000 capital account of the companies, and that it will be sufficient, after making allowances for the division with the city of the excess over the 5 per cent allowed to the companies on the capital account, to meet the interest on their bonded debt. Finally upon the question of ultimate relief in the event that this should be required, the commission says:

> This increased burden should not be placed on the public when there are other and obvious measures of relief against either reduction of wages or a receivership. The settlement ordinances provide for a commutation of the city's share of profits into reduction of fares. Of course, we must assume that the city will exercise control over its profits in such a way as to prevent, on the one hand, injury to the properties in which it has an interest, and, on the other, to avoid a necessity for increasing the burden on the public. And there is a distinction between profits and money actually required to give a fair return on property used in the public service. The commission would not be justified in imposing a burden of $3,000,000 or $4,000,000 upon the people of Chicago, in order to make up a deficit of a few hundred thousand dollars for which provision can be made through a commutation of the city's profits and a readjustment of allowances for renewals and depreciation.

AN EMERGENCY DOES EXIST, SAYS DISSENTER

In his dissenting opinion, Commissioner Lucey insisted that present conditions constitute an emergency for the companies and that the efficient and continuous operation of the surface railway system is of vital necessity to the business life of Chicago. In this connection he said:

> Unless state regulatory bodies take a liberal view of the necessities of utility corporations serving the public, and permit them to earn sufficient money to pay a fair rate of return and keep their plants in an efficient and first-class condition, state regulation, which is now on trial in many states, may not prove as successful as municipal disorder has proved in the past. The city of Chicago as a governmental agency should be more interested in preserving present conditions than in confronting a chaotic condition of affairs, wherever the responsibility for the same may be ultimately placed.

The petition of the Chicago Surface Lines for a 7-cent fare was filed with the commission on Nov. 21, 1918. Hearings were held up to Feb. 14 when the case was taken under advisement. There have been rumors that the company would go back to its old wage scale for trainmen under a contract which still has more than a year to run.

The War Labor Board scale of 43 cents to 48 cents is now being paid, but the company has the right to abandon this with the coming of peace. The trainmen's organization has taken the position that the company is entitled to a reasonable return which will enable it to continue the wage scale that is now in force.

The Chicago Elevated Railways have been collecting a 6-cent fare since Nov. 19, 1918, under authority of the State commission. The city is inclined to ask that the 5-cent fare be restored on these lines, but the present rate is likely to continue on the Elevated at least until Dec. 1.

Syracuse Results Poor

Company Has Been Charging Six Cents, but Now Wants Additional Cent for Transfer

The New York State Railways has asked the Public Service Commission for the Second District, as a means of increasing its revenues to the extent that it will be able to carry on a track and pavement reconstruction program in Syracuse this year:

> That for a period of one year the company be permitted to collect 1 cent for each transfer issued.
>
> That the proceeds from the sale of transfers be placed in a special fund in the bank, and
>
> That the proceeds from the sale of transfers be spent entirely for reconstruction of tracks and pavements in the city.

The railway's application was filed by B. E. Tilton as vice-president. A hearing will follow.

WANTS TRANSFER CHARGE

The company alleges that its rates are insufficient to yield a reasonable compensation for the services rendered and are unjustly and unreasonably low and do not allow a reasonable average return upon the value of the property used in the public service and do not provide sufficient income for surplus and contingencies. It asks the commission to determine that a 6-cent fare with 1 cent for a transfer is a just and reasonable rate in Syracuse.

The increase asked, according to the petition is required to carry on necessary and important work and improvements. The company says on April 3 the city notified it of contemplated paving and resurfacing on certain streets this year in which the company's tracks are located, at an estimated cost of $356,600 for resurfacing and $109,000 for new paving between tracks.

COMPANY'S CREDIT IMPAIRED

The company, it is stated, is not able to raise money to carry on the construction work other than through its receipts, and these, with present operating expenses, it is claimed, are not sufficient to pay the fixed charges. Under these conditions, the company says it is not possible for it to undertake the reconstruction work at this time.

The company says the result of 6-cent fare operations in Syracuse since Dec. 2 shows this increase in revenue:

December	$22,467	13.22 per cent
January	$32,764	20.29 per cent
February	$31,813	21.65 per cent
March	$34,072	21.10 per cent

It is further set forth that these increases have not, in spite of rigid economies, met the increase in operating expenses, due to higher costs of materials and higher rates of wages granted under the decision of the War Labor Board, that the results of operations for December, January and February under a 6-cent fare have not enabled the company to earn its fixed charges and this in spite of mild winter when operating expenses were comparatively low. Losses for December, January and February are given as follows:

December	$15,111
January	5,744
February	12,537

The railway company says the streets upon which improvements are contemplated are in need of resurfacing, and if it is permittted to charge 1 cent for a transfer the work can be carried on and the improvements made. With present revenues the company says it cannot undertake any reconstruction work this year.

Public Service Seven-Cent Fare Case Closed

After extended hearings on the application of the Public Service Railway, Newark, N. J., for permission to increase its rate of fare to 7 cents, plus 1 cent for a transfer, the oral testimony was brought to a close on April 25 and the railway and F. H. Sommer, for a number of municipalities, filed briefs summarizing the case on April 29. In the briefs the railway holds that the rate asked for is necessary if safe, adequate and proper service is to be given, while the municipalities endeavor to show that advanced rates sought exceed the value of the service to the short-haul rider.

The company showed the payment of moderate dividends during 1917 was justified in the maintaining of its credit. In the following year operating costs mounted to unheard of figures, necessitating immediate relief. It was not until July 10, however, that permission to charge 1 cent for a transfer was granted. It was held at that time that this additional revenue would permit the company during 1918 to earn its fixed charges and its operating expenses, including $800,000 for depreciation, no return being allowed on stockholders' investments, because the commission thought that the company could temporarily get along without any new capital. Immediately thereafter a ruling of the National War Labor Board caused a further great increase in operating expense and permission was obtained to increase the fare to 7 cents, with 1 cent for a transfer, from Oct. 15 to April 1, 1919, on which date the fare was to be reduced to 6 cents.

In 1918 the railway company spent in operating expenses and fixed charges every cent collected from fares. Allowing for rational and proper expenditure for operation and maintenance, including depreciation but nothing for dividends, the estimates show that even with the 7-cent fare there will be a deficit. The company petitioned that the new rate be made effective from May 1.

In his brief Mr. Sommer called attention to the fact that if the pending application is granted the company will have been allowed to charge five different rates of fare within a period of eleven months.

Seven Cents in Worcester

Conditions that Led Massachusetts Commission to Sanction that Rate In Its Recent Decision

A 7-cent fare unit was established on the Worcester (Mass.) Consolidated Street Railway on April 14 by a decision of the Public Service Commission. The board required the company, however, to place tickets on sale at the rate of ten for 65 cents, good in all fare zones and sold by conductors. An increase of 33⅓ per cent in existing workingman's tickets was also established by the decision. The company desired to put a flat 7-cent fare unit into effect on its system and to increase workingmen's ticket rates 40 per cent. The commission believes from experience on other properties that about 60 per cent of the traffic will be handled on the reduced-rate ticket basis.

SIX CENTS NOT ENOUGH

The Worcester company operates 290 miles of single track, about 80 miles of which are located in the city of Worcester. These city lines contribute about 71 per cent of the total passenger traffic. Thirty cities and towns are served, with a population of 358,005 in 1915. Until July 1, 1918, the company had a 5-cent fare, with the railway divided into zones of varying lengths. On that date a revised tariff went into effect, without opposition, substituting a 6-cent fare upon all zones outside Worcester, and on Aug. 1, 1918, a tariff became affective, also without opposition, changing the fare in Worcester to 6 cents.

In January, 1919, the company filed a tariff with the commission making the charge in each zone uniformly 7 cents, proportionally increasing the rates for pupils' tickets, and fixing a 40 per cent increase on workmen's tickets, these last not having been increased before.

It appeared at the public hearings on the present application that the increases in payrolls made by the company since 1914 represented an additional cost for every passenger carried of about 1.07 cents. The company has paid dividends every year since 1887 until 1918, when no dividends were were paid. The average earnings on the total stock investment was 4.57 per cent. The commission found that the company has been conservative in its accounting and that until recently the property has been well maintained. The company estimated that since 1914 the following increased costs per passenger among others have resulted: payroll, 1.07 cents; materials and supplies, 0.239 cents; power, 0.323 cents.

INCREASE IN REVENUE VERY SMALL

The increase in revenue under a 6-cent fare from Aug. 1, 1918, to the end of that year, excluding October on account of the influenza epidemic, was 7.6 per cent as compared with the same months of 1917 when the 5-cent fare

was in effect. Upon all the evidence the commission is of the opinion that the company is entitled to an increase above existing rates which will yield at least $400,000. The board believes that general economic conditions associated with the war resulted in a steady decline of traffic wholly apart from the effect of rate increases. The estimated requirements of the company for 1919 are: Operating expenses, $3,033,900; additional depreciation charge, $171,964; interest on funded and unfunded debt, $268,026; taxes and other charges, $182,121; return on stock investment (6 per cent) $429,197; total $4,085,209.

Providence Men Insistent

The union of employees of the Rhode Island Company, Providence, R. I., at a meeting held on April 28 voted to strike unless the back wages due them, amounting to $144,000, are paid by May 3.

Presiding Justice Tanner in the Rhode Island Superior Court last week issued an order directing the receivers of the Rhode Island Company to make the payment, the employees having threatened to strike unless such a decree was entered.

The reason for the latest action of the carmen was explained by Business Agent Coleman. He stated that under the law other creditors in the same class with the employees have thirty days in which to file an appeal from the decision of the court, but as the carmen have waited for several months for the payment of the back wages, they do not propose to permit the payment to be delayed further. It is their belief that if there is to be an appeal from the court's decision by any of the creditors, such an appeal could be filed immediately and a hearing given by the court, thus expediting the matter and removing any obstacles to the receivers carrying out the court's decree and making the payment.

If the payment is not made by May 3, it is the intention of the union men to give the public twenty-four hours' notice of their purpose to strike. If the union adheres to this program the strike will become effective on May 4.

Court Allows Six-Cent Fare

Kansas City, Kan., and Rosedale citizens are paying 6 cents on the cars of the Kansas City (Mo.) Railways operated in Kansas. A temporary restraining order against the Public Utilities Commission, the Attorney General of Kansas and the cities of Kansas City, Kan., and Rosedale, enjoining them from interfering with it in charging and collecting a 6-cent fare in the two cities was granted the railway on April 15 by Judge John C. Pollock in the federal court at Topeka. Under the court decree the company is required to issue to each passenger paying a 6-cent fare a receipt, reciting that the fare is conditional on the final outcome of the litigation. The application of the railway for an interlocutory injunction was set for a hearing on April 24.

The restraining order, removes the entire 6-cent fare litigation, pending since last May, to the Federal Court. The city officials have maintained that they were the proper authorities to pass on any increase applications, basing their claims on the fact that the city was a party to a contract with the company. The State Supreme Court ruled that the Public Utilities Commission had jurisdiction in fare increase matters. Under this decision the commission recently denied an appeal for an increase.

The order fixing the fare at 6 cents was issued by Judge Pollock on the application of the railway which stated that by reason of the refusal of the Public Utilities Commission to allow it to charge 6-cent fares the company was suffering great financial loss.

Transportation News Notes

Fare Hearing Postponed.—The State Public Service Commission of Washington has set May 14 as the date of hearing on the increase of fare on the Seattle & Rainier Valley Railway, postponing the date from April 23. The railway has filed a schedule increasing fare in the city limits to 7 cents, with 1 cent extra for each transfer.

Restraining Order in Fare Case.—Circuit Judge S. G. Houghton, recently issued a preliminary mandatory injunction restraining the Saginaw-Bay City Railway from putting in effect its proposed 6-cent fare in Bay City and compelling the continuance of the operation of its cars. The company notified the Council some time ago to the effect that it would increase its rate of fare to 6 cents commencing on April 18.

Must Abide by State Rate.—Judge C. W. Sessions has filed in the eastern district of Michigan a decision dismissing the action of the Michigan Railway, Jackson, Mich., seeking to absolve it from the provision in its charter requiring it to observe the 2-cent fare law. The court holds that the Michigan Railway never was under federal control and that it is bound by the provisions of its charter, in which the 2-cent fare law is incorporated.

Traffic Check in Kansas City.—The Kansas City Railways has adopted the "origin and destination basis" checking system in use in Chicago, Philadelphia, and the State of New Jersey. Seventy checkers have been engaged to work upon suburban cars before the canvass is extended to the business district. The work will be under Major H. F. Mayer, recently released from military service. When a passenger boards a car he will receive a card upon which to write his destination. Cards will be collected as passengers leave the car. The count will be repeated several times on each line so that an accurate approximation of the travel on the different lines may be made.

Seven-Cent Zones Denied.—The application of the Bridgeton & Millville Traction Company, Bridgeton, N. J., for authority to increase its passenger rates in each fare zone from 5 cents to 7 cents has been denied by the Board of Public Utility Commissioners, but an order has been issued allowing the company to file an amended tariff providing for a 6-cent instead of a 5-cent fare in each zone. The fare zones are each 2 miles long and under the 5-cent fare the company charged 2½ cents a mile. This is said to be the highest electric railway rate per mile in New Jersey. Under the 6-cent fare, the rate per mile is increased to 3 cents. Increases in freight rates are also allowed the company. The commission was prompted to allow the 6-cent fare because the evidence in the cause clearly shows that the company is not earning sufficient revenue.

New Transfers in Kansas City.—The Kansas City (Mo.) Railways will change on May 4 from the transfers now in use, which have not proved satisfactory, to the one in use generally some years ago. When a transfer is given it will be punched to the first change of cars, and, if the holder wishes another it will be given him in exchange for the first one issued. The transfers will contain a list of intersections and the passenger will be obliged to state at which street he wishes to change to another line. This street will be punched and the transfer will be good at no other street. It will be good for any line at that intersection, but not for a return trip. Upon the second transfer, the number from which the original was issued will also be punched, so that a record can, in this manner, be kept of all traffic and transfers. The directions will be noted by colors. The new transfer will be an inch longer than the one now in use.

Seven-Cent Fare Asked in Memphis.—Declaring that present revenues from the 5-cent fare are inadequate to meet increased cost of production the Memphis (Tenn.) Street Railway, through Receivers Frank Elgin and T. H. Tutwiler, has petitioned Federal Judge John E. McCall for permission to apply to the new State Railroad and Public Utilities Commission for a 7-cent cash fare and 1 cent for each transfer. Judge McCall has since authorized the company to proceed and the petition will be presented in a few days. The deficit of the company in 1918 was $225,000. A special plea will be made for the Raleigh line to be allowed to charge an additional cash fare beyond the town of Binghampton. Heretofore the fare from Memphis to Binghampton has been 5 cents with an additional nickel from the Macon Road to Raleigh. By act of the Legislature which adjourned recently the town of Binghampton, except for its manufacturing surburbs, will become a part of the city proper soon.

Personal Mention

George P. Toby to London

He Is Appointed Executive Secretary to the American Chamber of Commerce in that City

George P. Toby, long connected with banking and industrial corporations in this country, has been appointed executive secretary of the American Chamber of Commerce in London and will sail for his new post about May 12, meanwhile conferring with American merchants as to the service which the American Chamber in London can render them. Mr. Toby has been long known as an investment banker, and in this capacity has made a careful study of the operation of American industrial and public utility corporations.

MR. TOBY WELL QUALIFIED

Mr. Toby spent more than a year in Washington during the war on work for the Treasury Department and on plans for co-operation between the various government departments and the business world. His banking interests brought him to a close study and investigation of the commercial possibilities of industrial corporations, including studies of the markets for products, methods of distribution, etc. These activities also have taken him to every part of the country, giving him therefore a broad sympathy with every section of the United States. He also has the advantage of having traveled extensively in Europe and Canada.

G. M. Cassatt, president of the American Chamber of Commerce in London, who is now in the United States, in announcing the appointment explained that the London organization has as its members the representatives in England of American manufacturing and exporting interests, and also of the foremost British manufacturers and exporters, too, and importers from the United States. The former are active members, the latter associate.

PREPARED FOR INQUIRIES

The Chamber has standing committees on finance, commerce and trade, transportation, trade information, etc., and the membership is also divided by businesses into trade groups, each working through its own committee. Thus almost any inquiry can be expeditiously handled by referring it to the proper committee or proper trade group. The London Chamber desires that the individual American manufacturer, merchant, exporter from one end of the country to the other should learn to look upon the chamber as an overseas service bureau of his own—ready to promote American business.

H. O. Allison, Beaver, Pa., has been appointed safety engineer of the Beaver Valley Traction Company, New Brighton, Pa. He assumed his new duties on April 1. Mr. Allison at the time of his selection was special inspector and assistant to the chief of the inspection bureau of the Associated Bureaus, Pittsburgh Railways, with headquarters at Pittsburgh, under the direction of Cecil G. Rice. A service bureau has been established by the Beaver Valley Traction Company to handle all complaints, service suggestions and accident prevention measures. Mr. Allison was associated with *The Daily Times* of Beaver, Pa., for six years prior to 1917 as general manager and secretary-treasurer. Twelve years ago he went to Beaver County from Ohio and a few months afterward became associated with *The Times* as advertising manager. Shortly afterward he assumed complete charge of the paper. It was while in charge there that he first brought his views of transportation facilities to the attention of W. H. Boyce, superintendent of the Beaver Valley Traction Company. After several consultations with him an extensive publicity campaign for the prevention of accidents and a better public understanding was begun. The success which attended what was then a new feature to electric railways was such that publicity has become a regular feature in connection with the Beaver Valley Traction Company. The service bureau of which Mr. Allison will now become the active head will not be an experiment, as many of its details have been in effect for some time, but in the present appointment it is the desire of Mr. Boyce to make it more complete under a supervision that will result in even a better service and less chance for accidents. The employment of new men will be a feature of the bureau.

H. O. ALLISON

Charles L. Tutt, secretary and treasurer of the Grand River Valley Railway, Colorado Springs, Col., when he went into service last September, resigned as secretary and treasurer of the railway, but the resignation was not accepted, and J. A. Hull was elected as assistant secretary and treasurer. Mr. Tutt has returned from military duty and has resumed the duties of secretary and treasurer. Mr. Hull has resigned.

W. A. Carson, who is vice-president and general manager of the Evansville & Ohio Valley Railway, Evansville, Ind., was elected as one of the two vice-presidents of the Y. M. C. A. State Association at the recent convention. Mr. Carson was chosen for this position because of his good record in the Y. M. C. A. work in Evansville, and because it is customary for the railroad world to be represented on the board of the Y. M. C. A.

M. J. B. McConnell, for the last year division superintendent of the Steubenville, East Liverpool & Beaver Valley Traction Company, Steubenville, Ohio, has been made general superintendent with headquarters at East Liverpool, Ohio. Before going to Steubenville Mr. McConnell was connected with the New York State Railways, Rochester Lines, as chief clerk to the general manager and later as assistant engineer of maintenance of way.

D. H. Braymer, formerly editor of the *Electrical Record*, has been appointed managing editor of the *Electrical World*. Mr. Braymer, prior to becoming editor of the *Electrical Record* in 1917, was for two years engineering editor of the *Electrical World*. Before that he was editor of *Electrical Engineering* of Atlanta, Ga., and of its successor, the *Southern Electrician*. Mr. Braymer was graduated from Cornell University in 1906, with the degrees of A.B. and E.E.

Lieut.-Col. W. R. Thompson, manager of construction and engineering of H. M. Byllesby & Company, Chicago, Ill., landed in New York from overseas recently. Colonel Thompson has been in uniform since completion of the second officers training camp at Fort Sheridan, from which he was sent as an instructor to Deming, N. M., commissioned as captain. Later he was made a major and sent to France with the 109th Engineers. About the time the armistice was signed he was promoted to the rank of Lieutenant-Colonel in the same regiment.

William A. Sullivan has announced his resignation as manager for the Shreveport (La.) Railways and his acceptance of the general managership of the Gulfport & Mississippi Coast Traction Company, which controls city, interurban and electric lighting companies in and between Pass Christian and Biloxi, Miss. Mr. Sullivan has been manager of the Shreveport Railways for the last nine years. He was formerly with Ford, Bacon & Davis, at Birmingham and Little Rock. Under his direction the Shreveport Railways increased from 13 miles of track to 33 miles. Mr. Sullivan was also secretary-treasurer of the Shreveport Baseball Club and was active in Texas League affairs.

J. C. Rockwell has been promoted from local general manager to vice-president of the Manila Electric Railroad & Light Company, Manila, P. I., in charge of the general Philippine affairs of that company. Mr. Rockwell was graduated in 1904 from Cornell University with the degree of mechanical engineer. Following his graduation he engaged in track construction work. In 1906 he became superintendent of transportation of the Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y. He was appointed general superintendent in 1909 of the Charleston (W. Va.) Interurban Railroad, and the following year was elected general manager of that company. In 1911 he joined the operating organization of The J. G. White Management Corporation, New York, N. Y., and was assigned to the Manila Electric Railroad & Light Company as manager of the light and power department. He was made general manager of that company in the early part of 1918.

J. C. ROCKWELL

John B. Crawford has been appointed general superintendent of the Concord & Manchester electric branch of the Boston & Maine Railroad, Concord, N. H. Mr. Crawford was formerly connected with the Middle West Utilities Company, Chicago, in the capacity of district superintendent of its various subsidiary companies. He is very well known in the East, having entered electric railway work in 1895 on the Hartford (Conn.) Street Railway. His experience since then has included some light, power and transmission work, but has been mostly in the railway field. Among the systems with which Mr. Crawford has served in various capacities are the Lexington & Interurban Railway, Lexington, Ky.; Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.; Winona Interurban Railway, Warsaw, Ind. and the Groton & Stonington Street Railway, New London, Conn.

Dr. William McClellan has resigned as dean of the Wharton School of Finance and Commerce of the University of Pennsylvania. He has announced that he has no other plans than to resume his relations with the firm of McClellan & Campion, with offices in New York and Philadelphia. Dr. McClellan was born in Philadelphia and was graduated from the Arts Department of the University of Pennsylvania. In 1903 he obtained the degree of Doctor of Philosophy and in 1914 the university presented to him the degree of Electrial Engineer. He was engineer in charge of construction of the Philadelphia Rapid Transit Company, supervising engineer with Westinghouse Church, Kerr & Company and in 1907 associated himself with H. T. Campion, Philadelphia, in the engineering business. He also served for a time as electrical engineer and chief of the division of light, heat and power of the Public Service Commission for the Second District of New York.

S. R. Dunbar, purchasing agent of the Union Traction Company of Indiana, Anderson, Ind., has resigned effective on May 15. Mr. Dunbar became associated with the Union Traction Company sixteen years ago as storekeeper. After being employed in this position for six months, he was promoted to the position of purchasing agent for the company. He held this position for two years and was then made general passenger agent, from which position he resigned after one year and went to Boston to engage in business. Mr. Dunbar returned to Anderson in 1907 as head of the purchasing department of the traction line and has retained this position since that time. He has also for the last year and one-half been editor of *Safety* a magazine published by the railway in the interest of the employees. Mr. Dunbar desired to change the exacting nature of his duties, but has made no decision as to what he will do in the future.

Capt. Howard H. George, formerly of the Fifty-fifth Engineers, A. E. F., has recently returned from France and has resumed his former position as assistant engineer with the Public Service Railway, Newark, N. J., having received his discharge from the service. Captain George is a member of the American Society of Civil Engineers and was commissioned in the Engineer Officers' Reserve Corps on Jan. 16, 1917. He was among the first civilian engineers to be commissioned in the army, and was ordered to active duty in May, 1917, subsequently serving eight months with the 305th Engineers, 80th Division. Later he was transferred to the Fifty-fifth Engineers, with which unit he went to France. The battalion of this regiment to which Captain George belonged was first engaged in the construction of a large ammunition dump, and later, along with several other units, on the large storage depot at Montierchaume. This project involved the construction of more than 400 miles of trackage, comprising receiving and departure yards, inbound and outbound classification yards, storage grids, many large steel and frame storage warehouses, barracks and officers' quarters for several thousand troops, an engine repair shop and other work of a miscellaneous character. Captain George was engineer officer in charge of all building construction on this project. He was finally transferred for duty with the Base Section Engineer at Le Havre, where he was stationed when the signing of the armistice stopped practically all construction work in the Service of Supplies and he received his orders to return home.

R. W. Spofford has been appointed local general manager of the Manila Electric Railroad & Light Company, Manila, P. I. Mr. Spofford was graduated from the United States Naval Academy at Annapolis, and spent about five years in the navy. He was retired in 1911. Shortly thereafter he was engaged by The J. G. White Management Corporation and was assigned to the staff of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga. Later he was made general manager of that company. When the United States entered the World War, Mr. Spofford, as a Naval Reserve officer, was called to the colors for service. With the signing of the armistice he was again placed on the retired list of the Navy, with the grade of lieutenant-commander.

R. W. SPOFFORD

Patrick F. Sheehan, for the last seventeen years president of the Brockton branch of the Amalgamated Association of Street & Electric Railway Employees of America, has been made assistant division superintendent of the Bay State Street Railway, Boston, Mass., with headquarters in Brockton, Mass. He succeeds John T. Conway, Quincy, who has been made manager of the Hyde Park division, succeeding Thomas Gammons, resigned. Mr. Sheehan automatically severed his official connection with the union upon entering on his railway duties. He has been a leader in the State branch of the American Federation of Labor.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Slack Adjusters Finding Fair Market

System of Trial Equipments Bringing Considerable Resales—No Price Changes Reported

Sales of slack adjusters, manufacturers report, are running in the neighborhood of 30 to 40 per cent of normal. Among the traction companies which are equipping their rolling stock with these accessories, is one prominent road in the East which, whenever a truck goes into the shop for overhauling, equips it with slack adjusters, provided it was not so equipped previously. This method spreads the cost over a considerable period of time and does not take the truck out of service to make the installation. Of course any repair work and replacements of adjusters which may be necessary are cared for as they appear.

Where adjusters are not employed the turnbuckle used to overcome wear on the brakes must be examined and set by hand periodically, sometimes as often as once a day, depending on the braking characteristics of the run. The necessary labor is appreciable and cases have been found where one pitman may be eliminated for approximately every 40 cars in service when slack adjusters are used. With their use it is only necessary to readjust the mechanism when the worn out brake shoes are replaced. Tests also show approximately 20 per cent increase in the life of the shoe.

THE FOLLOWING TABLE GIVES AVERAGE PRICES FOR SOME RAILWAY SCRAPS IN DIFFERENT SECTIONS OF THE COUNTRY

	New York	Philadelphia	Chicago	Cincinnati
Heavy melting steel scrap, G. T.	$12.50	$15.50	$16.25	$15.75
Old iron axles, G. T.	22.75	24.00	*24.00	22.75
Old steel axles, G. T.	22.50	24.50	*27.00	......
Old car wheels, G. T.	22.50	24.00	22.50	19.25
Steel rails, re-rolling, G. T.	......	17.50	17.25	......
No. 1 R.R. wrought, N. T.	20.00	21.50	15.75	16.25

*Net tons

A number of traction companies are purchasing sufficient sets of adjusters to equip a few cars on trial. Results are shown in the number of resales made through this method. One manufacturer with a curtailed sales force finds that most of his sales are resales from trial installations.

But little factory stock of complete equipments can be kept because of the number of varieties of car trucks in use. Certain parts which are adapted to virtually any style of truck, however, can be stocked. Depending upon the size of the order deliveries can be made by the manufacturers in from one to four weeks. So far as could be learned there have been no changes in price this year.

Little Movement of Scrap Iron and Steel

Settlement of Steel Controversy Will Probably Increase Activity—More Scrap Used Than Formerly

Present conditions in the scrap iron and steel market are extremely quiet. This market reflects the new steel and iron market to a great degree, and when a solution to the present steel controversy is found it is expected that the activity of the steel interests which it is reasonable to assume will follow, will cause a corresponding activity in the scrap market.

After the price suggestions of five weeks ago the scrap market picked up in good shape. The demand became better and prices showed an advance of $1 to $1.50 a ton on nearly all grades. Then the prices and the demand fell off and both buyers and sellers assumed a waiting attitude.

Scrap is rather a local proposition and seldom moves any great distance. The Pittsburgh district is a heavy consumer of scrap iron and steel and cannot always provide sufficient for its own uses. There is a shortage in supply in this district and little demand from consumers. Dealers, however, would heavily stock the material if much were forced on the market.

Larger proportions of scrap than formerly are now being used by most mills, except where specified amounts of pig are required. This pig is approximately $10 a ton higher than heavy melting steel.

200 Safety Cars for B. R. T.

The Brooklyn (N. Y.) Rapid Transit Company and the Public Service Commission have come to an agreement whereby 200 safety cars will be purchased for operation on these surface lines. The original order of the commission was for 250 new cars. Two orders of fifty center-entrance trail cars have already been placed. The Commission has approved the operation of the twelve safety cars which have been tried out on the lines with the result that the decision has been reached to order 200 additional cars of this type, making a total of fifty more cars than originally specified.

Improvement in Southern Market Coming

While Buying Has Been Light for Some Time the Future Appears to Be Decidedly Hopeful

A number of Southern street railroads are passing through the crucible of financial difficulty, chargeable to a protracted period of high material and equipment prices combined with mounting labor costs on the one hand and fixed fares on the other. A few roads that have not been permitted to increase fares have so far weathered these conditions. Others that have secured relief are carrying heavy financial burdens, and with a gradual decline in price levels it is possible that they will be able to pass over the present crisis successfully. Although the Southern street railways do not occupy a unique position in regard to the present-day utility problems, a survey of the field indicates that the financial aspect reflects immediate purchasing power and what may be expected from this quarter in the way of extensions and replacements for the near future. Operators are cognizant of the present needs of their properties, and it is not a question of what to buy but of how long purchases can be postponed until the occasion is more propitious.

Rotaries and Turbines Needed

Practically no generating equipment has been purchased since the establishment of cantonments made it absolutely necessary in some instances; and while the need is great and a potential market exists for rotaries and turbines, the manufacturers can not hope to close any large transactions for some time to come.

Car equipment over the entire section is badly in need of replenishment, but nothing is being bought outside of a few second-hand outfits. The demand for new motors has almost disappeared and second-hand motors go begging. No price change has been recorded in grid resistances and the volume of sales appears to be picking up. Rails and spikes are dull. Deliveries are now much easier.

If too much attention is paid to the volume of street railway supply business transacted during the past two years, a feeling of pessimism is bound to prevail; but if, on the other hand, a close study is made of the present and underlying conditions of the street railway field, a brighter outlook will be the result. There is no doubt that in summing up the prospects, a gradual improvement in this region is perceptible.

General Electric Company's Sales for 1918 Large

Orders Received in 1918 Aggregate $234,100,000 While Sales Billed Total of $216,800,000

While the totals of orders received by the General Electric Company in 1918 reached large figures, they were not so great as in the preceding year. On the other hand, the amount of sales billed was larger in 1918 than in 1917. The figures compare as follows:

	1918	1917
Orders received..	$234,134,037	$246,778,491
Sales billed......	216,815,277	196,926,318

An important feature of the year was the provision of increased manufacturing facilities. Regarding these and the curtailment of production which followed the armistice Mr. Coffin, chairman of the board of directors, said:

"In order to expedite the completion of government and other contracts essential to the prosecution of the war, your company was forced to make heavy expenditures for additional manufacturing facilities. As a result the rate of production had reached the highest point in the company's history when the armistice was signed on Nov. 11, 1918. The cessation of hostilities resulted in suspensions and cancellations of orders, estimated at the date of closing the accounts at $30,000,000, leaving a balance of approximately $80,000,000 of unfilled orders at the end of the year.

"The expenditures for additional land, buildings, machinery and other equipment aggregated $21,593,996. As these facilities were required for the manufacture of apparatus and supplies urgently needed in the prosecution of the war, it was imperative that they be provided with the least delay and under circumstances which made economy of construction impossible.

"In view of the fact that a portion of the recent additions to manufacturing facilities will for a considerable time be unused, and having regard to the high cost of such additions, the sum of $15,224,162 has been written off the plant account, and $3,186,793 will be included in the cost of unfinished contracts."

The total factory floor space in 1918 was 19,581,000 sq.ft., as compared with 17,573,000 sq.ft. in 1917.

Ball-Bearing Manufacturers Combine

SKF Administrative Company, 5 Nassau Street, New York City, announces a reorganization, effective May 1, whereby the products of the Hess-Bright Manufacturing Company, the SKF Ball Bearing Company, the Atlas Ball Company and the Hubbard Machine Company will be sold through one central organization. The new company, under the name of SKF Industries, Inc., will thereby be able to offer a comprehensive line of ball bearings, including the Hess-Bright deep-groove type, SKF self-aligning radial and thrust bearings and ball bearing pillow-blocks and shafting hangers. Through the medium of its engineering organization, backed up by a well-equipped laboratory, the new company will be able to place at the service of bearing users the knowledge gained in many years' study of anti-friction bearings of all kinds. On request, manufacturers' problems will be analyzed in detail and that type of bearing recommended which (independent of sales considerations) is best suited to the conditions met. In addition, the laboratory staff will carry on research studies affecting anti-friction bearing design and application. The new company—SKF Industries, Inc.—will be under the direction of B. G. Prytz, president; W. L. Batt, vice-president; J. P. Walsh, comptroller, and S. B. Taylor, sales manager. The principal office will be at 165 Broadway, New York City, with branches at Boston, Philadelphia, Atlanta, Buffalo, Cleveland, Detroit, Cincinnati, Chicago and San Francisco.

Track and Roadway

British Columbia Electric Company, Ltd., Vancouver, B. C.—The British Columbia Electric Railway proposes laying a submarine cable across Victoria Harbor for supplying electrical energy for industrial purposes on the Songhees Indian Reserve.

Visalia Electric Company, Exeter, Cal.—The Railroad Commission of California recently approved an agreement between the Southern Pacific Company, the Visalia Electric Company, the Minkler Southern Railroad and the Santa Fe Railroad, under the terms of which the Visalia Electric Company agrees to sell to the Minkler Southern Railroad that portion of its line south of the city of Porterville. The Minkler Southern Railroad has agreed to re-

NEW YORK METAL MARKET PRICES

	Apr 17	May 1
Copper, ingots, cents per lb	15 37½	15 37½
Copper wire base, cents per lb	17.25 to 18.00	17.25 to 18.00
Lead, cents per lb	5.00	5.00
Nickel, cents per lb	40.00	40.00
Spelter, cents per lb	6.45	6.40
Tin, cents per lb	†72.50	†72.50
Aluminum, 98 to 99 per cent., cents per lb	31.00	31.00 to 33.00

† Government price in 25-ton lots or more f.o.b. plant.

OLD METAL PRICES—NEW YORK

	Apr. 17	May 1
Heavy copper, cents per lb	13.50 to 13.75	13.50 to 13.75
Light copper, cents per lb	11.00 to 11.25	11.00 to 11.25
Heavy brass, cents per lb	7.50 to 8.00	7.50 to 8.00
Zinc, cents per lb	5.25 to 5.50	5.25 to 5.50
Yellow brass, cents per lb	6.50 to 7.00	6.50 to 7.00
Lead, heavy, cents per lb	4.00 to 4.25	4.00 to 4.25
Steel car axles, Chicago, per net ton	$26.00 to $28.00	$23.00 to $25.00
Old carwheels, Chicago, per gross ton	$22.00 to $23.00	$21.00 to $22.00
Steel rails (scrap), Chicago, per gross ton	$17.00 to $17.50	$17.00 to $17.50
Steel rails (relaying), Chicago, gross ton	$17.00 to $17.50	$17.00 to $17.50
Machine shop turnings, Chicago, net ton	$6.50 to $7.00	$6.00 to $7.00

ELECTRIC RAILWAY MATERIAL PRICES

	Apr. 17	May 1
Rubber-covered wire base, New York, cents per lb	20	20
Weatherproof wire (100 lb. lots), cents per lb., New York	23.00	23.00 to 23.25
Weatherproof wire (100 lb. lots), cents per lb., Chicago	23.75 to 37.35	23.75 to 37.35
T rails (A. S. C. E. standard), per gross ton	$49.00 to $51.00	49.00 to 51.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	$47.00 to $49.00	47.00 to 49.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$45.00 to $47.00	45.00 to 47.00
T rail, high (Shanghai), cents per lb	3	3
Rails, girder (grooved), cents per lb	3.75	3.75
Wire nails, Pittsburgh, cents per lb	3.25	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3.25	3.35
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	2.75	2.75
Tie plates (brace type), cents per lb	2.75	2.75
Tie rods, Pittsburgh base, cents per lb	7	7
Fish plates, cents per lb	3	3
Angle plates, cents per lb	3.90	3.90
Angle bars, cents per lb	3.90	3.90
Rail bolts and nuts, Pittsburgh base, cents per lb	4.35	4.35
Steel bars, Pittsburgh, cents per lb	2.35	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.20	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.25	5.25
Galvanized barbed wire, Pittsburgh, cents per lb	4.10	4.10

	Apr. 3	Apr. 17
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.70	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount †	80%	80%
Car window glass (single strength, first three brackets, B quality), New York, discount	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount	81%	81%
Waste, wool (according to grade), cents per lb	14 to 17	14 to 17
Waste cotton (100 lb. bale) cents per lb.	8 to 13½	8 to 13½
Asphalt, hot (150 tons minimum) per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton		
Asphalt filler, per ton	$30.00	$30.00
Cement (carload lots), New York, per bbl	$2.90	$2.90
Cement (carload lots), Chicago, per bbl.	$3.05	$3.05
Cement (carload lots), Seattle, per bbl.	$3.13	$3.13
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.53	$1.61
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.63	$1.68
White lead (100 lb. keg), New York, cents per lb	13	13
Turpentine (bbl. lots), New York, cents per gal	78	78

† These prices are f. o. b. works, with boxing charges extra.

construct the road, making it suitable for the operation of steam or electric trains, the new construction to be completed to a connection with the Southern Pacific Company's tracks at Ducor, in Tulare County. The agreement further provides for the joint use of the reconstructed line by all of the lines concerned in the agreement and of the Southern Pacific Company's line between Ducor and the station of Oil Junction, Kern County.

Topeka (Kan.) Railway.—Plans have been made by the Topeka Railway for the rehabilitation of its entire system, including track repair, remodeling of cars and improvement of service generally.

International Transit Company, Sault Ste Marie, Ont.—A report from the International Transit Company states that it will build about 3,500 ft. of new track and will rebuild about 7,000 ft. of old track.

St. Catharines, Ont.—Formal request to the Dominion government has been made by the Ontario Hydro-Electric Power Commission for an order in council authorizing immediate beginning of construction work on two hydro-radial lines, one from Toronto to Bridgeburg and the other from Toronto to London. The two roads will have a total mileage of 250 miles and will cost about $26,000,000.

Philadelphia, Pa.—A contract has been awarded by the Department of City Transit to the North American Railway Construction Company, Chicago, for the first six miles of the proposed Frankford-Byberry line. The contract price is $370,892. Bids were opened on April 22 for the construction of the superstructure on the Frankford elevated line from Callowhill Street south to within a short distance of Arch Street. The lowest bidder was the Phoenix Bridge Company, Phoenixville, Pa., at $176,399.

Reading Transit & Light Company, Reading, Pa.—The Reading Transit & Light Company is about completing the construction of a new railway bridge over the Reading Railroad Company's tracks at Wyomissing, on the outskirts of the city. The improvement will cost about $4,500 and will make possible a speeding up of the service.

Forth Worth, Tex.—It is reported that a survey will soon be begun by Richard Ferris and H. E. Robison, Fort Worth, Tex., of a proposed electric railway to extend between Forth Worth and Mineral Wells.

Monongahela Valley Traction Company, Clarksburg, W. Va.—It is reported that the Monongahela Valley Traction Company will construct a bridge over the West Fork River.

Morgantown & Wheeling Railway, Morgantown, W. Va.—It is reported that work will be begun soon by the Morgantown & Wheeling Railway on the construction of an extension from Blackville, W. Va., to Waynesburg, Pa., about 14 miles.

Power Houses, Shops and Buildings

Little Rock Railway & Electric Company, Little Rock, Ark.—An addition will probably be built by the Little Rock Railway & Electric Company to its power house in Little Rock.

Philadelphia (Pa.) Rapid Transit Company.—A permit has been granted to the Philadelphia Rapid Transit Company for an addition, 22 ft. x 29 ft., to its power plant at 963 Beach Street.

West Penn Traction Company, Pittsburgh, Pa.—The West Penn Traction Company will in the near future locate its central carhouse and machine shop in South Warwood, near Wheeling. The plant will cover a space of 10 acres.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—Plans are being made by the Chattanooga Railway & Light Company for the reconstruction of its power house on the Lookout Mountain incline which was recently destroyed by fire.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—The Whatcom County Commissioners have granted the Puget Sound Traction, Light & Power Company permission to erect electric transmission lines along the county roads to Ferndale.

Trade Notes

W. H. Green has been appointed Pacific Coast manager of the Chicago Fuse Manufacturing Company, with headquarters in San Francisco.

Ohio Brass Company, Mansfield, Ohio, announces that on May 1 its Chicago office moved from 508 Fisher Building to 1217 Fisher Building, 343 South Dearborn Street.

Holden & White, Inc., Chicago, Ill., have been appointed sales representatives for C. I. Earll for the Central and Southwestern states, handling the sale of Earll catchers and retrievers.

Chas. F. Ames & Company, Ltd., 90 West Street, New York, has been appointed to act as the New York sales department of the Platt Iron Works, Dayton, Ohio, manufacturers of pumping and power plant equipment.

Henry M. Sperry, publicity representative for Union Switch & Signal Company, General Railway Signal Company, Federal Signal Company and Hall Switch & Signal Company, has moved to new offices at 347 Madison Avenue, New York City.

Blau-Knox Company, Pittsburgh, Pa., announces the appointment of J. E. Mason as manager of field sales, in which capacity he will supervise the operation of a wide sales agency plan throughout the country. Mr. Mason was in charge of the Chicago office of the *Engineering News-Record.*

Van Dorn Electric Tool Company, Cleveland, Ohio, announces that the new Chicago office is located at 527 South Dearborn Street, and extends through to 528 Plymouth. Wm. Cottrell, sales manager at the Chicago branch, says that the phenomenal increase in business enjoyed by the company is the result of the insistent demand today for mechanical devices of proved efficiency and economy.

Advance Manufacturing & Tool Company, 1244 St. Clair Avenue, Cleveland, Ohio, announces that it has recently purchased the assets of the Cleveland Trolley Supply Company, and is now prepared to supply trolley wheels, harps, trolley bases, conductors' seats, window catches, ticket holders, drinking fountains, brush-holders, sleet cutters, or any other product formerly produced or handled by the Cleveland Trolley Supply Company. C. H. Bell is president of the new company and Henry Holland, formerly president of the old company, will remain with the Advance company.

T. W. Holt, formerly connected with the Pressed Steel Car Company, Pittsburgh, Pa., has become assistant general manager of the Curtain Supply Company, Chicago, Ill., succeeding the late R. S. Reynolds. Mr. Holt went to Europe in the latter part of 1914 to study foreign conditions and methods of making munitions. Since that time he has had charge of the munition work performed by the Pressed Steel Car Company. He was appointed a member of the committee to represent the forging makers of the country at Washington, and also acted in an advisory capacity for the British Forging Company, owned and controlled by the Imperial Forging Board, Canada. For a period of eight years previous to the war, Mr. Holt has held various executive positions in connection with steam, passenger and freight car construction and fabrication of materials. He has also had charge of wheel foundry, gray iron foundry and malleable foundry operations, having had special training along metallurgical lines.

New Advertising Literature

Vulcan Soot Cleaner Company, Du Bois, Pa.: Bulletin on "Soot Cleaners for Return Tubular Boilers."

Westinghouse, Church, Kerr & Company, New York City: Illustrated circular on building with concrete, showing typical buildings of various types.

Joseph Walker & Sons, New York City: Circular on the merits of the stock of the Manhattan (Elevated) Railway, New York, whose dividend is 7 per cent is guaranteed by the Interborough Rapid Transit Company. It is said that the payment of the dividends on this stock is a prior charge on the Interborough Rapid Transit Company's earnings to its first and refunding bonds, that the lease has always been a profitable one to the Interborough Company except since July, 1918, and that the franchise of the Manhattan Railway does not limit the company to a 5-cent fare.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, May 10, 1919 *Number* 19

Straight Talk from a Representative Union to Its Members

STATING that "the car employee who believes that the union was organized for the purpose of retaining men in their positions who refuse to do right is fooling no one but himself," the official organ of the trainmen's union in Chicago declares in a recent issue that these men will not be supported in wrong doing. This editorial pronouncement was evidently prompted by the question of a traction official as to why the organization should insist on restoring to their positions men who have been discharged for serious offenses; referring especially to failing to register fares and permitting liquor to interfere with performance of their duties.

On this point the editorial says: "Men who persist in these practices should be game enough to take their medicine when they are caught with the goods, and not try to unload their troubles on the union. Men who willfully do these things are no good to the union or themselves, and there is no reason why the great body of good men in the business should suffer because of their indiscretions. The union cannot support cases of this kind."

Leaders of this union are to be commended for taking this positive stand. Stories about dishonesty of conductors have too long been taken as a matter of course, and it is to the credit of the great body of honest employees that they wish no longer to be associated with such co-workers. Organized labor is coming to take a greater interest in the employer's welfare, and the latter will not be the only beneficiary if union appeals for higher fares and for getting rid of those who tamper with the company's revenues have a successful outcome. If these utilities are once more restored to a position where they are earning a reasonable return we do not believe the employees will have occasion to regret their part in helping to bring about this happy result. Co-operation is a tendency of the times. It augurs well for the future.

It Isn't Economical to Build Cars to Last Forever

IN VISITING different railway properties in this country one cannot fail to be impressed by the large number of old cars and antiquated types of motors and equipment still in service. With some types of electrical apparatus, as for instance incandescent units, engineers have long since worked out curves which show that it is cheaper to replace them with new lamps after they have had a certain life, rather than continue them longer in service. Manufacturing engineers, from time to time, have tried to impress upon electric railway operating officials the desirability of similar treatment for their entire equipment. It is very difficult, however, to convince a general manager that any equipment which will still operate should be scrapped in order to give way for a more modern type.

At a recent meeting of a committee of the American Electric Railway Engineering Association there was considerable discussion regarding the light construction which is being employed in certain recent types of cars. This suggests that perhaps it would be much better for the electric railway industry if the equipment, instead of being built to last twenty or twenty-five years, was built to last only half as long. The first cost would then be considerably less and there would not be the temptation to continue the equipment in service after its period of usefulness had ended. The automobile business has progressed as rapidly as it has, partly at least because the cars wear out quickly and can be readily scrapped and new apparatus installed.

In this connection an editorial in the July 7, 1917, issue of this paper entitled "Are City Cars Made for Collisions or Passengers?" is á propos. As was pointed out in this editorial, when railways learn to look upon their cars as production units then they will put less money into dead metal and more money into equipment which will produce high acceleration, rapid braking and economical operation. Operating officials should learn to look upon their car equipment as a means for delivering a passenger-mile. Any method of delivering this in the most economical and attractive manner is the best for their railway property.

The Relation of Rail Steel to Rail Joints on Electric Railways

THERE is an increasing tendency toward the selection of some form of welded joint in track construction in streets. The old cast-weld method has been revived with marked success, while electric arc welds, electric bar welds and thermit welds have also held their own in favor as subdivisions of the general class known as welded joints. The basis of the popularity of all of these is the desire of the track engineer for a continuous rail which is considered the ideal, particularly as the costly item of copper bonding is usually eliminated. The continuous rail, as such, is a success in paved streets because the pavement prevents or retards the injurious action of that old bugaboo "expansion and contraction."

Having long ago banished this deterrent, street railway engineers have since been troubled mainly with the problem of securing the most succesful form of weld required to give the continuous rail. With all of the forms of welds previously referred to there has been a certain percentage of failures, not primarily in the welds themselves but in the rails at or not far away from them. A comparison of chemical compositions of rails which have failed in this way, and general observation as well, have shown a tendency to confine the larger proportion of the breakages to rails coming from one mill. Special trackwork manufacturers find that similar trouble in breakage of iron arms in castings can be traced usually to rail of a particular manufacture.

It would appear from this that there is a big field of investigation open to the new welding society on the subject of the relation of chemical analysis and details of manufacture of rails to the suitability of the steel for adaptation to the several forms of joint welding now current. Robert B. Holt, of Leeds, England, pointed this out in his book on tramway track construction, but we believe that his suggestion has received little attention in this country. Here we have another subject upon which the American Electric Railway Engineering Association could well afford to co-operate in an investigation which should be of great value to the industry. Metallurgical experts should be engaged to assist in the work as no committee member should be expected to devote to it the great amount of time that is necessary for effectiveness in such joint efforts.

Make Up for Lost Maintenance Time

AN ENORMOUS amount of maintenance work has piled up during war days and while labor and materials are not much less in price, they are at least easier to get. We realize that most companies have little money to spend on maintenance but some of it must be done and the men who are returning from the front will be glad to help in this work. We can thus "kill two birds with one stone," by utilizing their detachment from pre-war jobs to secure their assistance and at the same time bring about a prompt readjustment of labor conditions throughout the country.

There seems to be little reason now to defer work in the hope that prices are speedily coming down, for the chances are strongly that they are not going to do so. Indeed, many competent analysts of the labor field anticipate further increases in prices for the following among other reasons:

The country confronts a labor shortage in the near future. There has not been the customary immigration into the United States which in the past has kept up the supply. At the same time many men have been away from their usual employment for a year or two, and the work which they would have done has not been done, or, at best, has been incompletely performed. During the war an enormous deferment of maintenance, repair and construction work has occurred, and this is due to be made up at once with ultimate overdraft on labor. To be sure, there are local surpluses of men due to cessation of war work and some congestion due to demobilization of troops. Reports of unemployment at many points are disconcerting. This is due, however, to failure of the labor distributing forces of the country to function properly and promptly, and the condition is temporary.

Granted that there will be an actual labor shortage, say in six months or a year, depending upon the speed with which the country gets upon a real peace footing, the conclusion is inevitable that work on track, line, power plant and equipment should speed up at once. We must be near the point at which the effects of deferred maintenance are near the limit. Further postponement will make the work still more difficult and expensive.

The Diesel Engine in a Railway Power Plant

IT IS a coincidence that in this issue of the ELECTRIC RAILWAY JOURNAL space is devoted to two of the most highly efficient but radically different power generating units, the ultra-large steam turbine and the Diesel oil engine. The turbine has largely displaced earlier types of steam engines, but the Diesel has made slow progress in the stationary power plant field in this country in spite of its many inherent virtues. In view of the comparative meagerness of data as to operating costs of Diesels in the electric railway power plant field, the figures given in this issue for results obtained at Lincoln, Neb., possess particular interest. Every engineer responsible for economical power plant operation needs all of such information that he can get. While he may never expect to use oil engines, he needs an intelligent concept of what engines of this type are and can do.

The Lincoln Traction Company has been using Diesel engines in its plant in combination with steam equipment for nearly three years, with entire satisfaction. The reasons for the adoption of this type of plant are explained in the article. From the data given it is obvious that the Lincoln situation is favorable to the Diesel, due to the high cost of generating energy by steam. The company estimates that during 1918 a saving of more than 0.9c. per kilowatt-hour was realized on all energy generated by these engines over what would have been the cost with steam. This estimate is somewhat vague due to the uncertain element of maintenance, for while it is possible to determine just what has been spent in this direction, it is never quite possible to determine the exact condition of the equipment at the end of a year as compared with that at the beginning.

It is, of course, the high maintenance cost or the fear of incurring such that has made power-plant engineers hesitate to adopt the oil engine. The increasing cost of coal, however, renders maintenance cost relatively less important, and high-efficiency energy transformers such as the internal combustion engine must have more thorough consideration than ever before. In this connection it is well to remember why the engine has an inherently high efficiency and why it is necessarily somewhat complicated and heavy in construction; not forgetting, however, that it requires no boilers or elaborate fuel and ashes handling apparatus, a fact which partly compensates for its limitations.

Internal combustion engines of all kinds transform a reasonable proportion of the energy of fuel into mechanical energy because the fuel is burned in the cylinder where it imparts its expansive power direct to the piston. The temperatures and pressures are high and the radiation losses are not excessive, facts which conduce to high thermodynamic efficiency. The Diesel engine burns heavy oil under favorable heat and energy conditions (high temperature and pressure) with self-ignition. This is accomplished by spraying it in atomized form into the cylinder clearance space behind the piston when that space is filled with air at very high pressure and temperature. The oil is automatically vaporized and ignited, burning so as to provide fairly uniform pressure during combustion.

The mechanical construction needed to permit this simple and effective process to go on is, of course, necessarily rugged and somewhat complicated. This, in addition to the fact that very high-class fitting is needed on account of the high temperatures and pressures, renders the engine expensive to build and entails skilled operation to produce the best results. When, however, one considers the inherently superior qualities of the engine it is no wonder that much study and capital have been invested in its development. And especially in view of the fact, as stated by Dr. Diesel in the writer's hearing: "My engine will burn anything in the way of liquid fuel."

It was in marine work that the Diesel engine first found a large field where the absence of boiler and coal bunker space requirements was naturally quickly appreciated. The stationary plant field is open, however, for fair competition.

60,000 Kw. in One Turbo-Generator Unit

IN AN EDITORIAL printed on Oct. 23, 1915, this paper estimated that at the then rate of increase in size of steam turbines the 50,000-kw. unit should materialize in three years. At this writing a 60,000-kw. machine is in operation in one of the great power plants of the Interborough Rapid Transit Company in New York City, somewhat ahead of schedule at the above rate of increase. This is in one sense three turbines in one, as there are three mechanically independent rotors. It is properly rated as one machine, however, because all parts are essential to each other to produce the result desired, and it therefore holds the world's record for single-unit capacity.

As far as heat transformations are concerned this machine cannot be expected greatly to better the record of the 30,000-kw. units in the same station, installed about four years ago. The heat and mechanical conditions in these units were discussed editorially on page 285 of the issue of the JOURNAL for April 24, 1915. It was shown that the total of losses, not inherent in transformation from heat to mechanical work in the range of temperature and pressure used, had been reduced to less than 25 per cent. This is truly remarkable when the possible losses through friction and radiation are considered. The advance marked by the 60,000-kw. machine is rather in the subdivision to permit of more economical use of materials and to provide for partial operation in case a section becomes disabled. In compactness, also, the new machine is a wonder, as it can be circumscribed by a rectangle roughly 50 ft. on a side. In a picture reproduced in this issue there can be seen the new unit and three (all) of the 30,000-kw. machines, a total of 150,000 kw., continuous rating, in only part of the area which but a few years ago sufficed for eight Corliss engines of a combined capacity but slightly greater than that of the latest new unit. This illustrates once more the radical change which has occurred in the practical transformation of energy from latent to kinetic form. It would seem as if the limit of space efficiency had now been reached.

The imagination can only with the greatest difficulty grasp what 60,000 kw., the capacity of the super-turbine, means. To use a device common with orators, we may say that it would propel 2000 city cars of 20 tons weight, operating simultaneously; it would light a string of 20-cp. lamps, placed a foot apart, stretching from New York to Columbus, from San Francisco to San Diego, or from Chicago to Buffalo; it would lift 250 tons vertically at a mile a minute, etc.

The Basis for the Chicago Rehearing Seems Reasonable

IN FILING its petition for a rehearing of its 7-cent fare case, suggesting a complete revaluation as the basis for a reasonable return upon the fair present value of the properties devoted to the public use, the Chicago Surface Lines has paved the way for developments which may lead to a more happy outcome.

The Illinois commission recently refused the companies' application for an increase in the rate of fare on the ground that the war-time emergency no longer exists and that a change in the rates could not be made without a showing that the present fare does not produce a reasonable return on the value of the properties. Without having heard evidence as to the present valuation of the lines, the commission thereupon arbitrarily eliminated items amounting to some $44,000,000 from the capital account of the companies and decided that the present rate would afford security to the investment.

The Surface Lines management is satisfied that the fair value of the property is in excess of the present amount of the purchase price or the capital account and is willing to stand on the results of an investigation covering this subject. Arguments on this petition are likely to lead to some fine distinctions between valuations for capitalizaton, taxation, purchase or rate making.

Without going into the merits of this debatable subject, which has so long furnished a complex problem for experts, we cannot forebear expressing the belief that, as a matter of equity, the investor should have opportunity to earn a fair return on what he has devoted to the public service whether in dollars and cents, time, energy, ingenuity or effort. But, if the cost of reproduction should be preferred as a basis for rates, there is probably not the same difference in values of many electric railway properties between the two plans as would formerly have been the case.

Thus, in the Chicago surface case, some of the capitalization represents money spent for equipment which has once depreciated in value or has been scrapped, like the old cable apparatus, while part of it represents money spent for property which has appreciated in value. Just how far these fluctuations in value will counterbalance each other is impossible now to say, but one cannot be considered without the other. In other words, if there is an allowance for depreciation there should be one also for appreciation under the cost of reproduction theory. Any other proposal would be based on the principle of "heads I win, tails you lose."

Several other items rejected by the commission in the Chicago valuation for rate making purposes might also in all fairness be restored. One of these, for instance, is the allowance for brokerage in raising money. If we remember correctly, this allowance was to have been taken care of part of the cost service in the Chicago ordinance which failed of passage last November. If the alderman and their special counsel saw fit to offer a return on such expenditures the Illinois commissioners might well give further consideration to the suggestion that it is a proper capital charge. There is strong need for standardization in valuation methods, and we hope for a fair solution of the Chicago troubles after the discussion of this case before the Illinois Public Commission.

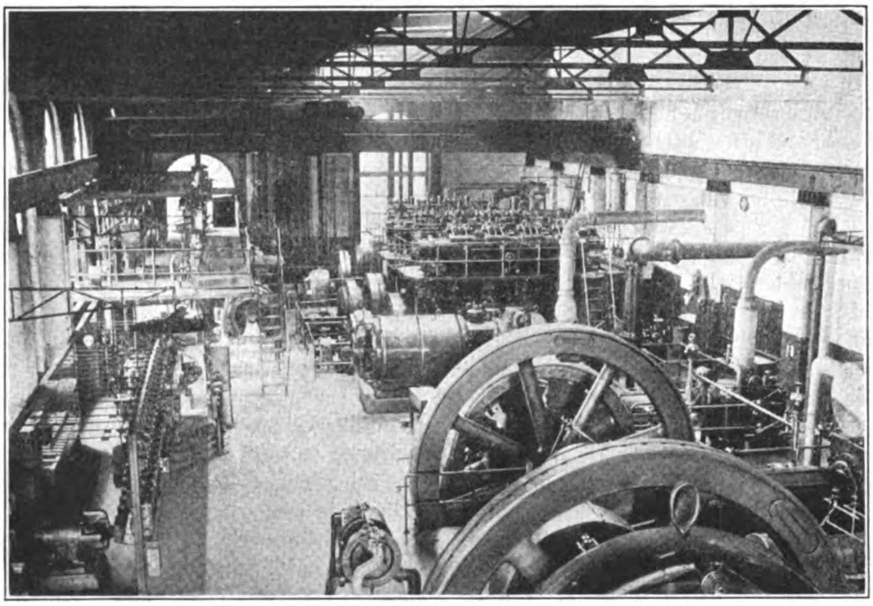
Diesel Engines Prove Economical at Lincoln

Three 350-Kw. Diesel Units Have Been in Service in This Plant for More Than Two Years in Combination with Steam Equipment — Although Maintenance Cost Is High a Considerable Saving Has Been Realized During the War Period

BY O. J. SHAW
Secretary Lincoln (Neb.) Traction Company

THE Lincoln (Neb.) Traction Company operates some 70 miles of electric railway lines together with an extensive lighting, power and steam heating business. It serves a city of more than 60,000 population, with various suburbs in addition. Lincoln is the State capital and the home of the State university, two other universities and several State institutions, but there are few large industries except of an agricultural nature.

The railway system comprises about sixty miles of city track and seventy-five cars. The schedules call for from forty to fifty cars between 6 a.m. and 12 p.m., with one car operating owl service thereafter. The rush hours fall between 7.30 and 8.30 a.m., and 5.30 and 7 p.m. The company also sells power, metered on the switchboard, to the Omaha, Lincoln & Beatrice Railway, a 6½-mile interurban line giving thirty-minute service between Lincoln and its suburbs, and doing a lighting and power business also. In addition to the lighting business in Lincoln the traction company supplies lighting service to from 10,000 to 12,000 suburbanites, the farthest point reached being about 6 miles from the power plant. In every suburban community the energy is sold to the municipality, which resells it to the consumer. The lighting and power peak falls between 7.30 and 9 p.m. in the summer, and 6 and 8 p.m. in the winter.



PART OF LINCOLN TRACTION COMPANY ENGINE ROOM, SHOWING DIESEL ENGINES AT FAR END

The company operates about two miles of steam heating mains, a 16-in. main from the station reaching practically all of the downtown retail district and serving theaters, churches, department stores, etc. Practically all of the steam is the low pressure exhaust from Corliss engines and steam from a bleeder-type turbine in the plant. Live steam is seldom needed.

Typical load curves for the years 1917, 1918 and 1919 are reproduced on page 904. In 1915 the company generated 10,776,910 kw.-hr. of electrical energy and sold 68,588,000 lb. of steam. The operating power station equipment at that time included one 750-kw. Curtis turbine, one 500-kw. Allis-Chalmers-Corliss engine, one 325-kw. Murray-Corliss engine, one 1500-kw. Curtis turbine and one 500-kw. Allis-Chalmers turbine. There was also one 200-kw. high-speed Harrisburg engine not in use. The boiler-room equipment included six B. & W. 250-hp. boilers equipped with Jones underfeed stokers, two Stirling 450-hp. boilers with Jones underfeed stokers, one Stirling 150-hp. boiler equipped with blowers and two Edgemoor 500-hp. boilers equipped with Green chain grates.

In 1916 the lighting demand increased considerably and the demand for steam heat increased more than 20 per cent. The boiler room had reached the limit of its output and it became essential either to increase its capacity or to obtain energy from some other source. A study of the Diesel engine led to the conclusion that the necessary increase in plant capacity could be obtained without increasing the boiler-room capacity by adding engines of this type, with an increase in efficiency of the plant as a whole. Two Busch-Sulzer four-cylinder, vertical, type-B, 500-hp., 200-r.p.m. Diesel engines were, therefore, installed in August, 1916. One is direct-connected to a 350-kw., 2300-volt, 60-cycle, three-phase, alternating-current generator and the other to a 350-kw. 550/575-volt, direct-current generator. The guarantees for these engines provide that with a net load of from 500 b.hp. to 250 b.hp. the fuel-oil consumption will not exceed 6 gal. per 100 b.hp.-hr. to 7.4 gal. per 100 b.hp.-hr. for the two loads mentioned, respectively, the fuel oil to have a heat value of not less than 18,500 B.t.u. per pound, specific gravity at 60 deg. Fahr. not higher than 20 deg. Baumé and not lower than 40 deg., with residue not more than 10 per cent. The speed variation from no load to full rated capacity is not to exceed 2½ per cent from mean.

When the Diesel engines were installed the 1500-kw. mixed-pressure turbine, using low-pressure steam from the Corliss engines and high-pressure live steam when necessary, was sold because uneconomical, and a 1500-kw., 3600-r.p.m., 2300-volt, General Electric bleeder-type turbine was installed on the same foundation.

In November, 1917, one McIntosh & Seymour, four-cylinder, vertical-type, 500-hp., 164-r.p.m. Diesel engine was installed. This is direct-connected to a 350-kw., 550/575-volt, direct-current generator. The maker guarantees that this engine, when carrying between full and one-quarter net load will consume fuel oil of a heating value of not less than 18,500 effective B.t.u. per pound, not to exceed a range between 0.408 lb. and 0.628 lb. per brake-horsepower per hour. The speed variation is guaranteed not to exceed 3 per cent from mean for normal variations in load and the consumption of lubricating oil is not to exceed 2½ gal. per day.

With the installation of the McIntosh & Seymour engine the Harrisburg engine was removed, unit No. 2, a 500-kw. motor-generator set, was moved into line with unit No. 1 and a new 500-kw. motor-generator set was installed in line with these two. A 50-kw. motor-driven G.E. exciter set was also installed. This has sufficient capacity to serve the entire plant.

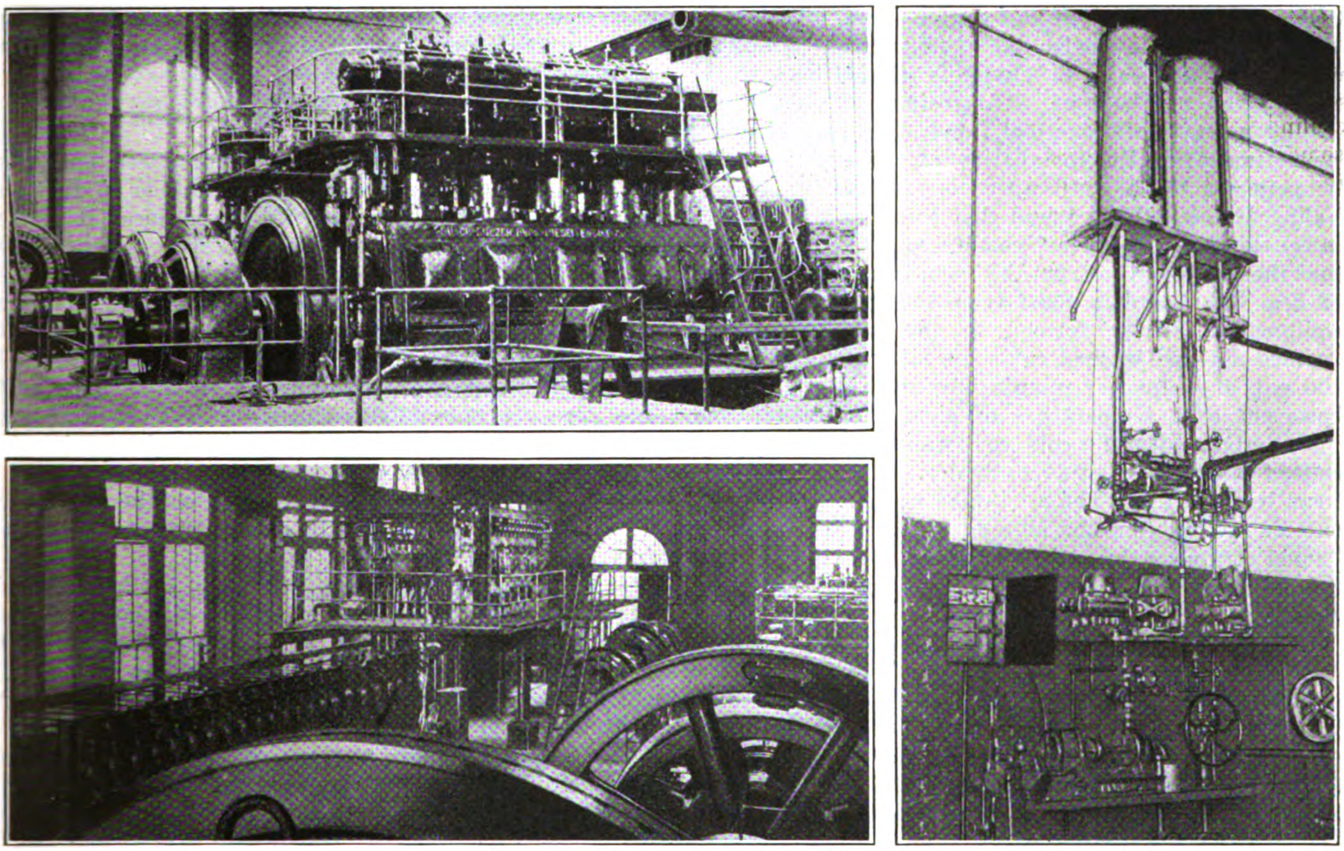
The alternating-current Diesel-engine unit operates in parallel with the 1500-kw. turbine and after midnight during the summer season when there is no heating it carries the load. The switchboard panel for this unit is on the alternating-current switchboard located on the balcony. The direct-current "Diesels" operate in parallel with the direct-current steam engines and motor-generator sets. Their panels are on the direct-current switchboard on the main floor. The alternating-current "Diesel" frequently carries a railway load by conversion through a motor-generator set, but it was installed as an alternating-current unit so that it could carry the lighting load after midnight.

The two Busch-Sulzer engines occupy a foundation approximately 31 ft. (in line with engine axis) by 26 ft. Each engine is, roughly, 10 ft. wide, 22 ft. long (over flywheel) and 11½ ft. high. The McIntosh & Seymour engine is approximately 11 ft. wide, 24 ft. long (over flywheel) and 14 ft. high. If a second unit is added the total floor space occupied will be about the same as that required for the other pair of "Diesels."

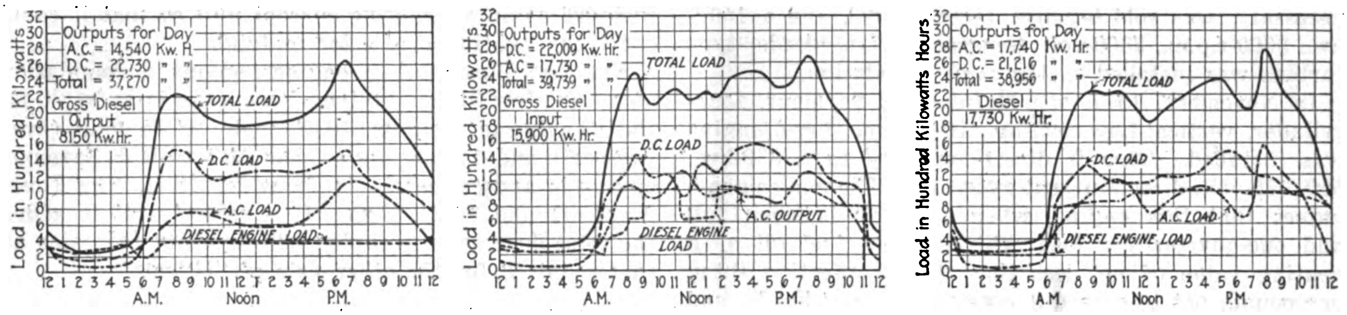
ROUTES OF FUEL OIL AND COOLING WATER THROUGH THE PLANT

The fuel oil is delivered in tank cars on a spur track and unloaded by gravity to two underground steel drum storage tanks with a capacity of 12,000 gal each. From the tanks it is pumped by small motor-driven pumps, supplemented with an auxiliary hand pump for emergency use, through Worthington piston-type oil meters to auxiliary supply tanks of 30 gal. capacity and located on the wall, about 6 ft. above the fuel oil pumps. Fuel pumps on the engines draw the oil from the auxiliary tanks and feed it, according to the position of the governor, through discharge lines to the needle valves. Air at 1000 lb. pressure is used to force the fuel oil through an atomizer and against a diffusing plate under 500 lb. compression. This operation produces about 1000 deg. Fahr. temperature in the cylinder. It there ignites, burns and expands, giving the necessary pressure for the power stroke.

Another important feature is the cooling water for the engine. This is pumped from wells just outside the plant to a 16-ft. x 16-ft. tank located on the roof of the



AT TOP, LEFT, TWO DIESEL UNITS IMMEDIATELY AFTER INSTALLATION; AT BOTTOM, LEFT, SWITCHBOARD LAYOUT OF LINCOLN PLANT ALTERNATING-CURRENT BOARD ON BALCONY AND DIRECT-CURRENT BOARD ON FLOOR; AT RIGHT, OIL PUMPS, METERS AND AUXILIARY SUPPLY TANKS FOR DIESEL ENGINE FUEL OIL



TYPICAL LOAD CURVES FOR 1917, 1918 AND 1919, SHOWING OPERATION OF DIESEL ENGINES

plant. The pumps are of the vertical, centrifugal type, direct-connected to motors and located in the wells close to the water level. From the supply tanks the water passes by gravity to the jackets on the engine-cylinders, exhaust valves and air compressors and drains to a tank in the basement of the engine room. Thence by means of a small, horizontal, motor-driven pump, approximately 100 gal. per minute is carried back to the supply tank on the roof. This return of part of the cooling water to the original supply is a feature added some time after the installation of the engines. The temperature of the well water is from 50 to 55 deg. Fahr. It was at first found that this was so low as to cause sweating in the air compressors due to the fact that the air drawn in from the room is at approximately 72 deg. Fahr., and is moist from the steam-generating equipment. Water formed in the air compressors drained out and washed out some lubricating oil. The 100 gal. of water per minute now returning from the basement at a temperature of about 110 to 125 deg. Fahr. mixes with the cold well water and gives a resultant temperature of 70 to 80 deg., approximately the room temperature. The air intake has now been placed outside the building and all entering air passes through flannel strainers thus eliminating all dirt and furnishing air not laden with moisture from the steam equipment.

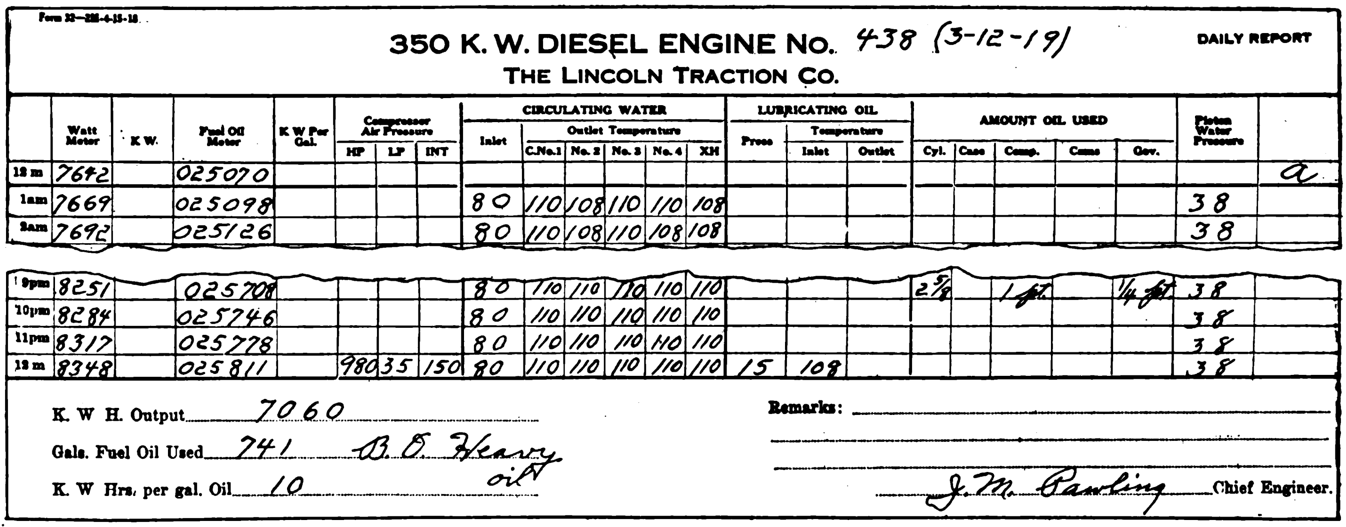
The water from the company wells is very salty. It cannot be used for piston cooling on the Busch-Sulzer engines because when heated the water forms a scale which destroys the efficiency of the cooling operation. City water is used for this purpose and is regulated to 38 lb. pressure. The water purchased from the city also contains scale-forming materials and if raised to a temperature sufficiently high will in cooling deposit a scale which requires an occasional sulphuric acid bath to remove. Failure to remove this scale is liable to result in cracked pistons, and failure to remove the scale from the cooling passages in the cylinder heads will cause these to crack due to the fact that the cooling is not properly performed if the passages are filled with scale.

RECORD FORMS SHOW OPERATION OF DIESEL UNITS

The Diesel engine daily report reproduced below is one of several kinds of records maintained to furnish data as to operating details of the oil engines. It shows the readings which are taken hourly. The records show that the Diesel unit which operated most nearly at constant full load gave the best efficiency in kilowatt-hours generated per gallon of fuel oil consumed. This unit generated an average of 10.7 kw.hr. per gal. of fuel oil and produced an average output of 303 kw. A pair of fuel-energy graphs is reproduced on the opposite page, showing how the oil consumption and load varied hour by hour on a typical day.

The table on page 905 gives data on the operation of the Lincoln plant for the years 1915 to 1918 inclusive.

It will be noted that during 1917 and 1918 the Diesel engines carried more than one-third the load of the plant; also that the cost of coal per kilowatt-hour generated in 1918 was 1.86 cents while the cost of oil per kilowatt-hour generated was only 0.566 cent. Part of this difference is offset by the increased cost of maintenance of the Diesel engines as compared with the steam units and by the fact that the coal cost also includes that of the coal used for heating, but there is an



Form 32—2M-4-15-18.

350 K. W. DIESEL ENGINE No. 438 (3-12-19) DAILY REPORT

THE LINCOLN TRACTION CO.

	Watt Meter	K. W.	Fuel Oil Meter	K W Per Gal.	Compressor Air Pressure			Circulating Water						Lubricating Oil			Amount Oil Used					Piston Water Pressure	
								Inlet	Outlet Temperature					Press	Temperature								
					HP	LP	INT		C.No.1	No. 2	No. 3	No. 4	XH		Inlet	Outlet	Cyl.	Case	Comp.	Cams	Gov.		
12 m	7642		025070																				a
1am	7669		025098					80	110	108	110	110	108									38	
2am	7692		025126					80	110	108	110	108	108									38	
9pm	8251		025708					80	110	110	110	110	110				2 5/8		1 gt.		1/4 gt.	38	
10pm	8284		025746					80	110	110	110	110	110									38	
11pm	8317		025778					80	110	110	110	110	110									38	
12 m	8348		025811		980	35	150	80	110	110	110	110	110	15	108							38	

K. W H. Output 7060

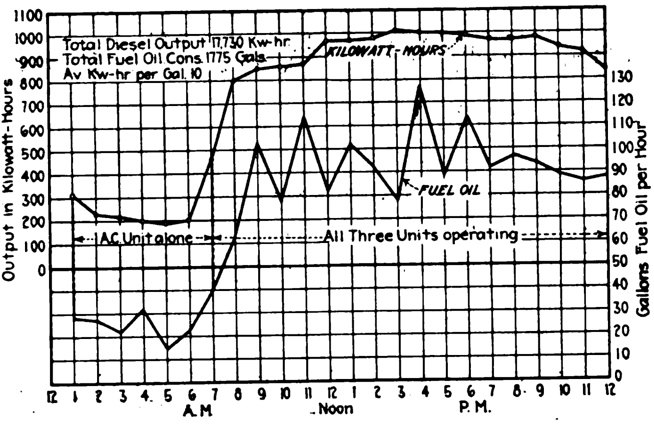
Gals. Fuel Oil Used 741 B. O. Heavy oil

K. W Hrs. per gal. Oil 10

Remarks:

J. M. Pawling Chief Engineer.

DIESEL ENGINE DAILY REPORT SHOWING TYPICAL DATA FOR ONE UNIT



LOAD CURVE AND FUEL CONSUMPTION CHART FOR THREE DIESEL UNITS COMBINED

estimated saving of more than 0.9 cent per kilowatt-hour on all energy generated by the Diesel units. As this amounted to 4,616,086 kw.-hr. the saving effected by this unit was more than $41,000 in one year on switchboard cost.

VIRTUES AND LIMITATIONS OF THE DIESEL-TYPE ENGINE

The Diesel engine is economical because it will burn a low grade of fuel and upon combustion of the oil, as in the gasoline engine, practically all of the mechanical energy is imparted directly to the piston. The maintenance cost, however, is high. This is still an unknown quantity in the Lincoln plant since records are not kept which permit separating the labor and overhead costs from those of the steam equipment. Since the Busch-Sulzer engine is designed for piston cooling, the local condition of the water in Lincoln has made the lubrication cost of this engine higher than on the other type. Recently the Busch-Sulzer Company has perfected the design of the piston-cooling equipment so that it does not interfere with the lubrication of the engines and the lubrication has been reduced to as little as two gallons of oil per day per engine.

The ideal operating condition for the Diesel engine is a constant load. This is true not only because the engine operates at highest efficiency under a constant full load but because the capital tied up in this equipment is so large that no units can afford to stand idle many hours of the day. As a Diesel engine cannot be heavily overloaded to carry a peak and as it is not economical to allow an engine to lie idle or operate on extremely light load many hours of the day the advisable plan for a plant with a load having one or more extreme peaks is either to operate with all steam equipment or enough Diesel equipment to handle the average load and a turbine to take the peak and overload. There is perhaps some objection to a mixed installation of this sort due to the fact that an engineer who can operate steam equipment satisfactorily cannot always operate a Diesel engine equally well. To obtain the most efficient operation of these units and avoid trouble with the equipment a specially trained man is advisable.

A complete Diesel installation is not working at its highest efficiency on a purely railway load due to the liability of heavy load swings. A plant with a constant load twenty-four hours a day offers an ideal opportunity Such a man should be paid more than a steam engineer. for a Diesel engine installation, while any condition under which the engines can operate for even eighteen hours a day with a fairly constant load will give excellent results.

OUTPUT AND COSTS OF OPERATION OF POWER PLANT, LINCOLN (NEB.) TRACTION COMPANY.

	1915	1916	1917	1918
Kilowatt-hours generated	10,776,910	11,531,890	12,613,994	12,907,625
Kilowatt-hours used by railway..............	6,161,741	6,194,657	6,180,776	6,076,431
Kilowatt-hours used for light and power.......	4,615,169	5,337,233	6,433,218	6,831,194
Pounds of steam sold.....	68,588,000	83,499,000	92,728,700	75,643,000
Kilowatt-hours generated by steam.............	10,776,910	10,062,180	8,309,057	8,291,539
Tons of coal used.........	38,411.51	42,652.19	35,736.17	31,110.43
Average cost per ton.....	$2.87	$3.50	$4.59	$4.96
Pounds of coal per kilowatt-hour.............	7.13	8.48	8.60	7.50
Cost of coal per kilowatt-hour, cents.......	1.02	1.48	1.97	1.86
Total cost of coal.........	$110,339.57	$149,271.05	$163,938.99$	154,329.60
Kilowatt-hours generated by Diesel engines......	none	1,469,710	4,242,377	4,616,086
Gallons fuel oil used......	none	136,664	395,568	427,967
Average cost per gallon of oil, cents............	none	3.14	3.70	5.66
Kilowatt-hours generated per gallon of oil.........	none	10.70	10.70	10.70
Cost of oil per kilowatt-hour, cents............	none	0.292	0.345	0.566
Total cost of fuel oil......	none	$4,294.12	$14,646.77	$24,238.99
Total fuel cost (oil and coal)..................	$110,339.57	$153,565.17	$178,585.76	$178,568.59
Average cost of fuel per kilowatt-hour, cents....	1.02	1.33	1.41	1.38
Wages of power station employees............	$20,967.92	$24,797.08	$27,029.13	$39,320.33
Cost of water............	7,839.49	9,699.51	7,424.19	8,711.05
Cost of lubrication........	1,127.08	2,404.24	3,851.77	4,991.90
Cost of power purchased..	317.26	386.32	1,898.75	....
Miscellaneous expense...	1,902.42	2,134.75	2,761.34	3,548.71
Power plant maintenance cost.................	13,136.66	11,891.43	20,179.56	25,376.53
Total cost of power station operation.........	155,630.40	204,878.50	241,730.50	260,517.11
Switchboard cost per kilowatt-hr., cents........	1.44	1.78	1.91	2.02

War-Time Changes in Living Costs

BETWEEN July, 1914, and November, 1918, the cost of living for wage earners in representative American communities advanced to the extent of from 65 to 70 per cent. The most marked advances were in the cases of clothing and food. This conclusion is presented in *Research Report Number 14* of the National Industrial Conference Board.

During the period in question the average advances in the cost of the separate items entering into the family budget were: Food, 83 per cent; shelter, 20 per cent; clothing, 93 per cent; fuel, heat and light, 55 per cent, and sundries, 55 per cent.

To estimate the total increase in the cost of living the increases found in the separate items must be related to the importance of these in the complete budget. The annual expenditures of the average workingman's family, according to careful investigations by governmental and other agencies, are said to be distributed approximately as follows: Food, 43 per cent; shelter, 18 per cent; clothing, 13 per cent; fuel, heat and light, 6 per cent, and sundries, 20 per cent. A few points' deviation from these averages may occur, but the normal variation is very small.

If the percentages of increase in the cost of the separate items as found in the board's investigation are weighed according to this distribution, the average advance in the cost of living as a whole up to November, 1918, was 65.9 per cent. It is said that no reasonable rearrangement of the budget items to suit individual requirements would greatly affect the average increase in the cost of living as a whole. Other possible combinations, however, would produce increases ranging from 64 to 69 per cent, and to cover this small variation the total increase in the cost of living has been placed at from 65 to 70 per cent.

Interborough Commissions 60,000-Kw. Turbo-Generator Unit

Attention Is Directed in This Article Particularly to the Automatic Control Features of the Installation

By W. S. FINLAY, Jr.
Superintendent of Motive Power, Interborough Rapid Transit Company, New York City

THE Interborough Rapid Transit Company, in its Seventy-fourth Street power plant in New York City, has the largest prime mover now in service in the world. The machine is the first of the three-cylinder type of turbine to be put into operation, one of the elements being the high-pressure section and the other two the low-pressure sections. The combined unit has a maximum continuous capacity of 60,000 kw., or 70,000 kw. for two hours. It occupies a floor space of 52 ft. x 50 ft. and at maximum load requires 826,000 lb. of steam per hour.

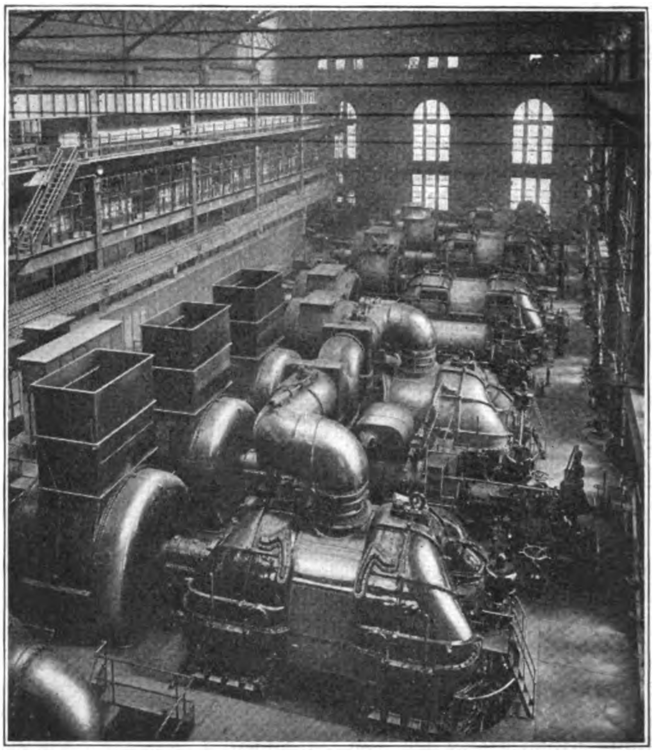
The unit is designed on what is known as the cross-compound principle. Each element is coupled direct to its electrical generator, and all three elements when in normal operation are tied together electrically. The steam path is such that all of the steam passes through the high-pressure element, then divides equally and flows through the two low-pressure elements. This principle of design, by dividing the work done into separate cylinders, allows the use of smaller individual elements which are inherently stronger than large cylinders; it makes possible an outfit considerably more flexible than a single large unit and more reliable because the turbines are smaller and there is less temperature difference in any one cylinder; and it permits the use of commercially common materials with moderate blade speeds and stresses.

Normal Load on Each Element Is 20,000 Kw.

The high and low-pressure turbines are proportioned so that with a total load of 60,000 kw. the load will be equally divided among the three elements. In case of failure of one of the low-pressure elements, it would be called upon to carry an abnormal load since all of the steam from the high-pressure element must pass through one low-pressure turbine. To provide against injury to the generator from this cause there is provided a back pressure valve on the exhaust of the high-pressure element which, when the pressure has reached a given amount, will permit steam to exhaust direct to atmosphere. The pressure selected is that which corresponds to a load of 30,000 kw. on the low-pressure turbine, which it is well able to sustain for a half hour. One half-hour is regarded as sufficient time in which to get other units onto the system, when the load on the high-pressure and one low-pressure element of the triple unit may be reduced to the limits of the continuous capacity of the low-pressure generator.

40,000 Kw. Is the Maximum-Economy Load

The high-pressure element contains fifty rows of blades, the height of the first row being 4 in. and that of the last row 9 in. The journals are 10 in. in diameter, and the rotor is equipped with a Kingsbury thrust bearing the function of which is to prevent any axial movement of the rotor. Each low-pressure element contains forty-four rows of blades, the height of the first row being 6 in. and that of the last row 15 in. In this element the turbine rotor journal is 12 in. in diameter. The rotor is, like the high-pressure element, equipped with a Kingsbury bearing.



TURBINES HAVING A NORMAL CAPACITY OF 150,000 KW. IN INTERBOROUGH POWER PLANT

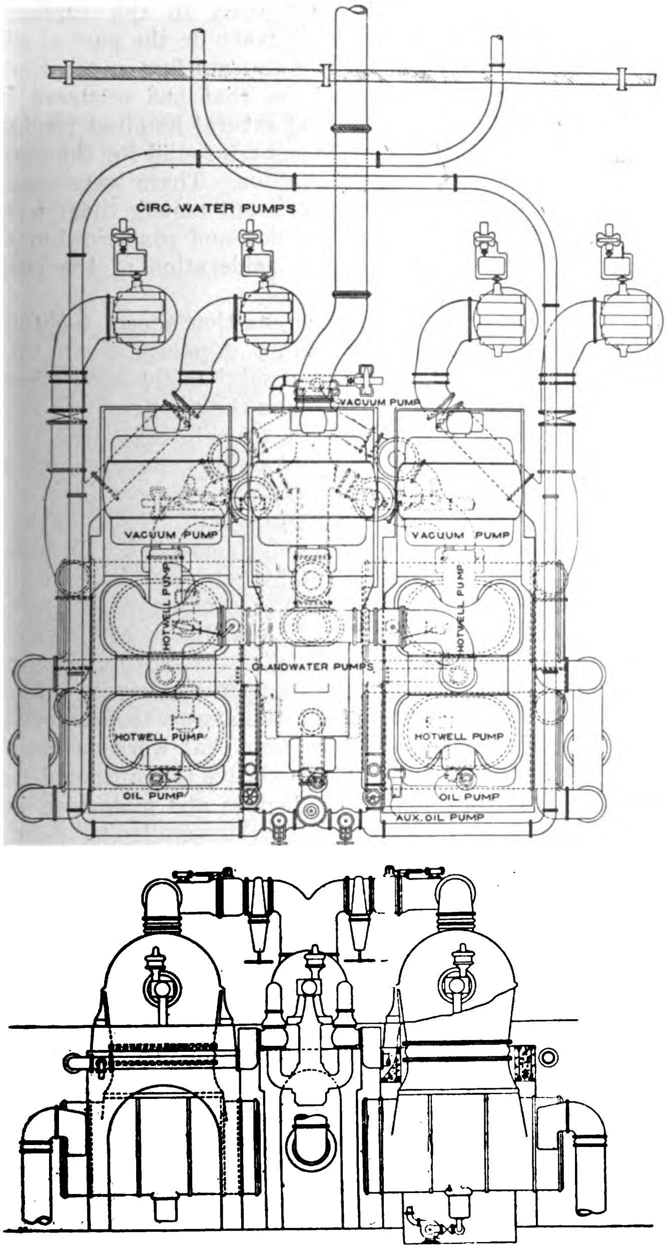
New 60,000-kw. unit in foreground—three 30,000-kw. units in background

In connection with the turbine there are four surface condensers installed, two being connected to each one of the low-pressure elements. The total area of cooling surface is 100,000 sq.ft.

The turbine is designed to operate with steam at 220 lb. per square inch, absolute pressure superheated 150 deg. Fahr. and to exhaust into a 29-in. vacuum. At a load of 40,000 kw., which is the point of best economy of the unit, the high-pressure element will exhaust into the low-pressure element at 29.7 lb. per square inch, absolute pressure, at a temperature of 250 deg. Fahr. This turbine unit is estimated to operate at any load between 30,000 kw. and 60,000 kw. at a water rate which is not more than 5 per cent greater than the minimum.

Each turbine runs at 1500 r.p.m. and its generator delivers three-phase power at 11,000 volts, 25 cycles. Each element has its individual busbars with separate feeders. Installed in the connections between the busbars are reactance coils to limit the flow of current between generators.

Although the unit consists of three separate elements the method of starting the elements from rest preparatory to synchronizing is essentially the same as for single-shaft units. First the field current of all three generators is applied; then the throttle valve on the high-pressure element is partially opened. As soon as the high-pressure rotor starts to revolve it will, through the applied field current, set the rotors of the two low-pressure elements revolving. This causes all three elements to come up to speed together and in correct phase with each other, so that when synchronized with the system they can be connected to the main busbars by closing a single circuit breaker.

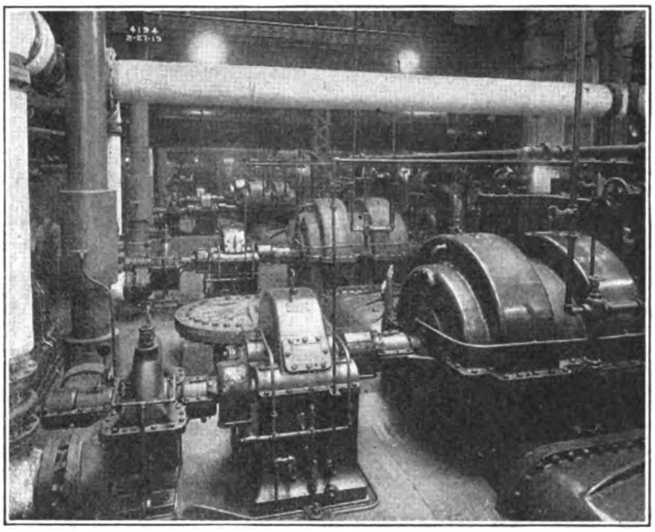


PLAN AND ELEVATION OF 60,000-KW. TURBO-GENERATOR UNIT

The new Interborough turbine unit is of interest not only on account of its size but because unusual attention has been given to the development of automatic features by means of which in the event of trouble with any of the elements it will be automatically cut out of service, the remaining two elements continuing to carry the load.

By the use of an ingenious governing arrangement means have been provided that will permit uninterrupted operation of each individual element, should one or the other two be taken out of service by tripping the automatic stop from any cause not affecting all three elements.

For example, if the high-pressure element is shut down, each low-pressure element will automatically receive high-pressure steam direct from the boilers through its own individual high-pressure steam system, whereas in normal operation the low-pressure elements do not receive any high-pressure steam direct. *Vice versa,* if the two low-pressure elements be shut down, from any cause not affecting the high-pressure element, the high-pressure element will continue operating and automatically exhaust its steam into the atmosphere. Should only one low-pressure element be removed from service, the high-pressure element will exhaust into the remaining low-pressure element. All this governing arrangement is entirely automatic.



CIRCULATING WATER PUMP IN INTERBOROUGH POWER PLANT

THE GOVERNORS SEEM ALMOST TO HAVE INTELLIGENCE

Since the governing mechanism must control three units, not only when operating together but also when operating separately, several features novel in steam turbine practice are involved. Each unit is provided with an over-speed stop governor which will immediately shut off the steam from that unit if the speed rises above a predetermined amount. Each unit is also equipped with a speed regulating governor of which that on the high-pressure unit is of the customary form. The speed-regulating governors on the low-pressure units are somewhat more complicated.

A butterfly valve, capable of automatic operation, is provided at each connection between the high and low-pressure units which will be automatically closed should the low-pressure turbine speed exceed a predetermined limit. This is tripped shut first by the speed regulating governor should it go to the outer position, and in the event of its failing then by the automatic stop governor. The high-pressure turbine is provided with another exhaust, having a back-pressure valve, so that when necessary the exhaust from the high-pressure turbine may pass to atmosphere and the high-pressure turbine continue to carry its load.

Similarly, if the high-pressure turbine loses its load its governor will cut off steam to the whole system. If the governor does not control the turbine and the speed reaches the predetermined limit, then the stop governor on the high-pressure will close the automatic throttle, similarly cutting off steam from the whole system. The whole system will then slow down until it reaches a predetermined speed lower than normal, when the governors on the low-pressure turbine will cause live steam to be admitted directly to them.

A DIFFERENTIALLY-OPERATED VALVE CONTROLS THE LOW-PRESSURE LINE

There is a butterfly valve in the low-pressure line which is controlled from the governor of the corresponding low-pressure turbine. Each valve is operated by a differential piston to both sides of which steam pressure is admitted. One end of this cylinder is connected to a valve trip mechanism located at the low-pressure governor and so arranged that when the governor reaches a prescribed position a valve will be tripped open, thus releasing steam from that side of the differential position. Steam pressure on the other side will then quickly force the butterfly valve closed. If the turbine is to be shut down the gate valve is then closed by hand. The butterfly valve may be opened or closed also by a hand-controlled valve.

The valve controlling live steam direct to the low-pressure turbine will begin to open when the low-pressure governor reaches a prescribed position. This valve mechanism does not differ in principle from the main high-pressure valve controlling steam in the system, and is in conformity with ordinary practice for such purposes.

The overspeed stop governor on the high-pressure turbine will close the main throttle valve and the main regulating valve, while that on the low-pressure turbine will bring about the closing of the butterfly valve and the governor and throttle valve, admitting high-pressure steam to the low-pressure turbines.

As part of the throttle valve there is a switch which, when closed, will open the main circuit breaker. Should some accident happen to one of the turbine elements, it may be instantly cut out by operating the emergency stop, which will cause the immediate closing of the automatic throttle. This in turn causes the closing of the switch, which opens the circuit breaker.

The new unit was built by the Westinghouse Electric & Manufacturing Company, but unlike most Westinghouse turbines of moderate capacity it is built entirely on the reaction principle, whereas the custom of this company has been to build its turbines with an impulse high-pressure section. This change is due to the enormous volumes of steam which are to be handled and it permits the use of relatively long blades in the first rows of the high-pressure element.

The Northern Ohio Traction & Light Company, Akron, Ohio, and the Joliet & Eastern Traction Company, Joliet, Ill., have become members of the electric railway section of the National Safety Council.

Employees Furnish Tips on Administration

Connecticut Company's Suggestion Campaign Proves Fruitful—Although Obvious Defects Are Pointed Out, Many Practical Improvements Are Proposed

RECENTLY President L. S. Storrs of the Connecticut Company sent circular letters to all of the company's employees, calling attention to the supreme importance of courtesy and efficiency on the part of all, and also asking the employees to send him suggestions for the improvement of service that had occurred to them. As a result he received several hundred replies, and the suggestions of the men were found for the most part to be of great practical value. There were many that dealt with obvious matters, but among them were hints for improvement of service and conservation of income that showed careful consideration of the company's problems.

The field covered by the suggestion sheets included every department of the company. A painter wrote that he could make certain kinds of paint in the shop where he is employed for much less than the company was paying, and thus reduce the cost of painting cars. His ideas are being tried out. Another employee called attention to lack of signs on certain cars to inform the public that the car passed a certain railroad station, and the deficiency was immediately corrected. Another showed how the company might get more income and save passengers' time by having conductors announce that the cars made a connection with one of the company's own lines to a certain city, instead of dropping passengers at a point where a competing company's lines connected. All of the suggestions were constructive, and there were only three or four that were unsigned.

Examination of suggestions relative to transportation showed that most of the conductors and motormen believe that the skip-stop system discourages trolley riding and drives business to the jitneys on streets where there is jitney competition. There were many suggestions relative to rerouting, and criticisms made by the public were reflected in the suggestions sent in by the men. Many employees urged a return to a 5-cent fare basis, with additional copper-zone fares on long runs. There were literally hundreds of suggestions relative to minor details of operation, and condition of line, equipment and track.

It is significant that the men themselves protested against dishonesty on the part of fellow employees, and did not hesitate to sign their names to such protests. None of them accused any individual of improper handling of funds, but they did make suggestions that certain conditions be looked into, with the result that remedial action could be taken. Among the suggestions was one that the company establish an annual safety prize, with payments to be paid to car operators who go through the year without accidents. Various suggestions for improvement in accounting methods, for better accommodations at amusement parks and kindred matters were made.

Every person who sent in a suggestion received a letter of appreciation from Mr. Storrs, and The Connecticut Company believes that when it makes its next request for constructive suggestions from employees it will receive a great many more than came in response to its first request.

The Zone Fare in Practice

BY WALTER JACKSON

BELFAST—PART I

BELFAST CASTLE ON ANTRIM ROAD

Ireland's Great Industrial City, with 400,000 People, Has Practically No Tenements in the American Sense—Twelve Passengers per Car-Mile Is Average for System Despite Most Unfavorable Routing Conditions for Short Riding and No Tributary Population on the Outskirts

THOSE who see an inevitable connection between the stage fare and the multi-family or tenement house would have their views greatly modified by a visit to Belfast. Here is a city of 14,937 acres and 400,000 people, of whom the poorest classes, and the most numerous, live in tiny brick one-family houses, in striking contrast to the tenements of Edinburgh and Glasgow only a few hundred miles away. To see block after block of these almost microscopic dwellings with their four or five rooms apiece is to realize that national characteristics and topographical conditions are perhaps the most potent factors in the character of housing found at any particular place.

Belfast is free to grow in almost every direction. Its tramway routes, unlike those of many British cities, do not terminate in small, populous communities but end in the open country after a rapid thinning out of traffic in the suburban areas. In this respect the tramways suffer, as there is much less of the pick-up and neighborhood riding that is so prominent in Glasgow's suburbs and its neighboring communities.

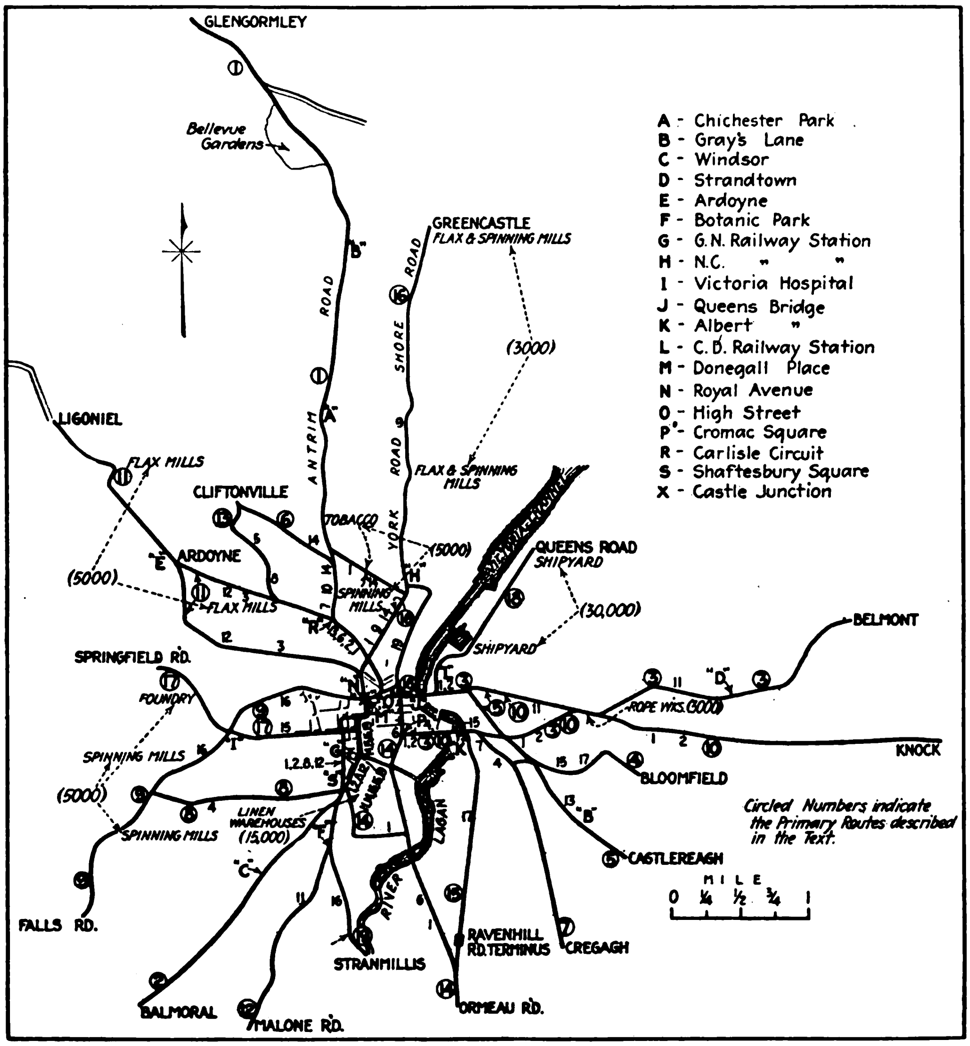
A second cause that gives Belfast a lower density per car-mile than other foreign cities is that its chief industries are so located in or near the town that the majority of the workers are within easy walking distance. This fact is apparent from the map on page 910, but the following figures may prove more convincing:

Of the 20,000 to 30,000 workers at the Queen's Island shipyards, about 8000 ride regularly.
Of 15,000 employees of the linen manufacturers, less than 10,000 ride.
Of 3000 at the rope works, 1000 ride.
Of 7000 flax spinners, 2000 ride.
Of 3000 tobacco workers, 1000 ride.
Of 2000 flax spinners (second group), 1000 ride.
Of 3000 flax spinners (third group), 500 to 600 ride.
Of 2000 at the Ligoniel Mills, 300 ride.

From the foregoing summary it is plain that although Belfast is a great industrial city, it is by no means an ideal tramway town.

A third factor which discourages heavy riding is the long-standing system of alternative routing for the Belfast City Tramways. Instead of radiating to a given terminus as a single line, a number of routes are double-armed and sometimes even triple-armed. The result naturally is that each branch gets only one-half the service that a single straight through route would give in shorter time and with less mileage. Through this scheme some passengers get a shorter walk, but short riding is discouraged since a man who wants to travel a mile or so will not wait for a car on a ten-minute headway. As short headways are quite as important as low fares in attracting the short-haul rider, J. S. D. Moffet, general manager, is giving serious thought to the possibility of one-man car service on some of the less important routes.

To summarize the situation: In a city of 400,000 with 100 miles of single track, with industries close to the homes of the workers, no suburban feeders and no high density of population, the returns for the fiscal year ended March 31, 1918, show earnings of 13.39d. (26.78 cents) per car-mile from traffic receipts, a density of twelve passengers per car-mile and a total travel of 75,416,816 passengers. These figures and others of interest to the operator are set forth in the table on page 913, covering operations for the fiscal years 1912 to date. It is worth pointing out that the tramways, despite the increase in fare, enjoyed the greatest traffic gain in their history during the fiscal year ended March 31, 1918. Not only was the £6,893 deficit of the preceding year absorbed, but a surplus of £11,545 was left as well.


GLENGORMLEY
Bellevue Gardens
GREENCASTLE
FLAX & SPINNING MILLS
ANTRIM ROAD
SHORE ROAD
YORK ROAD
(3000)
LIGONIEL
FLAX MILLS
CLIFTONVILLE
ARDOYNE
FLAX & SPINNING MILLS
TOBACCO
(5000)
QUEENS ROAD SHIPYARD
(5000)
FLAX MILLS
SPINNING MILLS
(30,000)
SHIPYARD
BELMONT
SPRINGFIELD RD.
FOUNDRY
ROPE WKS. (3000)
KNOCK
SPINNING MILLS
(5000)
LINEN WAREHOUSES (15,000)
SPINNING MILLS
BLOOMFIELD
CASTLEREAGH
FALLS RD.
RIVER LAGAN
STRANMILLIS
RAVENHILL RD. TERMINUS
CREAGH
BALMORAL
MALONE RD.
ORMEAU RD.
A - Chichester Park
B - Gray's Lane
C - Windsor
D - Strandtown
E - Ardoyne
F - Botanic Park
G - G.N. Railway Station
H - N.C. " "
I - Victoria Hospital
J - Queens Bridge
K - Albert "
L - C.D. Railway Station
M - Donegall Place
N - Royal Avenue
O - High Street
P - Cromac Square
R - Carlisle Circuit
S - Shaftesbury Square
X - Castle Junction
Circled Numbers indicate the Primary Routes described in the Text.
MILE
0 ¼ ½ ¾ 1

PRINCIPAL INDUSTRIES, ALTERNATIVE CAR ROUTES AND GENERAL LAYOUT OF BELFAST CITY TRAMWAYS

Although the fare revisions began on May 21, 1917, the passengers per car-mile increased from 11.1 in the 1917 fiscal year to 12.0 in the 1918 fiscal year. Such figures indicate that the rates of fare must have been increased with a scientific understanding of what the traffic would bear. The improvement can hardly be ascribed to industrial conditions, because Belfast was a busy city throughout the whole war, and there was no special change during 1917-1918. There were many prognosticators of dire results, but they proved bad prophets! Fig. 1 contains graphs of car-miles and passengers, gross receipts and operating expenses, and cost and revenue per passenger from 1906 to 1918.

BELFAST ROUTINGS ARE PECULIAR

In view of the peculiarities of the Belfast routing and the comparative sparseness of population along various lines, the following detailed statement of services with route mileages, might well be compared with American practices:

1. *Antrim Road and Glengormley section* (*route*), 6 miles long, gives three- to six-minute service to Chichester Park, 2¼ miles out; ten-minute service between Chichester Park and Gray's Lane, 4 miles from city, and twenty-minute service between Gray's Lane and end of line at Glengormley. The greater part of this route is an avenue of fine residences, but beyond Gray's Lane there is nothing until the tiny village of Glengormley is reached. The village is a popular summer resort with a number of tearooms. Formerly the city had a band there, such service being charged against the tramway department. But this is not the worst. About 4 miles out is a rock-walled hill called Bellevue Gardens, on which thousands of pounds have been spent for park development, all charged against the tramways because of the old park fallacy that pleasure travel would pay for it. Although this, the longest line on the system, has been in existence for twenty years and has a well-to-do class of patrons, buildings become scarce almost as soon as the city line is reached. At present, slightly more people are being carried to Glengormley at 4d. than before at 3d., proving that the 1d. increase in the total fare has not stopped whatever development there was.

2. *Balmoral section* is residential. It is 3 miles long. The all-day service to the terminus is ten minutes, but the 2-mile division to Windsor has a five-minute headway during the morning, midday and evening rush hours.

3. *Belmont section* includes both residential and mill territory. It is 3½ miles long with a twenty-minute service on each arm but ten minutes for Strandtown 2¼ miles out. On this route the overlapping of lines gives the short rider a car every four minutes during the day and every two minutes during the rush hours for a distance of 1¾ miles.

4. *Bloomfield section* is residential. It is a 2½-mile crosstown line feeding midway between Castlereagh and Knock Road. It has a twenty-minute headway as a war measure.

5. *Castlereagh section* runs through a thinly populated district. It is 2½ miles long and has a headway of twenty minutes as a war measure with some extra cars turned back ¾ mile from the terminus.

6. *Cliftonville section* is residential and well populated. It is 2 miles long. The normal all-day headway is ten minutes with two or three cars added during the rush hours.

7. *Cregagh section* is a 3-mile residential line which runs to open country. It has a ten-minute headway all day.

WIDE STREETS AND TINY HOUSES IN ONE OF OLDEST PARTS OF BELFAST

8. *Donegall Road section* is 2¼ miles long, running in conjunction with but not using the same track as the Falls Road section. It passes through thinly-populated territory and terminates at the city cemetery. A twenty-minute headway prevails.

9. *Falls Road section* is 3 miles long to Andersonstown terminus. It has a ten-minute headway over the entire line and five-minute service to the city cemetery. Traffic on this line ordinarily is moderate but is heavy on football Saturdays.

10. *Knock Road section* serves both a factory and a better-class residential district. A ten-minute service (an absurd alternative twenty-minute service via Queens Bridge and the same via Albert Bridge) is given over the complete length of the road, 4 miles to Knock, and a five-minute regular and three-minute rush service to Knock Road, 3 miles out. This is one of the busiest routes in the city.

11. *Ligoniel section* runs to Ligoniel, 3½ miles out. This is a working-class line with a ten-minute service to the terminus. It has two arms which join at Ardoyne, 2 miles from the center of Belfast. The Shankill Road arm has a base headway of ten minutes with changes to five and three-minute intervals according to needs. The Crumlin Road arm has a normal headway of ten minutes with a few extras during the rush hours. All turnbacks are made at Ardoyne, leaving a ten-minute headway between Ardoyne and Ligoniel. This line is a type of the two-arm routing where a single intermediate line would give a straight instead of a roundabout route and permit so short a headway that walking along the route would be almost elminated. It is true that the walk to and from the car would be increased, but the public would be benefited as it would always find a car in sight.

12. *Malone Road section* is a high-class residential line with a ten-minute service to the terminus. At a point (Botanic Park) 1¼ miles from the center of the city it has a branch to a terminus ¾ mile beyond the park and known as Stranmillis. As this branch also has a ten-minute service, it is possible to give a five-minute service on the joint track.

13. *Old Park section* runs over the Crumlin arm of the Ligoniel route for a distance of 1 mile to Agnes Street and terminates at Cliftonville, making a total length of 2¼ miles through a partly working-class and partly high-grade residential section. The Old Park service proper is ten minutes, but on the 1 mile of joint operation the combined headway is five minutes. This route serves one side of the Old Park territory, while the Cliftonville section serves the other side of the recreation grounds and residences in this part of the city.

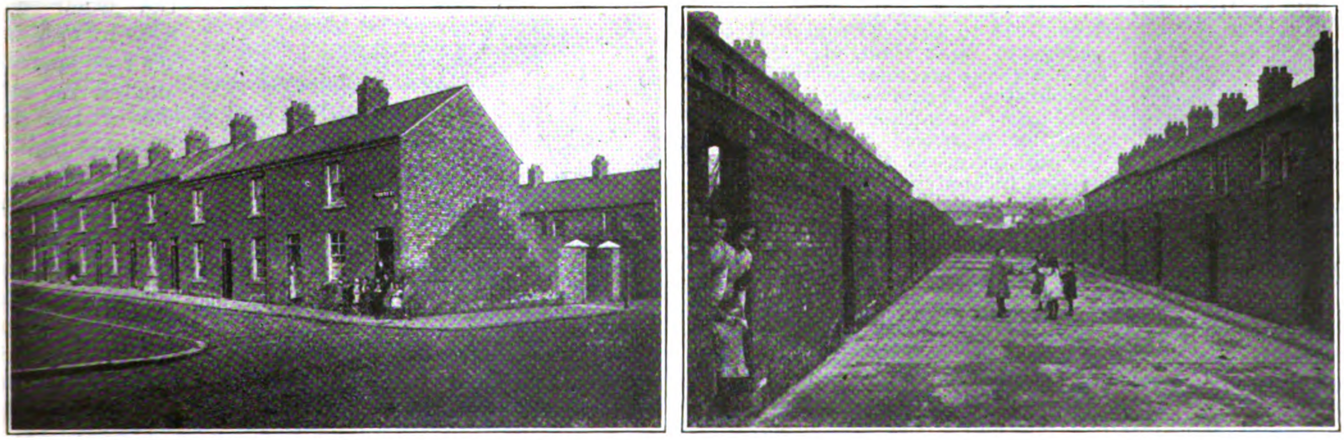
14. *Ormeau Road section*, 2¾ miles long, serves a residential district. It has two arms which join at University Street, 1½ miles from the center of town. Both the Botanic Avenue and Cromac Street arms have individual services of ten minutes, giving a joint service of five minutes in the less populated sections! This is the curious result of starting the alternative routes in the center of the city instead of some point nearer the suburbs.

15. *Ravenhill Road section*, 2¼ miles long, has an individual all-day headway of twenty minutes as a war measure. It is in residential territory running along the Public Park, which is flanked by Ormeau Road on the opposite side, forming a "V" therewith.

16. *Greencastle or Shore Road section*, 3¾ miles long, has a ten-minute headway to the terminus with five-minute service over the first mile. This route serves a working-class district. It passes the station of the Northern Counties Midland Railway, into which a car is run on a stub track every twenty minutes—more often than train connections warrant. This is a possibility for one-man car service.

17. *Springfield Road section* is 2 miles long with a straight ten-minute headway. It serves the Victoria Hospital and the same general territory as the Falls Road section and the Shankill Road route of the Ligoniel section.

18. *Queen's Road section* has extraordinary traffic morning and evening, because it serves the two great shipyards on Queen's Island. These establishments deliver about one-half the morning and evening rush traffic, about eighty cars being used in the morning and a few less at night. Whereas the individual Queen's Road service is simply a ten-minute headway over the 1¾-mile run up to 7 p.m., with no reason



LATEST TYPE OF WORKMEN'S DWELLINGS IN BELFAST WITH PLAYGROUND FOR "CHILDHER" IN REAR

for service after that hour, the same tracks during the rush hours are used for through cars to or from every part of Belfast. This through routing involves no extra costs for special work, and it has the advantage of distributing the load to a certain degree. Plenty of the impatient patrons, however, take the first car that leads to Castle Junction—the great gathering point—where they either pay a second fare on a second car or walk the remainder of the way. Of the 20,000 to 30,000 workmen in the shipyards, about 8000 use the cars, and these are disposed of in ten minues despite unfavorable car-storage and fare-collection conditions. The tracks extend down a narrow street between the yards with few crossovers and no continuous third track that could be used for storage. Passengers pile on pell-mell, since no space is available for the desired prepayment area, but somehow or other the conductors manage to get the fares of everybody except the boys who hang on the outside and drop off before the cars reach the Queen's Bridge into the city. The inbound or morning service is easier, of course, as the fares are collected individually rather than in mass. Eventually, train service may be introduced for the evening operation. As in the case of the Greencastle section, a few cars of the Queen's Road section are run into the County Down Railway station for the convenience of steam railroad patrons.

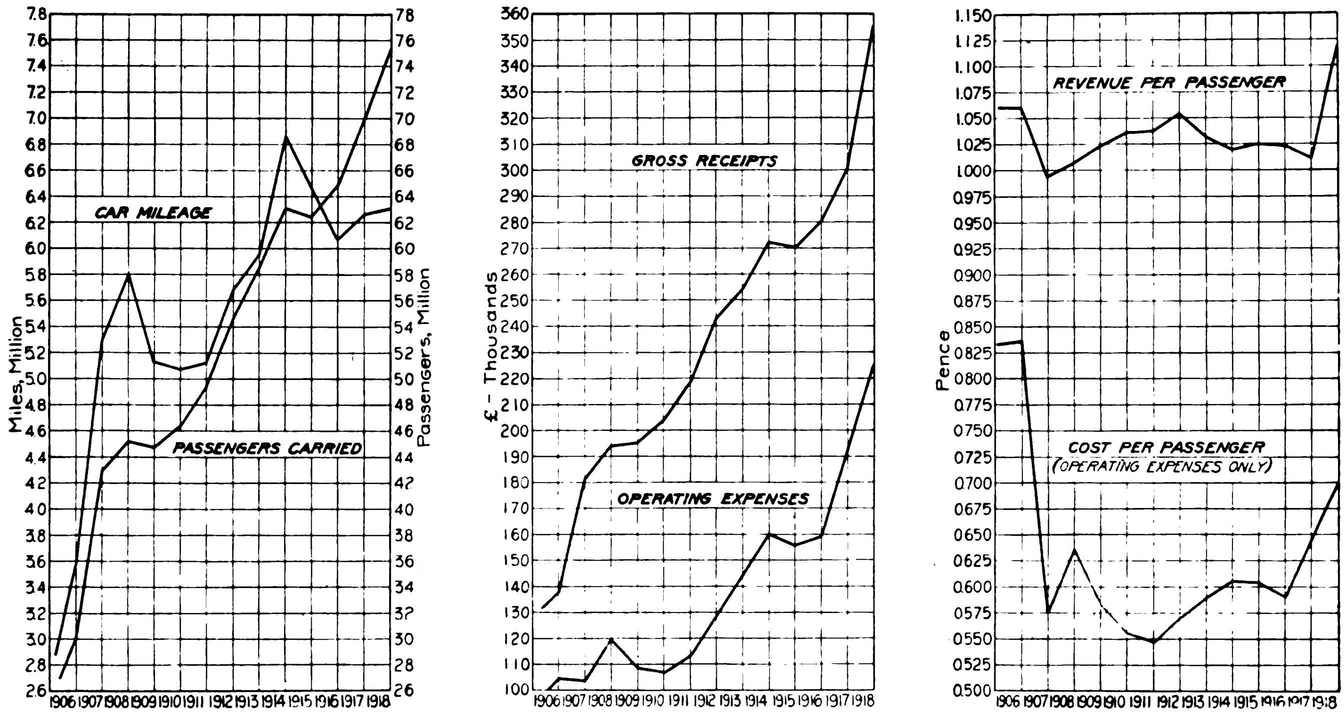


FIG. 1—COMPARATIVE TRAFFIC AND OPERATING STATISTICS OF BELFAST CITY TRAMWAYS FOR 1906-1918

In general, all the services as far as possible are routed over at least two sections (routes). The exception is the Glengormley section, which can be looped in and out of Castle Junction without switching. The bad feature of the present arrangement is that some routes have odd cars (put on to please individuals who were able to influence the Council in their own as against the public interest) routed over several other sections. For instance on the Antrim Road section, services are run from Chichester Park to Ormeau Road, Knock, Cregagh and Balmoral (Windsor), but of the two last one has only a twenty-minute headway and the other consists of only odd cars operated during the middle of the day. The natural result of this multiplication of the "chances of disturbance" is that instead of an even headway at the busy periods, the cars not only arrive at the converging point in groups but travel the remainder of the journey in bunches of twos and threes. In consequence, the service is bad and the road inadequately covered.

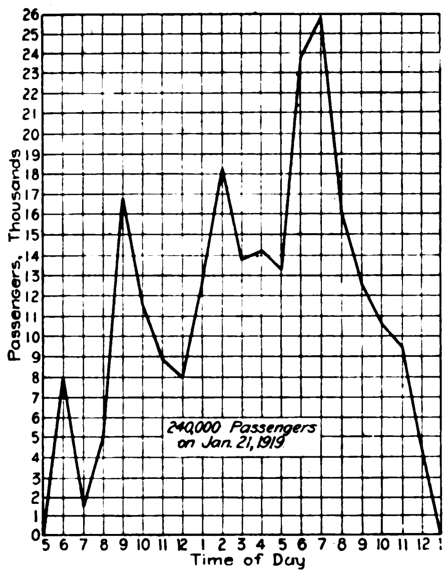


FIG. 2—MARKED MIDDAY TRAFFIC IN BELFAST

J. S. D. MOFFET, general manager Belfast City Tramways since October, 1916, came to Belfast from the West Ham Corporation Tramways, of which he was general manager and engineer from 1913 to 1916. From 1904 to his change to West Ham, Mr. Moffet had been general manager of the Rochdale Corporation Tramways. Mr. Moffet has been conspicuously successful in securing increased travel at Belfast despite increases in fare. Educated as an engineer, he believes in applying engineering principles to the sometimes elusive problems of the traffic department, and this belief is illustrated by the various graphic records and principles of analysis used by him in Belfast. Mr. Moffet, as general manager at Rochdale, was a pioneer in the installation of car-checking devices, and at West Ham he secured the adoption of a central telephone control system that was the first and only one of its kind in British or European tramway practice. Mr. Moffet is a native of Sunderland, Durham, England. He has traveled over a good part of the world but never visited America. He is familiar, however, with the latest American practices and before long hopes to introduce some highly advanced traffic devices still unknown to European tramway service.

More normal examples of routing a car over two sections are: Falls Road and Greencastle (Shore Road) sections; Donegall Road and Bloomfield sections; Springfield Road and Ravenhill Road sections; Malone and Ligoniel sections; Old Park and Castlereagh sections; Cliftonville and Ormeau Road sections, and Stranmillis and Northern Counties railway station.

Malone Road

Cypress Gardens

Dunbarton

HOMES IN OUTER PARTS OF BELFAST WHICH INDICATE THAT THE ZONE FARE HAS NO TERRORS FOR THE MIDDLE CLASS

Like other cities of the United Kingdom, Belfast has a pronounced mid-day travel in addition to the usual a.m. and p.m. peaks. This characteristic is clearly brought out in the graph on page 912 of the traffic handled on Jan. 21, 1919. This shows that 17,000 passengers were on the cars at 9 a.m., about 18,300 at 2 p.m. and 26,000 at 7 p.m. The total travel between 5 a.m. and midnight was 240,000. It will be understood, of course, that the actual periods of maximum boarding were say thirty minutes ahead of the time shown on the graph. Aside from the three highest peaks, there will be noted one reaching the total of 8000 passengers at 6 a.m. This, of course, is the early workmen's traffic. How long this will continue is problematical. The present agitation for shorter workdays would, if successful, throw the morning load on top of the 8 to 9 o'clock peak unless the riders concerned could see the advantage of using the hours saved by starting a little later than at present but quitting earlier. In other words, serious discomfort to the public would be avoided by splitting the saving instead of applying all of it to the postponement of the opening hour. Every cloud is reputed to have a silver lining. In this case, if the workmen do prefer to start after 8 a.m. they lose the low-rate fare. Hence the tramways can offer a choice between the staggered hour with the low-rate fare retained, or an accentuated peak with the low-rate fare eliminated.

This aspect of the daily traffic curve is by no means unique to Belfast. The agitation for shorter workdays is universal throughout the United Kingdom, and their installation will have effects similar to that indicated at Belfast. It is not likely, however, that noonday riding from mills and sales-shop will be much affected. The habit of going home to luncheon has been so strongly cultivated that many shops are completely closed for one to one and one-half hours at midday.

Service to the extent of handling nearly 250,000 passengers a day is being given now with 291 cars, of which 250 to 260 are in daily use. The schedule speed is exceedingly good, 8.5 to 9 m.p.h., owing in large measure to double-track operation, wide streets and good traffic

RESULTS OF OPERATION OF THE BELFAST CITY TRAMWAYS FROM 1912 TO 1918

Year Ended March 31	Traffic Revenue £	Traffic Revenue per Car-Mile d.	Total Revenue £	Total Revenue per Car-Mile d.	Working Expenses £	Working Expenses per Car-Mile d.	Total Expenditure £	Surplus £	Car Mileage	Passengers Carried	Average Return per Passenger	Total Working Expenses per Passenger d.	Passengers per Car-Mile
1912	239,263	10.12	243,068	10.29	129,343	5.47	219,197	23,871	5,671.776	54,546,856	1.052	0.904	9.6
1913	250,589	10.12	254,377	10.27	143,885	5.81	238,576	15,801	5,946,659	58,437,942	1.029	0.979	9.8
1914	268,250	9.38	272,062	9.51	160,278	5.60	269,157	2,905	6,865,591	63,131,820	1.019	1.023	9.2
1915	266,249	9.93	270,237	10.08	156,913	5.85	267,014	3,223	6,432,600	62,340,269	1.025	1.028	9.7
1916	275,668	10.88	280,653	11.08	159,310	6.29	272,792	7,861	6,077,658	64,697,292	1.022	1.012	10.6
1917	296,910	11.41	301,345	11.58	189,666	7.29	308,238	*6,893	6,245,012	69,582,066	1.024	1.063	11.1
1918	350,385	13.39	355,056	13.57	221,967	8.48	343,511	11,545	6,279,072	75,416,816	1.150	1.093	12.0

* Deficit.

NOTE—First fare revision May 21, 1917; second fare revision July 1, 1918.

regulation. Cars attain a maximum free running speed of 16 m.p.h. The same running time is maintained throughout the day. Belfast has no buses, and in view of the good car speeds and the low density of population it is not likely to have any in the near future.

Stops are spaced five poles or 600 ft., and practically all of them are nearside. Safety stops, as is the case with operating speeds through different parts of the city, are specified only by the Board of Trade regulations. They are indicated by red signs, while blue signs identify the regular "by request" stops. At an early date, the railway will make the stopping places still clearer by striping the poles.

At Castle Junction, the gathering point of all the cars on the system, three traffic regulators are stationed to accelerate traffic movement. These men are on duty from 8 to 10 a.m. and 12 to 7.30 p.m. They assume the responsibility of starting off each car so that the conductor can begin earlier to collect fares. As two passengers can readily board the car at one time, no attempt is made to load people in queues. Only the rear platform is used for entrance and exit.

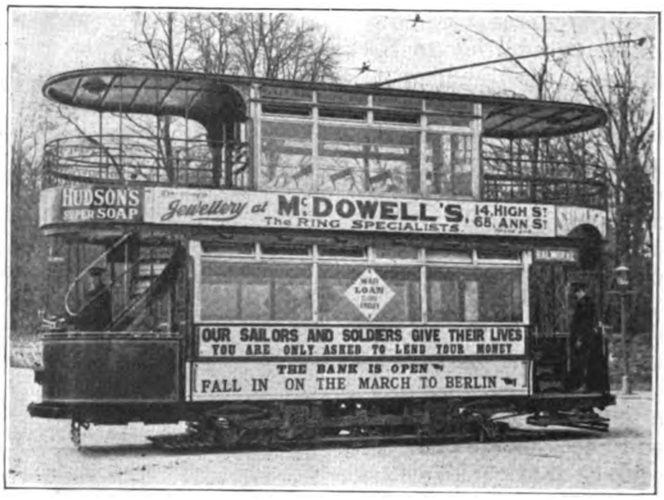
ROLLING STOCK IN BELFAST

The standard car of Belfast is double-deck with open vestibules and open ends on the upper deck. It is 27 ft. 10 in. over all, with 5-ft. 6-in. platforms, seats twenty-two passengers below and thirty eight above, and weighs 24,640 lb. The cars are mounted on Brush single trucks with two 35-hp. Westinghouse No. 200 motors. The controllers are Westinghouse No. 90 M with electric braking features. Magnetic sanders are also used in operating the slipper brake as an addition to ordinary hand brakes. Illumination is afforded by 16-cp. lamps enclosed in molded glass. The conductor's pull cord is still the only signal device, but push-button signals available for both the passenger and the conductor are under consideration.

CASTLE JUNCTION, THE GATHERING POINT FOR ALL CARS AT BELFAST
(Note booth where traffic regulators make out reports)

Although illuminated roller destination signs are carried over both dash and step, the management is considering the installation of a big route number sign which would be carried from the upper deck so that a prospective passenger would be sure to see it even if a large motor truck or wagon happened to be obscuring the lower deck of the car. Route information boards are placed over the central window of all cars as in common British practice.

An unusual—and appreciated—feature of Belfast car equipment is the installation of Neill clocks. These are electrically operated by means of two Western Electric 2-volt dry cells, "Bluebell" type. The accuracy of these clocks has helped many a passenger make his train.


HUDSON'S SUPER SOAP
Jewellery at McDOWELL'S The RING SPECIALISTS 14 HIGH St 65 ANN St
WAR LOAN
OUR SAILORS AND SOLDIERS GIVE THEIR LIVES
YOU ARE ONLY ASKED TO LEND YOUR MONEY
THE BANK IS OPEN
FALL IN ON THE MARCH TO BERLIN

BELFAST DOUBLE-DECK CAR USED DURING A WAR-LOAN RALLY

From the foregoing account, it is apparent that Belfast rolling stock does not differ materially from the usual British double-deck car. In a later issue data will be published concerning the maintenance of this equipment, more particularly the wheels and axles. The second part of this present Belfast article, to be published in the May 24 issue, will show how fare increases have been successfully worked out and how the fares are collected and accounted for.

Making Change on Safety Cars

IN CONNECTION with the establishment of safety-car service in Hartford, Conn., Manager W. P. Bristol of the Hartford division of The Connecticut Company made a graphic demonstration of the time that it lost in making change on trolley cars.

Mr. Bristol had as his guests, on a trial trip of a safety car, a number of newspaper men and other citizens of Hartford. He supplied each man with a half dollar and also with 6 cents in change. There were eleven passengers on the trip and Mr. Bristol asked each one to present the half dollar to the operator when he boarded the car. A stop watch was held by one of the men and, although the operator worked very rapidly, it took one minute and thirteen seconds for him to collect the fares, make change, register the fares and get under way. At another stop Mr. Bristol asked the passengers to present the six cents in change to the operator. This they did and the fares were collected and the car under way in twenty-one and two-fifths seconds.

The demonstration might be called part of a campaign being conducted by The Connecticut Company to educate the public to have the exact fare ready. It gave all those who were on the trial trip a vivid conception of the time that may be saved if passengers will have their fares ready instead of presenting coins or bills that take the operator's time in making change.

Why More Income Must Be Secured

Hearing Before Committee on Public Utilities of National Chamber of Commerce in St. Louis Brings Out Needs of Electric Railways for Adequate Revenues and Needs of Communities for Adequate Railways

THE meeting of the United States Chamber of Commerce on April 30, as briefly noted in the ELECTRIC RAILWAY JOURNAL of May 3 in connection with the general account of last week's convention in St. Louis, took the form of "hearing" by the committee on public utilities. Lewis E. Pierson, Irving National Bank, New York, chairman of the committee, presided during the first part of the meeting and Paul M. Myers, president St. Paul Association of Commerce, during the latter part. Evidence in regard to the utility situation was presented, usually in the form of answers to questions put by or through the chairman.

J. B. Chilberg, president Scandinavian-American Bank of Seattle and a member of the Seattle Chamber of Commerce, was the first speaker. Mr. Chilberg said that the franchise in Seattle prescribed a franchise tax of 2 per cent of the gross earnings in addition to the regular taxes; a fare of 5 cents, including transfers, and the sale of twenty-five tickets without transfer privilege for $1. With the outbreak of the war there was a tremendous expansion in the shipbuilding business at Seattle, and large numbers of workmen had to be carried twice a day to and from the shipyards. In the meantime the operating expense of the company increased greatly. With the war the 4-cent fare was abolished, but under a State law the company was not allowed to charge more than 5 cents although the city was willing to grant a 6-cent fare.

As it would have required several years to repeal this law, Mr. Chilberg stated, municipal purchase seemed to be the only alternative. This was carried out, most business men supporting the purchase plan although none was in favor of municipal ownership except as the last resort. For the purchase price of $15,000,000 the city issued bonds which were a first lien on the gross receipts of the combined old and new city lines.

In reviewing the steps taken by the city since the purchase of the property, Mr. Chilberg said that the Council had passed an ordinance stopping jitney competition and was planning to put in skip stops. It had also cut off free transportation for policemen and firemen. Of course, under municipal ownership the 2 per cent franchise payment and the taxes would be lost to the city. The traction company had formerly paved about one-third of the surface of the streets through which its tracks ran, but Mr. Chilberg did not know whether the cost of this paving would be assessed in the future against the tramway department or not. With these changes T. F. Murphine, superintendent of public utilities, hoped to be able to carry passengers for 5 cents. The old municipal railway in Seattle, Mr. Chilberg said, had not been a financial success. So far as he knew, no plan has been made for keeping the accounts of the whole system so as to show the comparative expense of operation under city management and private management, or the taxes and other city payments which would now be forfeited. Such a plan would have to be initiated by the city, if undertaken, because the Public Utility Commission in Washington does not have jurisdiction over municipal properties.

The testimony of Harlow C. Clark, of the American Electric Railway Association staff, the next speaker, is published on the next three pages of this issue.

W. O. Clure of Minneapolis who described himself as a writer of newspaper articles, said that he had been interested for many years in studying the local electric railway situation. He referred particularly to the activity of the Citizens' Council, which was doing its best to reach a common basis of understanding between the company and the city. He thought that the social aspect of the problem was more important than its economic aspect. He believed in private ownership and was in favor of a cost-of-service franchise with the abolition of all charges not directly connected with the rendering of the service.

The next speaker was Ralph S. Bauer, Lynn, Mass., who spoke in favor of low fares, the deficit to be made up by general taxation. In his opinion, high fares discourage travel, whether they are on the straight-fare or zone basis. The experience with high fares in Boston indicates that there will be a passenger loss of about 72,000,000 during the year. Low fares from the outlying districts are a boon to the merchants of any city, and they can well afford to pay the additional amount required in taxes to subsidize such a service. When asked whether employees in manufacturing plants would not require employers to raise their wages in the case of higher fares and so distribute the burden, Mr. Bauer did not think that this would occur. He considered the jitney an economic waste. He believed that a service-at-cost plan will not permit a company to give the maximum service which is desirable from a car-riding standpoint, and thus would hamper community development. High fares, he said, would force many workers to live in the industrial district and thus produce undesirable living conditions.

R. A. Leussler, assistant general manager Omaha & Council Bluffs Street Railway, said that this property before the war was prosperous, but expenses have increased so greatly that the company cannot earn interest on its bonds. The War Labor Board granted a yearly increase of $760,000 or 40 per cent in the company's payroll, but the municipal authorities have resisted an increase in fare. The fuel administrator has raised the price of coal and the railroad administrator has raised the charges on freight, but neither the state commissioners nor the municipal authorities have taken these prices into consideration.

Walter A. Draper, vice-president Cincinnati Traction Company, then described the cost-of-service franchise in force in Cincinnati. The Manufacturers' Association of that city was of assistance in securing the franchise, and the company now has a fare of 6 cents. In answer to the inquiry asked of a previous witness as to whether employees would not ask their employers to stand the additional transportation charges, he said that one manufacturer had told him that his employees had asked for a 10-cent increase a day in wages to pay the 2-cent increase in car fare.

A. L. Faber, Westinghouse Electric & Manufacturing Company, testified to the merits of the one-man car in increasing the service and reducing expenses.

Horace Lowry, president Twin City Rapid Transit Company, Minneapolis, spoke against an extra charge for a transfer on the ground that it created a discrimination between the man who lived on a main line and one who lived on a branch line.

At the close of the session Mr. Pierson explained that it was the hope of the committee to conduct or initiate somewhat similar hearings in other cities to find some solution of the traction problem and invited suggestions in the way of those whose testimony would be helpful and of questions to be asked. The meeting then adjourned.

The Railway Situation

Survey of National Situation Indicates Imperative Need of Aid for Electric Railways

AT THE HEARING on April 30 before the committee on public utilities of the United States Chamber of Commerce, a general survey of the electric railway situation was given by Harlow C. Clark, of the American Electric Railway Association Staff. This survey follows in part, in the form of Mr. Clark's answers to queries:

Is the electric street railway industry as a whole at the present time in a prosperous or unprosperous condition?

In an unprosperous condition. A statement prepared by the statistical bureau of the American Electric Railway Association shows that of the 44,800 miles of single track of electric railways in the United States there were in the hands of receivers on April 29 5897 miles, or more than 13 per cent. It is also a matter of common knowledge that a large mileage which is not actually in the hands of receivers is practically in an insolvent condition. Since Jan. 1, 1915, service has been abandoned upon 240 miles of track and 528.87 miles have been dismantled and sold as junk. Thus 769.12 miles are no longer in service.

In the case of seventy-six companies whose common stock is listed, the value of this based on present capitalization and the market price of January, 1914, was at that time $496,238,398. The value on the same capitalization and the prices of January, 1919, was $245,741,642, a shrinkage of $250,496,756 or more than one-half. The shrinkage in the value of the securities of the largest New York City electric railway as between January, 1917, and February, 1919, was $126,811,100, in a total of $423,505,000.

The preliminary report of the United States Census Bureau covering statistics of electric railways for 1907, 1912 and 1917 shows that between 1917 and 1907 the income from all sources increased 69.9 per cent and the operating expenses increased 80.1 per cent, while between 1917 and 1912 the income from all sources rose 24.6 per cent and the operating expenses 36.87 per cent. Hence, in the last five years covered by the report, operating expenses increased at a greater rate than did income from all sources. This should be contrasted with the figures for the previous five years—1907 to 1912—when income from all sources increased 36.3 per cent and operating expenses 32.5 per cent, as well as the figures between 1902 and 1907, which show an increase of 71 per cent in income and 76 per cent in operating expenses.

The net income from 1907 to 1917 increased 39.9 per cent, but between 1912 and 1917 there was an actual decrease of 17.2 per cent, as compared to an increase of 68.9 per cent for the five years 1907 to 1912. This decrease in net income is perhaps more fully illustrated by a comparison based on the net income per passenger carried. This was in 1907 0.0249 cent; in 1912, 0.00354 cent, and in 1917, 0.00263 cent.

The income statement of 283 companies for 1917 and 1918, compiled by the American Electric Railway Association, shows a net income of $10,561,902 for 1916 as compared with $39,490,008 in 1917, or a decrease of 73.25 per cent. Unfortunately, it is impossible to reduce this to the revenue passenger basis, but on the basis of total passengers carried, it shows 0.0034 cent for 1917 and 0.0008 cent for 1918. It is also, unfortunately, impossible from the figures available to show all the amounts per revenue car-mile expended for maintenance. It may safely be stated, however, that since the present era of high prices the maintenance of electric railways in the United States has been cut down below what would in normal times be considered a proper standard, and that if these charges had been included, there would have been an even greater decrease in net.

Few, if any, of the companies operating in this country are charging to operating expense sufficient allowance for depreciation. In general, therefore, the census figures, as well as any income statement that may be obtained, may be said to be a distortion of the actual situation, in that a more favorable aspect is presented than is in reality warranted.

In regard to the traction situation in the 273 cities of the United States having a population of 25,000 or more, in all but twenty-nine applications for an increase in fares necessitated by the financial condition of the companies have been made. In the twenty-nine cases where no applications have been made, local and particular reasons have been the causes.

What, in your opinion, are the principal causes of the present unprosperous condition?

The fundamental cause is the decrease in the purchasing power of the dollar. Accepting the statement of Prof. Irving Fisher of Yale University that the purchasing power of the dollar declined 50 per cent between 1896 and 1918, and the further statement of William H. Taft and Frank P. Walsh, joint-chairmen of the National War Labor Board, which they based upon information furnished by government departments, that as between 1915 and 1918 the purchasing power of the nickel had declined so that a seven-cent fare now purchases no more than did a five-cent fare in 1915, it is easy enough to account for the condition of the industry. If the unit of fare was to-day 10 cents instead of 5 cents, the traction system would be able to meet the greatly increased costs of material, wages, taxes and money.

The cost of operation has undoubtedly advanced to a very notable degree. Between 1914 and 1918 the principal materials used by electric railways advanced from 50 to 200 per cent. A statement recently presented in the zone-system report of the Public Service Railway to the Board of Public Utility Commissioners of New Jersey shows on a weighted average an estimated increase of 82.30 per cent in the cost of materials between 1917 and 1918, while the decrease between 1918 and 1919 amounts to 2.25 per cent.

It is more difficult to give an average for the increase in wages. It may safely be said, however, that since the National War Labor Board became active the increase in wages has amounted to about 50 per cent.

In addition to these causes there is a very important reason contained in the demands of the communities for increased and improved facilities and in the constantly mounting requirements for taxes and other imposts. The amount paid by 130 companies for direct taxes increased from $7,706,343 in 1912 to $9,721,694 in 1916, or 26 per cent. Other requirements of government total $4,093,636 in 1912 and $4,626,568 in 1916, or 1.2 per cent increase. In other words, the amount paid for taxes and other requirements was in 1912 2.36 cents per car-mile; in 1913, 2.53 cents; in 1914, 2.66 cents; in 1915, 2.53 cents, and in 1916, 2.48 cents.

The gradual extension of the transfer privilege has also had considerable effect upon the industry. Census figures show that while the revenue passengers increased 18.4 per cent between 1912 and 1917, the transfer passengers increased 24.6 per cent, whereas as between 1912 and 1907 the revenue passengers increased 28.23 per cent and the transfer passengers 21.25 per cent.

The great increase in the use of automobiles has also had a very marked effect. In the city of Schenectady, which has about 100,000 population, J. P. Barnes, general manager Schenectady Railway, recently made a study of the effect of automobile traffic upon street-car riding. This covers the years 1912 to 1918 inclusive and shows that in 1912 the ratio of pleasure-car riders to trolley-car riders was 1 to 20, while in 1918 it was 1 to 5.08. No doubt these figures would, in general, apply to the cities of the entire country. Aside from the use of pleasure automobiles, the use of the unregulated jitney is another principal reason for the condition of many electric railways.

Has the rapid development of the art of electric traction made necessary frequent and large replacements and betterments in response to public demand and the orders of regulatory bodies?

Undoubtedly. The cars, track, overhead equipment, power houses and practically everything used in connection with electric railways have very materially improved and have become materially more expensive. A very large part of this improvement has brought absolutely no increase in the way of revenue to the companies. The paving required —both as to character and to material—is an example of the kind of expenditure which has been forced upon the companies by municipal requirements but which has brought no corresponding increase in revenue. Moreover, improvements in ventilation, lighting and heating of cars have been made in response to public demand without commensurate increase in revenue. Many extensions to outlying districts have been of material benefit to property and the city as a whole, but have not been paying propositions.

Can you state the comparative operating ratios for a series of years?

For 1902, 57.5 per cent; for 1907, 60.1 per cent; for 1912, 58.7 per cent; for 1917, 63.76 per cent (census figures); for 1916, 62.51 per cent; for 1917, 66.65 per cent; for 1918, 72.65 per cent (American Electric Railway Association figures).

Should traction companies be required to pay part of the cost of bridges over which their lines pass?

This is a fundamental question and one not to be finally answered until a lasting basis for the relations between the companies and the communities is fixed. My personal opinion is that the furnishing of public service, such as electric railway service, should be done upon a cost basis and that it should be done by private capital and private enterprise because of increased efficiency thus secured, and that private enterprise should be allowed a fair and reasonable return, including a reward for economy and efficiency. This return, which must be sufficient to attract new capital into the business, is a necessary part of the cost of service. Having arrived at this conclusion, we must look at every charge against electric railway operation as a charge against the car rider and not as a deduction from the profits of the corporation controlling the company. I do not believe that a public utility should be used as a means of profit-making for a community or for the reduction of taxes or of the cost of city government.

The problem is one of the proper division of city expense as between users of car service and the tax payers. If we accept the theory of service at cost, then we must agree that every charge placed upon the service is paid from the fare received from the passenger. Under existing theories and methods the car service is being taxed to provide thoroughfares for practically every form of transportation except car service. Not only is this true as regards paving, but also as regards street cleaning, street sprinkling and snow removal. For a person who uses an automobile, a wagon, a truck, bicycle, jitney, omnibus or a taxi, the community furnishes a thoroughfare provided at public expense. For the citizen who uses the street car it not only compels him to pay for his own thoroughfare, but taxes him for the benefit of the users of other transportation.

In general, as regards bridge, paving construction and similar highway charges, those made necessary by the special nature of the transportation, namely, rails, ties and other things involved in providing the track and strengthening and improving bridges for use by cars are a proper charge against the carrier. On the other hand, there is no reason why he should be taxed for any part of the thoroughfare which is furnished to other means by transportation without charge.

The committee may be interested to note the theory of the State-appointed trustees of the Boston Elevated Railway in conneection with the use of subways by the Boston electric railway system. In their annual report the trustees say: "The trustees believe that subways are nothing more than highways under the surface, and that the public should own all its highways whether on the surface or below the surface. . . .The trustees believe that the public owes the same duty to furnish highways for electric railway travel that it does for pedestrian or other travelers. . . . The trustees have also asked that the company be reimbursed from the public treasury for the subway rentals which it has been called upon to pay."

Is it for the public interest that traction companies which perform an indispensable public function be protected against the destructive effect of unregulated jitney competition? If so, to what extent and in what manner should regulation of jitneys be applied?

Jitneys should be declared common carriers and treated as such. The same methods and practices of regulation should be applied to them as to the transportation systems —a certificate of convenience and necessity should be required for the operation of a jitney bus; where special licenses, imposts and taxes are levied upon an electric railway they should be similarly levied upon jitney bus lines; where rates, schedules and service of an electric railway are specified and controlled, they should be similarly specified for jitneys, and requirements as to safe and efficient operation for electric railways should be extended to jitneys.

Assuming that the continuance of existing conditions will make most traction companies insolvent and prevent or curtail their operation, what remedy or remedies would you suggest?

(a) Exemption from special taxes, reduction of property taxes and abolition of franchise charges?

(b) Exemption from special charges for bridge construction?

(c) Exemption from paving charges except those arising directly from the existence of operation of the tracks?

It seems to me that communities and the companies must get together on a basis which recognizes that the return to capital should be limited to such a rate as will attract new capital into the business, but which will assure this return on the basis of a flexible fare automatically regulated to provide the cost of the service. I believe that the communities should be permitted to prescribe the service that they require. I believe that there should be special inducement to the private operators of these companies for the exercise of economy and initiative. I believe that co-operative action as between companies and communities will alone bring about such service as will meet the requirements of the city under a reasonable rate of fare. My answers to the detailed queries are these:

(a) Yes.

(b) Exemption from special charges for bridge construction except such as arise from the necessity of increasing bridge strength.

(c) Exemption from paving charges except those arising directly from the existence or operation of the tracks. I would favor exemption from all paving charges excepting those which might arise from the tearing up or reconstruction of track necessitated by electric railway work.

Would you favor an increase in fare and, if so, would you favor an increase for a flat rate irrespective of distance traveled or would you favor the substitution of the zone system?

I would favor such an increase in fares as would cover the cost of providing the service. As between a flat rate system and a zone system, it seems logical that a system of charges based on a stand-by charge or readiness-to-serve charge plus a charge for distance is more equitable between individuals than a flat-rate system. However, the experience with zone or distance tariffs in this country has as yet been insufficient to demonstrate whether such a distance charge would be better for the social welfare of the community as a whole than the present flat-rate system. I think, moreover, that conditions which prevail in various communities must be taken into consideration in the determination of this question. It is apparent that in the smaller cities the zone system is unnecessary and impracticable.

Would an increase in the flat rate tend so materially to lessen short-haul traffic as to decrease instead of increase net revenues?

The answer to this question depends largely upon the amount of such fare increase and the particular conditions concerning the property to which it is applied. In general, I think the car fare should be considered as it affects the riding habit in terms of the average income rather than in its relation to past fares. Car fare is usually a comparatively small part of the budget of the average family. The increase in the cost of living has been met, and is being met by an increase in wages and salaries. I think it would be found true in a very great majority of cases that the proportion of the family budget spent for car fare under any rate of fare now prevailing in the United States is considerably less than it was under a 5-cent fare at the time when most of the fare stipulations were written into the present franchises. For instance, in the period before 1900, $2 was a fair average for the laboring man's wage—the 5-cent fare was then one-fortieth of his wage. To-day $4 is rather below the average wage, but on this basis it would require a 10-cent fare to absorb the same proportion of the income that a 5-cent fare did in those days. It is, therefore, apparent that any rate of fare now likely to be charged imposes no more hardship than did the nickel fare, and that if the riding habit falls off under these conditions we must seek other reasons.

I think that it may safely be said that the experience of most companies charging an increased rate of fare was that there was a temporary falling off of greater or less degree in the traffic, but that the traffic is gradually returning. There is in all cities, except those whose growth is stationary, a normal increase in riding from year to year, so that any decrease in traffic occasioned by an increase in fares would gradually be taken care of by this normal increase. If a service-at-cost system is established and the public is persuaded that it is paying the actual cost of the service and no more, many of the psychological reasons which arise to antagonize the public when a fare increase is made will be eliminated.

Would the zone system tend materially to reduce traffic in outlying districts?

See the above.

Should the transfer privilege be greatly restricted or abolished as a means for increasing revenues? If so, why?

If the cost-of-service plan be in effect, the question of the method of charging becomes largely a social question to be determined by the community.

The general effect of traction service has been to develop suburban and interurban districts by providing means of access thereto. Real estate values have been greatly increased and large investments in homes and factory buildings have been made because of the facilities afforded by such traction service. Would not such property suffer heavy depreciation if traction service were withdrawn because of the insolvency of the companies?

Undoubtedly.

Can you inform us of the extent of suburban and outlying trackage, the operation of which has already been abandoned by reason of the financial difficulties of traction companies?

See statement of abandoned lines already made. The majority of these were, of course, in suburban and outlying districts.

Do you know of any outlying factories, the labor supply of which has been interfered with by cessation of traction facilities?

None in particular.

In general terms, what are your views as to the effect upon communities everywhere of such a material reduction of traction service as would necessarily result from the general insolvency of traction companies?

It would prove disastrous to such communities. From my experience in the position of secretary of a Chamber of Commerce in a city of 150,000 people, I know how important to the commercial and industrial as well as social development of the communities is good electric railway service. The industrial development of the town—that is development of its factories—is very largely dependent upon electric railway service. Communities without such service are at a disadvantage in their competition with other communities.

In your opinion, is such a condition of general insolvency probable unless means for the relief of the companies are provided

(a) *By remission of charges now imposed by public authorities?*

(b) *By increasing the earnings by higher rates of fare?*

Yes.

The electric railway section of the National Safety Council, H. B. Adams, chairman, Aurora, Elgin & Chicago Railroad Company, Aurora, Ill., desires bulletins which can be distributed to members of the section. Electric railways which have had unusual success with bulletins can assist in the general safety movement by co-operating with the railway section in this way.

How One Company Makes Sure Its Men Do Not Miss Useful Technical Articles

ONCE a year a list of fifty or seventy-five technical publications is sent around to officers and heads of departments in the Portland Railway Light & Power Company, and each man writes his name opposite those periodicals he desires to see regularly. The ruling is that any periodical called for by company officers is provided without question, while the name of more than one head of department is required to warrant the addition of a new paper to the list.

The papers come addressed to the library where an assistant librarian scans each article to see what should be referred specifically to individuals. For the guidance of this library reader there has been prepared a list of topics on which the several officials should see articles, for example:

President—fare increases, one-man cars, public relations, legal questions.

Vice-president—franchises, operating problems, improvement of equipment.

City superintendent—labor management, organization, training platform men, accounting, bonuses.

Electrical engineer—plant construction management and operation.

A paster is attached to each paper on which the name of the officials scheduled to receive that number are listed and on which the dates on which they receive the paper are listed.

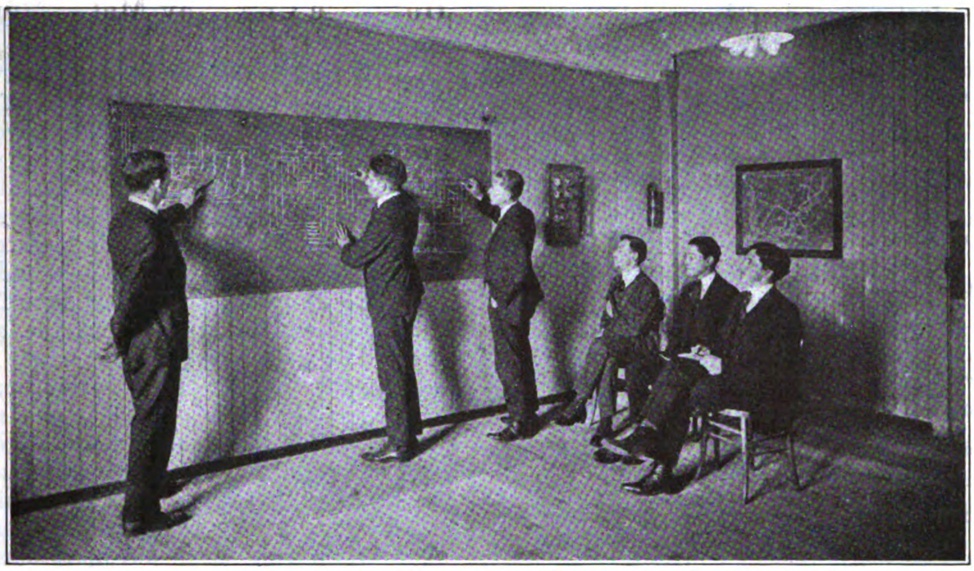
Standard Rule for Grade Crossings Objectionable

A SUGGESTION was made recently by a manufacturer's representative in regard to grade crossings with steam railroads. It was to the effect that no blanket rule covering operation of street cars over such crossings can be made by either city or state authorities.

If the same rule is applied to the two extreme conditions of a switch track in a sparsely settled district where steam operation is infrequent and where the view in either direction is unobstructed and to a double-track main-line crossing where fast trains are frequently passing and the view is obstructed, the danger connected with each will assume somewhat of equal magnitude in the mind of the conductor who goes through the same operations at each crossing. There is a tendency for him to become careless at the switch track because of the realization that the rule is not warranted.

This carelessness is quite likely to spread until it eventually manifests itself at the main-line crossing. Of course the suggestion made applies to both two-man cars and safety cars.

In one city in the Middle West, on a 5-mile line which has been completely equipped with safety cars, there are six double-track grade crossings. During the rush hours of the steam railroad the electric railway company uses men from other departments to act as flagmen at these crossings. At other times the operator flags himself across, just as a careful automobile driver would, namely, by bringing his car to a standstill and observing the crossing in each direction, and after being satisfied that there is no danger from oncoming trains, proceeding.



DRAWING DIAGRAM ON BLACKBOARD FOR THE CRITICISM OF INSTRUCTOR

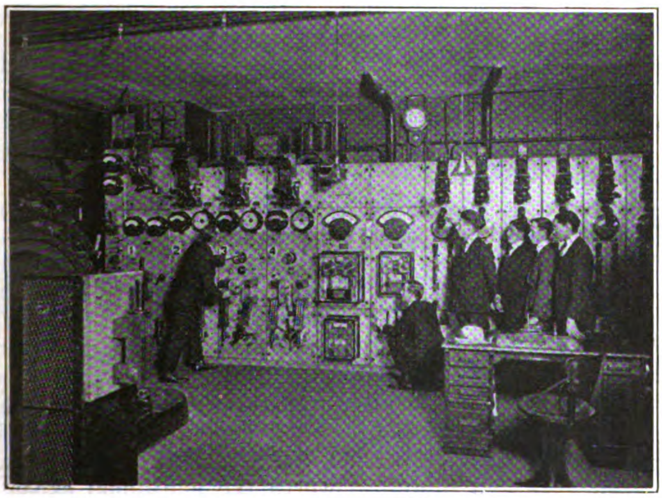
Substation Operators Trained in Fifteen Days

Intensive Instruction Courses Originally Conceived as a War Measure Are Now Being Continued by the Brooklyn Rapid Transit System and Prove a Great Success Under Normal Conditions

A SCHOOL for substation operators was started in the spring of 1918 by R. B. Arthur, assistant to H. A. Robbins, Superintendent of Power for the Brooklyn Rapid Transit Company. This school was first started to train operators for filling vacancies created by the demands of the war. It has met with such success, however, that it is now being continued as a permanent adjunct of the electrical department.

Before a man may become an operator he must be employed in a substation of the company as a rotary man, for in that position he becomes familiar with the general plan and operation of the substation, learns how the current comes from the central station to the substation, and how it is distributed over the wires and cables to the elevated, surface and subway lines. Previous to the establishment of the school the training of operators was left to the various substation foremen. In some cases this plan gave good results, yet while a foreman may have been an excellent operator it did not always follow that he had the ability to instruct green men in the operation of substations. Before a man was certified as an operator he would be placed under several foremen so as to get as much information as possible. If reports on the progress of the man were satisfactory, and if he was found to be competent, he was made an operator.

Naturally this method of instruction was slow, and when men began to leave the substations in rather large numbers to enter military service and war industries, it was found necessary to change the method of instruction. As a result a class of six rotary men was started, and they received instruction in a course lasting six days. At the end of this time three men were qualified as operators and two others were qualified a week



TIMING ROTARY CONVERTERS FOR "CUTTING IN" ON THE LINE

STUDENTS TESTING HIGH TENSION FEEDERS UNDER SUPERVISION OF THE INSTRUCTOR later. The first few classes demonstrated the value of such a course of training, and this substation school for operators has now been made permanent.

The course as at present arranged for green men lasts about fifteen days. After the operators have been qualified, in order to maintain a high standard of efficiency they are occasionally recalled to the school for further instruction. The courses for operators recalled to the school are naturally much shorter and deal with specific phases for operating. The hours for the school are from 8 o'clock in the morning until 4 o'clock in the afternoon, for five days a week. The men are chosen for the school according to their seniority, provided they have served at least two months as rotary men and have had previous experience in the electrical line.

THERE ARE THREE PHASES OF THE INSTRUCTION PERIOD

The instruction course for green men is divided into three periods. The first of these provides instruction in the general plan and operation of all substations on the system. They are taught how electric power is generated, how the generating station furnishes the alternating current to the high-tension bus and how the power is handled at the substation. The path that the current takes after leaving the high-tension bus is explained, and the operation of each piece of apparatus is amplified by diagrams put on a blackboard, and showing the exact connections of the apparatus. The students take notes and copy all diagrams. Each piece of apparatus is explained in detail.

During the second period of instruction the student is required to explain just what to do if some piece of station equipment becomes defective and how to remedy the trouble and get the machine in operation. All the station circuits, both alternating current and direct current, are gone over very carefully, and each one in turn is explained. The class is then taken to a substation and taught how to synchronize or bring the rotary into "step" with the generator at the generating station. In order to guard against closing of the switch at the wrong time when the rotary is out of phase or "step" with the generator the instructor controls the main switch. If he thinks the period is a good one, he closes the main switch at the same time that the student closes his own. This prevents damage to the apparatus. Each student performs this operation until he can do it to the entire satisfaction of the instructor. He is then permitted to "cut in" the rotary on the line. By using this method it is found that the men become more confident, and only twice since the school was started have machines been "cut in" by the students while out of phase.

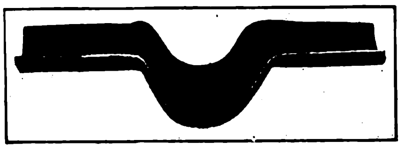
After the entire class is able to "cut in" and "cut out" a rotary the apparatus is tied up in every possible way. Fuses are removed in the control circuit, burnt lamps are inserted in the synchronizing circuit, the field wires are disconnected from the rotary, the oil switches are blocked out and the jaws of the starting switch on the induction motor opened to avoid contact. In addition to these, after the rotary has become synchronized and is ready to "cut in" on the direct-current bus, the student may find that the auxiliary apparatus has been put out of service or that the circuit breaker will not remain in. In either case it is his place to discover the reason for this and also find the remedy. Instruction is also given in how to correct local troubles that may arise, such as the handling of alternating-current and direct-current feeders and overloads and short-circuits.

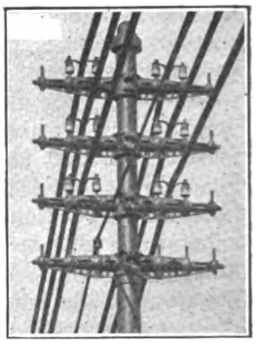
By the end of the second period all the students are able to make a diagram of any piece of apparatus found in the various substations. They are then ready for the third period, which is spent in visiting different substations where the operating conditions of each station are fully explained. When students are working on any piece of apparatus it is blocked and locked out, and the key is kept by the individual working on the apparatus in question. This is done for the protection of himself and others so that the apparatus cannot possibly be made alive, which might result in injury and perhaps death to those working on it.

The last two days of the course are spent by the student in his classroom where a general review of the instruction given in three previous weeks is made, and anything that is not clear is explained. The course is brought to a close by a written examination consisting in answering some 367 questions, and preparing diagrams for the exact connections of the more important circuits.

Double Feeder Insulators Give Strong Construction

THE six heavy wires on the upper arms of the feeder line shown in the accompanying illustration are not supported directly by the insulators, but instead are lying in saddles bridging the gaps between two adjacent insulators and are supported by them. The reason for this unusual construction is that the wires are of 2,000,000 circ.mil section and the engineer who built the line feared that the ordinary tie-top pin insulators would not be strong enough safely to carry their weight on a 90-ft. or 100-ft. span if a single insulator were used. He therefore had saddles for the feeders made of steel in the form shown in the "close up" view, and placed these between the prongs of the insulators with the U-shaped portion, in which the cable rests, located midway between the pins.





ABOVE, SADDLE USED FOR CABLE SUPPORT. AT RIGHT, FEEDER LINE WITH CABLE SUPPORTED IN SADDLES

This form of construction makes an extra strong line at little additional cost; the only increase in price being for the extra arms, insulators and saddles required, and the labor for installing them. On other portions of the same system where the spans are not as long 2,000,000-circ.mil wires have been carried on single insulators for a number of years without the slightest trouble. While the additional precautions taken in this case may not have been needed yet the double construction is undoubtedly stronger than one with only half as many insulators and therefore worth the additional expense for material and labor necessary for installation on this important line.

Sidelights on the Zone Fare—The Problem of Currency

Intermediate Coins Should Be Added to American Currency to Attain Flexibility as Good as England's Without Excessive Use of Tokens

BY WALTER JACKSON

"AMERICANS won't bother about splitting a nickel" is an opinion frequently expressed by street railway men. Be that as it may, it is obvious from the records of many companies which have gone to 6, 7 and 8-cent fares that quite a number of Americans surely have an aversion to splitting a *dime*. Yet this phenomenon in turn has led to the rise of a comparatively small school which avers that American riders would rather pay a dime than be bothered with the making of change! If any noteworthy number of these higher-fare travelers are murmuring to the conductor: "Keep the change," this theory stands vindicated.

Most of us are agreed that the convenience of having a single-coin passport outweighed much of the inequity of the old 5-cent universal fare as long as the purchasing power of the nickel was unimpaired. But that advantage has gone, whether we are dealing with increased universal, central district 5-cent fares, more-than-5-cent zone fares or less-than-5-cent zone fares. Therefore, we must not blame the zone fare because the amount of change-making and number of car-hours for a given traffic may have to be increased. Every operator will have to face the problem of securing the kind of currency most convenient for his patrons. If he cannot get it from Uncle Sam he will have to make it.

Fortunately, the situation is not so bad as it might have been had the electric railways been the first to go to odd prices. The department store with its 99-cent and $1.98 bargains went only a comparatively small way in popularizing the cent. In fact, up to the great increases following the outbreak of war in 1914, the nickel still was the pre-eminent coin, not merely for the street care ride but also for the loaf of bread, the packet of chewing gum, many articles in the "5 and 10-cent" store, etc. It is true that some merchants have met the rise in costs by giving a smaller package or quantity for the old unit price, but in a great number of cases the selling price has been raised to some figure like 6, 7 and 8 cents. This has resulted in ceaseless calls upon the government for more copper and still more copper. With the arrival of fare increases, it is necessary to secure 1-cent pieces by the ton and to supply each conductor with special means to hold them! Alas! for the good old days when Pacific Coast conductors had so noble a scorn for copper that they would rather permit Easterners to ride free than soil their hands with man's primal metal.

A news item just to hand also states that since the new consumption taxes went into effect this month, the Philadelphia and Denver mints are making 2,000,000 cent-pieces a day. From the foregoing sketchy but truthful résumé of changes in the proportion of 5-cent and 1-cent pieces, it is apparent that since copper is more plentiful it is easier to split the nickel now than it was three or four years ago. For the street railway man, also, there has arisen this most distressing situation—the average man feels that his income has not increased so rapidly as the purchasing power of money has decreased, and he is therefore watching his pennies as he never did before.

Let us get next to Mr. Common Citizen to realize how careful he has become about the purchase of a thing that he can dispense with in whole or in part—and that thing is the ride on the street car. Where he once used the car as a convenience, he must now be convinced that he ought to use it for economy in shoe leather and time. How are we going to convince him to return with still greater patronage unless we do what is always done in every other line of selling—give the customer as small a package as he wants or can afford to buy!

Just for a parallel: How many of us are aware that more people in this world buy their fowl by the quarter than by the entire bird? A trip to the East Side of New York or to the East End of London will reward anyone who wants to see the principle of meeting the customer's wishes carried to the limit.

Why is it that the better-paid American workingman or clerk will not ride for such distances as the Britisher unless it be that we have not been applying to him this first principle of salesmanship?

To be sure, there are many American towns and cities where the density of population is so low and the degree of individual prosperity so high that a fare below 5 cents would not increase the traffic sufficiently to make up for the loss of 5-cent short riders. In such places, frequent service with light one-man cars will probably scoop up almost everything worth while. If, after the installation of these cars, the proportion of riders within the 1 or 1½-mile radius is still low, it will prove worth while to do some figuring. There's Aberdeen, for example, with 25 per cent of the passengers riding less than 0.6 mile. Can any of our steepest or warmest cities match this record of a city where climate and national characteristics favor walking?

What has this to do with the splitting of the nickel for short rides? Just this: That such splitting, and consequently short-ride cultivation, has already been made easier by the large increase in 1-cent pieces. The public, however, would be still more willing to take advantage of short-ride fares, and the conductors would be more willing to handle such fares, if our coinage system were improved by adding some intermediate coin like a 2½-cent piece to get a better coin grading like 2½, 5, 7½, 10, etc. A good share of the success of the British system is due to the greater supply of copper half-pence and pence, the abundance of which cancels much of the awkwardness of British coinage considered as a whole. The difference in steps is much less than in United States money, as will be apparent from the following tables of coins and ratios up to 50 cents (United States) and 2 sh. (48 cents) United Kingdom. In each case the lowest coin is the basis of both ratios:

United States:

Coins	1 Cent	5 Cents	10 Cents	25 Cents	50 Cents
Ratios	1	5	10	25	50

Great Britain:

Coins	Farthing	Half-Penny	Penny	3d.	6d.	Shilling	2s.
	½c	*1c*	*2c*	*6c*	*12c*	*24c*	*48c*
Ratios	1	2	4	12	24	48	96

The foregoing tabulation shows why British coinage is better adapted for operating a zone system successfully. The penny is the fare paid by about one-half of the riders, and it is exceptionally prominent, although it was not over-abundant during the war years. This last statement is backed by the fact that London banks now are glad to carry off copper at their own expense whereas they formerly expected the depositor to pay for carriage. The half-penny has been pushed into the background by the rise in costs and the farthing has become almost as mythical as our mil.

American electric railways know of course that paper tickets and metal tokens are permissible substitutes for real money. However, substitutes have usually been employed only for special rates such as four-for-25-cents tickets, and not as direct replacements of standard coins. It would be most desirable to have a single coin to represent each class of ride so that it would be easier for the greater part of the passengers to tender exact fare. More than a generation ago we had both the 2-cent and 3-cent piece, and it is hardly a decade since an unsuccessful effort was made to restore the latter. How helpful that 3-cent piece would be now, either for a short-rate ride or for an increment to the 5-cent fare for extra-length riders! However, a 2½-cent piece would be more logical in our decimal system, as the half-nickel would bear the same relation to the nickel as the latter (once called a "half-dime") does to the dime. Eventually this coin rather than the cent would be our base.

Let us at least agitate for a system of coinage that will show greater flexibility, not alone on systems with graduated fares but on those where the service-at-cost principle keeps the universal rate see-sawing with the income statement. At the worst, we could follow the example of one of the larger British tramways which, finding farthings too scarce for its purpose in encouraging short rides in small towns, successfully sold full-rate farthing strip tickets through the conductors. By the time the war had taken its toll in higher costs, the farthing increments to the base fare of 1 penny were gently displaced by the half-penny increment without any injury to the riding habit.

Sources of Economy in Automatic Substation Control

A Resumé of the Savings in Labor and Material and the Increase in Reliability Made Possible by this New Development

By Charles F. Lloyd

Manager Substation Section Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

THE automatic substation presents such economic possibilities in railway operation that its universal use is only a question of time. Its economic value is appreciated in a general way, yet a clear statement of some of its qualities and limitations, with a practical calculation of economies that can be realized by operating railway substations automatically, should be of interest to both the central station and the railway company; to the one as a possibility for increasing its railway power load and to the other as a possibility for securing a better power rate, or more economical substation operation, or both.

The primary economies to be realized with automatic switching of substations are as follows:

1. Labor charges are materially curtailed, especially where two or three operating shifts are required and where a number of substations are made automatic.

2. Labor difficulties are materially reduced or eliminated. With the present-day labor unrest this is a feature to which full consideration should be given even though it may be difficult to figure the value on a monetary basis.

3. Energy saving amounts to a considerable item, especially on interurban lines where the power demand is intermittent. This saving will result from the elimination of no-load losses, since the automatic switching shuts down the substations when power is not required. This saving means, in general, a conservation of coal, the necessity for which has been brought home to us recently in a forcible manner.

4. Feeder loss can be cut down on account of the practicability of locating substations where required, without having to take labor operating cost into consideration.

5. Feeder copper can usually be reduced on existing properties by relocating substations, or increasing their number, or by both. There are, no doubt, many properties where to-day sufficient copper could be taken down to go a long way toward paying for automatic switching.

6. Electrolysis conditions are invariably improved since the proper location of substations, made possible by automatic switching, materially reduces the length of return circuits and reduces return drops.

7. Reliability of the service can be increased. Considering the ability of the best operators who can be obtained in many cases greater reliability of service is to be anticipated. At least in one case an automatic substation has shown more reliable results than a similar manually-operated one. In any event, it is safe to say that reliability will not be impaired by automatic operation.

8. Maintenance is being classed as a quality since at least in one or two actual cases its cost has run very low. Proper and intelligent inspection and cleaning of the apparatus will undoubtedly result in reduced maintenance expense.

Like all equipment automatic switching apparatus has its limitations and features that partially counterbalance the good qualities. The following are salient items in this case:

1. Inspection must be made by a competent engineer. Since experience seems to indicate that this will not be required oftener than once or twice per week, it is probable that labor saving will not have to be reduced to maintain this talent. It is also probable that the labor for cleaning up the substation apparatus every week or ten days can be obtained by using carhouse men, thereby making it necessary to charge little expense to this item.

2. Investment will probably be increased, entailing, of course, additional capital charge.

3. Hazard to the apparatus may be increased. However the indications are that automatic switching has been developed to such a degree that if properly applied, this fact may even be turned to an advantage in favor of automatic switching.

4. Complication in switching is increased over hand switching; but with proper inspection this should be immaterial since the switching is surprisingly simple.

5. Feeders require careful application to prevent annealing of dropping trolley wires.

6. High-tension lines may have to be rearranged in some cases for automatic substations since there will be no operators to transfer them in case of high-tension troubles. Since the tendency is toward simplication in high-tension switching, with much better line construction, this is not a serious feature. In cases where automatic substations may be used at high-tension switching points, it may be practicable to handle the high-tension switching by remote control.

To illustrate the economies to be realized in substation

TYPICAL ECONOMIES PRODUCED BY AUTOMATIC SUBSTATION SWITCHING

Headway between cars	1 Hr.	2 Hr.
Length of line, miles	25	25
Number of substations	3	3
Capacity of substations, kilowatts	300	300
Distance between substations, miles	10	10
Schedule speed, miles per hour	25	20
Length of operating day, hours	20	60
Total substation hours (manual operation)	60	60
Total substation hours (automatic operation)	32	20
Running-light loss per station, kilowatts	15	15
Energy saved per day (automatic operation), kilowatt-hours	420	600
Energy saved per year (automatic operation), kilowatt-hours	153,300	219,000
Value of energy saving at 1 cent per kilowatt-hour	$1,533	$2,190
Labor-saving per year, six operators at $70 per month	$5,040	$5,040
Total saving per year	$6,673	$7,230
Total investment automatic control—three stations	$18,000	$18,000
Interest, insurance, maintenance, depreciation, taxes, at 15 per cent	$2,700	$2,700
Cost of inspection per year	$500	$500
Total annual charges	$3,200	$3,200
Net annual saving	$3,373	$4,030
Return on investment, per cent	18.7	22.4

operation by automatic control, the table above shows a typical case where the principal features producing savings have been only considered. This tabulation shows what may be considered an average condition and it would not be surprising to find that much greater savings can be effected in the majority of cases, especially when all features are taken into thorough consideration.

Drilling Fender Slats With an Electric Drill Saves Time

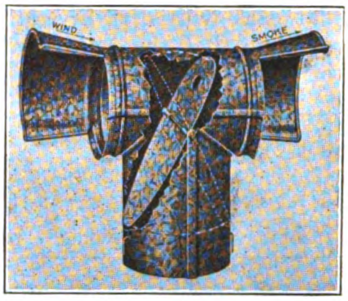
SEVERE operating conditions keep car fender work very active in the shops of the Winnipeg Electric Railway. The accompanying illustration shows an electric drill mounted on a bench in a convenient location for drilling fender slats. This drill was formerly used in some other branch of the service. A jig to insure that the holes are drilled in their proper location facilitates rapid operation. This bench is located alongside the place where the fender repairs are made and its convenience has resulted in nearly five times the amount of work being accomplished in the same time as was previously done when this work was performed by hand.

DRILLING FENDER SLATS AT THE SHOPS OF THE WINNIPEG ELECTRIC RAILWAY

According to results secured in experiments at the University of Illinois 1/32 in. of scale in boiler tubes may reduce efficiency by 9 per cent, while 1/9 in, may reduce it 16 per cent.

A Flue Top for Cars

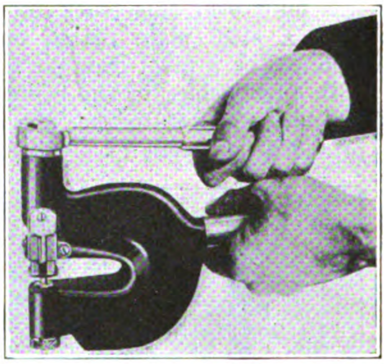
THE simple ventilator flue top for coal heaters, illustrated herewith, is being used on some of the cars of the Cincinnati Traction Company. It is made by William G. Fischer of that city and is designed to exhaust the smoke, gases and other products of combustion generated in stoves carried on moving vehicles, especially where soft coal is used. The flue pipe consists of horizontal and vertical sections, the horizontal section being transverse to the length of the car. The open ends of the horizontal section then face the side-quarters of the wind. Inside the vertical section is an oscillating tongue or diaphragm which leads the smoke into both outlets under normal conditions but will swing to void the smoke through the opening away from the wind if the wind pressure is much higher on one side than on the other. Each orifice is provided with semi-circular wings with their convex surfaces disposed forward to avoid back draft.



SECTIONAL VIEW OF FLUE TOP

New Type of Hand-Operated Punch

A NEW TYPE of hand punch has recently been placed on the market by Paul W. Koch & Company, Chicago, Ill. It is called the "Jiffy" punch and punches holes of $\frac{5}{32}$ in., $\frac{3}{16}$ in., $\frac{7}{32}$ in. and $\frac{1}{4}$ in. in metal up to a thickness of No. 10 gage. The particular feature of the machine is a deep throat and one-piece automatic disappearing stripper which gives a clear view to the punch and punch marks for the next operation. This also permits several sheets to be punched with one operation. The punch is shown in an accompanying illustration. It weighs 5 pounds, is $9\frac{1}{2}$ in. long and may be clamped in a vise if desired. One-half turn of the top handle operates the punch and drives it through the metal.


NEW TYPE OF HAND-OPERATED PUNCH

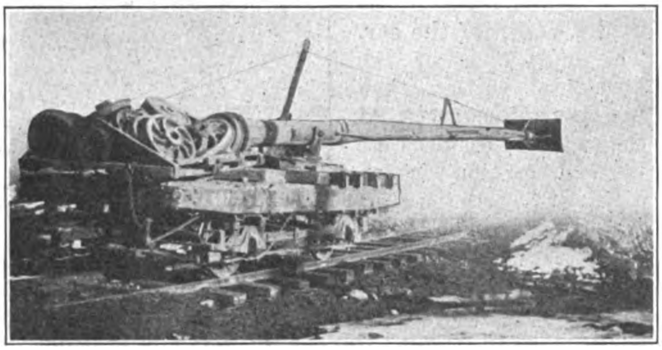
Electrification Shows Surprising Results on an English Railroad

Three years before the electrification of the London & Southwestern Railroad's suburban lines 25,000,000 passengers were carried. Due to the inadequacy of the steam service rendered this number fell off to 23,000,000 just preceding electrification. In 1916 electric service was gradually brought into operation and the number of passengers carried increased to 29,000,000. In 1917 this number further increased to 33,000,000 and in 1918 the total was 40,000,000.

A Mechanical Pusher for Unloading Flat Cars

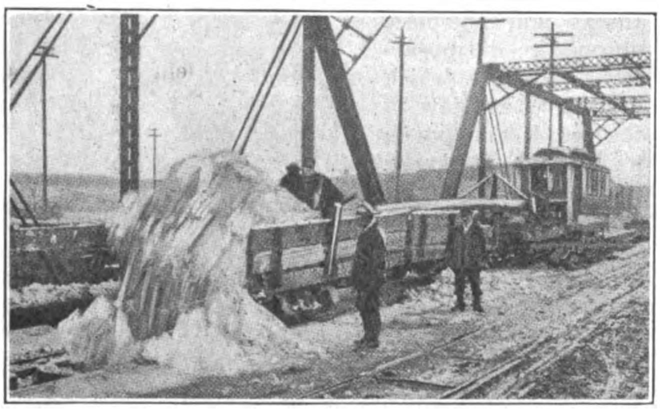
By W. L. Whitlock
Office Engineer The Denver Tramway Company

THE "pusher" shown in the accompanying photos was constructed by the Denver Tramway Company for the purpose of reducing the labor costs of unloading flat cars with dirt in addition to reducing the length of time that the equipment was tied up on this class of work. The dirt excavations of track, bridge and building jobs whenever possible are loaded onto our standard flat cars, and in former years this material was used to backfill a gravel pit that this company leased. At the present time a dump has been established at which waste materials are disposed.



"PUSHER" ON TURNOUT

The "pusher" is mounted on a Bemis single truck having a wheelbase of approximately 7 ft. A platform was built over this truck and a wood pole 55 ft. long with a steel plate placed on the end of pole, was mounted on a pivot over the truck and three steel rods, with turnbuckles in the center to adjust strains were provided for reinforcing the pole. Counterbalance is provided by means of a platform weighted with scrap steel on the rear end of the pole. A coupler is provided on the rear end of the pusher to permit of coupling to a work car equipment.



AN ECONOMICAL DUMPING OPERATION

It is necessary to have the dump track provided with a turnout in order to use this equipment to advantage. The "pusher" stands on the turnout track when not in use. A motor car with a flat car loaded with dirt backs onto the dump track and the brakeman sets up the handbrake on the flat car, removes the brake staff and "cuts off" the motor car. This then backs up, couples onto the "pusher" and runs up to the flat car. The train crew drop the side boards of the flat car and then unload it by means of the "pusher." The brakeman takes his stand at the head of the "pusher" pole and guides the pole as to depth and side swing and the motor car provides the power. A crew of two men will unload a car of dirt in approximately fifteen minutes.

During a very heavy fall of snow a few years ago, it was necessary to remove snow in certain locations by flat cars, and the "pusher" unloaded these cars into the Platte River through an opening in the bridge as shown in an accompanying photograph. By the use of the "pusher" three men were able to perform the work which otherwise would have required a work gang of fifteen shovelers. Flat cars each holding from 12 to 14 cu.yd. of snow were unloaded at an average rate of six minutes per car. This home-made pusher running day and night, at a cost of $9 per shift for labor, was able to unload more snow than was handled off flat cars by the city at Sixth Avenue with a cost of more than $80 per shift.

New Soot Cleaner Swivel Head

THE Vulcan Soot Cleaner Company, Du Bois, Pa, has just placed on the market a new swivel head for its soot cleaner. Steam from the boiler passes into the swivel head from the bottom through a vertical pipe and thence into the horizontal element which extends from the swivel head through the brick wall and into the setting.

After the steam is turned on the operator rotates the element slowly from one extreme to the other. Steam turbine nozzles inserted in the element discharge the steam between the tubes in high velocity jets, and in the course of rotation the tubes are freed from soot. The limitations of rotation are regulated by stops attached to the link chain. A pointer from one arm of the sprocket indicates to the operator the direction in which the steam jets are discharging.

To take care of expansion and contraction a gastight, sliding joint is provided between the sprocket wheel and the metal housing that is mortared into the brickwork. As the vertical riser expands or contracts, the swivel head moves up or down and the attached end of the element follows.

Leaks Through Subway Walls Stopped

THE leaks in the Canal Street station of the Broadway Subway, New York, operated by the Brooklyn Rapid Transit Company, which perplexed engineers for many months, have been finally stopped. When the situation was at its worst several months ago, water poured into the station at the rate of 150 gal. a minute. Under the direction of engineers of the Public Service Commission for the First District, a system was devised by which these leaks have been very largely stopped; so that now the total flow of water is less than 2 gal a minute, and it is expected that shortly it will be stopped altogether. The system employed in ending the leaks consists of drilling holes through the concrete side walls of the subway at various points, and through these forcing grout—a mixture of cement and water—until no more can be pumped through the openings. By this means the leaks, which were in reality breaks at the connection of waterproofing laps on the outside of the structure, were effectually stopped.

American Association News

VALUATION COMMITTEE OF AMERICAN ASSOCIATION AND EQUIPMENT COMMITTEE OF ENGINEERING ASSOCIATION BEGIN ACTIVITIES—NEWS OF COMPANY SECTION MEETINGS

Changes in Washington Office

W. V. HILL has tendered his resignation as manager of the Washington office of the American Association and has returned to California to resume his work as manager of the California Electric Railway Association. Mr. Hill performed invaluable service in Washington for the Electric Railway War Board and later for the committee on national relations, and his resignation was accepted with regret.

The committee on national relations has placed A. S. Hills temporarily in charge of the Washington office as acting manager. Mr. Hills is the executive secretary of the National Public Utilities Committee.

Valuation Committee Begins Work

THE valuation committee of the American Association held its first meeting of the year in New York on May 6. The members in attendance were J. N. Shannahan, Hampton, Va.; C. E. Bailey, New York, N. Y.; Martin Schreiber, Newark, N. J.; George Weston, Philadelphia, Pa., and B. E. Tilton, Syracuse, N. Y.; J. H. Pardee, E. B. Burritt and J. W. Welsh were also present. Owing to P. J. Kealy, chairman, being unavoidably detained in Kansas City, Mr. Shannahan was chosen to preside.

The discussion covered the general work of the committee and the program to be followed. Mr. Weston was requested to formulate a statement of cardinal principles of valuation and submit it to the other committee members in advance of the next meeting. It was proposed that these members should then reduce to writing their opinions in regard to this statement, all the material to be presented at the next meeting for discussion.

Epuipment Committee Meeting Well Attended

THE equipment committee of the Engineering Association met in New York City on April 30. The three subjects which had been assigned the commitee for study and report were considered, and subcommittees were appointed to collect information and make recommendations on each. These were listed in the ELECTRIC RAILWAY JOURNAL of March 22, page 609. The following were present: Daniel Durie, Connellsville, Pa., chairman; W. S. Adams, Philadelphia, Pa.; R. H. Dalgleish, Washington, D. C.; E. D. Priest, Schenectady, N. Y.; K. A. Simmon, Pittsburgh, Pa., and N. D. Trist, Pittsburgh, Pa.

In regard to coöperation with the National Fire Protection Association in formulating a new code for 1200-volt car wiring, the committee considered that it was very important to have representation. The wiring problem and conditions for electric car equipment differ considerably from other forms of electric installation, and as the latest practice is to install the wiring in conduits wherever possible any increase in thickness of the insulation on the various wires would mean the use of large conduits and heavier construction. All felt that the outside diameter of the wires should be kept as small as would be consistent with the necessary safety protection. The subcommittee appointed to have charge of this subject consisted of W. G. Gove, chairman; J. M. Bosenbury, E. D. Priest and K. A. Simmon.

In the discussion on the development of check gages and templates for wheels and truck parts it was pointed out that the present "standard" wheel is used scarcely at all. It was also felt that the adoption of gages for wheels would properly follow the adoption of a standard wheel which would be used more generally. It was also considered advisable that any standards adopted should be for wrought steel wheels and should not apply to cast iron wheels. The subcommittee to work on this subject comprises H. A. Johnson, chairman; W. S. Adams, R. H. Dalgleish, W. G. Gove, E. W. Lyndon and N. D. Trist.

The topic, "Standardization of Motor Parts," brought out discussion as to the extent to which standardization may prevent progress. The operating members of the committee mentioned the great number of spare motor parts which they find it necessary to carry, many of which differ very slightly. Any standardization would of course be of great assistance in reducing the number of these parts. The manufacturing engineers described the large amount of standardization work that had been going on in their individual companies and said that it was to their advantage as well as the purchasers' to keep the number of parts small. This would reduce the number of dies, tools, etc., which are required. Some of the items which might be standardized are the supports of field coils, field coil terminals, lengths of leads, types of motor lead connectors and style of bushing for leads. Perhaps a recommendation for the use in new designs of only the nose type of motor suspension and box-frame motors might be favored. The subcommittee appointed to consider this subject and make recommendations consists of R. H. Dalgleish, chairman; J. M. Bosenbury, Daniel Durie, E. D. Priest and K. A. Simmon.

The sub-committees were instructed to hold meetings as soon and as frequently as possible, and the next general meeting of the committee was scheduled for June 26 and 27.

Lively Meeting at Bridgeport, Conn.

THE April meeting of the Connecticut Company section was held under the auspices of the Bridgeport division, J. S. Goodwin manager, at the Hotel Stratfield on Apr. 29. Two hundred or more dined together and after dinner a program, largely of entertainment, was carried out. The membership committee reported additions of fifty-one during the month bringing the total membership to 330. W. E. Jones, statistician, and J. F. Berry, attorney, were presented with gifts in appreciation of their services to the section. Mr. Jones has joined the auditing department of the Rhode Island Company, and Mr. Berry is taking up the practice of law in Hartford.

Mr. Berry, who has conducted the higher fare and legislative relief cases for the company, explained what had been done in showing the legislature why the company needed relief, but the action taken on the day of the meeting showed that little impression had been made. As long as the cars keep moving, said he, the people will continue to believe that the railways will get along somehow. J. K. Punderford, general manager, followed in the same general strain and urged an even greater co-operation on the part of the organization. Lieut. Devine, a local lawyer, gave a dramatic tale of the soldier's life at the front, closing with a plea for the Victory Loan.

The entertainment comprised orchestral and vocal music, recitation of original verses by "Motorman 4449," solo dancing and "black-face comedy."

Important Mail Hearings

THE Interstate Commerce Commission has arranged for an important series of regional hearings during June and July in regard to the compensation of electric railways for the transportation of United States mail. It is highly essential that all companies should take advantage of this opportunity to present their case in order that adequate conpensation may be secured, for under changes in legislation made in 1918 it is provided that:

> It shall be unlawful for any urban or interurban electric railroad to refuse to perform mail service at the rates or methods of compensation thus provided for such service when required by the Postmaster General so to do, and for such offense it shall be fined $100. Each day of refusal shall constitute a separate offense.

The American Electric Railway Association, in order that the electric railways may be able properly to present their case, is arranging for the designation of different electric railway men to supervise and co-ordinate the work in connection with the regional hearings. There will be one of these railway leaders for each hearing. The hearings are to be held before Examiner George N. Brown at 10 a.m. on the dates and at the places here noted:

June 9, 1919	Office of Interstate Commerce Com.	Washington, D. C.
June 11, 1919	United States Court Rooms	Philadelphia, Pa.
June 13, 1919	United States Court Rooms	Boston, Mass.
June 18, 1919	Hotel Onondaga	Syracuse, N. Y.
June 20, 1919	United States Court Rooms	Cleveland, Ohio
June 23, 1919	United States Court Rooms	Detroit, Mich.
June 25, 1919	United States Court Rooms	Indianapolis, Ind.
June 27, 1919	Federal Building	Chicago, Ill.
June 30, 1919	United States Court Rooms	Minneapolis, Minn.
July 3, 1919	United States Court Rooms	Portland, Ore.
July 7, 1919	Hotel St. Francis	San Francisco, Cal.
July 9, 1919	United States Court Rooms	Los Angeles, Cal.
July 15, 1919	United States Court Rooms	Salt Lake City, Utah
July 18, 1919	Federal Building	Kansas City, Mo.
July 22, 1919	United States Court Rooms	Dallas, Tex.
July 24, 1919	Hotel Jefferson	St. Louis, Mo.
July 26, 1919	Hotel Gibson	Cincinnati, Ohio
July 28, 1919	Rooms of Chamber of Commerce	Pittsburgh, Pa.

The association has also thoroughly canvassed the situation and has prepared under the direction of F. W. Doolittle, consulting engineer, a form of exhibit for the use of the companies in order that data may be presented upon a uniform basis. The subject matter of the exhibit is divided into two general parts relating to the transportation of pouch mail and to the transportation of mail in independent cars. Data on both subjects are necessary to the Interstate Commerce Commission in determining a general theory of rates for electric railway transportation of mail and in calculating specific rates applicable to the companies engaged in this business.

Utility Commission Inspector Addresses Newark Section

ON APRIL 25 H. C. Eddy, senior inspector Public Utility Commission of New Jersey, read a paper on "The Development of the Electric Railway" before the Public Service Railway company section at Newark, N. J. This was illustrated by means of a large collection of lantern slides from various sources which the speaker had assembled for the purpose. He traced the evolution of the modern car body, track, overhead, and power system using illustrations relating to the local property as far as possible. As the speaker based his talk largely on personal experience gained in the electric railway business in different parts of the world he was able to give a touch of reality to the narration. In his audience were many men who had taken an active part in the development of the local system, their experience extending over many years, and this furnished a strong bond between the audience and the speaker. The audience included a public utility commissioner, the chief engineer of the commission, officials of the railway company and 150 or more employees.

The membership committee reported seventy-four accessions since April 1 and the secretary read a letter from E. B. Burritt reminding the section that the competition for the medal to be awarded by the American Association for the best paper presented before a company section will close on May 31.

Mississippi Association Reconvenes

H. E. BRANDLI, vice-president and general manager Meridian Light & Railway Company, was elected president of the Mississippi Electrical Association at a meeting held in Gulfport, Miss., on April 15, 16 and 17. E. S. Myers, general manager Vicksburg Light & Traction Company, was elected secretary.

Owing to war conditions this was the first convention held by the State association during the last four years. The meeting was an enthusiastic one from start to finish and was well attended. One of the interesting social features of the program was a boat trip from Biloxi, Miss., around the bay.

In the absence of W. T. Stewart, president Mississippi Coast Traction Company, Gulfport, Miss., Barney E. Eaton, attorney for the Gulf & Ship Island Railroad, an allied interest, gave the welcoming address. Mr. Eaton called attention to the handicap suffered by the utilities during the war period, owing to inability to get satisfactory rates from the communities served.

In the course of his president's address H. F. Wheeler, general manager Hattiesburg Traction Company, said:

> While we call ourselves an electric association, we are most of us vitally interested just at this time as to the future of our associated electric railway properties. The case of the small electric railway is infinitely worse than that of the other utilities. The privately-owned automobile first came and made heavy inroads on its revenue. Then the jitney came and took its share, but nothing like the privately-owned machine. The last straw was the war, which doubled the cost of all commodities except utility service and particularly the 5-cent car fare.
>
> In the light of present conditions we are almost tempted

to believe that the small electric railway was a mistake from the beginning and that there never was an excuse for building one in a small community. Some may differ with me in this statement and ask what about residences, schools or hospitals a mile or more from town. The answer is that these would doubtless have been built much nearer town had there been no street-car system, or if there were no street-car system they would doubtless be served by their own bus or by some company operating a bus line. It is easy to look back and see mistakes, and as we now look back it is difficult to understand why a small system was ever built.

Of course we understand the old argument that a street-car system helps to build up a town. The operating expense and fixed charges, however, have to be paid by someone while the town is growing to the system, and it is now getting to the point where these are fast bankrupting the small electric railway. If this is associated with an electric light proposition, it is almost sure to drag the whole company into a receivership unless some drastic action is taken. The small company is not a real necessity but rather a convenience or luxury, and if the fares are placed at a high enough figure to permit the utility to exist, the number of passengers will fall sufficiently to more than offset any increases.

I am not here to propose any radical step, but only to repeat what we have found out for ourselves about the electric railway game. If we follow the policy of least resistance we will hang to our respective railways until our present equipment falls to pieces, with the hope that either gasoline will go to such a point that the use of the auto will be restricted, or that some new type of car may be developed which will save the day.

Toledo Section Appoints Permanent Secretary

ON ACCOUNT of the present large membership of more than 1300 in the Toledo joint company section, it has been found necessary to appoint a permanent secretary to look after the details of the work. David H. Shapiro, formerly private secretary to Frank R. Coates, has been selected for this purpose. Mr. Shapiro reports that a very successful get-together meeting was held on April 28, with 600 members in attendance. The program comprised vaudeville "stunts," instrumental music, community singing, monolog, and boxing and wrestling matches.

LETTERS TO THE EDITORS

How Travel in Large Cities Increases

80 WALL STREET
NEW YORK CITY, April 29, 1919.

To the Editors:

On page 839 of your April 26 issue, there is published an estimate by Public Service Commissioner Kracke on the probable population and traffic of New York City in 1950. While it is within the limits of probability that the population of Greater New York will reach 12,500,000 persons in 1950, it is utterly impossible that this population should produce over 8,000,000,000 passengers on the city transportation lines. This would mean nearly 700 rides per capita per annum, which, as can be readily shown, is an absurdly high figure.

It is an established fact that during a certain period of a city's growth the traffic increases more rapidly than the population. This is due to the increase of the riding habit, conveniently expressed as rides per capita per annum. The riding habit, however, has a definite limit, and the increase in rides per capita becomes smaller and smaller as this limit is approached. After the riding habit has reached its limit, the traffic will grow only in the proportion of the population growth.

Only about 40 per cent of the people in a large city are habitual riders and most of these ride only twice a day. The other 60 per cent, children, housewives and those workers who walk to their places of employment, ride only occasionally. No matter how large the city and how extensive the transportation facilities, this part of the population will not ride more than four times per week per person. If this traffic and also that derived from non-residents are prorated to the habitual riders, it becomes evident that no higher figure than 3⅓ rides per day should be assigned to them. On the basis of 300 business days, therefore, one thousand rides per year per habitual rider or 400 rides per capita of the whole population appears to be the limit of the riding habit.

It may be concluded that even should greater New York become a metropolis with 12,500,000 population the traffic on the city transportation lines would not be over 5 billion passengers. EUGENE E. HALMOS.

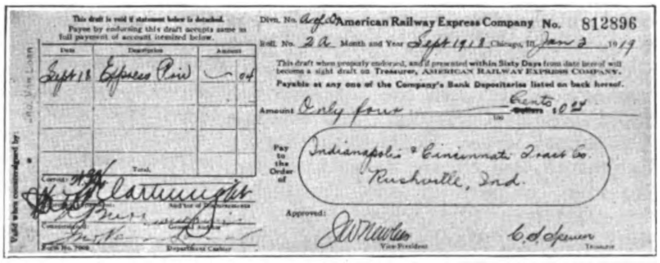
All the Railway Got During One Month Was 4 Cents

INDIANAPOLIS & CINCINNATI TRACTION COMPANY

INDIANAPOLIS, IND., May 6, 1919.

To the Editors:

On July 1, 1918, the American Railway Express Company took over the privilege of the Adams Express Company for operating over our lines, for which we were receiving 40 per cent of the gross receipts for the transportation of express. The results of the operation of the American Railway Express Company are so striking that I think attention should be called to them. Below, in tabulated form, is a comparison of amounts paid to this company by each of the two companies:



This draft is void if statement below is detached.
Payee by endorsing this draft accepts same in full payment of account itemized below.

Date	Description	Amount
Sept 18	Express Paid	.04

Divn. No. Acfl.O American Railway Express Company No. 812896
Roll No. 2A Month and Year Sept 1918 Chicago, Ill. Jan 3 1919

This draft when properly endorsed, and if presented within Sixty Days from date hereof will become a sight draft on Treasurer, AMERICAN RAILWAY EXPRESS COMPANY.
Payable at any one of the Company's Bank Depositaries listed on back hereof.

Amount Only four Cents ~~Dollars~~ .04

Pay to the Order of Indianapolis & Cincinnati Tract Co. Rushville, Ind.

Approved:
Vice President
C. E. Spencer Treasurer

Valid when countersigned by
Department Cashier

REPRODUCTION OF THE CHECK FOR SEPTEMBER, 1918

For same privilege Adams Express Company paid for:		While the American Railway Express Company paid the following:	
January, 1918	$320.00	July, 1918	$58.26
February, 1918	288.61	August. 1918	130.47
March, 1918	430.14	September, 1918	.04
April, 1918	439.01	October. 1918	18.78
May, 1918	456.72	November, 1918	3.12
		December, 1918	65.13
Total for 5 months	$1,934.48	Total for 6 months	$275.80

I also inclose a photograph of the draft sent us for 4 cents for our 40 per cent of the business for the month of September, 1918.

This surely is a good illustration of the benefits of government control.

CHARLES L. HENRY, President.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Transit Work Almost Completed

New York City's $300,000,000 Municipally-Owned, but Privately-Managed, System Ready

The opening recently of the new Clark Street tunnel between Manhattan and Brooklyn leaves few important parts of the dual rapid transit system for New York City yet to be placed in operation. There are still three more East River tunnels to be completed and placed in service, but they are parts of the system operated by the New York Consolidated Railroad Company (Brooklyn Rapid Transit System).

MORE RIVER TUNNELS SOON

The first to be opened will be the Whitehall Street-Montague Street tunnel, which will connect the Fourth Avenue subway system in Brooklyn with the new Broadway subway in Manhattan. Another is the tunnel from Sixtieth Street, Manhattan, to Long Island City in Queens, which will connect the northern part of the Broadway subway in Manhattan with the existing elevated railroads to Astoria and Corona in Queens, over which the New York Consolidated Company will have joint trackage rights with the Interborough Rapid Transit Company. The third is the tunnel from Fourteenth Street, Manhattan, to North Seventh Street, Brooklyn, a part of the Fourteenth Street-Eastern line which begins at Sixth Avenue, Manhattan, runs under Fourteenth Street to the East River, under the river to North Seventh Street, Brooklyn, under North Seventh Street to Metropolitan Avenue, to Johnson Avenue, to Bushwick Avenue, and thence by elevated railroad to East New York.

It will be another year or more before all these lines will be completed, but it is hoped that the Whitehall-Montague Street tunnel will be placed in operation early in the coming Summer. Another line for this system yet to be built is the projected subway extension from the Municipal Building, under Nassau Street to a junction with the Montague Street tunnel line at Hanover Square. The contracts for this subway have not yet been awarded.

INTERBOROUGH SYSTEM NEARLY FINISHED

With the exception of one short subway line in Manhattan, one elevated extension and one subway extension in the Bronx, storage yards in Brooklyn, the Bronx and Queens, and the extension of the Brooklyn subway from Atlantic Avenue, out Eastern Parkway to Buffalo Avenue, and its branch down Nostrand Avenue to Flatbush Avenue, and the elevated extension from Buffalo Avenue over East Ninety-eighth Street and Livonia Avenue to New Lots Road, the Interborough part of the dual system is completed.

The subway line in Manhattan just referred to is the extension of the Queensborough subway or Steinway tunnel line westward under Forty-second Street from the Grand Central to Times Square. The elevated extension in the Bronx is the extension of the Third Avenue Elevated Railroad out Webster Avenue to a junction with the White Plains Road branch of the subway at Gun Hill Road, and the subway extension is the elevated part of the Pelham Bay Park branch. All of this work is being built and will be owned by the city of New York with the exception of the Webster Avenue elevated extension, which is to be built and paid for by the Interborough Rapid Transit Company.

Strike on Canadian Line

A strike of the employees of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., controlled by the Detroit (Mich.) United Railway, stopped all traffic on the lines of the company at 5 a. m., on May 3. Attempts at conciliation between the men and the company have so far proved unsuccessful.

The men demand the dismissal of F. E. Hayes, general superintendent of lines, the recognition of the union, an eight-hour day with a minimum wage of 50 cents an hour and a maximum of 65 cents an hour. The present wage scale is 36 cents minimum and 41 cents maximum. The strikers have expressed willingness to compromise on all points except the removal of Mr. Hayes.

Mr. Anderson, manager of the company, stated that the officials of the company had no proposals to make, and contended that an increase in wages could not be granted to the employees unless an increase in fares was allowed by the five border cities in which the railway operates.

No arrangements have been made for continued service and the suggestion that the lines be taken over temporarily by the Ontario Hydro-Electric Commission was rejected by the company's officials.

The action of the men is sanctioned by the Amalgamated Association. The Detroit men are asking practically the same scale of wages.

As a result of the strike business and manufacturing concerns in Windsor and the neighboring municipalities are seriously hampered. There is little traffic on the Detroit-Windsor ferry.

New York Commission Reorganized

Lewis Nixon Appointed Regulatory Head of Commission for Greater New York

Lewis Nixon, appointed by Governor Smith as the regulatory head of the Public Service Commission for the First District of New York, was designated by the Governor on May 3 to supervise the construction end of the subway work until the appointment of a public service commissioner in charge of construction work. Under the changes made in the commission law at the session of the Legislature ended recently, the commission with jurisdiction covering Greater New York will be organized with two members, one in charge of regulation and the other in charge of construction.

Commissioners Whitney, Hervey and Kracke, who have been serving, completed their work on May 3. Two names for appointment to the post of commissioner in charge of construction are suggested as probabilities. One is that of Col. Merritt Smith, who was chief engineer of the Bureau of Water Supply, Gas and Electricity of the City of New York, and the other is that of Henry B. Seaman, formerly chief engineer of the commission.

PLANS OF RETIRING COMMISSIONERS

Travis H. Whitney, acting chairman of the commission, has announced that he will resume the practice of law. Mr. Whitney has been connected with the commission since it was created, at first as its secretary and for the last two years as a commissioner.

Commissioner Kracke will enter no business field that would restrict his political activities.

Commissioner Hervey has entered the moving picture field.

Mr. Nixon refused to say anything definite in regard to his plans until after he had formally taken over the work of the commissionership and acquainted himself with his surroundings. He did, however, make the following general statement:

> The Governor told me that he wanted a man for the place who knew the value of money, as well as its comparative value with time in certain emergencies, and who had the knack of getting a dollar's worth for every dollar spent. Well, I believe I am that kind of a man. I shall serve the public to the best of my ability, not with the hope of pleasing all, for that is impossible, but surely with the expectation of giving all that I have to the work.
>
> Whatever decided opinions I may have, they must be and shall be subordinated to the statutes. I enter upon the office almost a stranger to its specific duties. I must have time to study conditions before I venture opinions upon this or that phase of a situation. This will require much time. Meantime I can do only one thing—enforce the law as I find it.

Wages in Seattle

Municipal Railway Makes Public Rates for Various Positions from Superintendent Down

The scale of wages for trainmen heretofore in effect on the short existing municipal line in the city of Seattle, Wash., will increase the monthly payroll on the present enlarged municipal line by $17,894. The city scale is considerably higher than the scale paid by the Puget Sound Traction, Light & Power Company, the railway lines of which were taken over recently by the city. The wage schedule covering all the executive positions and many of those of the rank and file follows:

	Per Year
Superintendent, unclassified	$4,500
	Per Month
Assistant superintendent	$300
Secretary-stenographer	150
Railway construction inspector	145
Service and equipment inspector	145
Subway inspector	135
Pole inspector	135
Gas franchise inspector	135
Junior utility inspector	130
Junior draftsman	135

Clerical Division

Head clerk	$150
Stenographers (6)	120
Lost article clerk	80

Accounting Division

Auditor	$260
Assistant auditor	185
Bookkeepers (2)	150
Revenue clerk	180
Cashier	165
Assistant cashiers (11)	100
General storekeeper	175
Assistant storekeeper	150
Head clerk	150

Transportation Division

Superintendent of transportation	$300
Assistant superintendent of transportation	200
Station masters (4)	170
First assistant station masters (4)	155
Second assistant station master (1)	100
Superintendent of schedules	200
Assistant superintendent of schedules	150
Mileage clerks (2)	80
Inspectors (15)	170
Starters (3)	150
Instructors (3)	170
Superintendent of freight	175
Chief dispatcher	190
Dispatchers (5)	150
Telephone engineer	175
	Per Day
Trainmen (cable gripmen)	$4.65 4.90 5.15
Trainmen (freight and passenger)	4.25 4.50 4.75
Trainmen (one-man car operators)	4.57 4.82 5.07
Oilers (16)	4.25 4.50 4.75

Ways and Structures Division

	Per Month
Chief engineer	$300
Assistant engineer	240
Chief draftsman	160
Railway draftsmen (2)	135
Roadmaster	200
Clerk	120 145
Bridge tender	140

Shops and Carhouses Division

Superintendent of equipment	$333
Assistant superintendent of equipment	200
Chief clerk	150
Clerks (3)	120 145
Junior clerk (1)	80 115
General shop foreman	250
Shop foremen (3)	175
	Per Month
General carhouse foreman	$200
Carhouse foremen (12)	140 175

Intelligence Division

	Per Month
Supervisor, publicity and contracts	$200
Supervisor, personnel	200
Assistant supervisor, personnel (4)	150
Supervisor, power	180
First assistant supervisor, power	175
Second assistant supervisor, power	150
Statistician	175
Complaints clerk	170
Equipment and ways and structures inspector	175
Service inspector	160
Assistant service inspector	150

The pay of trainmen is to commence at the minimum rates noted previously and increase to the next higher rate after six months' service at any specified rate. Due allowance is to be made for continuous service with any electric railway company, the property of which shall be acquired by the city. Such continuous service, however, is to be immediately prior to the acquisition of the railway property by the city of Seattle.

Short Strike in Wheeling

The entire Wheeling district of West Virginia, as well as a number of communities in eastern Ohio from Steubenville to Bellaire, was affected for a day by a strike of about 1200 employees of the electric railway companies operating there.

The strike went into effect at midnight on April 30 and was declared off at midnight on May 1, when an agreement was reached to arbitrate the differences. The men returned to work on May 2. The old agreement between companies and their employees expired on April 30. No attempt was made to operate cars during the strike. The companies affected were the Wheeling Traction Company, Pan Handle Traction Company, Steubenville & Wheeling Traction Company, West Virginia Traction & Electric Company, Steubenville, Wellsburg & Weirton Railway and the City Railway.

The strike was the climax to numerous conferences between representatives of the companies during which agreement was reached on nearly every section of the contract except that covering wages. The employees demanded an increase in wages of about 33 per cent over the old scale.

At a meeting of the employees on April 28 it was finally decided that in the event no agreement could be reached with representatives of the companies the employees would agree to arbitration. Difficulties then arose as to what ground should be covered by any tribunal of arbitration and as to just what extent the whole question of wages should be or could be considered. Through the absence of railway officials from Wheeling no conference was held between representatives of the conflicting interests on April 29 and this led to further misunderstanding, as a result of which employees balloted on the question of declaring a strike.

Following the issuance of the strike order the companies affected gave out a statement reviewing the entire situation, including what transpired at the conference looking toward a peaceful settlement of the matter.

Against the One-Man Car

President Mahon Sees in It Merely a Device for Making One Man Do Work of Two

W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees of America, has contributed to the *Motorman and Conductor*, the official organ of the association, an article "The One-Man Car Proposition." He says that in listening to the arguments of the representatives of the railway companies on the one-man car "one would think that all the geniuses of the world had been combined to produce in the one-man car a blessing for humanity, while the truth is that the one-man car is about as old as the street railway business itself."

After further reviewing the history of cars Mr. Mahon launches into presenting his case against the one-man vehicle. While telling what a terrible maker of accidents he thinks the one-man car will prove he offers real proof of what a really frightful increase there has actually been under operation with cars on which two men are used. But let Mr. Mahon convict himself with his own pen. Here in part is what he says:

> This is a case where the public have forgotten the one-man car and the fight they had to displace it. They are now trying to put this old, discarded and outlawed proposition over you again. They are gilding it a little with gold and stripes and giving it the appearance of something new.
>
> Now, let us analyze the one-man car proposition honestly. If you can find one benefit in it in favor of the riding or traveling public I will concede without further argument that they should have the one-man car.
>
> There is but one proposition that brings forth the one-man car, and that is the question of finance to the company. It means that one man shall do the work of two in the operation of a car. Does it mean any better treatment to the public? Does it mean more safety to the man who uses the streets? Does it mean more safety to the employee? Does it mean less labor to the operator? Does it mean more safety to the men, women and children that ride upon the cars or that occupy or use the streets? Can you show one single argument that will produce anything of that kind? You know you cannot, and every advocate of the proposition knows he cannot.
>
> What do they claim? They claim that they will run the cars faster. What will that do? Will that lessen the danger to the riding public or to the users of the streets? Oh, but he says, the car will be so equipped with but one door for passengers to get in and out; that the door will be locked and no one can get out until the motorman stops the car and opens the door. Does that mean safety to the public? Is that in line with the motto we see painted on the cars, in the barns, on the telegraph poles—"Safety First"? This motorman with his passengers locked in must cross the steam railroad tracks and other crossings without anyone to warn or signal him. What does it mean if a railroad train bears down upon this car with these passengers all locked in and no way to escape? Stop a moment and think what this means to these people. Suppose this motorman should faint or meet with death while his car is in operation. So you see by the use of this car you are increasing the danger and to add to the speed of it means a greater danger with absolutely no escape or protection provided for. Not only is it a danger to the riding public but to every user of the streets. This motorman will have all the additional burdens of answering the questions of the passengers, making change and doing the other man's work placed upon him, and then, with increased speed you can readily see what you are confronted with.

Mr. Mahon then quotes from the census of the United States government. He says that the census figures show that the electric railways killed one passenger out of every 18,015,894 persons carried in 1902 and in the same year killed one employee out of every 1154 in service. In 1907 the railways killed one person out of every 13,603,500 passengers carried and one employee out of 746 employees in service, an increase in five years of more than 106 per cent in number of passengers killed and more than 143 per cent of employees. In 1902 the expense for damages to the electric railways of the United States was $9,395,545. In 1907 it was $18,176,305, or an increase of more than 93 per cent. Mr. Mahon says that the 1912 census is silent for some unknown reason on this subject. In conclusion he says:

> But we are satisfied from what we know that the death rate is greater to-day than it was in 1907. If these figures say anything to you, they say that as a commission or a council having the welfare of the citizens of your municipality to protect, you cannot afford to pass any ordinance allowing the use of the one-man car, which means to increase the danger to the life and limb of every citizen of your municipality.

Wages Up for Settlement in East St. Louis

Although the working agreement of motormen and conductors employed by the East St. Louis & Suburban Railway and the Alton, Granite City & St. Louis Traction Company, East St. Louis, Ill., has expired, terms for the 1919-1920 contract have not been decided upon.

Employees of the East St. Louis & Suburban Railway are asking an eight-hour day and 80 cents an hour. The traction company's men demand eight hours and 87½ cents an hour.

Conductors and motormen on both lines were working under agreements made by the War Labor Board after they had gone on strike last year. The traction employees now receive 47 cents an hour and the East St. Louis & Suburban Railway is paying a sliding scale from 41 cents to 45 cents an hour.

The demands probably will be submitted to an arbitration committee for settlement. It has been suggested that this committee shall consist of a member named by the union, another by the companies, and a federal judge.

Want Wages Almost Doubled

A draft of a new wage scale agreement which calls for an increase that is generally regarded as excessive is being framed by the union for submission to the Rhode Island Company, Providence, to become effective on May 31.

Under an award of the War Labor Board in October, 1918, the wages of platform men were increased to 43 cents an hour for the first three months' service, 46 cents for the following nine months, and 48 cents an hour thereafter. Under the new wage agreement, which has already received the approval of the union, the following scale is demanded: 70 cents for the first three months, 73 cents an hour for the following nine months and 75 cents thereafter.

Prior to the increase granted by the War Labor Board the schedule of wages in effect was as follows: 29 cents an hour for the first six months, 31 cents an hour for the second six months, 32 cents an hour after two years, 34 cents an hour after three years and 35 cents an hour thereafter.

The eight-hour day is demanded, with double time for overtime. Snowplow men are asking in addition to the overtime pay, 20 cents an hour and the motormen on plows 30 cents an hour, the oldest men in point of service to be given the preference for this class of work.

The agreement will soon be submitted to the receivers of the Rhode Island Company for consideration.

News Notes

Albany Men Will Demand More.—The employees of the United Traction Company, Albany, N. Y., will put in a demand for an increase in wages on July 1, the present agreement with the company expiring on that date. It is said unofficially that the employees will seek more than 45 cents an hour.

County Commissioners Reject Franchise.—The first draft of a franchise on the Canton-Massillon road, prepared by the Northern Ohio Traction & Light Company, Akron, Ohio, was rejected by the Commissioners of Stark County on May 3 on the grounds that it failed to meet the conditions laid down by the county.

Kansas City Viaduct Will Go.—The question of demolishing the old intercity viaduct from Kansas City, Mo., into Kansas City, Kan., has been settled by the City Council granting the Kansas City Railways permission to raze the structure. It is expected that the elevated will be destroyed and the tracks brought to street level within the next sixty days.

Wage Demand Submitted to Arbitration.—Recently the employees of the Stark Electric Railway, Alliance, Ohio, made a demand for an increase in wages amounting to 10 per cent. The company offered an increase of 3 cents an hour. This was refused. The matter was referred to a board of arbitration on May 1.

Wage Conference in St. Louis.—The wage committee of the local Amalgamated Association at St. Louis, Mo., conferred recently with Rolla Wells, receiver of the company, in regard to the demands of the employees for an increase in pay and for an eight-hour day. The conference was held as the result of a communication addressed to the men by the receiver, declaring that the demands could not be granted at present. The men have since adopted a proposal to wait a reasonable time to permit Mr. Wells to become acquainted with the situation before pressing a settlement.

Short Strike in Tulsa.—The basis for a settlement of the strike of the employees of the Tulsa (Okla.) Street Railway was reached on April 22 after a four-hour conference between C. H. Bosler, president, and the employees. The right of the men to organize was recognized and their demand for more pay was granted. Service was resumed late in the afternoon of April 22.

Wages Adjusted in London.—The London (Ont.) Street Railway and its employees have arranged an amicable settlement of wage differences. The new scale will mean an advance of 3 cents an hour, and will give a maximum rate of 38 cents. This amount is 1 cent in advance of rates first proposed as a compromise. The men will also receive 12 cents an hour overtime. Sunday work will be classed as overtime.

Must Live Up to Wage Contract.—Employees of the Schuylkill Railways, Girardville, Pa., were notified recently that their application for an increase in wages had been denied by the War Labor Board, on the ground that an increase could not be granted because of a contract existing between the employees and the company. The case has been pending before the board for several months.

Inspectors Now Want More.—Twenty inspectors of the San Francisco (Cal.) Municipal Railway have petitioned the Board of Supervisors of the city to increase their salaries to $150 a month. The inspectors now receive $4.80 a day. It is pointed out in the request that wages of platform men have been increased 50 per cent since 1915, while the increase to the inspectors has amounted to only 17½ per cent.

Jitney Men of Newark Organize.—Permanent organization of the Federation of Jitneymen's Associations was completed recently at a meeting in Newark, N. J. Three representatives from each of the thirteen jitney lines in Newark, which operate more than 300 cars, attended, elected officers and took steps for the establishment of a business office and for the adoption of a constitution and by-laws.

Canadian Border Cities Want Line.—Unanimously indorsing the plan to take over the system of the Sandwich, Windsor & Amherstburg Railway, a subsidiary of the Detroit (Mich.) United Railway, the convention of the Councils of Canadian border cities has authorized the Ontario Hydro-Electric Commission to offer the company a price for the entire road from Tecumseh to Amherstburg, a distance of 28 miles.

Grade Crossing Payments in Columbus.—An arrangement has been made by which the Columbus Railway, Power & Light Company, Columbus, Ohio, will reimburse the city of Columbus in nine payments for the $59,000 which was advanced as its portion of the expense of eliminating grade crossings on West Broad Street. The first payment will be 25 per cent of the total debt and will be made on May 15. The deferred payments will bear interest at the rate of 4 per cent.

Utilities Bills Killed.—The bill of Assemblyman Gill allowing any city in New Jersey to acquire and operate transportation lines within the city and for 14 miles distant from the city is dead. The House committee on corporations reported the bill adversely and the Assembly concurred in the report. The bill of Senator Edwards, of Hudson County, providing for an elective Public Utility Commission has also been killed in the Senate. The bill provided that members be elected by districts for a term of six years. The salary was fixed at $7,500 for each commissioner.

Wage Increase in Fort Wayne.—All trainmen of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., received an increase of 1 cent an hour in wages on May 1, which brings the rate up to 40 cents an hour for men in the service six years or more, with 35 cents from the date of employment. The former maximum was 39 cents. Following is the rate of hourly wage paid the trainmen under the new scale: first year, 35 cents; second year, 36 cents; third year, 37 cents; fourth year, 38 cents; fifth year, 39 cents; sixth year, 40 cents.

Home for Trade Organizations.—During the week ended May 10, work was started upon a building which, it is hoped, will be occupied largely by the trade associations now located, or which will locate in the future, in New York City. The building will be near the corner of Fifth Avenue and Forty-third Street, extending through the block to Forty-fourth Street. It will be twenty stories high. An arcade with display rooms will extend through from Forty-third Street to Forty-fourth Street. The name of the structure will be the National Association Building.

Civil Service Modified in Seattle.—The Civil Service Commission of Seattle, Wash., has waived practically all the requirements ordinarily exacted of employees entering civil service employ, in the case of motormen and conductors on the Seattle Municipal Railway. The text as it now stands amounts to little more than a statement of experience and a medical examination, and citizenship qualification. The rigid requirements have been waived in the case of the railway men so that the personnel of the railway system may be maintained with as little change as possible.

Developing Bridge for Railway Traffic.—The free bridge committee of the Tenth Ward Improvement Association at St. Louis, Mo., plans to make an active campaign to have the city government of St. Louis, Mo., and the officers of East St. Louis, Ill., arrange for the construction of an interurban loop in East St. Louis, thereby paving the way for the entrance of interurban business into St. Louis, Mo., via the St. Louis bridge. The committee is actively at work on its program. Up to the present time the city of St. Louis has really done nothing in regard to finishing the upper deck of the bridge for the reception of railway tracks for local and interurban traffic. The Board of Public Works of St. Louis, however, since the program of the free bridge committee was initiated, has started the construction of a short loop in the city of St. Louis and commenced stringing trolley wires on the bridge. The board expects to have this work completed by July 1, at which time two city-owned cars will be put into operation on the bridge.

Employees and Officers Dine.—About a hundred persons were present at a banquet held in Parkersburg, W. Va., the latter part of April by the employees of the Monongahela Valley Traction Company, at which officials of the company were guests. The affair followed and supplemented a dinner on the day before which was attended by the following officials of the company: James O. Watson, Fairmont, chairman of the board; E. Blaine Moore, general manager; W. V. Neal, superintendent of the Clarksburg Division; H. S. Newton, manager of the Parkersburg & Marietta Division. W. M. Rogers, Fairmont, president of the State Federation of Labor, acted as toastmaster. He made an earnest appeal for harmony in the relations of the company and its employees and referred approvingly to the way the company had co-operated with its employees. Chairman Watson spoke of the three elements to be considered in the public utility business—the employee, the public and the owner. Both Mr. Watson and Mr. Moore, the general manager, went into detail as to the conditions of public utilities all over the country and emphasized the need of united effort toward conservation.

Programs of Meetings

National Association of Corporation Schools

The seventh annual convention of the National Association of Corporation Schools will be held in Chicago, Ill., the first week in June.

Missouri Association of Public Utilities

The convention of the Missouri Association of Public Utilities will be held at Excelsior Springs, Mo., on June 5, 6 and 7. The association is now at work formulating its program.

American Society of Mechanical Engineers

The spring meeting of the American Society of Mechanical Engineers will open at the Hotel Statler, Detroit, Mich., on June 16, and close on June 19. The session on the afternoon of June 17 will be on the subject of industrial relations, with several addresses by men of national reputation. This session will constitute a symposium by leading organizers on the factors dominant in the labor situation, with an interchange of views as to what must be done to assure industrial peace.

National Highway Traffic Association

The annual meeting of the National Highway Traffic Association will be held at the Automobile Club of America New York City, on May 14. Among the papers of interest to officers of electric railways are the following:

"Development of Rural Motor Express Throughout the United States," by F. W. Fenn, secretary of the motor truck committee of the National Automobile Chamber of Commerce.

"Transportation Surveys for Rural Motor Express Routes," by J. H. Collins, member of the highways transport committee of the Council of National Defense and investigator of market surveys, United States Department of Agriculture.

"Wanted: Rural Motor Express in the State of New York," by James E. Boyle, extension professor of rural economy at Cornell University.

American Institute of Electrical Engineers

The annual convention of the American Institute of Electrical Engineers will be held at the Lake Placid Club, Adirondacks, N. Y., June 24 to 27.

The convention committee in conjunction with the meetings and papers committee has practically completed the program for the convention, the principal features of which may be announced as follows:

June 24

President's address, by C. A. Adams.

"Present-Day Practice of Transmission and Tie-Line Relay Protection," by H. R. Woodrow, D. W. Roper, O. C. Traver and P. MacGahan.

"Grounded Neutral," (a) by H. R. Woodrow, (b) William E. Richards.

June 25

Reports of technical committees.

Conference of committee on development, section delegates and A. I. E. E. officers, at luncheon.

Conference under auspices of committee on development, including section delegates and institute officers, open to all institute members

June 27

"High - Tension Single Conductor Cables for Polyphase Systems," by W. F. Clark and G. B. Shanklin.

"Electrostatic Field in Electric Power Cables," by H. W. Fisher and R. W. Atkinson.

"Commercial Problems of 220-Kv. Power Transmission," by A. E. Silver.

"The Effect of Transient Voltages on Dielectrics—II," by F. W. Peek, Jr.

On the evening of June 24 there will be an informal reception and dance.

Financial and Corporate

San Francisco Municipal Ownership Gains

City-Owned Lines Turned 1917 Deficit of $103,908 Into 1918 Net Income of $107,587

The preliminary report of the Municipal Railway of San Francisco for the fiscal year ended June 30, 1918, which has just been issued, shows a marked gain in net income. Although the result of operation for the preceding year, after the inclusion of all "comparison" charges required by the charter, was a deficit of $103,908, the outcome for the fiscal year 1918 was a gain of more than twice this amount to a positive net income of $107,587 for the year.

The various comparison charges are required by the charter in order that the municipal line may be considered upon the same basis as privately-owned companies when the relative efficiency of operation is being judged. In actuality the municipal railway pays no taxes, and in some instances it pays nothing for services rendered by other departments of the municipal government. The city's "true" net income—that which it really receives—is therefore greater than the comparison net income by the amount of these charter charges. For example, in 1917 the comparison net was a deficit of $103,908, and the true net a profit of $31,084; for 1918, the comparison net a profit of $107,587, and the true net a profit of $326,306. Electric railway operators and students of transportation economics are, of course, primarily interested in the comparison figures.

1918 PASSENGER REVENUE JUMPED 60 PER CENT

The chief reason for the improved showing in the fiscal year ended June 30, 1918, was the fact that the passenger revenue increased to a far greater extent than the total operating expenses. Whereas the gain in passenger revenue was $893,173 or 60.8 per cent, the operating expenses increased only $592,272 or 47.7 per cent. As a result the net operating revenue in 1918 represented an increase of $305,747 or 128.6 per cent over that of the preceding year. The taxes showed a heavy increase, on account of the fact that the State franchise tax went up in direct proportion to the gross revenues, the municipal franchise tax in proportion to the passenger revenues, and the federal income tax in proportion to the net income.

Although the expenses for maintenance of way and structures showed a decrease of $1,640 or 3.2 per cent, those for maintenance of equipment rose $25,756 or 36.9 per cent. A heavy increase also came in the item of power, which rose $72,927 or 34.5 per cent, and the heaviest in that of conducting transportation, which jumped $303,818 or 50.9 per cent. The reservation for depreciation and for injuries and damages is reported at a higher figure in view of the fact that it is based on 18 per cent of the revenues.

GROWTH SINCE 1913

The accompanying statement gives not only the income figures of the Municipal Railway of San Francisco for the latest fiscal year, but also comparative data since its opening on Dec. 28, 1912. The figures show a heavy growth both in revenues and in expenses year by year except in the fiscal year ended June 30, 1917, which was the only one to show a deficit after the inclusion of the comparison charges.

The mileage and passenger figures indicate that the big expansion of the municipal system and its business occurred during 1914-1915 and 1915-1916. Each of these fiscal years, it will be recalled, included six months of the Panama-Pacific Exposition of 1915. This fact not only explains the revenue gains in these two fiscal years, but also has a bearing upon the revenue loss in 1916-1917. In regard to this point M. M. O'Shaughnessy, city engineer of San Francisco, says:

> The poorer showing in the fiscal year 1917 was due mostly to the decrease in passenger revenue, exposition travel being over. It is, of course, readily understood that the revenue per car-mile on a system when traffic is on the increase will be much higher than when it is on the decrease even when the volume of traffic is the same, owing to the fact that with increasing density of traffic the increase of service or car mileage lags behind the increase of traffic, whereas when traffic begins to decrease the reduction of car mileage lags behind the reduction of traffic. The reduction of operating expenses per car-mile from 18.32 cents in 1915-1916 to 18.17 cents in 1916-1917 and the increase per car-hour from $1.579 in 1915-1916 to $1.6637 in 1916-1917 were due to the speeding up of the schedules following the reduction in the heavy service to the exposition grounds.

In this connection it may be pointed out that during 1917-1918, when the business increased so greatly over 1916-1917, the total passenger traffic rose 26,161,313, or 72 per cent, and the revenue passenger traffic 18,250,139, or 60 per cent, as compared to 1916-1917. The car-miles, however, increased only 1,617,821, or 30 per cent.

For the fiscal year ended June 30, 1918, the traffic showed a total larger than ever before, and the unit figures for this year and the two exposition years afford some interesting comparisons. The passenger revenues per car-mile in 1917-1918 were 34.08 cents, thus substantially exceeding those of 32.90 cents in 1914-1915 and 30.99 cents in 1915-1916. The operating expenses per car-mile increased more rapidly, however, for the figure for 1917-1918 was 20.15 cents as compared to 18.63 cents in 1914-1915 and 18.32 cents in 1915-1916. As a result the net income from operation per car-mile at 4.64 cents in 1917-1918 fell below that of 5.37 cents in 1914-1915, although it was more than that of 4.37 cents in 1915-1916.

The platform expense per car-mile varied from 9.44 cents in 1915-1916 to 10.43 cents in 1917-1918, the average for the whole period since December, 1912, being 9.50 cents. The ratio of platform expense to operating expenses has remained nearly the same for the years of greatest growth—the percentages being 50.8 per cent for 1914-1915, 51.5 per cent for 1915-1916 and 51.7 per cent for 1917-1918.

According to the car-hour figures, the passenger revenue at $3.081 and the operating expenses at $1.822 for 1917-1918 produced a gain in operating earnings of about 2 cents over 1914-1915 and about 17 cents over 1915-1916. The net income from operation per car-hour at $0.419 for 1917-1918 was less than that of $0.465 for 1914-1915, but greater than that of $0.376 for 1915-1916. The platform expense per car-hour ranged from $0.814 in 1915-1916 to $0.943 in 1917-1918.

The gross income for 1917-1918, less taxes, amounted to $355,801. Upon the $6,265,801 representing the cost of road and equipment, this return represented a rate of almost 5.7 per cent. The combined reservation for depreciation and injuries and damages was 6.13 cents per car-mile in 1917-1918 and on the average 5.75 cents for the whole period.

LARGE DEPRECIATION ALLOWANCE

Regarding the comparison of the San Francisco system with privately-owned lines, Mr. O'Shaughnessy makes these statements:

> In comparing the operating statements of the Municipal Railway of San Francisco with privately-owned lines, it is but fair to point out that the municipal railway, in addition to maintaining its property at a very high standard, is setting aside 14 per cent of its gross operating revenue as a depreciation reserve, whereas there are few privately operated properties that carry this depreciation reserve in addition to maintaining their property at the same standard of efficiency. It is claimed by the management of many private properties that it is unnecessary to carry a depreciation reserve, all renewals and replacements being handled as maintenance charges in the same manner as repairs.
>
> The following results of six years of operation of the San Francisco municipal lines [up to Jan. 1, 1919] should be of interest:
>
> San Francisco owns about 60 miles of single track, and for this it has bonded itself for the sum of $5,500,000. This amount, however, has been reduced by the sum of $404,000 for redemptions from earnings. In addition to paying all operating expenses and maintenance charges the city has put $800,000 into new construction and created a depreciation reserve of $1,000,000, $567,000 of which is invested in other municipal bonds and the balance is in the form of cash.

COMPARATIVE FINANCIAL AND OPERATING DATA OF SAN FRANCISCO MUNICIPAL RAILWAY FROM 1912 TO 1918

Items	Dec. 28, 1912 to Dec. 31, 1913	Dec. 31, 1913 to June 30, 1914	June 30, 1914 to June 30, 1915	June 30, 1915 to June 30, 1916	June 30, 1916 to June 30, 1917	June 30, 1917 to June 30, 1918	Total to June 30, 1918
Passenger revenues	$444,393	(*f*) $520,371	$1,630,778	$1,970,477	$1,470,193	$2,363,365	$8,399,579
Miscellaneous revenues	354	1,348	7,886	12,326	7,717	12,563	42,197
Operating revenues	$444,747	$521,719	$1,638,664	$1,982,804	$1,477,910	$2,375,929	$8,441,777
Ways and structures	$5,659	$9,260	$40,715	$40,456	$50,976	$49,337	$196,405
Equipment	10,561	19,440	64,787	77,743	69,702	95,459	337,695
Power	....	62,590	201,098	258,163	211,506	284,432	1,017,789
Traffic	81	90	307	218	293	338	1,330
Conducting transportation	182,097	150,740	564,185	731,508	596,445	899,764	3,124,741
General and miscellaneous	8,389	27,558	52,293	56,526	37,212	68,304	250,286
General and miscellaneous (comparison charges)	4,587	3,009	7,768	9,182	9,416	9,644	43,606
(*a*) Depreciation	80,054	93,909	294,959	352,075	264,727	425,271	1,510,998
Operating expenses	$291,431	$366,597	$1,226,115	$1,525,874	$1,240,281	$1,832,553	$6,482,853
Net operating revenue	$153,316	$155,122	$412,548	$456,929	$237,629	$543,376	$1,958,923
Income from municipal bonds	1,328	2,217	10,407	24,038	22,108	21,500	81,600
Gross income	$154,645	$157,340	$422,956	$480,967	$259,737	$564,876	$2,040,524
(*b*) Taxes—comparison charges—municipal franchise, 3 per cent on passenger revenue	$13,331	$15,611	$48,923	$59,149	$44,121	$70,878	$252,015
(*b*) Municipal car license	547	540	2,471	2,955	2,955	2,955	12,423
(*b*) State franchise, 5¼ per cent on gross revenue	(*c*) 21,125	27,390	86,029	103,854	78,500	124,601	441,501
(*b*) Federal income, 1 per cent on net income	449	596	829	755	....	10,640	13,270
Total taxes	$35,454	$44,137	$138,254	$166,714	$125,576	$209,075	$719,211
Interest on funded debt	73,886	54,383	202,567	239,486	238,069	248,214	1,056,607
Deductions from income	$109,340	$98,521	$340,821	$406,200	$363,645	$457,289	$1,775,819
Net profit for year	$45,304	$59,013	$82,135	$74,767	(*e*) $103,908	$107,586	$264,900
(*d*) Add general and miscellaneous comparison charges	4,587	3,009	7,768	9,182	9,416	9,644	43,606
Comparison charges for taxes	35,454	43,888	138,254	166,714	125,576	209,075	718,962
True net profit for year	$85,345	$105,911	$228,157	$250,663	$31,084	$326,306	$1,027,469
Per Car-Mile:							Average
Passenger revenue	$0.3419	$0.3687	$0.3290	$0.3099	$0.2765	$0.3408	$0.3196
Operating expense	.1590	.1911	.1863	.1832	.1817	.2015	.1875
Operating earnings	.1829	.1776	.1427	.1267	.0948	.1397	.1321
(*b*) Taxes and charter charges	.0308	.0332	.0295	.0277	.0254	.0315	.0290
Operating expense and taxes	.1897	.2243	.2158	.2108	.2071	.2331	.2166
Depreciation reserve	.0615	.0665	.0595	.0553	.0498	.0613	.0575
Operating expense and depreciation	.2240	.2576	.2474	.2385	.2315	.2629	.2450
Operating expense, depreciation and taxes	.2513	.2909	.2753	.2662	.2569	.2944	.2741
Net income from operation	.0906	.0779	.0537	.0437	.0196	.0464	.0456
Platform expense	.0765	.0839	.0947	.0944	.0914	.1043	.0950
Per Car-Hour:							
Passenger revenue	$3.4463	$3.3924	$2.8478	$2.6729	$2.5317	$3.0813	$2.8570
Operating expense	1.6024	1.7581	1.6125	1.5798	1.6637	1.8222	1.6763
Operating earnings	1.8439	1.6343	1.2353	1.0931	.8680	1.2591	1.1808
Taxes and charter charges	.3103	.3057	.2550	.2386	.2325	.2852	.2594
Operating expense and taxes	1.9127	2.0638	1.8675	1.8183	1.8962	2.1074	1.9357
Depreciation	.6203	.6122	.5151	.4776	.4558	.5545	.5139
Operating expense and depreciation	2.2582	2.3703	2.1412	2.0573	2.1195	2.3767	2.1902
Operating expense, depreciation and taxes	2.5330	2.6760	2.3826	2.2959	2.3520	2.6618	2.4496
Net income from operation	.9133	.7164	.4652	.3769	.1797	.4195	.4074
Platform expense	.7710	.7717	.8196	.8143	.8366	.9431	.8492
Totals:							Totals
Passenger revenue	$444,393	$520,371	$1,630,778	$1,970,477	$1,470,193	$2,363,365	$8,399,579
Operating expense	206,789	269,678	923,387	1,164,617	966,137	1,397,637	4,928,248
Operating earnings	237,958	250,693	707,390	805,860	504,055	965,728	3,471,685
Taxes and charter charges	40,041	46,897	146,022	175,896	134,992	218,719	762,569
Operating expenses and taxes	246,830	316,576	1,069,409	1,340,513	1,101,130	1,616,357	5,690,817
Depreciation	80,054	93,909	294,959	352,075	264,727	425,271	1,510,998
Operating expenses and depreciation	286,844	363,588	1,218,347	1,516,692	1,230,865	1,822,909	6,439,247
Operating expenses, depreciation and taxes	326,885	410,485	1,364,369	1,692,589	1,365,857	2,041,629	7,201,816
Net income from operation	117,507	109,885	266,408	277,888	104,335	321,736	1,197,763
Platform expense	99,498	118,377	469,328	600,297	485,851	723,378	2,496,732
Passenger car-miles	1,300,869	1,411,196	4,956,429	6,358,543	5,317,269	6,935,090	26,279,396
Passenger car-hours	129,050	153,394	572,637	737,213	580,716	766,997	2,940,007
Passenger cars owned	43	197	197	197	197	197	....
Single track mileage, beginning of year	11.94	16.18	22.62	43.04	46.63	46.63	(*g*) 63.95
Passengers: 5-cent fare	8,882,996	10,069,725	32,676,932	39,295,667	29,230,644	46,874,775	167,030,739
Government	....	6,405	24,911	44,218	61,159	110,303	246,996
School	49,035	54,527	278,796	429,212	399,066	683,192	1,893,828
Revenue transfers	49,543	287,504	653,360	479,019	477,288	750,026	2,696,740
Free transfers	631,363	1,703,139	6,442,207	7,273,072	5,678,274	13,589,247	35,317,302
Free	110,240	100,147	293,659	365,596	388,292	388,493	1,646,427
Total	9,723,177	12,221,447	40,369,865	47,886,784	36,234,723	62,396,036	208,832,032

Reserve Funds at End of Year	Dec. 31, 1913	June 30, 1914	June 30, 1915	June 30, 1916	June 30, 1917	June 30, 1918
Operative	....	$274,338	$312,044	$273,305	$132,348	$406,784
Unexpended bond money	$199,569	1,357,174	500,957	219,262	107,918	17,942
Depreciation	....	....	435,688	722,608	840,322	853,603
Injury insurance	....	64,023	25,237	49,144	64,046	48,740
Investment account	106,100	124,500	124,500	200,000	200,000	....
Cost of road and equipment	1,657,251	2,654,538	5,042,331	5,396,706	5,838,791	6,265,801
Funded indebtedness	1,969,000	3,771,500	5,475,000	5,380,000	5,279,000	5,077,000

(*a*) This 18 per cent of "gross revenue" includes 4 per cent set aside for accident and insurance and 14 per cent set aside as a depreciation reserve fund.

(*b*) The municipal railway pays no taxes, so that these are fictitious charges shown for comparative purposes as required by the city charter.

(*c*) 4¾ per cent in 1913.

(*d*) Value of services rendered by other departments of the city government for which no payment was made by the railway.

(*e*) Apparent deficit.

(*f*) Change made from calendar year to fiscal year Jan. 1, 1914; hence accounts are shown for six months' period. The distribution of operating expense is approximate.

(*g*) Total single track mileage April 1, 1919, at 63.95 miles, includes 6.53 miles of joint track and operation rights.

New Blue-Sky Law

Governor Lowden of Illinois, Secretary of State Emmerson, and banking institutions and associations throughout the State are reported to have agreed upon a new form of blue-sky law. The outstanding change in the law will be abandonment of the practice of licensing vendors of securities. The bill requires every person floating securities to file with the Secretary of State the fullest of financial statements prepared under oath. The Secretary of State is to have funds with which to finance complete investigation of all statements. The most important phase of the new bill is that it provides that a copy of all information filed with the Secretary of State as to any flotation must be mailed to any person requesting it.

Financial News Notes

Abandonment in Yakima.—N. C. Richards, president of the Yakima Valley Transporation Company, North Yakima, Wash., announced recently that the company would discontinue service on the North Fourth Street line. The abandonment of this service marks the beginning of the curtailment policy that was predicted when fares were raised to 10 cents.

Income Bond Interest Passed.—Payment of interest on the adjustment income bonds due on May 1 has been passed by the Chicago Railways. These bonds are known generally as "adjustment 4s." The last payment of interest, amounting to $100,000, was made on May 1, 1918. The bonds were issued in 1910 at the time the traction interests acquired the lines of the Chicago Consolidated Traction Company, comprising 128 miles of track.

To Sell Traction Stock at Auction.—Notice is given that the Guaranty Trust Company, New York, N. Y., as trustee under the indenture of the collateral trust 4 per cent bonds of the International Traction Company, Buffalo, N. Y., will offer for sale at public auction in New York, on May 28, all of the securities pledged as collateral. The offering will be made in one lot subject to certain conditions, one of which is a deposit of $50,000 in cash or a certified check for a like amount.

Valuation Is Suggested.—In a letter to W. C. Culkins, Director of Street Railroads at Cincinnati, Ohio, C. M. Leslie, receiver for the Interurban Railway & Terminal Company, suggests that a valuation of the track and overhead wires of the company, extending from the city terminal to Coney Island, be made by appraisers to be named by the Cincinnati Traction Company, the Interurban Railway & Terminal Company and the court. This stretch of track is sought by the Cincinnati Traction Company for purpose of extending its East End line to Coney Island.

Another Dividend Reduction.—The directors of the Union Street Railway, New Bedford, Mass., recently announced that the dividened rate would be reduced from 8 per cent to 6. This action was taken as a result of the large deficit in the earnings for the last quarter. Last June the company was authorized to increase its capital stock by $812,500, the proceeds to be applied principally to paying for a new power house. The company previously had $1,625,000 of stock outstanding. There is only $250,000 of outstanding funded debt. The company heretofore has been unusually successful, but increases in operating cost and jitney competition have cut into earnings materially.

Interest Payment Authorized.—Rolla Wells, receiver for the United Railways, St. Louis, Mo., recently asked permission in the United States District Court to make a disbursement of $42,750 as interest on an issue of $2,000,000 in bonds under a mortgage on a portion of the Broadway line, which the petition says is necessary to the United Railways. In answer to the petition, Judge Dyer ruled that Mr. Wells was authorized to pay, out of the money on hand, derived from the operation of the system, the interest on $1,900,000 par value of the bonds of the St. Louis Railroad. In presenting the petition Mr. Wells said he had enough money on hand derived from the operation of the system to pay the interest on the bonds and to continue to operate without embarrassment. The interest payment on the bonds was due on May 1.

Small Bond Issue Approved.—The application of the Trenton & Mercer County Traction Corporation, Trenton, N. J., for authority to issue $40,000 of bonds to raise funds for an extension through Trenton Junction and for other work has been refused by the Board of Public Utility Commissioners, but an order has been issued allowing the company to issue $14,000 of bonds. In discussing the refusal to grant the full amount the board said in its order: "It appears that the balance of the proposed issue is to be used on account of construction work which is contemplated, but which for causes not within the company's control cannot be immediately undertaken. The board withholds approval of the balance of $26,000 of the proposed issue, with leave to the company to renew its application for approval of the same."

City Accepts Minneapolis Valuation.—The Minneapolis (Minn.) Street Railway, controlled by the Twin City Rapid Transit Company, has received from the City Council certified notice of its acceptance of $22,553,150 as the valuation of the property of the company as of Jan. 1, 1916. The company has thirty days to act upon this. The matter will be submitted to the board of directors. To become a basis for franchise determination acceptance must be received from the company. To obtain this new figure deductions were made of $3,381,257 from the estimate of City Engineer F. W. Cappelen, which was $25,914,307. These deductions were: Depreciation, $600,000; taxes during construction, $162,000; Harriet right-of-way, $632,712; water power leases, $491,857; going concern value, $1,494,581.

Will Resume Receivership Hearings on May 19.—The hearing in the receivership suits against the United Railways, St. Louis, Mo., which were consolidated under the John W. Seaman suit in the United States District Court by Judge Dyer, will be resumed on May 19, according to an announcement made by Special Master Henry Lamm following a conference with the attorneys for all parties. Rolla Wells, though automatically removed as receiver in the order making the Samuel W. Adler suit an intervening one to the Seaman suit, was renamed by Judge Dyer as receiver under the consolidated suits. Judge Lamm was reappointed as special master to conduct the hearings. The attorneys taking part in the conference with Special Master Lamm were Judge Henry S. Priest, Samuel A. Mitchell, Lon O. Hocker, Charles W. Bates and Ephraim Caplan. No other matters were discussed in the conference, except the date for the hearings of the consolidated suit. Mr. Bates was appointed by Judge Dyer as counsel for the receiver in the consolidated action. The judge said he had appointed Mr. Bates after consulting Receiver Wells.

A Wheel Within a Wheel.—The Board of Public Utility Commissioners of New Jersey is considering the case of the Morris County Traction Company and the Morris Railroad, Morristown, which entered into a traffic agreement some time ago as a result of the traction company's inability to extend its line from Morristown to Madison because of the opposition of wealthy property owners along the route. The officials of the Morris County Traction Company organized the Morris Railroad under a steam railroad charter to build and operate over a private right-of-way bordering the Lackawanna Railroad for 2¼ miles. It cost $250,000 to build this part of the line, but its construction gave the traction company a continuous line from Maplewood to the terminal at Wharton and Lake Hopatcong. Without realizing that the approval of the Board of Public Utility Commissioners was necessary, the traction company agreed to guarantee the 5 per cent bonds of the Morris Railroad and the 6 per cent stock and to retire and cancel $4,000 of the bonds annually. The liability of the traction company under this agreement was subsequently removed by the Board of Public Utility Commissioners instructing the traction company to retire the bonds but not to cancel them.

Traffic and Transportation

Safety Day in Baltimore

The Message to Be Careful Is Carried Home Forcefully in Competition in Schools

At the instance of the United Railways & Electric Company, Baltimore, Md., the public, parochial and private school authorities of Baltimore made May 1 "Safety Day" and all the children in the fourth, fifth, sixth, seventh and eighth grades in every school in the city on that day wrote compositions on some phase of accident prevention.

In the lower grades the little tots wrestled with the mysteries of "don'ts" and a delightfully interesting time they had with this valuable lesson.

The schoolmaster for the occasion was "Mister Accident," a special edition of the United Railways *Trolley News*, a leaflet that is ordinarily distributed in the cars of the company. On this occasion *Trolley News* was placed in the hands of every child in the schools, and the lesson that it offered was the foundation of thought for the day's work.

After the reading of the leaflet to her class each teacher put her pupils to work on compositions. That the teachers might have all necessary aid in selecting a definite subject this list of subjects approved by the board of superintendents of the public schools was presented to each class.

Our Foe, Mr. Accident
Our Friend, Mr. Safety.
Always be Careful. (The A, B, C of Safety.)
Danger of Playing in the Streets.
Safety.
How to Get On and Off Cars Safely.
Safety at Street Crossings.
Saving Our Lives Is More Important Than Saving Time.
Do Not Put Head or Arms Out of Windows.
Where to Cross the Street.
Do Not Risk Life in Play.
Cross the Street at Crossing.
Home Is Better than the Hospital.
Look Both Ways Before Crossing the Street.
Do Not Cross Street in Front of a Moving Car.
Do Not Get On or Off a Car Until It Stops.
Do Not Play on Car Tracks.
Helping Others to Be Safe.
Carelessness Our Enemy.
Some Accidents I Have Seen (or Heard of) and How It Could Have Been Avoided.

The children of the lower grades in which composition writing is not practiced had another form of the safety lesson. After reading aloud the story of "Mister Accident," the teacher called upon her pupils to suggest "Don'ts," or things not to do in order to protect oneself from mishap.

As little "Jimmie" Jones made a suggestion, as, for instance, "don't play in car tracks," this was written on the blackboard. Then Sarah Smith's "don't get off car until it stops" was written under the other, and so on until a dozen or a score of first-class "don'ts" had been displayed before the class.

The pupils were then called to read the whole list in unison, after which individuals were asked to recite as many as they could remember without looking at the blackboard.

Then all the children copied the list on paper. It is said by the teachers that the children took the keenest interest in the exercises and there was no question that the truths were driven home.

The whole purpose of "Safety Day" was to secure the concentration of school children's minds on accident prevention, and one of "Mister Accident's" strongest points was that the lessons of "Safety Day" should abide in the mind every day.

Complaint Against New Castle Increase Dismissed

Increases in rates filed by the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, operating the New Castle Electric Street Railway and the New Castle & Mahonington Street Railway, in New Castle, Pa., were approved by the Public Service Commission of Pennsylvania on April 28, and complaints filed by the city of New Castle were accordingly dismissed.

James Alcorn, public service commissioner, in the opinion approving the rate increase, states that the commission will permit the company to charge the present fares until May 1, 1920, when the old rates are to be established unless the company can show that it is necessary to have the revenue realized from the increased charge. The new rates increased fares from 5 cents to 6 cents, sale of tickets in packages of eleven for 60 cents, instead of 50 cents, and school tickets to be used between 7.30 a. m. and 5.30 p. m. in packages of fifty for $1.50. In concluding his opinion in the case, Commissioner Alcorn said:

> The commission is of the opinion that the new rates will not produce more revenue than will be sufficient to provide for operating expenses, taxes, depreciation and a fair return. It appears that in previous years the respondent was doing a successful business and receiving a fair income. In 1916, for instance, the net revenue was $84,502. This shows that under normal conditions the 5-cent rate is sufficient. As the respondent asks for the increased rates because of the increased cost of operation it should if permitted to put the new rates into effect restore the old rate when the conditions become normal. The new rates cannot be considered excessive. A passenger can by purchasing a package of tickets ride for less than 5½ cents. This is not too high, under present conditions as disclosed in this case.
>
> We are of opinion that in view of the increase in operating expenses the new rates are just and reasonable, and we will permit the respondent to collect those rates until May 1, 1920, and an order will be entered dismissing the complaints and requiring the company to restore the old rate after May 1, 1920, unless it be shown that the company then requires the revenue which the new rates produce.

East St. Louis Will Appeal

Company There Dissatisfied with Commission Decision Fixing Six-Cent Fare

The East St. Louis (Ill.) Railway is disappointed at the decision of the Public Service Commission of Illinois continuing in effect the 6-cent fare. The company regards the rate as confiscatory. As explained recently in the ELECTRIC RAILWAY JOURNAL the order extends the temporary order under which the company now operates to July 31 and specifies that the rate may, after that date, be extended in like manner without hearing. The railway company had petitioned some time ago for a 7-cent fare.

W. H. Sawyer, president of the railway company, issued a statement of which the following is a very brief summary:

RAILWAY PRESIDENT DISAPPOINTED

I have not had time to read the order, but have just noted the general conclusions and am naturally disappointed. My assumption is that we will immediately ask for rehearing in this case, as it would appear impossible to continue with 6-cent fare and still pay the present scale of wages and give good service. If we continue to be limited to a 6-cent fare it means that our rate of return is so low that we will be unable to secure necessary new money for needed improvements. The situation is just as serious for East St. Louis as it is for the East St. Louis Railway itself, because the interests of the city and the railway are and must continue to be mutual.

The valuation claimed by the company was $2,898,000. This valuation was supported by J. E. Allison, consulting engineer of St. Louis, who was retained by the company as an independent outside expert. The commission finds a valuation of only $1,560,000, but states that this valuation is not necessarily final but "is used in the present case without prejudice to the railway company or others in any future proceeding."

I regard this valuation as absolutely confiscatory, as there is no question whatever but that the actual cost of rails, ties, trolley wire, cars, and physical property which go to make up the railway undertaking was very considerably in excess of this amount.

INDEPENDENT VALUATION $2,750,000

Mr. Allison's valuation showed the actual physical property to be about $2,750,000, to which he rightfully contended should be added the cost of financing and other intangibles, which represent money the company actually spent, approximately $600,000. The order makes no reference whatever to Mr. Allison's testimony. Mr. Allison testified that the company should be allowed to earn a total of $300,000 a year, whereas the company is only earning under the 6-cent fare approximately one-third of this amount.

REPRODUCTION BASIS USED

As to the company's valuation the order states that this was "prepared upon a strict reproduction basis," whereas the facts are that in so far as all the physical property was concerned, this was prepared upon a strictly actual cost basis. I speak of this because a reproduction basis would give a higher valuation than we claimed, as no war-time prices were included in our figures, but the costs taken by us were the actual costs at the time the track or cars were built. We, of course, claimed that in addition to the $2,898,000 there were other expenditures when the company was purchased which were not included, but Mr. Allison took this all into account when he stated that the company should be allowed to earn, in his opinion, $300,000, where it did earn in 1918 approximately $113,000.

In addition to the $300,000, Mr. Allison rightly contended that there should be earned and set aside by the railway company for depreciation purposes an additional amount.

Seven-Cent Charge Restored

New Jersey Commission Refuses Request of Cities to Keep Fares at Six Cents Pending Action on Zone System

The Board of Public Utility Commissioners of New Jersey in a decision filed on May 3, granted the application of the Public Service Railway, Newark, for a modification of its order of Sept. 25, 1918, which stipulated that the company was to drop its fare from 7 cents to 6 cents on April 1. The decision of May 3 wipes out that stipulation and the rate goes back to 7 cents, with the additional cent for the first transfer. The 7-cent fare went into effect at midnight on May 3.

$486,127 Lost in Three Months

The old rate of 7 cents is to remain effective until the commission passes upon the zoning system of fares, which was prepared by the railway by order of the commission and is now before the commission, "or until this board shall find and determine other rates than those filed as aforesaid to be just and reasonable in the pending proceedings to determine the justness and reasonableness of the schedule of fares filed as aforesaid."

The decision of the commission is based on a comparison of the financial condition of the company on March 31 of this year, with Dec. 31, 1918. The board says it thus appears that the actual loss during the first three months of the present year amounts to $486,127. This is arrived at by adding the sum of $94,120, which represented the railways' surplus of Dec. 31, 1918, and the sum of $392,007, which represented the company's deficit on March 31, 1919.

In order to ascertain the elements entering into the operation of the lines of the company for the first three months of the present year, the decision of the commission includes an analysis of the operating statement for the first quarter, as compared with the same quarter of 1918. The first quarter of this year shows a deficit of $484,562, on March 31, as compared with $62,702 on the same date a year before.

Labor and Material Costs Very High

This is explained by the fact that whereas the railway operating revenue deductions in 1918, for this quarter, amounted to $3,115,272, they jumped to $4,554,392 for the same period of the present year. On this point the commission said:

> This large increase in railway operating deductions was naturally the subject of protracted investigation in the present proceedings. A fair deduction summarizing the reasons for the increase is as follows: The major part of the increase is due to the increased cost of labor and material and the company did a greater amount of work during the first quarter of 1919 than it did during the same quarter of the year 1918 because of the open weather which permitted the work to be done and which had prevented any work of a corresponding character to be done during the corresponding quarter of 1918.

It is pointed out much of this work was in the rehabilitation of the company's equipment. The testimony of the general manager is quoted in explanation. He stated, for instance, that on account of lack of labor in January, February and March, 1918, and the severe weather, only six cars were painted. In this connection the general manager's testimony is quoted as follows:

> And I defy anyone to point out one piece of track or one car which has been repaired which should not have been repaired.

The decision points out that the board has heretofore criticised the company because of its failure to provide a sufficient reserve for depreciation, and indicated in its order of July 10, 1918, the necessity for the proper maintenance and renewal of its railway by maintaining a sufficient depreciation reserve.

Nor can these expenditures of this year, which greatly swelled the operating expenses of the first quarter, in the opinion of the commission, be properly ordered to what is known as the capital account of a company. Then the decision of the board sums as follows:

> #### Basis of Equitable Rates
>
> Equitable rates should be based on the average expenditures during the period in which they are to prevail. It was established by the record that the expenditures for maintenance of property which the company was enabled to make by reason of the open winter exceeded the normal expenditures for that purpose, and the strike in March caused a further abnormal loss. With the necessary corrections made for such abnormal expenditures, however, it is apparent that, under the conditions existing during the second quarter of the year, a 6-cent fare will not enable the company either to recoup the losses incurred in the first quarter or possibly to pay its fixed charges during the second quarter considered by itself. If the company is to continue to render service to the public, all of the evidence in the case justified the board in concluding that it is necessary to permit the company to revert immediately to the tariff providing for a 7-cent fare and a charge of 1 cent for the initial transfer, subject to the board's jurisdiction to modify the same if and when conditions may warrant.
>
> It is urged by the municipalities that this board, having under consideration the putting into effect of a zoning system, shall necessarily require a revision of rates and should not act upon the present application but should dispose of the matter with the zoning plan. This is manifestly unfair. With full proof before the board that the railway is daily piling up a deficit, to refuse relief for the comparatively short period would be a flagrant failure of justice and a violation of duty.
>
> In the interim and until the schedule of rates or fares filed by the company with its report entitled "Plan for a Zone System of Fares Upon the Lines of the Public Service Railway" is approved by this board, or until this board shall find and determine other rates than those filed as aforesaid to be just and reasonable in the pending proceedings to determine the justness and reasonableness of the schedule of fares filed as aforesaid, the board will and hereby does modify the order of Sept. 25, 1918, in so far as the same provides for a charge of 6 cents on and after April 1, 1919, and will permit the charge of 7 cents where 6 cents is now charged. In all other respects said order to be and remain the same.

Frank H. Sommer, counsel for the municipalities opposed to a return to a higher fare, made a statement in which he said that he would advise the associated municipalities to make an application for a judicial review of the order. Among other things he said:

> For the sake of those who are financially interested in the Public Service Railway, and for the sake of those who require the service it affords, I sincerely hope that the game of hide-and-seek as to just and reasonable rates, which now has been going on for almost a year, may soon come to an end, and that as a result of a thorough investigation of all the elements entering into the problem stable rates may be established for the future.

The Mayor of Newark paid the 7-cent fare under protest, with the object in view of bringing suit for a judicial review of the decision of the commission. The appeal to the courts from the commission order will probably be given precedence on the court calendar.

The railway is distributing a sixteen-page pamphlet, "Inside Facts About Public Service Railway," being testimony of President Thomas N. McCarter before the commission in connection with the proposed zone-fare system.

Wants Increase in Mobile

The Mobile Light & Railroad Company, Mobile, Ala., has submitted to the City Commissioners a long statement in support of its petition for increased fares. This statement is signed by J. H. Wilson, president of the company. As the company puts it "Our company is now asking that the contract rate for a car ride be increased slightly, owing to our increased operating costs." The appeal is for 6 cents.

The statement starts out with a review of the franchise contracts establishing the 5-cent fare and then takes up in turn increased costs, how other kinds of business have met increased costs, fare increases elsewhere, the net income that changed into a deficit, the local ownership of the company, the indorsement of fair rates by leading public men, the matter of increased facilities needed for Mobile and the interests of the employees. In conclusion under "Draw Your Own Conclusions" the company says:

> We have shown that our company's lines did not earn enough in the past six months to pay operating expenses and fixed charges, falling behind to the amount of $7,136.
>
> We have shown that including amounts paid for improvements and betterments the deficit was $25,718.
>
> We have shown that we now have no surplus, but a deficit, so we can not take care of ordinary improvements and betterments, always required by an electric railway company.
>
> We have shown that the ultimate welfare of our employees is dependent upon the prosperity of the company.
>
> Our company has put the greater part of its net earnings for twenty-six years into the betterments and extensions of the property for your service, during which time it has paid only an average dividend of 0.85 of 1 per cent.
>
> There is no hope of a material reduction of expenses, as prices of coal and labor, our two chief items of expense, cannot be expected to fall enough to make any appreciable difference in our net income.
>
> We do not desire to increase the cost of school children's tickets.
>
> At this time, and not in the future unless it becomes necessary, do we expect to ask for an increased fare on the Whistler, Magazine Point or Spring Hill divisions, on account of the passengers on said lines having to pay two fares to reach the city.
>
> To-day the electric railway fare in Mobile is the only commodity that has not only not increased over its price in 1917, but is actually just the same price it was in 1892, with vastly improved and increased service. The last commodity to increase is the 20 per cent advance by the post-office department for telegrams.

From the Loop, Chicago, to Milwaukee

Plans are progressing for operation of fast electric trains of the Chicago, North Shore & Milwaukee Railroad into the heart of Chicago. This road is operated in conjunction with the Northwestern Elevated Railroad, Britton I. Budd being president of both. The elevated cars continue north of Chicago to Wilmette, paralleling for a few miles the service of the North Shore road, which has its southern terminus in Evanston. Part of the right-of-way used by the elevated lines is owned by the Chicago, Milwaukee & St. Paul steam road, and negotiations are being conducted with the management of that company to permit electric trains to continue into the loop district of Chicago from Milwaukee. This is expected to prove a boon for interurban passengers, affording cheaper and more convenient transportation between Chicago and the north shore towns than is possible by use of the steam railroads. The North Shore road has been doing a profitable business owing to the heavy travel to and from Fort Sheridan and Great Lakes Naval Training Station.

Liberty Becomes License in Seattle

Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., has asked the City Council to pass legislation intended to correct practices on cars which developed during the war when shipyard workers received special consideration on account of congested conditions. For instance, smoking was originally prohibited on all street cars. This rule was modified during the war so that smoking was allowed on the early cars, which contained shipyard workers almost exclusively. This liberty soon degenerated into license, with the result that the practice of smoking was gradually carried over to practically all hours of the day on certain lines. Arguments between smokers and non-smokers were the result. As a preliminary to the enforcement of the proposed legislation forty inspectors and other municipal railway employees have been given police commissions.

Fare Arbitration in Kansas City, Kan.

Judge John C. Pollock of the Kansas Federal Court has named A. L. Berger, an attorney of Kansas City, Kan, and Frank Hagerman, Kansas City, Mo., as arbitrators to adjust the fare and other disputes between the city of Kansas City, Kan., and the Kansas City Railways.

The appointments were made after word had been received from Topeka that the State Public Utilities Commission of Kansas had agreed to the arbitration plan. Judge Pollock said that he selected Mr. Berger and Mr. Hagerman because both were familiar with the Kansas City railway situation.

Judge Pollock said that he has felt for some time that the railway dispute would never be settled except through arbitration. The questions of fares, of franchises and all public contracts, the use of the Inter-City viaduct and the removal of the "L" road structure will be considered.

Under the stipulation for arbitration Judge Pollock retains the right to modify the findings of the arbitrators if he desires to do so. The city has bound itself to adopt such ordinances as may be necessary to enforce the findings of the arbitrators.

Many Angles to Spokane Case

The City Council, of Spokane, Wash., according to Mayor C. M. Fassett, will refuse a franchise to the proposed consolidated company to take over the local lines of the Spokane Traction Company and the Washington Water Power Company, unless the city obtains a provision for municipal ownership. The local lines are making an effort to consolidate, and the Council has gone on record as opposing any form of franchise that does not include the municipal-ownership provision. While the city has no immediate intention of buying out the lines, according to Mayor Fassett, "it is watching with interest the struggle in Seattle."

The city will also renew its fight for 5-cent fares, according to Mayor Fassett. He states that the consolidation will not only bring about a price value for the system, which would be a basis for possible municipal purchase later on, but will also make the justified earnings of the investment less than in the past.

The City Council is holding over the heads of the local railways the threat of unrestricted jitney competition, although agreeing to hold up the bus licenses until the end of the ninety-day trial with the 6-cent fare recently authorized. On the other hand a strong faction in the City Council is in favor of putting the jitneys out of business, if it will help restore the 5-cent fare.

Increase Likely in New Bedford

The Union Street Railway, New Bedford, Mass., one of the most conservatively managed and most successful electric railways in all New England, is confronted with the need of increasing its fares. Increases in the costs of materials and supplies and jitney competition are held to be responsible for the depletion of the company's earnings. Company officials estimate that the operation of jitneys has taken $100,000 in revenue from the railroad. It is said that the only hope of the company in sight lies in the new jitney regulations about to go into effect, which require a bond of $2,500 and put the jitney operators under so many restrictions that it is believed it will drive the jitneys out of business. The company will not apply to the Public Service Commission for authority to increase fares until the results of the new jitney regulations are apparent.

Fare Rehearing Asked in Chicago

An application for a rehearing and for the introduction of additional evidence in its fare case was filed by the Chicago (Ill.) Surface Lines on May 1 before the Public Utilities Commission of Illinois. The petition asked that the case be reopened so that the companies could present full and complete evidence with reference to the value of the lines, the commission having recently refused an increased fare on the theory that the companies were earning a reasonable return on a fair valuation of the properties.

In explaining this latest move, L. A. Busby, president of the company, said:

> Our petition for increased fares was presented last November as an emergency measure. In similar cases, decided about that time, the commission granted increases without making a complete and detailed valuation. We proved up the city purchase price as established by the 1907 ordinances, and considered this evidence sufficient upon which to base an emergency order for an increase in fares. The commission, however, finally decided not to treat our application as an emergency matter, and said that the time had come to return to the former course of procedure—that is, a complete valuation of the properties when making a change of rates.
>
> The commission rejected a number of items in our capital account, amounting to several millions of dollars, and pointed out that it did so because there was no evidence, or insufficient evidence, to satisfy the members, regarding these items. We believe the fair value of the properties is in excess of the purchase price. We will also point out that some of the estimates of the commission as to income available to meet fixed charges are, notwithstanding our increase in traffic, at the rate of several hundred thousand dollars per annum in excess of the earnings which will be realized.

Three Cents a Mile for Interurban

The Public Service Commission for the Second District of New York has approved proposed increased fares on the Rochester & Syracuse Railroad on a 3-cent-a-mile basis except in the city of Rochester. The company has been directed to charge a 5-cent fare from Rockwood Street to the city terminal of the New York State Railways. The company under the tariff which it filed on a 3-cent-a-mile basis provided for a 5-cent fare from Rockwood Street to Culver Road and another 5-cent fare from Culver Road on the New York State Railways' tracks. The railroad consented to eliminate the proposed Rockwood Street to Culver Road fare.

The commission holds that with this exception the proposed new rate of fare is just in amount and necessary to yield reasonable compensation for the service rendered, taking into account the present cost of operation. Existing rates are 2.5 cents a mile by ticket, 2.75 cents cash with one-quarter cent refund, 1.25 cents a mile for thirty-day, fifty-ride commutation books and 1.6 cents per mile for fifteen-day twenty-five-ride East Rochester to Culver road. New rates to go into effect are 3 cents a mile by ticket, 3 cents a mile by cash with 10 cents excess redeemable and 1.5 cents and 1.6 cents per mile for the commutation books and mileage books at 2.5 cents a mile.

Hastings Rebels

Hastings-on-the-Hudson, a quiet little town snuggled in the valley of the Hudson some distance below Storm King and within easy distance of the bridge over which the headless horseman of the "Sketch Book" rode, has had its silence disturbed, its bucolic existence disrupted and its family life thrown into turmoil by a railway controversy. All Hastings is walking. In fact, all Hastings has to walk. This is established beyond a doubt, however much some of the other moves of the Yonkers Railroad and its opponents may be obfuscated by the conflicting news reports of suits, counter suits, injunctions unheeded, etc.

The Yonkers Railroad was in need of added revenue. Of this it convinced the Council of Yonkers. Hastings, however, remained unconvinced. When the railroad began to collect an extra fare at the limits of Yonkers, passengers to Hastings became obdurate. But the company was insistent. Conflicts between employees of the railroad and passengers followed. Then the railroad, with the approval of the Public Service Commission, decided to abandon service in Hastings. This it did while Hastings was making up its mind to secure an injunction to prevent the discontinuance of operation. When the court order restraining the company was ready all Hastings was walking. A railroad that has already abandoned service cannot be prevented from abandoning service. An injunction does not hold that is issued to prevent something being done that already has become an established fact. Hastings was isolated from Yonkers and from New York. In time, no doubt, the town would have become reconciled to isolation from Yonkers, but to be cut adrift from New York was more than Hastings could endure.

Meanwhile the opposition to the fare increase in Yonkers was organizing. The dissenters prepared to fight. As a first move they sought the courts. In consequence there is now pending before Supreme Court Justice Morschauser an action seeking to require the railroad to give passengers rebate checks pending the final settlement of the legality of the extra fare charge. As for Hastings, it still remains cut off from New York, so far as access to that city over the Yonkers Railroad is concerned.

Wants Seven Cents in Jamestown

A conference has been called in Jamestown, N. Y., between A. N. Broadhead, president of the Jamestown Street Railway, the municipal authorities of the city and Charles R. Barnes, electric railway inspector of the Public Service Commission for the Second District, in an effort to bring about an agreement between the city and the company regarding the discontinuance of transfer service between the company and the Warren & Jamestown Street Railway. The Jamestown Street Railway also seeks a 7-cent fare.

In a communication to the City Council of Jamestown, President Broadhead calls attention to the fact that unless a 7-cent fare is granted the company will have to discontinue its Willard Street line, the latest addition to its system. He points out that the company lost $70,000 last year and that the company has never paid any dividends. The City Council seeks to force the company to issue transfers to the Warren & Jamestown Street Railway. The Warren & Jamestown Street Railway has already discontinued giving transfers for the Jamestown local lines.

Jitney Measure Re-enacted

The ordinance in Huntington, W. Va., placing severe restrictions on jitney traffic, which was repealed last July when service on the Ohio Valley Electric Railway was impaired by lack of power, was re-enacted by the City Commissioners on April 30 at the instance of George I. Neal, attorney for the company. Mr. Neal stated the company was preparing to build the South Side line and would be required to float a bond issue to defray the expenses of the improvement. He explained that it would be difficult to sell bonds as long as there was no statute on the books restricting jitney traffic. The ordinance re-enacted on April 30 requires every company operating jitneys to furnish a $5,000 bond for every vehicle in operation and to pay a license fee of $50 for each bus of four-passenger capacity. The jitneys are further required to follow a fixed route and operate seven days a week on a regular schedule. A fine of from $10 to $100 or imprisonment for not more than thirty days is provided as a penalty for violation of the law.

Transportation News Notes

Skip Stops for Municipal Line.—Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., has announced that the skip-stop system will be employed on the Seattle Municipal Railway. Details of the proposed plan have not yet been worked out.

Fare Petition Renewed.—The Topeka (Kan.) Railway has applied to the Public Utilities commission for a 6-cent fare. The commission denied a similar increase a month ago, but the company states in the new petition that it has been compelled to increase wages in the meantime.

Government Road Increases Fare.—On the Nipissing Central Railway North Colbalt, Ont., Can., an electric railroad owned by the Dominion government, fares have been raised 25 per cent. Within the limits of Cobalt, Haileybury and New Liskeard the fare is now 7 cents.

Detroit United Class Rate Increase.—The Detriot (Mich.) United Railway has been authorized by the Interstate Commerce Commission to increase its class rates 25 per cent, but to retain its freight rates at not more than those charged on steam railroads between the same points.

Orders Fare Increase Suspension.—The Public Service Commission of Massachusetts has ordered the Massachusetts Northeastern Street Railway, Haverhill, Mass., to suspend until May 15 the operation of the company's tariff proposing an increase in the single cash fare from 6 cents to 10 cents.

Making the Most of It.—The Philadelphia (Pa.) Rapid Transit Company is advertising in the cars of its surface lines and on the stations of its elevated and subway rapid transit line that whereas Philadelphia has a 5-cent fare in Boston 8 cents is charged, in Pittsburgh 7 cents and in St. Louis 6 cents.

Fare Referendum in Akron.—Opponents of the city ordinance providing for an increase in fares to 6 cents on the lines of the Northern Ohio Traction & Light Company in Akron have filed petitions for a referendum. City officials said that the referendum would be submitted at a special election not later than May 20.

Fare Request Refused.—The City Council of Decatur, Ga., has voted unanimously to deny the petition of the Georgia Railway & Power Company, Atlanta, Ga., that the 5-cent fare contract existing between Decatur and the company be suspended and the company be permitted to charge 6 cents fare on this line.

New Fare Accounting Plan.—The Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has agreed with its employees that the p-a-y-e fare boxes shall remain locked and be opened only by representatives of the company. The railway company will accept all mutilated coins and will not take into account with its men any shortages or overs.

Reduction in Buffalo-Niagara Falls Fares.—The International Railway, Buffalo, N. Y., under a tariff supplement filed with the Public Service Commission for the Second District, and proposed as effective on June 1, will reduce joint one-way fares from Buffalo via Niagara Falls and Niagara Gorge Railroad, $1.10 to 97 cents to Lewiston and $1.25 to $1.17 to Youngstown.

Fare Increase on Columbus Suburban Line.—A new fare schedule, providing for an increase of 1½ cents per zone, has been put into effect on the Westerville line of the Columbus Railway, Power & Light Company, Columbus, Ohio. This was done on the contract for a sliding scale, made two years ago. When the working capital for the line falls below $15,000, the rate of fare is increased and when this fund reaches $25,000, the fare is reduced.

Asks Increase in Freight and Passenger Rates.—The hearing on the petition of the Ohio Electric Railway for an increase in freight and passenger rates has been set by the Public Service Commission of Indiana for May 8. The company is asking for permission to increase fares on the lines to a basis not exceeding 3 cents a mile for passengers between all stations in Indiana and for authority to increase freight rates approximately 25 per cent between all stations on the railway in the State.

Seven Cents in Vancouver, Wash.—The Public Utilities Commission of the State of Washington has authorized an increase from 5 cents to 7 cents in fare on the lines of the North Coast Power Company in Vancouver, Wash., to become effective at once. One of the urgent reasons given for asking the increase is the increasing number of automobiles in use in the city, detracting from the company's revenues. A few months ago, permission was granted the company to raise the fares on the interurban lines to Sifton and Orchards.

Fare Settlement in Battle Creek.—Battle Creek's controversy with the Michigan United Railways, Jackson, was settled on April 28. The company is allowed to return to 6-cent fares, but is required to sell nine tickets for 50 cents. There will also be a flat 5-cent fare for workingmen between 6 and 8 o'clock in the morning and 5 and 7 o'clock at night. Conductors will be required to carry workingmen's tickets. For a week previous to the settlement of the controversy the company charged only 5 cents, but refused to give transfers.

Agrees to Increase of Interurban Fare.—On May 3 the City Council of Warren, Ohio, passed a twenty-five-year franchise which grants an increase in fare to the Mahoning & Shenango Railway & Light Company as follows: Between Warren and Niles, from 5 cents to 10 cents; between Warren and Girard, from 10 cents to 20 cents, and between Warren and Youngstown, from 15 cents to 25 cents. Before the franchise becomes effective, however, it must be ratified by the Councils of Niles and Girard and by the Commissioners of Trumbull County.

Plea for Equalization of Tariffs.—A petition has been filed with the Public Service Commission of Indiana by the interurban railways operating in Indiana to change the tariffs being used by the lines. The companies ask that they be placed on the same basis of rates as the steam lines. The petitioners are seeking to increase the rates slightly on short hauls and to decrease the rates on long hauls. If the changes are granted they are not expected to increase the operating revenues of the companies. The changes are being sought principally for the purpose of removing discrimination.

Not Partial to Zone Plan.—W. F. Ham, president of the Washington Railway & Electric Company, Washington, D. C., on May 5 reiterated that the company is by no means insistent upon zone charges. It merely has proposed this plan as one of several offering a possible solution of the company's financial difficulties. The company, he stated, has withheld no facts bearing upon its inability to continue furnishing service at the present rates and is willing to leave to the Public Utilities Commission the question of how it shall obtain sufficient revenue to enable it to exist.

Increased Fares Suspended in Schenectady.—The Public Service Commission for the Second District of New York at its regular session on April 29 further suspended the effectiveness of proposed increased rates by the Schenectady Railway until May 31, inclusive. Increased fares under suspension are in Schenectady and on the three interurban divisions. The railway has filed a new application for permission to increase its fares in Schenectady from 5 cents to 6 cents. With the application there was filed a certified copy of the ordinance adopted by the Common Council of Schenectady waiving the city's 5-cent fare rights under the existing franchises.

Service Case Practically Closed.—The New York State Railways, Rochester Lines, on May 1 practically closed its evidence before the Public Service Commission for the Second District, under the order to show cause which the commission issued relative to increased service in Rochester. Corporation Counsel Cunningham cross-examined Chester G. Brown, an accountant, over various charges and the apportionment to the Rochester city and interurban lines. Mr. Cunningham asked for some additional information along this line which the railway said it would produce at an adjourned hearing in Albany on May 19. The case will be submitted at the next hearing.

I. C. C. Denies Service Order.—On the ground that it is without jurisdiction to require increased service even when an increase in revenue is granted, the Interstate Commerce Commission has denied a petition of the city of New Albany, Ind., and others for a rehearing of the application of the Louisville & Northern Railway & Light Company and the Louisville & Southern Indiana Traction Company for an increase in fares. The companies had been granted an increase from 5 cents to 7 cents. The petitioners sought to require them to double the number of motor cars and trailers in use and to establish at certain hours a fixed time schedule.

Columbus President Not Entirely Satisfied.—Charles L. Kurtz, president of the Columbus Railway, Power & Light Company, Columbus, Ohio, on his return from Mexico, took up the study of the new ordinance through which the company would be authorized to operate at a fare of six tickets for 25 cents for two years. Mr. Kurtz said that the rate was not sufficiently high to give the people the service they desired and the company would like to offer. He said figures were being prepared which would show where all the money collected was being expended. Every body would know just what was being done and there would be no need of guessing in the future. A referendum is planned on the six-for-a-quarter fare.

Eight Cents in Girardville.—The Public Service Commission of Pennsylvania has announced that "as an emergency measure and for the purpose of giving the company what appears to be the necessary relief" it had granted the application of the Schuylkill Railway, Girardville, Pa., to charge an 8-cent fare, but refused the company the right to sell thirteen tickets for $1. Instead the railway is to sell seven tickets for 50 cents. The decision was rendered in the complaint of the boroughs of Mahanoy City and Ashland and an application of the company for the right to charge an 8-cent fare. The tariff is to be effective on one day's notice and to run until June 1, 1920.

Suburban Fares Reduced in Rhode Island.—Reductions in fares on nine of the suburban lines operated by the Rhode Island Company, Providence, R. I., effective on May 1 were authorized by the Public Utilities Commission in an order issued on April 30, which continues in effect until further order of the commission the rates which have been in force on all other lines. The new rates are, with a few exceptions, the same as were proposed by the Rhode Island Company in tariffs filed with the commission on April 1. As explained in the review of the new fare tariff in the ELECTRIC RAILWAY JOURNAL for April 12, page 758, the new rates were offered as a basis for the readjustment of fares on the heavily traveled suburban line. It was suggested that they be tried for three months for the purpose of building up business, as they are lower than the company could offer on the previous volume of business.

No Fare Action in New York City.—The Public Service Commission for the First District of New York on April 30 decided to take no further action on the applications of the various surface railways for authority to charge for transfers, because the Board of Estimate is adhering to its decision not to modify the franchises, thus leaving the commission practically without jurisdiction. The commission has felt that the increase in operating expenses should be followed by some concessions in the fare rate, either by a direct increase in the fare, the abrogation of transfers, or a charge of 3 cents for them. It is stated that if the law legislating the present commission out of office had not been enacted some definite steps might have been taken to settle the question of the rate-making power of the commission, but the outgoing commissioners did not feel that they should do anything that might embarrass their successors.

Legal Notes

FEDERAL COURTS — *Ruling on Free Transportation of Detectives by Philippine Supreme Court Not Renewable by United States Supreme Court.*

Under Section 248 of the Judicial Code the Supreme Court had authority to review decisions of the Supreme Court of the Philippine Islands (a) where the constitution or any statute, treaty, title or privilege of the United States is involved, or (b) where the value in controversy exceeded $25,000. Hence, a ruling of the Philippine Supreme Court that a franchise ordinance which required free transportation of members of police department did not apply to detectives with such badges concealed, was held not to come within the jurisdiction of the United States Supreme Court as not falling within the two classes of cases mentioned above. (Board of Public Utility Commissioners *vs.* Manila Electric Railway & Light Co., 39 Supreme Court Rep., 272).

CALIFORNIA—*Injury to Person Between Tracks—Contributory Negligence.*

Where, in daytime, a passenger after alighting from a street car, walked around its rear and was injured by being struck by the projecting step of a passing car on the other track, while in a space between the tracks wide enough to permit a clearage of 43 in. between passing cars, she was guilty of contributory negligence as a matter of law, and a nonsuit was properly granted. (Ross et al. *vs.* Pacific Electric Ry., 179 Pacific Rep. 538.)

NEW YORK—*Negligence of Pedestrian Held Responsible in Spite of Ordinance Violation.*

One who alighted from a street car, stood until the car had gone 30 ft., then started to cross the street, looking and listening when he could see about 40 ft., and then crossing the opposite track, where he was struck by a car going 20 m.p.h., was negligent, although there was an ordinance requiring street cars to reduce their speed to 5 m.p.h. while approaching and passing a standing car. (Schasel *vs.* International Ry., 571 New York Sup., 571.)

NEW YORK—*Orders of Public Service Commission Must Be Executed.*

Where the Public Service Commission directed a company to install an interlocking signal device at a crossing and there was long delay in enforcing the order, and the price of materials had greatly increased, compliance with the order will be compelled by mandamus, despite the company's claim of financial inability. (Public Service Commission, Second District, *vs.* International Ry., 174 New York Sup., 708.)

NEW YORK—*The Raising of Trolley Wires to Let a High Obstruction Pass.*

A street railway cannot interfere with the reasonable use of the street by others, even where such use involved temporary obstruction of traffic or interference with wires, as by the moving of a pile driver 16 ft. high. Where the company was informed that such an obstruction could not pass across the street without coming in contact with trolley wires, and sent a wrecking gang of men to raise the wires, such a gang was not a mere "volunteer," but was performing a legal duty and would be liable for injuries due to negligence in undertaking to raise the wires to prevent contact as the truck passed under them. (Chace Trucking Co. *vs.* Richmond Light & Railroad Co., 122 Northeastern Rep., 210.)

NEW YORK—*Collision Because Motorman Lost Consciousness Not Negligence Per Se.*

Where a street car motorman fainted in his cab and caused a collision, the responsibility of the company for the motorman's failure to exercise reasonable care must be determined in the same manner as any other question arising in the course of the motorman's employment. (Goldman *vs.* New York Rys., 173 New York Sup., 738.)

WISCONSIN—*Reservation of Certain Cars for Interurban Traffic Held Reasonable.*

A regulation of an electric railway company reserving interurban cars for interurban traffic only and excluding city traffic therefrom, was held to be a reasonable one, such a system having been approved by the Railroad Commission. (Campbell *vs.* Milwaukee Electric Railway & Light Co., 170 Northwestern Rep., 937.)

WISCONSIN—*Company Not Responsible for Injury to Workman Near Track.*

Where a laborer working near the tracks of a street railway was injured by a passing car and neither his duties nor any obstruction of view prevented him from seeing the car, his failure to keep a proper lookout was negligence preventing recovery. (Yellick *vs.* Milwaukee Northern Ry., 170 Northwestern Rep., 941.)

New Publications

Industrial Safety Codes

Report of conference at the Bureau of Standards, held on Jan. 15, 1919. United States Bureau of Standards, Washington, D. C.

This pamphlet contains a brief report of the conference and a proposal for the organization of an American Standards Association.

Saving Coal in Steam Power Plants

Reprint of Engineering Bulletin No. 2, prepared by the United States Fuel Administration in collaboration with the Bureau of Mines. Five cents per copy. Address Superintendent of Documents, Government Printing Office, Washington, D. C.

A practical little pamphlet which should be in the hands of every man responsible for the operation of any part of a steam power plant.

Thirty-fifth and Thirty-sixth Annual Reports of New York Electric Railway Association

Published from the office of the secretary of the association, Rochester, N. Y.; 275 pages.

This volume just issued contains the proceedings of the annual meetings on June 27, 1917, and June 22, 1918, the quarterly meeting of March 2, 1917, and the special meetings of Dec. 13, 1917, and April 29, 1918.

Combustion and Flue Gas Analysis

Technical Paper 219 of the United States Bureau of Mines, reprint of Engineering Bulletin No. 4 prepared by United States Fuel Administration in collaboration with the Bureau of Mines. One copy free from the Bureau of Mines, other copies at 5 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C.

This bulletin contains practical information based on an article by Joseph W. Hayes, combustion engineer, and is in the nature of a set of directions for securing efficient fuel combustion.

Industrial Electrical Measuring Instruments

By Kenelm Edgcumbe. D. Van Nostrand Company, 25 Park Place, New York, N. Y. 414 pages. Illustrated, cloth, $5 net.

This is the second edition of the author's book and it includes very considerable revisions from the original text. The subject of electrical measurements is covered with due regard for theory, but without complicated mathematics. There is little of detail regarding commercial instruments, although a number of such devices are described by way of example. These examples are, however, all drawn from British practice.

Analysis of Tests of Rigidly Connected Reinforced Concrete Frames

Bulletin 107, University of Illinois Engineering Experiment Station, Urbana, Ill. Copies may be had without charge from the station.

This bulletin gives the results of a series of tests conducted to obtain experimental information on stresses in the reinforcement and the concrete, the continuity in the composing members of a frame, the locations of sections of critical stress, the reliability of a reinforced-concrete frame and the applicability of the theoretical formulas in the design of frames. The following cases have been analyzed for vertical load: Single-story frame, single-span; single story, three-span; trestle bent with tie, single-span; building frame with several stories and several spans, and bridge trestle. For horizontal load, single story, single-span; octagonal reservoir or tank, and rectangular reservoir or tank have been analyzed.

Personal Mention

Lewis Nixon, State Superintendent of Public Works of New York, has been appointed by Governor Smith to be Public Service Commissioner for the First District of New York (Greater New York) in charge of regulation. Mr. Nixon was born at Leesburg, Va., fifty-eight years ago. He was graduated from the Naval Academy in 1882 at the head of his class. He served on the staff of the chief constructor of the navy, being detailed to Cramp's, Philadelphia, and to the Navy Yard in New York. He afterward had his own yard at Elizabeth, N. J. As a naval constructor, Mr. Nixon designed the Oregon, the Indiana and the Massachusetts. Mr. Nixon was a member of the East River Bridge Commission in charge of the construction of the Williamsburg Bridge. He won national fame as the man who built the first really big battleship of the American Navy, the Oregon. For a time he was leader of Tammany Hall.

Joseph E. Dozier has resigned as general manager of the Nahant & Lynn Street Railway Lynn, Mass., to become sales manager of the Northway Motor Organization Company of Boston and Natick, Mass. Mr. Dozier entered the traction field only fourteen years ago. He was born in Barnesville, Ga., in 1867, and was reared in Macon, Ga., graduating from Planters' Academy in 1886. In his boyhood he was employed as night operator by the Southern Bell Telephone & Telegraph Company for five years. This experience led to his appointment as an exchange manager soon after leaving school. He remained with the Southern Bell Company until 1894, when he was called to Boston by the New England Telephone & Telegraph Company. He served as manager of various exchanges until 1905 when he resigned to become associated with the Nahant & Lynn Street Railway, which he constructed and has operated ever since. He was elected president of the New England Street Railway Club at the annual meeting of the club last March.

Joseph F. Berry has resigned as attorney for the Connecticut Company New Haven, Conn., to engage in private practice in Hartford. Mr. Berry spent practically all of his time, since graduation from college, as attorney for street railway corporations. He was born on Feb. 13, 1880, in Boston. He attended the public schools in Boston and was graduated from Tufts College in 1901 with the degree of A. B. He was graduated from Harvard Law School in 1904 with the degree of LL.B. Mr. Berry entered the office of Choate, Hall & Stewart, Boston, in July, 1904, where he was principally engaged in preparation and assistance in defense of personal injury actions against the Boston Elevated Railway, the New York, New Haven & Hartford Railroad and the Boston & Albany Railroad. On Oct. 1, 1907, he resigned to accept the position of assistant attorney of the New York, New Haven & Hartford Railroad in New Haven. He engaged in the trial of cases for the railroad and affiliated companies in Connecticut until March 1, 1914, at which time the Connecticut Company was separated from the New York, New Haven & Hartford Railroad. He was appointed attorney for the Connecticut Company, the New York & Stamford Railway and the Westchester Street Railway on March 1, 1914, and acted as such in trials in all counties of Connecticut. During the last two years he did much general legal work. Mr. Berry was admitted to the Massachusetts Bar in February, 1904, at Boston; the Connecticut Bar November, 1907, at New Haven and the United States Supreme Court Bar in October, 1910, and also is a member of the Bar of the United States District Court and the Circuit Court of Appeals for New York District.

Obituary

George O. Nagle Dead

George O. Nagle, who for twelve years up to November, 1915, had been general manager of the Wheeling (W. Va.) Traction Company, died at his home in that city on April 15. Death was due to complications from stomach trouble. At the time of his death Mr. Nagle was city manager of Wheeling. He was the first incumbent of that office and was elected to it in June, 1917, when Wheeling adopted the city manager form of government.

Mr. Nagle was born in Milton, Pa., on Dec. 31, 1868, and moved to Chicago in 1886. Shortly after this he entered the employ of the Chicago, Burlington & Quincy Railroad, serving first in the ticket auditor's office and later in that of the general auditor. In February, 1891, he entered the employ of the Chicago City Railway as junior in the claim department. Six months later he was promoted to the position of private secretary to the superintendent, and in 1898 was appointed superintendent. After he resigned from the Chicago City Railway he became connected with Stone & Webster, first as manager of the Savannah (Ga.) Electric Company and later in general charge of the properties of this firm in the Southeast. He left the Stone & Webster interests to go to Wheeling in 1903.

Mr. Nagle's ability as a railway manager soon became appreciated in Wheeling and not only brought about good public relations and improvement in the service, but led to his active participation in many civic enterprises. Thus he became an influential member of the Board of Trade, entered the Playground Association and at the time of the Panama-Pacific Exposition was appointed by the Governor a member of the State Exposition Commission. Shortly after leaving the traction company in 1915 he was elected president of the Morris Plan Bank and also president of the West Virginia Manufacturers' Association. His work as city manager was attended by many reforms and economies. In referring to his death the Wheeling *Majority* said, in part:

> He could have been a millionaire. Men with much less mental equipment have made much more. But he chose instead to serve others instead of himself. He viewed the city government not as a pension list or public corral but as a public utility, designed to do collectively for the people the things they could not do for themselves. His example of public service cannot help but live.

Thomas B. Jennings, shop foreman for the Texas Electric Railway at Sherman, Tex., was killed by an automobile recently. Mr. Jennings was supervising some track work in front of the company's carhouse in Sherman when he was struck by a passing automobile. Mr. Jennings suffered a fractured skull and other injuries to which he succumbed in a few hours.

Charles Andrew, president of the Electric Railway Equipment Company, Cincinnati, Ohio, is dead. Mr. Andrew, was born at Cincinnati, Ohio, on Feb. 14, 1850. He was a son of Peter Andrew, long identified with the business life of Cincinnati and at one time vice-president of the Chamber of Commerce. Early in his career Charles Andrew was connected with the grain business. He was, however, greatly interested in electricity and with the introduction of electric traction in the early nineties became identified with his brothers in the manufacture of tubular steel street railway poles. With this as a beginning the business was gradually extended to include overhead line material and electric light poles. With the introduction of a patent wirelock swedged joint the business in steel poles greatly increased and there are now few cities in this country or foreign countries where poles with this type of joint are not now well known. Some two years ago Mr. Andrew's failing health compelled him to give up an active participation in business. His health continued to fail and on April 29 he died. In his death the electric railway business loses a pioneer manufacturer and one of the most popular men connected with the production of electric railway materials.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Italian Railways Desire American Equipment

Water Powers Easily Developed—Credit System Must Be Substituted for Present Cash Transactions

Before the pressure of war required Germany to curtail her output of electrical machinery for commercial purposes, Italy purchased most of its electrical power-house machinery and railway supplies from that country. When new railroads or traction systems were projected the Italian government, principality or municipality issued subsidies for the work. Much of the capital needed was raised by the territory affected and in many cases the remainder came from Germany.

A single German bank for financing projects of electrical power houses only loaned the required balance of capital and supplied the electrical machinery through the German manufacturing companies. Thus the Italians, with a certain amount of capital, were enabled to secure sufficient credit to carry out their electrifications. And the machinery came from Germany and the lien on the property was held by Germany.

AMERICAN CREDIT WANTED

To-day the Italians are seeking credit in the United States, a prominent Italian engineer who is in this country told a representative of the ELECTRIC RAILWAY JOURNAL, to enable them to construct new traction systems and electrify existing steam lines through the use of American equipment. It has been stated that the cash basis of Americans has been and now is keeping back needed electrifications. A suggestion has been made that an American bank be organized to extend credit on electrical machinery to Italy; 50 to 70 per cent of the total investment has been mentioned as the amount of capital which the Italians could normally invest in the project, while the balance would be necessary in credit from this bank.

Many municipalities in Italy are now connected with light steam lines. The operation of these lines, it has been stated, is almost impossible. Coal is high, the wood substituted for it is green and poor burning and the equipment is in bad repair. Water power is abundant and about 2,000,000 hp. is so available as to make its harnessing a simple task.

Of the many industrial enterprises directly damaged by the war, electric power plants suffered to the extent of approximately $5,000,000. This industry is third in the list, having been surpassed by cotton and silk mills.

Open Market for Iron and Steel

Lower Prices for a Short Time May Result, but Prices Later Will Be Higher

As has been confidently expected for some time the plan of the Industrial Board to stabilize steel prices by fixing minimums for the current year has failed. The steel producers and the representatives of the Railroad Administration were not able at their meeting on Thursday to agree on minimum prices following the refusal of the Railroad Administration to accept the prices earlier agreed upon by the steel producers and the Industrial Board. The Railroad Administration held out for more than $3 a ton less for Bessemer rails than the price in the Industrial Board schedule. An open market for iron and steel products now exists. The Railroad Administration is to ask at once for competitive bids on 200,000 tons of rails.

By this action the stage is once more set for big business. Ever since the refusal of the Railroad Administration to accept the minimum prices first agreed on, buying and construction have been held back in large measure. Now that a free market governed once more, after a lapse of many, many months, by the fundamental economic law of supply and demand, exists, agreater volume of business can be expected.

Prices of steel products including rails are, as a result of the meeting, in a peculiar position. The steel producers, it must be remembered, did not state that they would not sell for lower prices but that they would not agree to sell at these lower prices for the balance of the year.

Looking at the situation from every angle the most natural thing to expect is lower prices for iron and steel. In order to stimulate buying there is every reason to believe that the mill operators will accept orders at prices under the cost to produce. Just how far steel men will go in price cutting depends on the rapidity with which buying responds and the need of the individual producer for business.

One thing is certain—lower prices will not prevail for long. Just as soon as the producers are convinced that buying is opening in a substantial way, prices will stiffen. Before the year is over prices for iron and steel, according to present indications, will reach a level higher than the present.

From late in the year on the prices of iron and steel can be expected to fluctuate with a general tendency downward.

Hewn Tie Prices Expected to Go Higher

Electric Railway Market Affected by Government Demand — Labor Conditions Better

The market for hewn ties for electric railway work is influenced to a great extent by the demands of the steam railroads for that same product. At the present time the demands of the government-controlled roads are not being met by the producers of hewn ties. One manufacturer of ties states it as his belief that not one railroad in the country has sufficient supply to take care of its renewals. This manufacturer has notified his best customers that the tendency of hewn tie prices is upward, and that they should anticipate their summer needs and order sufficient for several months' supply by the first of June.

He attributes this rise in price to the small supply available. The government needs more ties for its roads than are now being supplied, and in order to stimulate production he anticipates that the government will offer a slightly higher price to the manufacturer.

This would probably be in the nature of a 5 cent or 10 cent increase per tie and possibly will be applied before the present month is out. The practice of the government has been to notify the manufacturers that it would pay a certain price over a given period, and it has step by step advanced these prices from time to time.

LARGE SUPPPLIES NEEDED

The same tie is used for electric as for steam roads, and the same price changes will apply. In normal times about 70 per cent of the tie business is for renewals, while the 30 per cent is for new work. At present new work has dwindled to practically nothing. Orders are coming in in the neighborhood of 10 to 40 per cent of normal for renewals. This means that both steam and electric roads, principally the latter, are not keeping their roadbeds in shape. Some roads have not placed orders for two years. Consequently, when those roads do buy ties they will have to buy for a large portion of their track.

In the Southern tie camps labor conditions have improved in the last two months. The large number of hewers who left the industry short handed when the army attracted their attention have returned to civilian life and taken up their former work. Deliveries are consequently much improved and are expected to continue so.

American Rails for British Traction System

City of Birmingham Orders 2200 Tons —Price and Delivery Influencing Factors in Placing Order

The City of Birmingham, England, after inviting bids on material for replacing its street car rails, finally decided to place its order in American hands. The first quantity of 1000 tons was followed by an order for 1200 tons, and this material has now been shipped. When the British firms lost the contracts protests were so numerous that the municipal government issued an official statement.

One of the British bidders, it was explained, agreed to begin delivering fifty tons a week in April, but would not consent to a penalty clause for nondelivery; the other promised 1200 tons within twenty weeks. The firm in the United States agreed to complete delivery by the end of May and quoted a lower price than either of the British manufacturers. The price and the fact that the authorities were anxious to complete the work this year were the influencing factors in favor of the American bidder.

Decline in Price of Controller Fingers and Segments

A prominent manufacturer of controller fingers and segments advises that prices of these articles of maintenance declined early in April. Although the traction companies are continuing sufficient sales to keep their controllers in running shape there has been no noticeable increase in purchasing.

Sufficient raw materials are stocked to care for increases in buying, and deliveries can be made for any quantities in about three weeks.

Rolling Stock

Denver & South Platte Railway, Denver, Col., announces the purchase of two safety cars from the American Car Company for June 1 delivery.

Quincy (Ill.) Railway will soon install twenty-five new one-man cars of the latest type. These cars will permit a five-minute service from the Soldiers' Home and a ten-minute service on State Street and Broadway and Tenth Street. The new cars will cost $6,000 each.

Manufacturers' Railway, St. Louis, Mo., it is announced, has ordered six electric locomotives, of which two have been delivered, for the 24 miles of terminals now being electrified. These locomotives are capable of drawing forty loaded cars at 15 m.p.h., and are said to have cost $300,000.

Central Illinois Public Service Company, Paris, Ill., will soon install three new pay-as-you-enter cars on the city line in Paris, it is reported. The cars will be one-man units with safety appliances and air-equipped doors and brakes, and they will be 28 ft. long and 8 ft. wide. The seating capacity will be thirty-two, with benches crosswise.

Recent Incorporations

Dayton & Tennessee Railway, Dayton, Tenn.—Incorporated to build a short line in Dayton. Capital stock, $10,000. Incorporators: J. S. Frazier, E. M. Williamson, Jake Benkovitz, A. P. Haggard and W. H. Jones.

Richmond & Ashland Railway, Richmond, Va.—The State Corporation Commission has granted a charter to the Richmond & Ashland Railway to operate the line of the Richmond & Chesapeake Railway from Richmond to Ashland. Capital stock, $300,000. Officers: Jonathan Bryan, Richmond, president; D. R. Midyette and W. L. Foy, both of Ashland, vice-presidents, and Oliver J. Sands, Richmond, secretary and treasurer. It is expected that operation of the line will be begun soon.

Franchises

Petaluma, Cal.—The Petaluma & Santa Rosa Electric Railway has asked the City Council of Petaluma for a franchise to construct an extension of its lines in that city for freight business.

Covington, Ky.—The South Covington & Cincinnati Street Railway has been granted a twenty-year franchise by the City Commissioners of Covington for the use of Rosedale and Latonia Streets.

Track and Roadway

Pacific Electric Railway, Los Angeles, Cal.—Preliminary work has been begun by the Pacific Electric Railway for the construction of the proposed extension of its La Rambla system. The work will include an extension north of the present terminus in Bandimi Street, San Pedro, to the canyon located in the northern section of the Peck properties.

Denver & South Platte Railway, Denver, Col.—Improvements are being planned by the Denver & South Platte Railway to its system.

Quincy (Ill.) Railway.—The Quincy Railway plans to expend $100,000 for general improvements in Quincy.

Worcester (Mass.) Consolidated Street Railway.—To relieve traffic congestion at Main and Front Streets the Worcester Consolidated Street Railway proposes to construct a loop from Main Street through Madison, Portland and Franklin Streets, back to Main Street.

Manufacturers' Railway, St. Louis, Mo.—It has been announced that the Manufacturers' Railway, which controls 24 miles of terminals in South St. Louis, will be operated with electric motive power within the next few weeks. Power will be obtained from the hydro-electric plant of the Mississippi River Power Company, Keokuk, Iowa.

Northern Ohio Traction & Light Company, Akron, Ohio.—During this year the Northern Ohio Traction & Light Company plans to construct a single track on Navarre Road from Garfield Avenue to Bryan Avenue SW and on Bryan Avenue and Twenty-second Street SW to the Canton Sheet Steel Company, a single track on Cleveland NW, a single track on Sixth Street SW and a single track on Fourth Street NW. The company also plans to build a Y at the end of Sixth Street and a siding on Tuscarawas Street.

Dominion Power & Transmission Company, Hamilton, Ont.—The Street Railway Committee of Hamilton contemplates the extension of the tracks south on Queens Street to Aberdeen, west to Dundurn Street, north to Charlton Avenue and east to the line on Locke Street.

Fort Worth Mineral Wells Interurban Co., Fort Worth, Tex.—The construction of the interurban line from Fort Worth to Mineral Wells, a distance of about 60 miles, is assured, according to H. E. Robinson, chairman of the executive committee of the Fort Worth-Mineral Wells Interurban Company. The line will be begun at Fort Worth and the 10-mile stretch to Lake Worth will be built at once. It is announced that this line will be in operation by the end of August. It is planned to use the tracks of the Northern Texas Traction Company to the end of the Rosen Heights car line, which will leave about 4½ miles to the lake. The company has been granted franchises through the cities of Weatherford and Mineral Wells [May 3, '19].

Seattle (Wash.) Municipal Railway.—Permanent improvements and additions to the Seattle Municipal Railway are provided for in an ordinance prepared by Corporation Counsel Meier, at the request of Thomas F. Murphine, Superintendent of Public Utilities, authorizing the sale of $520,000 in utility bonds. The ordinance has been introduced in the Council, and referred to the Finance and City Utilities Committees. Among the improvements proposed are the double-tracking of the Fauntleroy line on Avalon Way, the connection of the East Union with the Madrona lines at Thirty-fourth Avenue; extension of Division Avenue across Pine Street; extension of lines on south approach to Ballard bridge. If the ordinance is passed, it is proposed to provide money to start the work immediately by a loan to the street railway construction fund, and to pay it back when the bonds are sold.

Ohio Valley Electric Railway, Huntington, W. Va.—Plans are being made by the Ohio Valley Electric Railway for the construction of an extension to be known as the South Side line. Under the provisions of the franchise, the line must be completed not later than one year from the signing of the peace treaty, and it is believed that work on the new line will be begun before the middle of the summer.

Power Houses, Shops and Buildings

Georgia Railway & Power Company, Atlanta, Ga.—It is reported that the Georgia Railway & Power Company plans additional water power development on the Tugaloo River.

Decatur Railway & Light Company, Decatur, Ill.—The Decatur Railway & Light Company has leased a tract of land 125 ft. x 500 ft. on Wood Street, just west of the Illinois Central Railroad, where the company will erect a new carhouse and shops. Upon the completion of these buildings the company will abandon practically all of their shops and other buildings in the city, with the exception of one warehouse.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—According to an announcement made by Britton I. Budd, president of the Chicago, North Shore & Milwaukee Railroad, the company contemplates the removal of its terminal from Highwood to Waukegan and the construction of repair shops and switches at an estimated cost of about $100,000.

New Orleans Railway & Light Company, New Orleans, La.—A new 15,000-kw. turbine capable of producing 20,000 hp. is being installed at the central power station of the New Orleans Railway & Light Company in Market Street.

Cumberland Railway & Power Company, Fayetteville, N. C.—Plans are being made by the Cumberland Railway & Power Company for the erection of a hydro-electric power plant at Fayetteville, with an initial capacity of about 3000 hp.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Northern Ohio Traction & Light Company proposes to erect a new transmission line from Canton to Akron.

Montreal (Que.) Tramways.—It is reported that the Montreal Tramways contemplates the construction of a new substation at Cartierville.

Lee Valley, Tenn.—It is reported that John N. Adams, engineer, proposes to construct a hydro-electric plant and railway.

Texas Power & Light Company, Dallas, Tex.—Plans are being made by the Texas Power & Light Company for the construction of a power station at Strawn.

Monongahela Valley Traction Company, Fairmont, W. Va.—The United States Engineering Department has granted permission to the Monongahela Valley Traction Company to construct a new high-tension transmission line over the Monongahela River near Hoult, W. Va.

Trade Notes

F. X Cleary has resigned as manager of the New York office of the Electric Service Supplies Company, 50 Church Street, and is succeeded by Randolph Mann.

Buda Company, Harvey, Ill., announces that F. W. Marvel has again joined the sales force of the company, and will be located at its New York office at 30 Church Street.

Briggs & Turivas, Inc., Chicago, Ill., announce that they have opened a New York office at 1805 Equitable Trust Building. This office will be under the direction of the company's president, Carl R. Briggs.

Terry Steam Turbine Company, Hartford, Conn., announces the appointment of R. L. Thomsen as sales manager. Previous to his appointment Mr. Thomsen was manager of the marine department for the Griscom-Russell Company.

Van Dorn & Dutton Company, Cleveland, Ohio, manufacturers of gears, has opened branch offices at New York and Chicago. At both cities it is the company's purpose to specialize in gears and pinions for electrical work. Harry F. Keegan, formerly with the Chicago Surface Lines, will manage the Chicago branch with offices at 1241 First National Bank Building. His brother, John Keegan, will manage in New York with offices at Room 317, 30 Church Street. The latter comes from the Interborough.

Engineer Material and Equipment in A. E. F. Depots.—The War Department News Bureau announces that the articles showing increase from Nov. 1 to March 1 are as follows: switches and fastenings, narrow gage, from 382 to 490 tons; narrow gage rails from 19,500 to 22,300 tons; copper wire and cable from 91,300,000 to 114,000,000 ft. Decreases were noted as follows: electric generators from 881 to 450; 60 cm. mfd. track from 6350 to 5430 tons; 80 lb. and 67½ lb. rails from 55,500 to 47,300 tons; standard-gage switches and fastenings from 9020 to 7180 tons.

Adams-Bagnall Electric Company, Cleveland, Ohio, announces the appointment of R. E. Uptegraff in charge of its transformer department. Mr. Uptegraff was with the Westinghouse Electric & Manufacturing Company seven years, where he had charge of turbine and switchboard operation and was connected with the manufacture of motors, generators and transformers and their accessories. He was also active in transformer designs. His five years with the Pittsburgh Transformer Company as assistant chief engineer were occupied with much transformer design. For two years Mr. Uptegraff was consulting engineer for Rutherford & Uptegraff, in which capacity he still acts, and during this time he redesigned and reorganized the transformer department of the Packard Electric Company.

Box for Exporting Electrical Insulators.—A new type of crate for shipment of insulators for high-voltage transmission lines has recently been developed by the Forest Products Laboratory of the United States Forest Service at Madison, Wis. The work was done at the request of one of the large manufacturers of electrical goods whose containers had failed to prevent breakage of contents in spite of the apparent strength and durability of the container itself. The redesigned crates were subjected to severe tests and breakage of the insulators was eliminated. Moreover, it was stated, the container proved under test to be 100 per cent stronger, to occupy 15 per cent less space and to save 15 per cent in the cost of material. It is understood that this new type of package will be used to ship thousands of insulators to China for the construction of electric power lines.

New Advertising Literature

Exell Manufacturing Company, New Haven, Conn.: New catalog of ticket punches.

Hickey & Schneider, Elizabeth, N. J.: Bulletin No. 11 on high-tension air-break switches.

Mitchell-Rand Manufacturing Company, 18 Vesey Street, New York City: A folder cataloging Hope electrical tapes and webbings.

American Steam Conveyor Corporation, Chicago, Ill.: Illustrated bulletin on reducing ash-disposal costs, showing a number of typical installations of the steam jet ash conveyor.

Portable Machinery Company, Inc., Passaic, N. J.: A twenty-page folder "Over 1000 Scoop Conveyors." Illustrations show the various uses of the conveyors and describe the features of the machines in storing, reclaiming, loading and unloading coal, coke, ashes and other kindred material

Guaranty Trust Company, New York, N. Y.: A comparative yield indicator for use in the Victory Liberty Loan campaign. This device enables one to tell at a glance the income value of tax-exempt securities as compared with those subject to the Normal Federal income tax and surfaces of 1919. By use of it the investor can determine, without calculation, the yield which would be required from fully taxable investments to give the same net return as tax-exempt investments.

Green Engineering Company, East Chicago, Ind.: A complete catalog covering its stoker and furnace equipment. Besides being well illustrated, this book contains considerable engineering information, including cross-sectional drawings of settings for burning coal under various conditions, tables showing analyses of the coal of the world, information on stoker improvement, with particular reference to rear drums, chain skids, air-sealing systems, "Sealflex" arches and pressure waterbacks.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, May 17, 1919 *Number* 20

Getting Ready for the Atlantic City Convention

NOW that the definite announcement has been made that the convention of the American Electric Railway Association is to be held at Atlantic City, Oct. 6 to 10 inclusive, and that there will be an exhibit in connection therewith, the prospective gathering takes on more tangible form. The choice of meeting place will meet with general approval, for somehow Atlantic City furnishes a combination of attractions for a large convention that is difficult to beat.

The exhibit will be of unusual value this year because it will show, in concrete form, the ways in which manufacturers have profited in a development way during the war period. There will be a certain zest to it, furthermore, on account of the hiatus which has interrupted the series.

It is a satisfaction also to know that the somewhat anomalous status which the manufacturing members of the association have occupied since 1913, when they were admitted as full members, is on the way to be ended by the organization of an affiliated manufacturers' association. This plan is discussed more fully in the following editorial.

With regard to the convention as a whole, the industry needs a "get together" of this kind more than ever before. While some sacrifice of time may be needed on the part of the members to insure adequate attendance at Atlantic City, such sacrifice will be well worth while.

The Manufacturers Desire to Help the Association

WE HAVE already mentioned the hope of the executive committee of the association to authorize the establishment and admission of an affiliated manufacturers' association this year. The only reason for the delay of the past two years in this matter has been the war, and the accompanying cessation of all association activity except that directly connected with hostilities against the enemy. The subject is one which can properly be taken up now, however, and it is the intention of the committee in charge to push it through so that definite action on the admission of the new association to the main body can be taken in October.

In a matter in which there has been such a variety of opinions we have no idea that the plan of the committee when completed will be satisfactory in all its details to everyone. Nevertheless, the committee will make every effort to unite all ideas in a working plan and solicits constructive suggestions. The aim sought will be the good of the industry as a whole by enlisting and making effective the power which the manufacturers can undoubtedly bring to help in the solution of electric railway problems. This assistance the American Association has recognized but should recognize still more, and the approval of a constitution giving the manufacturers an opportunity to do what they can best do for the American Association will be a step in this direction.

There is a great chance now to forget all differences of opinion that may have existed in the past, to put a firm shoulder to the wheel, and to push with might and main to get the business out of the "slough of despond," in which it has been temporarily mired, and upon firm earth again.

Rush-Hour Traffic Breaking the Industry's Back

ONE of the fathers of the electric railway industry once said that the "dividends are in the straps." It was a catchy phrase but merely a half-truth, and half-truths—like the Bolshevist doctrine that manual labor can be economically self-sufficient—are invariably vicious. That the rush-hour straphanger pays dividends has never been true. At the present time, he is a disastrous liability, although a certain acceptance of the twenty-year-old catchword in his favor has probably obscured the belief that the industry would be better off without him. In fact, the peak-load passenger is carried at a loss—a direct loss, not an indirect one—and to the extent that the electric railway can drive away traffic at the top of its peak it benefits itself.

Naturally, the public does not recognize this, yet the explanation may be made in relatively simple terms. For example, assume that a group of 100 prospective patrons appear before a railway management and request transportation from city to suburbs daily during the peak hour. Does the railway want this brand-new business? It does not! Not even if fifty of the passengers agree to strap-hang without kicking! Of course, the railway will, in the end, have to carry the new patrons but it would much prefer that they walk.

In the first place, a new car for these passengers must be purchased for, say, $8,000, and on this there will be an annual charge of $960 for interest and depreciation, or $4 per day, considering the electric railways' five-day week of peak loads. As the car can make only 10 m.p.h. and will run, say 5 miles out and back, it will complete its round trip after the peak hour has passed. This will limit the period during which it is needed to carry passengers to one trip per day and will make the fixed charge for that trip $4. In the second place, additional power facilities to the extent of 30 kw. must be provided even though used only for one hour daily, and the resulting high demand charge will bring the power cost to $2 for the trip. Maintenance, carhouse expense, accidents, accounting and supervision will amount to about $1 for the 10 miles traveled. Platform labor, at the War Labor Board's intermediate rate of 45 cents per hour, would add 90 cents to the foregoing if the railway was lucky or skillful enough to make exact arrangements for a swing-run crew to handle the one-hour trip without paying for any dead time. At the other extreme, if all available crews were scheduled, and a new crew had to be hired for this trip alone, the platform expense would be the minimum day rate for the two men; perhaps $6. The probabilities are that a figure between these extremes, or say, $2, would represent a reasonable average, and by adding this the total direct cost for the trip would become $9.

One hundred new peak-hour passengers, including fifty straphangers, would thus cost the company—exclusive of any indirect costs on permanent installation—9 cents each. Whether each paid 5 cents or 8 cents for his fare would make only a difference in the amount that the railway could profitably pay each one to stay off the cars until after the peak or to walk. In fine, the electric railways not only don't want peak-hour traffic but, in the present situation, can't afford to handle it.

Learning From the Experiences of Others

FOR the past seven months this paper has been publishing, in the "Mechanical and Engineering" issues under the heading "Some Mysterious Car Ailments," groups of short articles devoted to equipment defects. The intention has been to describe types of car equipment trouble whose cause is not evident without detailed investigation, and to give such information regarding methods of overcoming the difficulty as will be of assistance to both the user and the manufacturer. We have kept these articles entirely free from reference to individuals or roads affected in order that operating men might feel no hesitancy in sending in the results of their experience. The information was put in a rather unusual form to secure the widest possible reading of the articles. The plan has been primarily to answer these queries: "How did the ailment manifest itself?" "What was the real difficulty?" "What did investigation show to be the cause of the difficulty?" and "How was the ailment cured?"

A large proportion of the occurrences recorded so far have been with multiple-unit equipment. This was not because equipment of this type gives more trouble than other apparatus but rather because most of the roads from which we have received information for these articles happen to have this type in operation. Furthermore, as shop men are less familiar with its operation than with older types, any trouble occurring appears to them much more mysterious than in the case of platform-type controllers. No attempt has been made to give all the methods for overcoming the troubles listed, nor is it assumed that those given are the best for all conditions. In cases where changes in design are apparently advisable, we have endeavored to obtain the manufacturers' viewpoint and give our readers the benefit of their experience.

The articles seem to meet a real need and should be of help in reducing maintenance costs. Some manufacturers may have felt that undue prominence was being given to the troubles with their particular equipment, but as far as we know the ailments have concerned detailed faults, mostly of a minor character and reflecting little discredit on the design of the equipment. In any event, the overcoming of defects in design, or in inspection and maintenance procedure, is certainly in the line of progress.

Citizen Mahon, Altruist!

ABOUT Citizen Mahon, president of the Amalgamated Association, many harsh things have been said, but none have been cruel enough to call him an altruist. Still, that is the only name that will fit him for his latest impassioned plea for the abolition of the modern one-man car. Why? Because no one knows better than he that hundreds of electric railways may have to go out of business altogether if they cannot use this means of keeping ahead of advancing costs. If these electric railways go out of business, their employees must go out of their jobs and paying dues to the Amalgamated simultaneously. Whereupon Mahon's, like Othello's, occupation would be gone. 'Tis indeed a noble sacrifice to turn Amalgamated carmen into gipsy jitneurs who owe allegiance to no unions whatsoever.

Citizen Mahon may not realize that it is he, and not the operator of the new one-man car, who is "pulling old stuff" in objecting to the seeming supersession of men by mechanisms. In principle he differs not an iota from the cotton-pickers who destroyed Eli Whitney's gin (the machine, not the liquor) from the hand weavers who broke the first power looms and from the horse-car directors who ascribed their rheumatism to those new fangled electric cars. Our good comrade's attempt to befog the question with talk about accidents is exceptionally naïve. In an article written in February, 1918, he sought to condemn the modern kind of one-man car by assigning to it the evils of the camouflaged junk put out here and there. This year Citizen Mahon is even more daring. His pathetic gloom about the accident possibilities of one-man cars are based upon the accident statistics of cars operated with two men!

It is hardly necessary to cite history to prove that no interests have ever proved powerful enough to stay for long the progress of labor-saving devices. What puzzles us most about Citizen Mahon, unless he really has become a 100 per cent altruist, is that he should object to the best means yet found of keeping his supporters in their jobs at higher pay for less fatiguing work, since he is thereby assured of a much steadier membership than is the case where one-half or more of the men drift on and off the car platform within a single year. Although a labor-saving device, the one-man car most emphatically does not force men out of their jobs. As we all know, the right introduction of this car generally means a big increase in service, often three cars for two. Then comes such a wave of public approval, expressed through heavier riding, that the happy manager is far more likely to augment than decrease his payroll. Of all the installations of modern one-man cars that we have had the good fortune to study, we have not run across a single instance where any man lost his job or where the one-man car operator failed to better his financial condition. As one manager said: "We have stopped firing and hiring. The men stick."

As for the accidents conjured up with such deep solicitude by Citizen Mahon, they are not only less numerous than with the old two-man cars but actually less numerous than one would fairly expect when operators are adjusting their instincts to a faster accelerating and faster braking car. Anyway, we wonder what Citizen Mahon's alternative to the modern one-man car is, for if these new cars are to be replaced by the trackless, reckless and *dues-less* jitney, the accident record would be infinitely worse than his electric railway record of one person killed for every 13,603,500 passengers carried. And would the families of the slaughtered get $18,176,305 from these irresponsible automobile ragamuffins? Let Citizen Mahon answer!

Can You Furnish Real Data—If Not, Why Not?

TOO much emphasis cannot be laid upon the importance of the hearings that are to be held by the Interstate Commerce Commission during June and July in regard to compensation for electric railway haulage of United States mail. There are two aspects of this matter which electric railway operators should recognize.

The first is the one which concerns merely the rates for mail carriage. The 1918 change in the postal law, whereby it is made unlawful for any electric line to refuse to perform mail service at the rates provided when required by the Postmaster General, renders it imperative that electric railways help the government to fix adequate rates. Back in 1916 the committee on compensation for carrying United States mail of the American Electric Railway Association could say with sorrow that the electric lines must either go out of the business of transporting mail or continue to carry it for less than cost. Now even the option of becoming a mourner through the forced abandonment of a losing practice is denied to the electric lines.

If the electric railways must carry the mails, therefore, it behooves them to redouble their efforts to secure adequate compensation. All the railways now under mail contracts or likely to be should attend the proper regional hearings and present the most detailed data possible in regard to the cost of operation. Full weight should be given in the case of pouch mail, in the absence of exact cost data, to increases in general operating costs and in volume of mail since old contracts were made, and in the case of independent car mail to all overhead costs. The association has prepared a commendable exhibit for companies to fill out in order that the data may be presented on a uniform basis. Have you begun to prepare your data?

The second aspect of this matter is more general. It concerns the inability of some companies to furnish real cost data instead of cost guesses. It is regrettable, but none the less true, that the number of blanks left in the association's exhibit will be an index of the railway's lack of appreciation or, worse yet, negligence of modern business practices. The same could be said of similar exhibits which might be prepared to show terminal and movement costs for passengers, freight and express costs, etc. Years ago accurate costs were not needed, but to-day government and commission officials can only regard as slipshod an industry whose managers and accountants in too many cases specialize in objections to rather than work toward such data. The electric railway industry as a whole needs costs and the determination to get them.

Automatic Control Applied to Motor-Started Converters

ANY engineer possessed of a spark of imagination, and successful engineers must have much more than a spark, cannot but be fascinated by the rapid development of automatic control for railway substations. Automatic control has proved its adaptability to a wide variety of applications, the latest being that to the old-fashioned motor-started rotary converter. R. J. Wensley tells in this issue just how the operation is performed. In this the elements that are of particular interest are the starting and cutting out of circuit of the starting motor and the act of synchronizing the rotary converter. Reading between the lines of this story the men who are familiar with the early days of the synchronous motor and the rotary converter will be reminded of some fundamental principles of which an earlier understanding would have saved much nervous energy and money. Just one of these may be cited for illustration.

When the alternating current generator was first developed it did not, in general, give satisfaction as a motor. It had to be brought up to synchronous speed by outside means and when synchronized showed a lamentable tendency to "fall out of step." Two among other important facts were then noted: (1) That inductance in the armature circuit stabilized operation, and (2) that eddy currents generated in the pole pieces (or in damper bars placed therein when laminated poles were used) could be used to bring the motors to speed and to prevent "hunting" when at speed. These simple but fundamental "discoveries" played an important part in the development of the rotary converter. Without them the automatic synchronizing described by Mr. Wensley would be very difficult, if not impossible.

In the plan described, the safeguards surrounding the converter are of prime importance. The induction starting motor is brought into action by low direct-current voltage, and it is cut out when the converter attains synchronous speed. This cutting out can be done electrically because the current falls to a low value as the starting motor approaches its own synchronous speed. It could, of course, be done mechanically also. The converter armature is then thrown in with reactors in circuit which not only limit the current but insure the proper phase relation of current and field flux to produce good torque. When the direct-current circuit goes on it contains resistors which also serve to limit the current. Hence the converter itself is between two sets of electrical "cushions" which serve to protect it from abnormal conditions. This cushioning action is supplemented, of course, by several protective relays. The safeguarding thus appears to be complete.

The automatic control of electrical machinery is for all the world like the "reflex" operation of the human nervous system. A sudden apparition before the eye causes a closing of the lid long before the brain has time to come into action. The blast of a Klaxon horn similarly arrests the step, bringing into instant sequence a complicated train of nerve signals and muscular contractions. So with carefully adjusted relays a drop in voltage or in load current, or a rise in temperature of apparatus or speed of rotary armature, sets in motion the devices for making the necessary changes in control circuit connection and the circuit breakers do the rest.

Adapting Automatic Control to Motor-Started Converters

The Author Presents Details of Relay and Switch Connections for Utilizing with Older-Type Converters the Principles Which Have Proved So Satisfactory in Automatically Controlling Self-Starting Machines

BY R. J. WENSLEY
Switchboard Engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

WHILE at present no motor-started rotary converters are being built in this country many old-style machines of this type are in service. These machines, in many cases, are still good for a long service period and it is quite possible that traction lines operating such machines may desire to provide them with automatic control. Such a control has been developed by the Westinghouse Electric & Manufacturing Company.

The control of motor-driven rotaries presents several problems not present with self-starting machines. The former must be synchronized with the line after having been brought up to speed by means of its starting motor. It also builds up with a definite polarity before reaching synchronous speed. These facts make necessary a slightly more complicated control scheme than need be used with the self-starting rotary.

Obviously any synchronizing scheme involving automatic speed control and the closing of the main switch at the point of synchronism is too complicated for practical use. Hence, reactance synchronizing was adopted for the automatic control on account of its relative simplicity. In reactance synchronizing the machine is brought up to approximately synchronous speed, the motor is then cut off, and the machine is thrown onto its transformer through reactance of sufficient magnitude to limit the flow of current to less than full-load value. The machine is then allowed to settle and to pull into step through the reactance. When it is in step the reactance is short-circuited, thus connecting the transformer directly to the converter rings. The direct-current switches may then be closed and the load put upon the machine.

Experience covering approximately a year with apparatus of the type described herein indicates that practically every contingency met with in actual operation has been anticipated and provided for. The equipment as described brings up a 300-kw. converter to speed, synchronizes it and picks up a load in from thirty to fifty seconds, obviously very much more rapidly than can be done in the old-fashioned hand operation.

The circuit diagrams for the new control as reproduced in Figs. 2 and 3 show the plan of connections and sequence of operations. To permit comparison with the same matters in connection with automatic control of self-starting converters, Fig. 1 is given.

STARTING THE ROTARY CONVERTER AUTOMATICALLY

Let us first take up the steps in preparing the converter for connection to the line and the devices provided for doing this with proper safeguarding of the machine. As the rotary is to be started by undervoltage, a relay (No. 1, Fig. 3) is provided to close its contacts when the trolley voltage falls below, say, 450, the relay being connected between trolley and rail. Means of changing the adjustment are a feature of this

Automatic Control of Motor-Started Synchronous Converter

The Primary Functions of the Control Are:

1. Inaugurate the starting process when the voltage falls below a set value.
2. Bring the starting motor up to speed.
3. Cut out the starting motor.
4. Connect the converter armature to the power transformer secondaries at approximate synchronism, with reactance in circuit.
5. Force the rotor to "slip a pole" if "reversed."
6. Short-circuit the converter starting reactors.
7. Connect the machine to the direct-current line through cushioning resistors.
8. Cut out the station if the current falls below a set limit for a definite time.

The Control Must Also:

1. Fail to bring the station in if the alternating current voltage is too low or if the phase rotation is in the wrong direction.
2. Cut out the station if the alternating-current supply becomes defective.
3. Cut out the station if the alternating-current circuit is overloaded.
4. Cut out the station if direct-current power flow is reversed.
5. Cut out the station if a direct-current overload occurs.
6. Cut out the station if the machine overspeeds.
7. Cut out the station if the bearings overheat.

relay, permitting the closing point to be varied to suit local conditions. There is also an induction-type voltage relay (No. 2), to insure the presence of sufficient line potential to start the converter and satisfactorily to operate the control. If this relay fails to open its contacts, due to insufficient voltage, no other switches can close and the station will not start.

The master control switch (No. 3) is a contactor through the contacts of which all alternating-current control circuits pass, with the exception of the main closing circuit of the oil circuit breaker which is relayed by a separate magnet switch (No. 22). By means of No. 22, the oil circuit-breaker (No. 20) is closed immediately after the closing of No. 3. A dash-pot relay (No. 21) serves to open the closing-coil circuit after the breaker is closed.

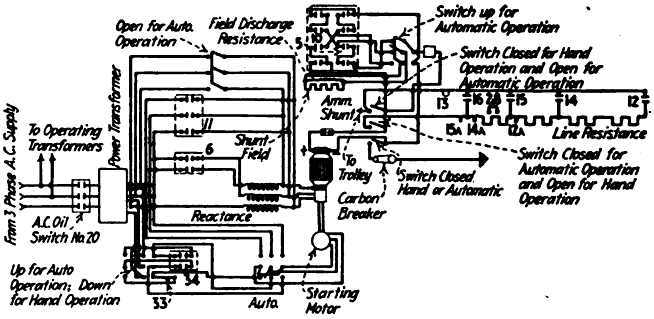
Assuming now that the trolley voltage has been low enough to close No. 1 and high enough to open No. 2, No. 3 will have been closed and power is available for starting the starting motor. We come next to the contactor (No. 4) in the main starting control circuit. This will not close unless a polyphase relay (No. 18) indicates the presence of sufficient voltage on all phases and the proper phase rotation. This relay is connected to the transformer secondaries, so that even if polyphase voltage is available on the supply line the station will not start if, through some fault of the oil circuit-breaker or the connections, polyphase voltage is not present at the converter slip rings.

Immediately following the closing of No. 3, a two-pole contactor (No. 34) in the starting motor circuit closes and the motor brings the converter up to speed in the usual manner. A current relay (No. 33) opens as the induction motor passes through synchronous speed, opening No. 34 and closing relay switch No. 60 through which the main starting contactor (No. 6) is closed. No. 6 connects the converter rings to the transformers through three single-phase reactance coils and the converter pulls into step with the line.

THE CONVERTER SOMETIMES COMES IN WITH REVERSED POLARITY

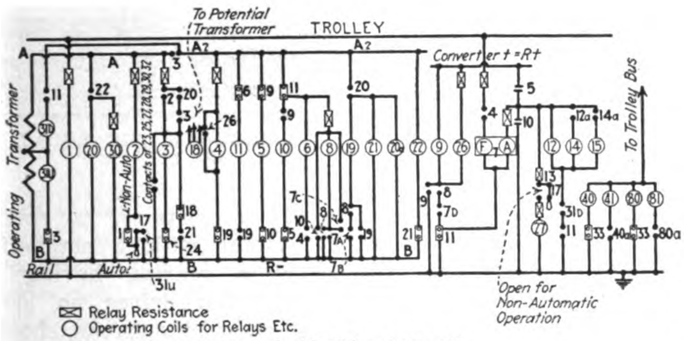
The rush of current at the moment of closing No. 6 occasionally reverses the polarity of the machine, which builds up some direct-current potential while on the starting motor. This condition is taken care of by a polarized motor relay (No. 7), the design and operation of which are as follows:

No. 7 relay consists of a tiny motor with a permanent magnetic field. Its armature is geared to a small skeleton drum switch having four positions (see illustration). The contacts made in the several positions are designated by 7*A*, 7*B*, 7*C*, and 7*D* in the diagram. The armature of this motor is supplied from the converter direct-current brushes during the starting pe-



Open for Auto. Operation
Field Discharge Resistance
Switch up for Automatic Operation
Switch Closed for Hand Operation and Open for Automatic Operation
Amm. Shunt
13 16 15 14 12
15A 14A 12A Line Resistance
To Operating Transformers
Power Transformer
From 3 Phase A.C. Supply
11
6
Shunt Field
To Trolley
Switch Closed Hand or Automatic
Switch Closed for Automatic Operation and Open for Hand Operation
Carbon Breaker
Reactance
A.C. Oil Switch No. 20
Up for Auto Operation; Down for Hand Operation
34
33
Auto
Starting Motor

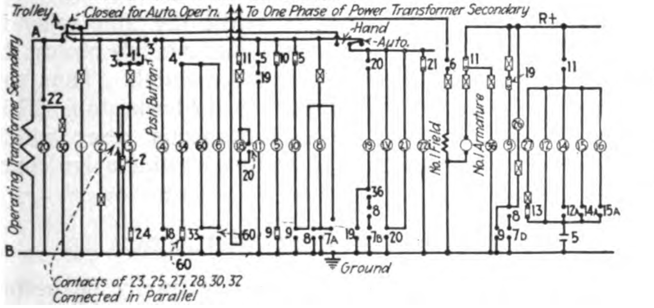
FIG. 2—SIMPLIFIED CIRCUIT DIAGRAM FOR SUBSTATION WITH AUTOMATIC CONTROL OF MOTOR-STARTED ROTARY CONVERTER



To Potential Transformer
TROLLEY
A
A2
Converter + = Rt
Operating Transformer
To Trolley Bus
Non-Auto
Contacts of 23, 25, 27, 28, 30, 32
Rail
Auto
B
R-
7B
31u
Open for Non-Automatic Operation
Relay Resistance
Operating Coils for Relays Etc.
Contact Closed for Deenergized Condition of Relays Etc.
Contact Open for Deenergized Condition of Relays Etc.
Main Contacts of the Field Contactors

DEVICE NUMBERS

OPERATION NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	19	20	21	22	27	31	31	REMARKS
1	●						B														●		Station Idle - Trolley Voltage Reduced
2	●	●					B														●		Relay No. 2 Closes after 5 Seconds
3	●	●	●				B														●		Relay 3 Energizes Aux. Control Bus
4	●	●	●	●	●		B												●		●		Normal Field Contactor Closes
5	●	●	●	●	●	●	B										●		●		●		Converter on Starting taps - Oil Sw. Closed
6	●	●	●	●	●	●	A	●									●	●			●		Polarity of Converter Reversed
7	●	●	●	●	●	●	D	●	●								●	●			●		Field Reversing Relay 9 Closes
8	●	●	●	●		●	C		●	●							●	●			●		Shunt Field of Converter Reversed
9	●	●	●	●	●	●	A	●									●	●			●		Polarity of Converter Correct
10	●	●	●		●		B				●					●	●	●			●		Converter Connected to Running Taps
11	●	●	●		●		B				●					●	●	●				●	Brushes Lowered to Commutator
12	●	●	●		●		B				●	●				●	●	●				●	Converter Connected to Trolley Thru Resistance
13	●	●	●		●		B				●	●	●	●		●	●	●				●	" " " " " Part Resis.
14		●	●		●		B				●	●	●	●	●	●	●	●				●	" " " " Directly
15		●	●		●		B				●	●		●	●	●	●	●		●		●	Time Delay Under-Load Relay 27 Operating
16							B													●		●	Converter Disconnected from A.C. & D.C. Lines
17							B														●		D.C. Brushes Raised to Starting Position



Trolley
Closed for Auto. Oper'n.
To One Phase of Power Transformer Secondary
R+
Hand
Auto
A
Operating Transformer Secondary
Push Button
No. 1 Field
No. 1 Armature
B
Ground
Contacts of 23, 25, 27, 28, 30, 32 Connected in Parallel

DEVICE NUMBERS

CORRECT POLARITY

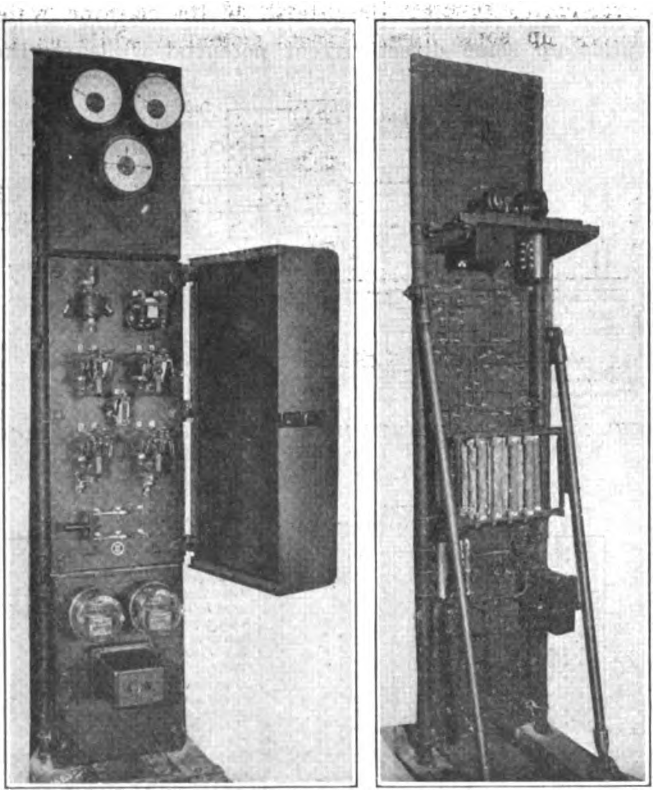
OPERATION NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19	20	21	22	27	33	34	36	60
1		●																								
2	●	●																								
3	●	●	●																		●					
4	●	●	●		●														●		●					
5	●	●	●	●	●												●		●	●						
6	●	●	●	●	●												●		●	●				●		
7	●	●	●	●	●	●											●		●	●			●	●		●
8	●	●	●	●	●	●	A	●									●		●	●					●	●
9	●	●	●	●	●	●	B	●									●	●	●	●					●	●
10	●	●	●	●	●	●	B	●			●						●	●	●	●					●	●
11	●	●	●		●		B	●			●	●						●	●	●						
12		●	●		●		B	●			●	●	●	●				●	●	●						
13		●	●		●		B	●			●	●	●	●	●			●	●	●						
14		●	●		●		B	●			●	●	●	●	●	●		●	●	●						
15		●	●		●		B	●			●	●		●	●	●		●	●	●						
16		●	●		●		B	●			●	●		●	●	●		●	●	●		●				
17							B																			

REVERSED POLARITY

OPERATION NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19	20	21	22	27	33	34	36	60
1		●																								
2	●	●																								
3	●	●	●																		●					
4	●	●	●		●														●		●					
5	●	●	●	●	●												●		●	●						
6	●	●	●	●	●												●		●	●				●		
7	●	●	●	●	●	●											●		●	●			●	●		●
8	●	●	●	●	●	●	A	●									●		●	●					●	●
9	●	●	●	●		●	D	●	●								●		●	●						●
10	●	●	●	●		●	C		●	●							●		●	●						●
11	●	●	●	●	●	●	C										●		●	●						●
12	●	●	●	●	●	●	C										●		●	●						●
13	●	●	●	●	●	●	C										●		●	●						●
14	●	●	●	●	●	●	A	●									●		●	●					●	●
15	●	●	●	●	●	●	B	●										●	●	●					●	●
16	●	●	●	●	●	●	B	●			●							●	●	●					●	●
17	●	●	●		●		B	●			●	●						●	●	●						
18		●	●		●		B	●			●	●	●	●				●	●	●						
19		●	●		●		B	●			●	●	●	●	●			●	●	●						
20		●	●		●		B	●			●	●	●	●	●	●		●	●	●						
21		●	●		●		B	●			●	●		●	●	●		●	●	●						
22		●	●		●		B	●			●	●		●	●	●		●	●	●		●				
23		●					B																			

AT TOP, FIG. 1—SCHEMATIC DIAGRAM AND SEQUENCE CHART FOR AUTOMATIC CONTROL OF SELF-STARTING ROTARY CONVERTER; AT BOTTOM, FIG. 3—SCHEMATIC DIAGRAM AND SEQUENCE CHART FOR AUTOMATIC CONTROL OF MOTOR-STARTED ROTARY CONVERTER

(Fig. 1 is reproduced for comparison with Fig. 3) riod. Since the motor has a fixed field, the direction of rotation is dependent upon the polarity of the converter brushes. If the converter is "upset" and locked into step inverted the relay revolves backwards, closing contacts *A* and *D*. Point *A* closes interlocking relay No. 8, which locks in through its own contacts when closed. Point *D* energizes field-reversing relay No. 9, which opens main field switch No. 5 and closes reverse field switch No. 10. The field-reversing relay is operated from the direct-current converter brushes and locks itself in after having been closed.



FRONT AND REAR VIEWS OF MASTER CONTROL PANEL

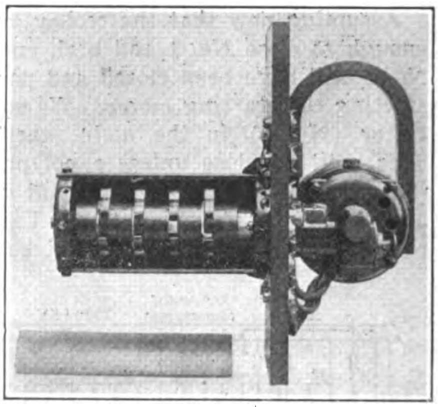
The reversal of the field causes the direct-current potential to die away, and when it has reached a point close to zero the field-reversing relay will no longer be held in and will open. This will open the reverse field switch and close the main field switch. This reversal of the field will cause the machine to slip a pole and come up with correct polarity. The polarized motor relay will then run in the opposite direction, closing contacts 7*A* and 7*B*. Contact 7*A* closes No. 8, which was opened by one of the contacts on No. 9. Contact 7*B* will close the circuits to No. 19, the running switch relay. In this circuit is the contact of No. 36, a direct-current voltage relay which is connected to the direct-current brushes. This is set to pull in at a point near the maximum direct-current voltage obtainable while reactance is in circuit. Thus the reactance will not be short-circuited until the machine has settled into step and has pulled up as near to exact synchronism as possible.

The motor relay will continue to revolve if No. 36 is not closed. Contact 7*C* will drop out No. 8; contact 7*D* will not cause any action because interlocking relay No. 8 is open. After No. 36 closes, the next time that contacts 7*A* and 7*B* are made No. 19 will close which in turn will close the running switch No. 11.

The master relay panel is shown in one of the illustrations; the mounting of the motor relays on brackets behind the panel are shown in another. The alternating-current switches are mounted on a third panel which may be located in the position most economical with respect to use of cable.

THE DIRECT-CURRENT CONTROL IS VERY SIMPLE

The converter is connected to the line through a series of cushioning resistors which are short-circuited in three sets. The closing of the main contactors is governed by current-limit relays which prevent the cutting out of the resistors in case the current demand is in excess of the current rating. The assembly of contactors and current-limit relays is shown in still another illustration. The station is held on the line by means of a current relay (No. 13) which is set to operate at about 15 per cent of normal full load. In its de-energized position this relay closes a circuit through the time relay No. 27. No. 27 consists of a small shunt-wound direct current motor with a magnetic clutch driven through reduction gearing having a ratio of 19,800 to 1. The clutch drives an arm which closes the contact at the end of the stroke, short-circuiting the coil of No. 3 and thus shutting down the station.



THE POLARIZED MOTOR RELAY (NO. 7)

If the load demand comes on while the time relay is operating then No. 13 picks up, opening the circuit to the time relay and de-energizing the clutch. Thus the moving arm is allowed to return to its back stop. This clutch action provides an instantaneous reset which prevents the time relay from having a cumulative characteristic.

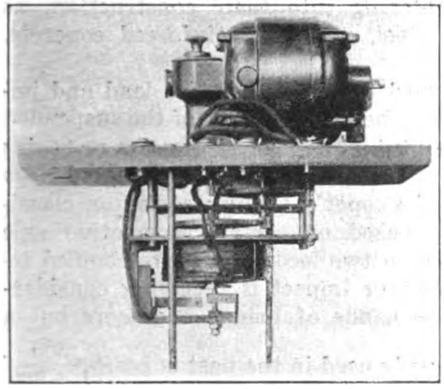
SAFEGUARDING THE SUBSTATION APPARATUS

An automatic substation must necessarily be better protected than an ordinary manually-operated station because the automatic control is required to take care of all operating contingencies that may arise. The protective features which have been provided in the control equipment under discussion are described below.

Protection against Low Voltage at Starting.—Relay No. 2, an induction type relay operating on single-phase potential, is calibrated to open its contact at 80 per cent of normal line potential. In case there is insufficient potential to start the converter this relay will not open.

Protection against Reversed Phase and Phase Failure.—Relay No. 18, a standard type "CP" induction relay having polyphase potential coils, is operated directly from the power transformer secondaries, so that if for any reason polyphase potential of adequate amount for operation of the converter is not present this relay will not close its contact. Thus the starting switch circuit relay will be opened and the station will be disconnected from the line.

Protection against Alternating-Current Overload.—The overload protection is normally set for 200 per cent of normal full-load current and with a sufficient time interval to allow the direct-current overload relay to operate in advance of the alternating-current relay. On equipment with primary voltage of 17,000 or less, current transformers and type "CO" relays are used, these being standard induction overload relays. For potentials above 17,000 volts a series high-tension induction relay is used which obviates the necessity for using current transformers insulated for the full line voltage.



THE UNDERLOAD DELAY RELAY

Direct - Current Reversed - Current Protection.—Protection against reversal of energy flow in direct-current circuits is guarded against by the use of a dynamometer-type reverse current relay of standard design. This relay has a very heavy shunt field and a light moving element with the winding energized from an ammeter shunt. If the station is tripped out by the reverse-current relay it will immediately attempt to start providing the demand exists and the alternating-current supply is adequate.

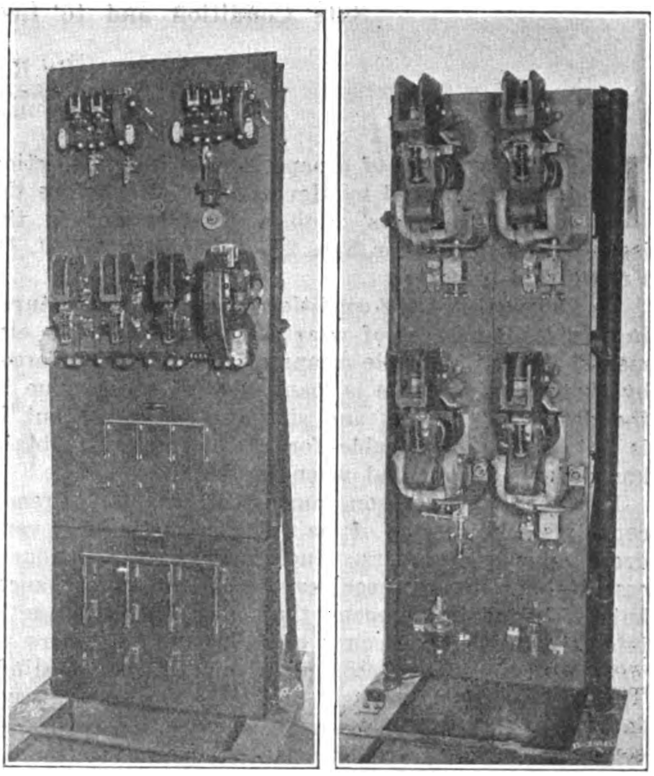
Direct-Current Overload Protection.—The current-limit relays 12*A*, 14*A* and 15*A*, are set for instantaneous action at approximately 175 per cent of normal full load current. This permits the utilization of the ability of the converter to withstand momentary swings, but does not protect the converter against continued overloads of less than 175 per cent of full-load current.

To guard against such a contingency a "Replica" relay is provided which is responsive to the effective heating value of the current passing through it. This relay is composed of a series coil connected in the converter circuit and a copper bellows filled with volatile fluid. When the series coil has heated sufficiently, due to continued overload, the volatile fluid is vaporized and the bellows expands thus closing the relay contacts and shutting down the station. The station will remain shut down until the series coil has cooled off enough to indicate that it is again safe to start.

When the series relays operate and open the contactors, thus putting the main resistors in circuit, the grids will become very hot if the short circuit or the extreme overload persists. A thermostat is mounted over the resistance grids and when a dangerous temperature has been attained this shuts down the station until the grids cool down.

Overspeed Protection.—The usual centrifugal overspeed device is used on the machine and this is non-resetting. In case of overspeeds sufficient to trip the device automatically the station must be visited by an inspector to reset the trigger and permit further operations.

Bearing Protection.—The machine bearings are protected against overheating by thermostats consisting of copper bulbs inserted in holes drilled through the side of the pedestal into the bearing housing, the bulb connecting with the copper bellows by copper tubing. The contact device is so arranged that when the heat of the bearing boils the fluid in the bulb the bellows expands and causes the substation to shut down. After once being shut down by this device it will not again restart until the thermostat is reset by hand.



AT LEFT, THE ALTERNATING-CURRENT PANEL; AT RIGHT, THE DIRECT-CURRENT CONTACTOR GROUP

Steam Conveyor Versus Manual Labor for Ash Handling

AN AMERICAN steam ash conveyor was installed to replace the use of men and horses in a boiler plant containing a battery of one 500-hp. and five 150-hp. boilers operating continuously. The cost of ash disposal previous to the installation of the conveyor was as follows: Two ash wheelers, $10.88; one teamster, $4.08; one horse and feed, $1.50; making a total of $16.46 per day of twenty-four hours. The cost of ash disposal after installation of the conveyor was $4.08 for one laborer working nine hours per day Between fire cleanings this laborer acted as assistant fireman and boiler-room helper.

The method of operation consists in raking the ashes onto the boiler-room floor in front of the boiler, leaving them there until the cleaning is completed, and then scraping them into the conveyor. The complete cleaning requires about seven minutes. The boilers are cleaned every two hours.

A Survey of Electric Railway Bridge Maintenance

Bridges Require Systematic Inspection and Prompt Attention to Needed Protection and Repair, Both to Maintain Them in Safe Condition and to Insure Reasonable Structure Life

By R. C. CRAM
Assistant Engineer Department of Way and Structure,
Brooklyn Rapid Transit System

IN THE discussion of a paper on "Bridge Inspection and Reports," read by Herbert C. Keith before the Brooklyn Engineers' Club, and abstracted in the issue of this paper for Feb. 24, 1917, page 357, J. D. French said in part:

"A knowledge of the conditions concerning structures in service, the forces of wear and exposure to the elements, and the available means of resisting such forces by proper maintenance is manifestly of great value in the design of bridges and similar structures; but it is not always practicable for the designer to obtain knowledge of this kind when needed."

For the above reason, among others, Mr. French considers a knowledge of maintenance methods of very great value to designers. Such knowledge is obviously essential for the engineer responsible for maintenance, but it frequently happens that good maintenance is interfered with on account of failure of designers to work with the idea of economical maintenance in mind. The purpose of the present article is to suggest ways in which this condition can be bettered by discussing some of the matters which arises from time to time in connection with the maintenance of electric railway bridges. It is not the intent to discuss the broad subject of design of bridges, as that is a matter almost entirely foreign to maintenance although it is realized that design and details thereof play an important part in the creation of factors which may cause excessive maintenance expense. Sometimes a rather insignificant detail will prove to be the source of very costly repairs.

HOW BRIDGES ARE CLASSIFIED

A bridge has been defined as any structure erected above the normal surface of the earth used for the passage of traffic of any kind. It is normally thought of as a structure forming a roadway over a watercourse or ravine. One classification of bridges is based on the position of connection of the floor system to the trusses and depth of trusses, when they are called "through," "half-through" or "pony truss" and "deck." The trusses of a through bridge are connected at the top by a system of lateral bracing and at the bottom by the floor system. A half-through truss has no top lateral bracing, while a deck bridge has its trusses connected at their tops by the floor system.

A truss may be defined as a combination of timbers, steel or other materials forming an unyielding frame for support of a floor or a roof.

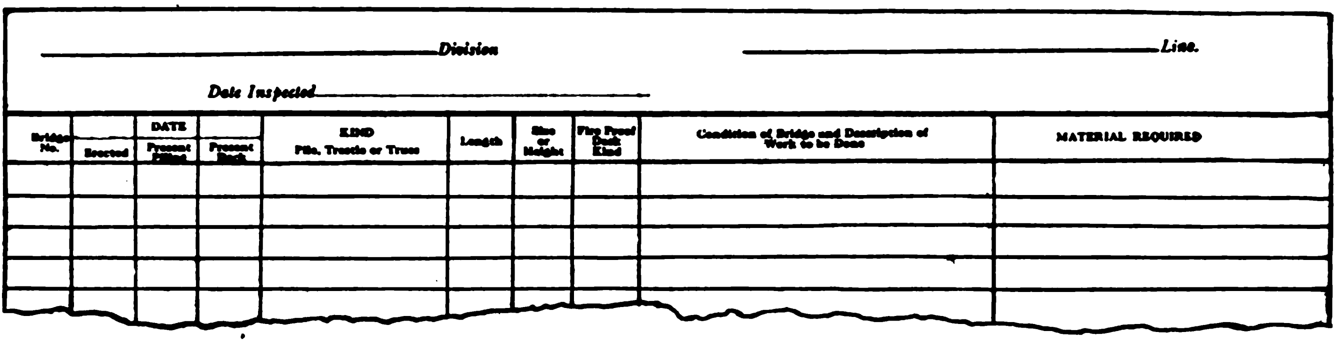
When considered on the basis of design or construction method, bridges are classified as truss, girder, lattice, trestle, arch, cantilever, suspension, pontoon, etc. When classed by operation method they are called draw, swing, lift, bascule, etc. A non-movable bridge forming an approach to a drawbridge (draw-span) is often spoken of as a "fixed span," to distinguish it from the draw span. They are also often spoken of according to the materials entering into their construction, as wooden or timber, steel, concrete, reinforced concrete, etc.

Bridges are designed for dead load, live load and impact. The dead load is the entire weight of the suspended structure. The live load is the load of the cars or trains which will use the structure. This is now based as a rule on some one of Cooper's loading series or classifications which are based on certain locomotive axle loads as produced when two locomotives are coupled together. The formula for impact is receiving considerable attention at the hands of bridge engineers but a common formula largely used in the past is $I = S\frac{300}{L+300}$, where I equals impact stress to be added to live load stress, S equals computed maximum live load stress for each member, and L equals loaded length of track in feet producing the maximum stress in the member. Bridges having more than one track require that the aggregate length of all tracks producing the maximum stress shall be used. In the design of combination highway and electric railway bridges, the live load assumed must consider the heaviest traffic which can come on the bridge floor in addition to the load produced by electric cars. When footwalks are present, the load which these may produce gives another loading factor for consideration.

Since many electric railways cross highway bridges, the following information as to loads used for designing and for a standard of comparison with existing structures should be of interest as the Massachusetts specifications are widely used:

Specifications of Massachusetts Public Service Commission for Electric Railway Bridges

For the track load these specifications use a 50-ton car with wheel spacing of 5 ft., 15 ft., 5 ft. and a total length of 40 ft. over all. For roadway and sidewalks loads of 100 lb. per square foot are used for city bridges and 80 lb. per square foot for country bridges 100 ft. or less in length. These uniform loads are assumed to cover the full area of the roadway and sidewalks except a width of 9 ft. at each track. For longer spans these uniform loads are reduced 1 lb. per square foot for every 5 ft. additional length up to 200 ft., and for all greater lengths 80 and 60 lb. per square foot respectively are used. For suburban bridges the floor is designed for the same loads as the city bridges, while trusses and girders are designed as for country loads. For highway bridges in city, town or country the specifications require provision for an alternative roadway load of a single 20-ton auto truck on two axles 12 ft. on centers and wheels at 6-ft. gage; the weight assumed to be distributed 6 tons on one and 14 tons on the other axle; the truck assumed to occupy a floor space of 32 ft. long and 10 ft. wide, the overhang being equal at front and back and at the sides. With track and



Division Line.

Date Inspected

Bridge No.	DATE Erected			KIND Pile, Trestle or Truss	Length	Size or Height	Fire Proof Deck Kind	Condition of Bridge and Description of Work to be Done	MATERIAL REQUIRED
		Present Piling	Present Deck						

SPECIMEN PAGE OF BRIDGE INSPECTION BOOK USED ON BAY STATE STREET RAILWAY

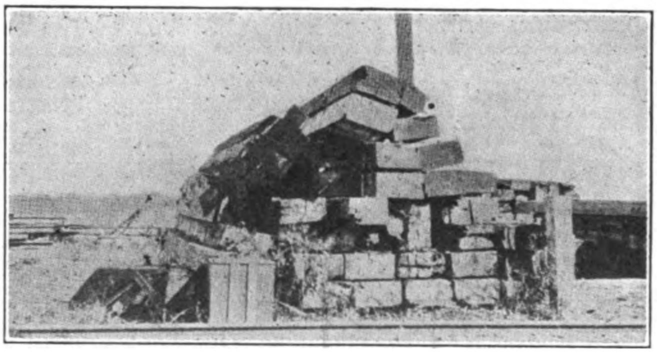
uniform roadway and sidewalk loads impact of 25 per cent is added for floor beams and stringers, while for girders and members of main trusses the impact used varies from 25 per cent to 10 per cent according to the loaded length producing maximum live-load stresses, except that 40 per cent is used for counters and floor-beam hangers. With the auto-truck load 50 per cent impact is used for steel members which receive their full load from one panel point only and no impact is used for wood floor or stringers. Tension stress allowed by these specifications is 16,000 lb. per square inch of "structural steel." Other allowed unit stresses in general correspond with those given in other specifications using the same tensile stress, except that in direct compression these specifications allow only 12,000 lb. per square inch of steel, reduced by the Gordon formula.

Modifications of Massachusetts Public Service Commission Specifications for Use in the Consideration of Existing Structures.—Although the specifications are eminently satisfactory for the design of new bridges or for the strengthening of old ones, as well as for use as a basis in investigating the capacity of existing structures which carry electric railways, there are many bridges for which certain features of these specifications would be unduly severe for determining fitness for further service. In other words, the specifications are considered for purposes of design but require modification for use in the consideration of existing structures and the desirability of continuing them longer in service.

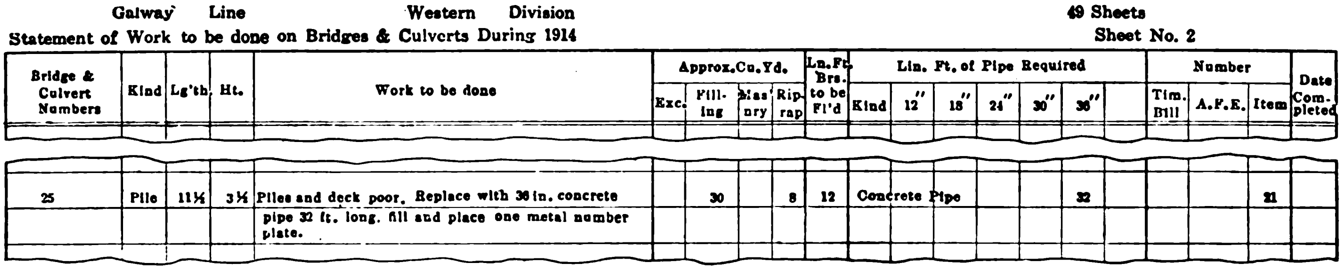
The carrying capacity of a bridge is the heaviest live load which it may receive in regular service without subjecting the bridge to such stresses as will impair its strength. The capacity decreases slowly under ordinary conditions as the age of the structure increases, due to the deterioration of the materials. On the other hand, the capacity may decrease rapidly if the structure is continually overstrained by loads greater than those for which it was designed. Hence it is essential that any change in car equipment which affects the wheel spacing or axle loads should be the cause for a careful examination of all bridges (particularly the details of the floor system) over which the new equipment is to operate. It may be added that as a rule highway bridges deteriorate, according to excellent authority, more in one year than do railway bridges in two years if independent of the highway.

Electric railways generally do not maintain separate bridge departments to look after the upkeep of their bridges. This is partly due to the comparatively small size, in mileage, of the average road, which cannot afford the luxury even if the number of bridges might otherwise warrant. In many cases practically all of the bridges are highway bridges which are maintained primarily by the various civic officials in charge. Even on roads of considerable mileage with several hundred bridges, the engineer of maintenance of way is in direct charge of the bridges and he usually calls in a consulting bridge engineer when confronted with unusual bridge problems such as strengthening for heavier loads, rebuilding for double tracking and periodic expert inspection, the latter being required by law in several states.

The first requirement in connection with well-ordered bridge maintenance is an adequate record of the number and type of structures over which the maintenance engineer has charge. The simplest way to obtain this, if not on hand, is to start afresh and have a comprehensive examination of all bridges made by an engineer who makes a specialty of such work. Too much dependence cannot be placed in such plans as may be available in the office unless every detail has been carefully checked up, and as a rule the detailed plans of highway bridges crossed by electric railways are not to be found in the railway company's files. Some consulting engineer, during the construction period of the road, may have had them but he generally has kept them, too. The importance of having them is best



UNTREATED SOUTHERN YELLOW PINE BRIDGE TIMBERS AFTER TWELVE YEARS IN SERVICE



Galway Line Western Division 49 Sheets

Statement of Work to be done on Bridges & Culverts During 1914 Sheet No. 2

Bridge & Culvert Numbers	Kind	Lg'th	Ht.	Work to be done	Approx. Cu. Yd.				Ln. Ft. Brs. to be Fl'd	Lin. Ft. of Pipe Required							Number			Date Completed
					Exc.	Filling	Masonry	Rip rap		Kind	12"	18"	24"	30"	36"		Tim. Bill	A.F.E.	Item	
25	Pile	11½	3½	Piles and deck poor. Replace with 36 in. concrete pipe 32 ft. long. fill and place one metal number plate.		30		8	12	Concrete Pipe					32				21	

SAMPLE WORK SHEET WITH AN ITEM INDICATING NEEDED REPAIRS appreciated when controversies arise with civic authorities over strengthening matters. In any event many details of bridges are changed in the shop and in the field during erection so that available plans may not be correct in rather important details.

The question arises as to what minimum length of span or width of opening may be classed as a bridge. Here it may be noted that the Public Service Commission of Massachusetts does not require reports from railroads upon openings of less than 10 ft. clear span. However, it is advisable to have general information available as to details of construction of all openings which interfere with the continuity of the ballast, excepting very small sluices for drainage between side ditches. Box and arch culverts and pipes are not usually classed as bridges, nor are they included in reports by special inspecting engineers unless their span is greater than 10 ft. and some special condition is observed which requires attention.

TABLE I—WORKING UNIT STRESSES FOR STRUCTURAL TIMBER EXPRESSED IN POUNDS PER SQUARE INCH*

KIND OF TIMBER.	BENDING.			SHEARING.				COMPRESSION.						Ratio of Length of Stringer to Depth.
	Extreme Fiber Stress.		Modulus of Elasticity.	Parallel to the Grain.		Longitudinal Shear in Beams.		Perpendicular to the Grain.		Parallel to the Grain.		For Columns under 15 Diams. Working Stress.	Formulas for Working Stress in Long Columns over 15 Diameters.	
	Average Ultimate	Working Stress	Average	Average Ultimate	Working Stress	Average Ultimate	Working Stress	Elastic Limit	Working Stress	Average Ultimate	Working Stress			
Douglas Fir	6100	1200	1 510 000	690	170	270	110	630	310	3600	1200	900	$1200(1-l/60d)$	10
Longleaf Pine	6500	1300	1 610 000	720	180	300	120	520	260	3800	1300	980	$1300(1-l/60d)$	10
Shortleaf Pine	5600	1100	1 480 000	710	170	330	130	340	170	3400	1100	830	$1100(1-l/60d)$	10
White Pine	4400	900	1 130 000	400	100	180	70	290	150	3000	1000	750	$1000(1-l/60d)$	10
Spruce	4800	1000	1 310 000	600	150	170	70	370	180	3200	1100	830	$1100(1-l/60d)$	
Norway Pine	4200	800	1 190 000	590*	130	250	100	—	150	2600*	800	600	$800(1-l/60d)$	
Tamarack	4600	900	1 220 000	670	170	260	100	—	220	3200*	1000	750	$1000(1-l/60d)$	
Western Hemlock	5800	1100	1 480 000	630	160	270*	100	440	220	3500	1200	900	$1200(1-l/60d)$	
Redwood	5000	900	800 000	300	80	—	—	400	150	3300	900	680	$900(1-l/60d)$	
Bald Cypress	4800	900	1 150 000	500	120	—	—	340	170	3900	1100	830	$1100(1-l/60d)$	
Red Cedar	4200	800	800 000	—	—	—	—	470	230	2800	900	680	$900(1-l/60d)$	
White Oak	5700	1100	1 150 000	840	210	270	110	920	450	3500	1300	980	$1300(1-l/60d)$	12

These unit-stresses are for a green condition of timber and are to be used without increasing the live load stresses for impact.

*Partially air-dry.

l = Length in inches.
d = Least side in inches.

NOTE—The working unit-stresses given in this table are intended for railroad bridges and trestles. For highway bridges and trestles the unit-stresses may be increased twenty-five (25) per cent. For buildings and similar structures, in which the timber is protected from the weather and practically free from impact, the unit-stresses may be increased fifty (50) per cent. To compute the deflection of a beam under long-continued loading instead of that when the load is first applied, only fifty (50) per cent of the corresponding modulus of elasticity given in the table is to be employed.

*From 1915 edition of Manual, American Railway Engineering Association. Adopted, see Vol. 10, 1909 pp. 537, 564, 609-611.

PAINTING IS ESSENTIAL FOR PRESERVATION OF IRON AND STEEL BRIDGES

There is no question as to the fact that paint properly applied and renewed is the most essential factor in protecting and preserving iron and steel bridges. Given two identical steel bridges, and other conditions being equal, that one which has had careful attention in the matter of painting will have the longer life with less cost for repairs. The purpose of the paint is to protect the metal from rusting by excluding moisture. It must be borne in mind that the steel should be thoroughly cleaned of all rust, scale and dirt before new paint is applied. The paint should only be put upon dry surfaces and painting work should not be undertaken in wet or freezing weather. By thinning the paint with turpentine, however, an experienced man can do good work in cold weather. The date of painting should be plainly indicated on the structure where it cannot be disturbed. It is hardly practicable to state the frequency of painting which may be advisable as climate, location, type of structure and several other factors create wide variations.

Certain points on steel bridges show failures in paint skin greatly in advance of the rest of the structure, namely, the upper horizontal surfaces such as top flanges of stringers, floor beams and upper chords. By watching these points an experienced inspector can quickly reach conclusions as to the time when the structure will need repainting. By cleaning and painting such places and by "spot painting" minor rust spots, the painting of the whole structure may often be deferred for a season.

Painting may be done by contract or by the company's own forces. The latter is preferable as it is more certain that the proper paints will be used and that the painters will be more likely to adhere to the rule for cleaning before painting. Only skilled painters, familiar with the painting of structural steel, should be employed. Contract painting presents difficulties in setting up a measure for payment unless the company has records in sufficient detail to apply as a check on the contractor's estimates. Furthermore, it is very necessary to keep an inspector with the contract painting gang all the time or the cleaning work will stand every chance of being slighted or even entirely omitted. The surfaces of the steel may be cleaned by using a hammer and chisel, wire brush or sand blast or scraping with special tools. While the sand blast is the most effective, it is also the most expensive and is seldom used.

Paints are made from various materials and in numerous forms and combinations. Consequently their relative efficiencies vary greatly. Certain pigments may have high waterproofing qualities and yet may actually stimulate corrosion of steel. Red lead mixed with pure linseed oil is a good rust-retarding paint. The most important and frequently used paints are mechanical mixtures of pigments and vehicles, which are a combination of pulverized solids and drying oils. The most durable paints are those composed of pigments with open-kettle boiled linseed oil as the chief ingredient of the vehicle. Pigments are classed as primary and secondary. The former are strong in color and covering power, while the latter are weak in these qualities and should not be used alone. The subject of paints and painting is one which requires much study, and the maintenance engineer may well afford to seek technical advice on the subject from his steam road friends who are responsible for bridge maintenance.

PROPER BRIDGE MAINTENENCE REQUIRES CAREFUL INSPECTION

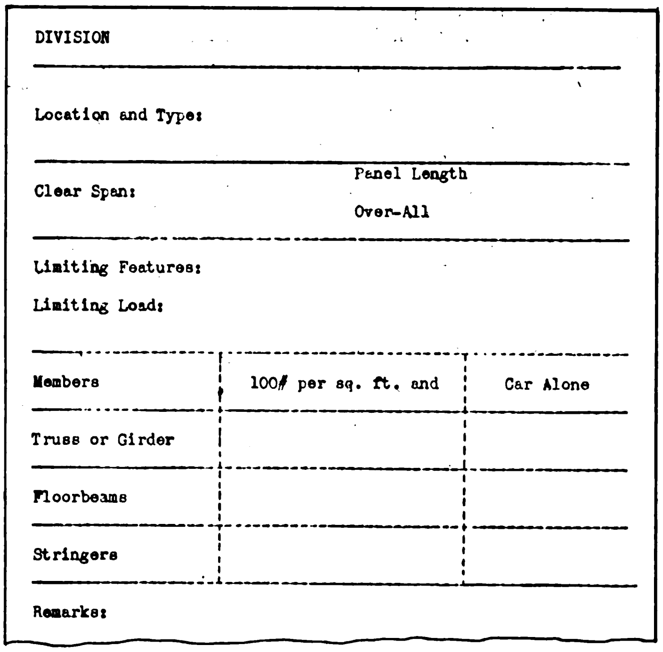
Safety of operation and continuity of service demand that bridges be given the most careful attention with respect to their maintenance. In order to do this, it is necessary that a rigid routine of periodical inspection and repair shall be followed year in and year out. The value of the inspections naturally depends upon the experience of the inspector both as to methods of maintenance and ability to forcast the effects of conditions found. Such inspections should be made, annually and preferably in the fall, so that the plans, work sheets (see page 953) and estimates for repairs may be made up in the winter and work started in the early spring. In some cases it may be advisable to provide for inspections twice each year, once in the spring and once in the fall.

The annual inspection should be thorough. A merely perfunctory examination, made while a car waits for the inspector, will not do. Hence the inspection should be made by the engineer who is directly in charge, or by assistants who are competent to do such work. In addition to the regular annual inspection, there should be an inspection by a consulting bridge engineer about every two years. Meanwhile the section foremen must be trained to make monthly inspections of the bridges on their sections, and these men should be instructed in regard to the general and particular features which should have their attention.

The notes (see page 953) concerning the condition of the structure should be made on the ground and, as far as possible, previous records of inspection and recommendations should be in hand so that it may be seen whether previously recommended work has been done. The spans, bents or piers of a bridge should be numbered always in the same direction for the same line, say from east to west or from north to south, commencing with No. 1 at the abutment, back bent or sill. Truss panels should be numbered in the same way and trusses should be designated right or left in the direction of the bent or panel numbering, although if the line and bent numbering read from south to north, the trusses can be designated east and west.

There is no short-cut method for making inspections in sufficient detail to be worth while. This is indicated by the number of things which need examination in connection with steel bridges for instance. Some of these are: (1) The rollers should move freely, at right angles to the line of the bridge and be free from rubbish. (2) Posts and compression members must be free from bends or bulges, with joints all having a firm, even bearing against each other. (3) Tension members must not be slack. (4) Floor beams and stringers must be examined for flaws in connecting angles and shelf angles, for defective, loose or missing rivets and for shearing or crushing of webs and flanges at connections. Riveted members require testing for loose rivets. In combined highway and electric railway bridges, the timber flooring must be examined, particularly the under course, for evidence of decay. Planking must be removed to permit examination of stringers and connections. (5) Bridge seats need to be examined for cracks; evidence of crushing, and to determine whether they are level. Parapet walls need attention to see that they are not encroaching, due to pressure of fill, upon the free movement of the free or expansion ends of the bridge. (6) The structure should be observed under passage of cars and vehicles, because swaying, excessive deflection, twisting and rattling of members will show that attention is required from the bridge gang.

Piers, abutments, retaining walls and culverts should be examined for undermining, scouring, bulging, cracking, settling or other movement. Fender piers or piling, cribbing and grillages must be watched as they frequently become disturbed and damaged during freshets.



DIVISION

Location and Type:

Clear Span: Panel Length

Over-All

Limiting Features:

Limiting Load:

Members	100# per sq. ft. and	Car Alone
Truss or Girder		
Floorbeams		
Stringers		

Remarks:

BLANK FORM FOR USE IN MAKING DIGEST OF BRIDGE DATA

Timber bridges present inspection difficulties of their own and they need very careful attention since timber is very erratic in performance, while its deterioration is generally more rapid and more deceptive than that of metal. The principal aids in determining the condition of timber are sight, sound and boring. However, appearance alone is a poor gage of timber condition, although moist conditions found in dry weather are usually indicative of unsoundness. In general the sound of a timber as produced by striking with a 5-lb. machinists' hammer will give the best indication of condition, which may be further tested by jabbing suspicious spots with an awl or ice pick. Boring is resorted to where doubt still remains as to interior condition.

Trestle bents should be plumb. Sills and caps should be level. Piles need the most careful examination at the ground line and at the water line. Stringer joints and bearings on caps need careful attention. Guard timbers should be rigidly fastened to the ties and bolt heads should not project above the general surface of such timbers. This is to prevent their being struck by wheel guards, fenders and wings of snowplows.

In short stringer spans (whether of timber or steel) the ends of stringers are frequently found incased in the abutments. This practice is to be condemned and the condition corrected by freeing the ends as soon as possible. When so incased, corrosion is very rapid and the abutments soon crack and break, due to expansion of the steel.

In the paper already referred to Mr. Keith notes that corrosion and bolt holes in flanges of rolled steel beams reduce the strength far more than is generally realized. Of course the fact is known when thought of, but it is too commonly overlooked. The following figures illustrate these cases:

If a 12-in. x 31½-in. I-beam used as a stringer has
  One hole ⅞ in. in diameter in one flange, the strength is reduced 12½ per cent,
  Two holes ⅞ in. in diameter in each flange, the strength is reduced 28½ per cent,
  ⅛ in. thickness rusted from one flange, the strength is reduced 15½ per cent.

If a 12-in. 20½-lb. channel used as a stringer has
  One hole ⅞ in. in diameter in one flange, the strength is reduced 17¾ per cent,
  Two holes ⅞ in. in diameter in each flange, the strength is reduced 21½ per cent,
  ⅛ in. thickness rusted from one flange, the strength is reduced 15 per cent.

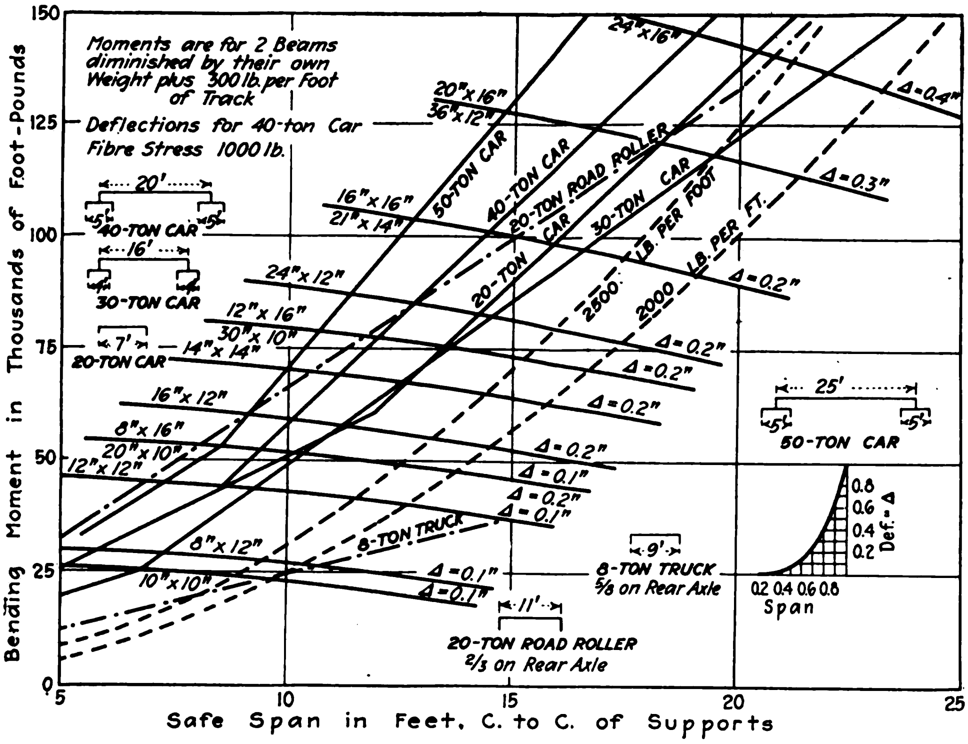


DIAGRAM SHOWING LOADS FOR WOOD STRINGERS

Timber stringers decay more rapidly when so incased, due to capillary action along the grain. Sapwood is more subject to decay than heartwood. Exposed ends of fibers contribute to decay and tops of stringers decay more than the sides or bottom. Timber laid with rings the concave side up decays faster than when laid with the convex side of the rings up. Wherever two timbers are placed close together dirt and moisture collect and rot results.

Mr. Keith says further that the reduction of the strength of timber stringers due to decay is not always appreciated. Regardless of the reduction of strength of individual fibers which, although not so far gone as to be called rotten are approaching that stage, a slight loss of section in the top or bottom of a stringer reduces the strength for resistance to bending altogether out of proportion to the amount of section lost. In a timber beam 12 in. deep a loss of

1 in. in depth reduces the section 8 per cent and the strength 16 per cent,
2 in. in depth reduces the section 17 per cent and the strength 30 per cent,
3 in. in depth reduces the section 25 per cent and the strength 44 per cent,
4 in. in depth reduces the section 33 per cent and the strength 55 per cent.

If the decay is uneven the loss of strength is even more striking. A 12-in. stringer having full depth at one side and reduced at the other side by

2 in. has its section reduced 8 per cent and the strength reduced 28 per cent,
4 in. has its section reduced 17 per cent and the strength 46 per cent.

Such cases occur where ends cut across the fiber are in contact with each other, as at stringer joints, or where trestle posts are set on sills and under caps. The practice of placing iron castings between sills and posts and caps and posts or between trestle caps or wall plates and stringers should be extended. Similarly the use of cast-iron spacers (in the form of "spools" on each bolt) between stringers, is far better than the old practice of using wood spacers. In addition to inspection of the structures, the adjacent streams and waterways require examination with the view of determining whether they need enlarging or cleaning, whether the waterway is insufficient, and whether embankments need rip-rapping. The general condition of line, surface, joint fastenings, and guard rails should have attention and tracks on approach. Fills should be watched for sagging especially at or near abutments. Further, the condition of paint on steel structures must be carefully noted. The condition of track bonding needs attention, as it is very desirable to prevent the escape of current to steel bridge structures.

Even timber trestles over salt water will require attention in this regard, and the writer has in mind a case where it was found that the current leakage was so great (partly because the structure was low and the tides high) that the track rails became badly corroded at the base, rendering the spiking insecure. It was remedied partly by setting up a girder rail with one end in the creek alongside the structure in guides and directly bonding to the track rails. It was surprising to note how rapidly the length of this "ground" rail decreased. The second part of the remedy consisted in replacing defective bonds on the whole line, and extending the return feeder cables.

Wood trestle bridges are very often used in the construction of a railway line to minimize the original investment by avoiding expense for heavy or long fills and more expensive steel or concrete structures, and even at times simply to hasten construction. They are, therefore, considered primarily as temporary structures which will create a certain amount of maintenance expense. The hope is that as the line develops they may be gradually eliminated. When the condition of a trestle or other structure warrants extensive repair or complete renewal, it is time to consider whether it should be eliminated or changed in order ultimately to reduce maintenance costs. Consideration should always be given to these projects when making up bridge maintenance schedules, following annual inspections.

It follows that an investigation of the question: Will it pay? must be made. Here the use of the formula advocated by G. L. Burr in the JOURNAL for June 3, 1916, should be of assistance.

Let us assume the following:

Reduction in annual operating expenses due to improvement $= S$
Replacement charges for improvement $= R$
Capital charges for improvement $= C$
Total charges for improvement $= R + C = T$
Estimated life of improvement (years) $= L$
Customary rate of interest $= r$
Increase in annual net earnings due to improvement $= N$

We must now remember that, as a result of the improvement, increased capital charges equal to rC must be met each year. Also, in the final analysis, a sum equal to $\frac{C}{L}$ should in some way be potentially reserved, charged off or held back in the surplus annually to maintain the integrity of the additional capital investment. Finally, the annual prorate of the replacement charges for the improvement amounting to $\frac{R}{L}$, should be taken into consideration. The particular method of accounting for these processes is of small importance, as the main fact to be kept in mind is that, consciously or unconsciously, the indicated charges or expenditures must be met.

The following equation may then be written:

$$N = S - rC - \frac{C}{L} - \frac{R}{L}$$

Thereupon, obviously the improvement will pay whenever N is greater than zero. This condition may be expressed thus:

$$N = S - rC - \frac{T}{L} > 0$$

$$S > rC + \frac{T}{L}$$

In other words, the improvement may be made when the saving in operating expenses exceeds the sum of the increases in interest charges and amortization and replacement expenses.

While bridge and trestle piling has been treated with preservatives by many railroads, the practice is not so extensive as it should be. Similarly other bridge timbers until recently have been mainly overlooked in this regard. When bridge timbers have been treated, creosote has been most extensively used but it may be noted that the Boston & Maine Railroad uses a brush treatment for bridge timbers. While creosoting by some pressure process is considered the most effective method of treating bridge timbers, the present high cost leads to greater use of open tank treatments, which have a far greater value than has usually been acknowledged. The photograph on page 953 indicates the condition of untreated yellow pine trestle stringers after twelve years of service.

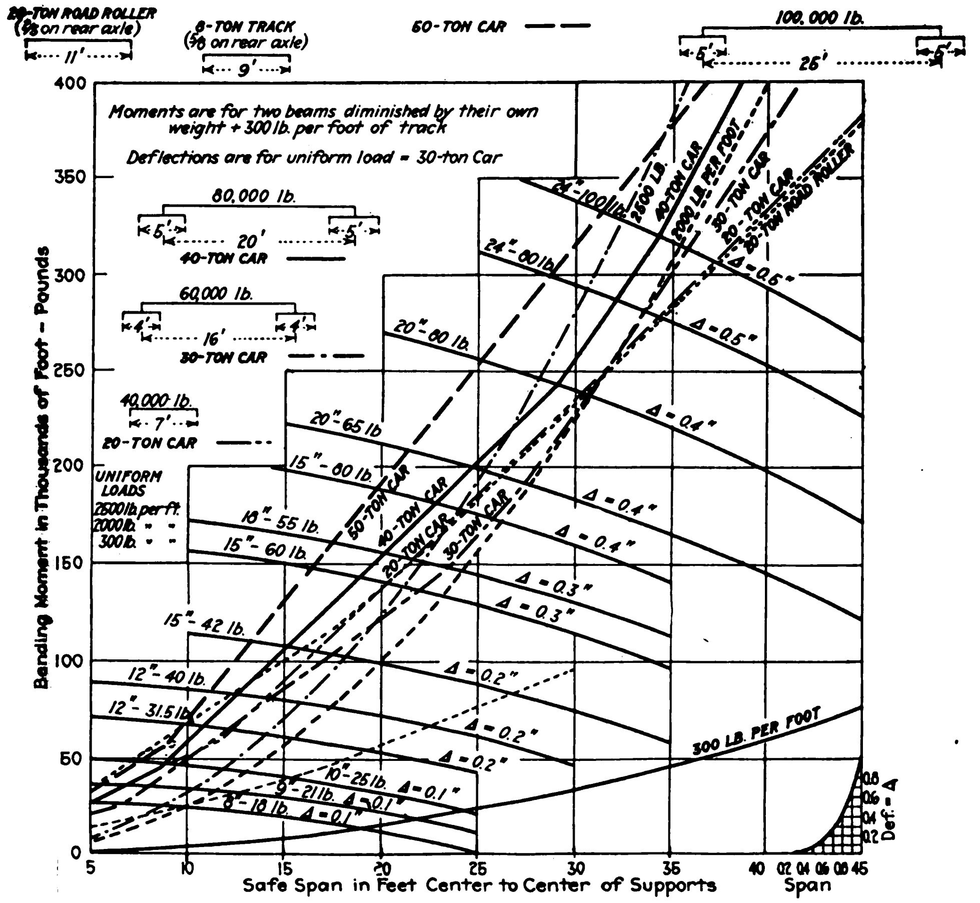
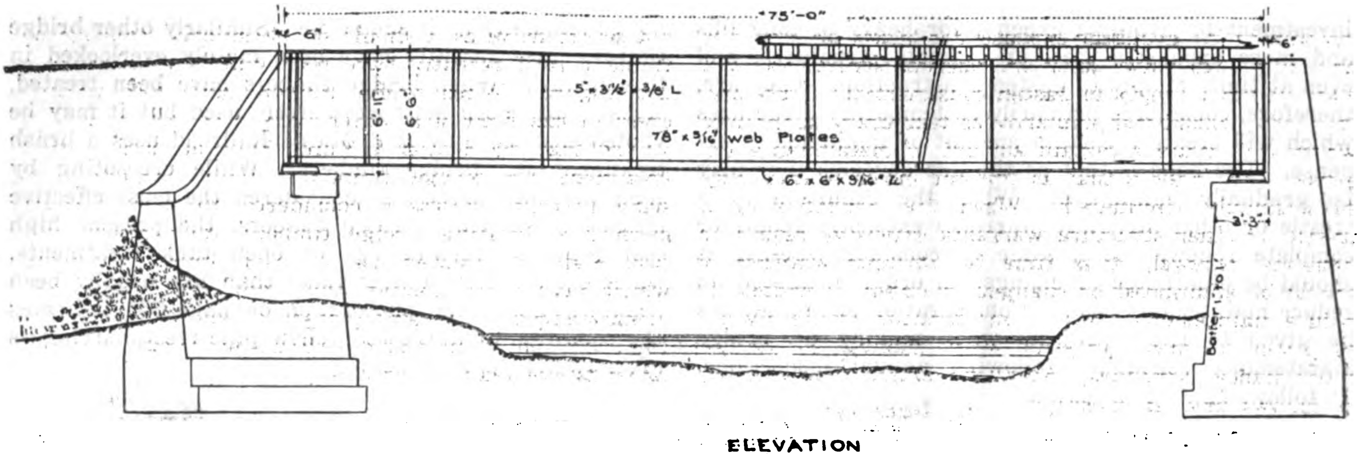


DIAGRAM SHOWING LOADS FOR I-BEAM STRINGERS

Electric railways frequently cross highway bridges which were built before the railways. Consequently the design of such bridges did not contemplate railway use. In placing tracks upon them various methods have been adopted which are not now considered desirable. In some cases it was necessary to rebuild the bridge, but more often only the floor system was altered and added to. In many instances, the construction used has been such as to render inspection and maintenance difficult.

Very often only one track is used and this placed as close as possible to one truss. Also it is seldom found that adequate provision was made, in replacing the plank flooring, for the security of a derailed car. Inside guard rails are seldom found on such bridges although they will be found universally upon steam and electric railway bridges.

During the time since tracks were first placed on highway bridges it has often been necessary either again to strengthen the floor system, or completely to rebuild the structures to provide for heavier equip-



A 75-FT. DECK-TYPE, PLATE GIRDER BRIDGE, UNION TRACTION COMPANY OF INDIANA

ment. Such work has frequently led to controversies with the civic authorities over the apportionment of expense. Arguments often arise over assumption of maintenance expenses for the structure as a whole and authorities in charge are very often unappreciative (to say the least) of their responsibilities in connection with bridge maintenance. It is no infrequent occurrence to see a highway bridge brightly glowing in a resplendent coat of fresh paint, but applied over rust and dirt and all above the floor. The under parts of the structure will be passed by somewhat in the spirit of "out of sight, out of mind" despite the fact that it would be best if the procedure were reversed because the under parts need cleaning and painting much more than the upper portions which are exposed to the action of wind and sun. Such conditions, when found by the maintenance engineer, require tact and patience and constant endeavor to have the authorities realize their duties.

When highway structures carrying railway tracks fail, as they sometimes do, an attempt is not infrequently made to place responsibility for the inadequacy of the structure upon the railway. For this reason alone the engineer of the railway should be in possession of all possible information relating to such bridges crossed by his lines, and the best way to secure this is through inspections, preferably made by a consulting bridge engineer, since the reports of consultants will have more weight with investigating authorities as a rule.

ELECTRIC RAILWAY BRIDGE FLOORS AND DECKS

Electric railway bridges generally have floor systems and decks which closely follow steam-road bridge practice, but where highway bridges are crossed a great variety of floor systems and decks are encountered. Space will not permit the discussion of the latter in this article, to the extent which the subject deserves. It will suffice to note that where timber highway bridge floors are found, the under course of planking should preferably be of creosoted timber and, whenever possible in renewing plank floors, creosoted timber under decking and, whenever possible, creosoted wood block wearing surfaces should be substituted in the interest of economy. The greater number of highway bridges as now built which call for wood floors make provision for a wood block wearing surface, as it is well known that a 3-in. or 4-in. wood block surface will outwear an ordinary plank surface several times over.

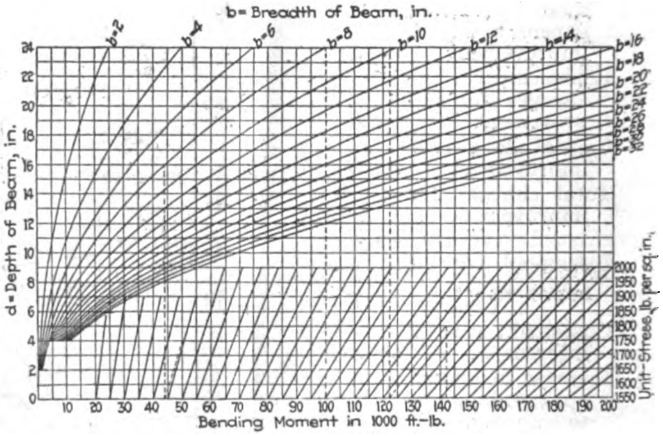
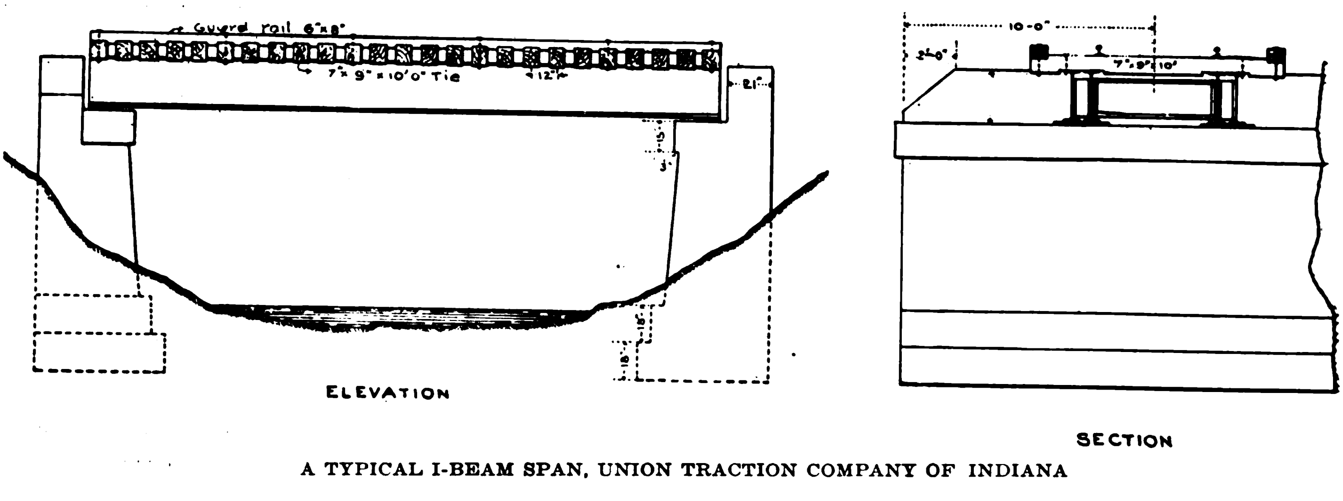


DIAGRAM FOR DETERMINING STRENGTH OF WOODEN BEAMS



A TYPICAL I-BEAM SPAN, UNION TRACTION COMPANY OF INDIANA

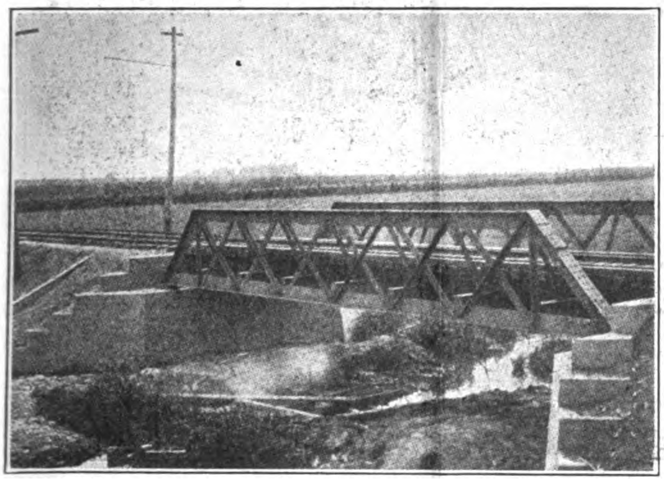
Bridge Records Are Very Useful in Maintenance Work

Bridges are constantly being referred to in maintenance correspondence. The general manager often wishes to know whether a foreign car will operate safely over the road. The freight department needs similar information as to acceptance of steam road freight cars. The bridges on the road usually present some limiting features the details of which should be on hand for ready reference in such cases. Clearance and strengthening problems, and addition and betterment matters, are continually arising, and these call for prompt and accurate information without waiting for field investigation. For these reasons it has been found advisable to have records at hand which will give all data ordinarily required, and the expense for obtaining the field information and preparing and revising the records will be found very small in comparison with their value as aids in connection with bridge maintenance problems.

Before outlining some of the features of bridge records it may be well to note that such records must be revised annually, so that they will be representative of existing conditions, by including all changes in structures which have been made during a season. An incorrect record is worse than none, since if no information is at hand it will be necessary to go to the bridge and get it.

Bridge records comprise two general features: (1) The field inspection record and (2) the condensed office records. The field inspection record consists of the following:

(A) *General Information*—as to the following items—(1) Location of bridge and what is crossed; (2) date of inspection; (3) type of bridge and use (whether railway only or highway); (4) number and location of tracks (eccentric location may be a serious matter); (5) skew, if any; (6) alignment and grade on bridge and on approaches; (7) distance from floor to ground or water below and depth of water; (8) factors which might limit changes in structure such as nearness of other structures, highways, buildings, etc., and (9) clear span and length over all.

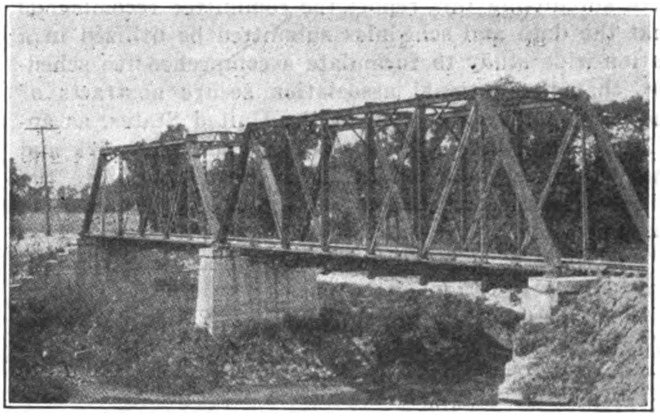


TYPICAL SINGLE-TRACK PONY TRUSS ELECTRIC RAILWAY BRIDGE

(B) *Substructure*—Information as to kind and quality of substructure; general statement as to condition; spacing of bents or piers.

(C) *Superstructure*—Information as to style and material of structure; statement as to general condition, spacing of panel points; condition of paint; notation as to whether vibration was observed and where; arrangement of rivets at joints; connections of stringers to floor beams.

(D) *Floor*—It is important that full information concerning the floor should be recorded, such as kind, condition, size and spacing of ties, location and size of guard timbers; size and location of inner guard rails; arrangement of ends of guard rails and their extent beyond the structure; kind, size, condition, number and location of stringers; method of suspending floor beams from structure.



SINGLE TRACK THROUGH TRUSS ELECTRIC RAILWAY BRIDGE

The condensed office records consist primarily of a digest (see page 955) of the bridge engineer's reports, which should be filed in a loose-leaf binder and should show the division, bridge number, location, type of bridge, span, capacity of truss or girder; if a highway bridge, capacity with and without highway load; capacity of floor beams and stringers; limiting features; limiting load and restraining orders governing loads or operation on the bridge. In addition a diagram should be prepared for the entire road showing the location of all bridges with their numbers and indication of capacity of each bridge. Similarly a clearance diagram should be made up which will indicate those bridges where clearance for all types of cars used, is not provided.

Sources of Further Information

Matters pertaining to inspection of bridges are very well described in an article by Frank B. Walker in the JOURNAL for April 28, 1917; while a description by William R. Dunham, Jr., of the carefully prepared records of the Connecticut Company appeared in the JOURNAL for Feb. 26, 1916.

The subject matter here discussed has been gathered from many sources, principally from H. C. Keith's paper on electric railway bridge inspection and reports (1918 Proceedings, Brooklyn Engineer's Club); Willard's Maintenance of Way and Structures; the Manual of the American Railway Engineering Association and the files of the ELECTRIC RAILWAY JOURNAL. It may be said in passing that the writer spent many weary days in company with Mr. Keith on bridge inspections for the Connecticut Company, and as a result, has come thoroughly to realize the necessity for and importance of accurate detailed inspections of bridges used by electric railways.

Compensation for Engineers

Engineering Association Draws Up Schedule for Salaries of Engineers in All Industries

THE committee on compensation of the Chicago Chapter of the American Association of Engineers has submitted to that chapter for consideration a schedule of salaries for engineers employed in various industries among which is included the electric railways.

In submitting this report the committee recommends that the data and schedules submitted be utilized in a nation-wide study to formulate a comprehensive schedule, that the national association secure abstracts of the laws of all states, and of the United States, as applicable to engineers and surveyors and their work and that these be published in leaflet form and given the widest possible circulation, accompanied by suggestion for improvement in these laws.

That part of the schedule which affects electric railway engineers recommends that for an electric railway with an equivalent of 60 miles of track the schedule of salaries be as follows:

Chief engineer	In charge of track, structure and transmission lines	$3,600–$4,800
Assistant engineer, field	Doing transit work and inspection. Under direction	2,400– 3,000
Roadmaster	Preferably technically educated man	2,400– 3,000
Mechanical electrical engineer	A trained engineer in both branches having charge of power house, plant, cars and equipment	4,200– 5,400
Office engineer	Equivalent to a first-class machine draftsman for work under direction	2,400– 3,000
Line superintendent	Not easy to describe, but position commonly understood	2,400– 3,000
Substation men	Duties as commonly understood	2,400– 3,000

The schedule recommended for an electric railway with the equivalent of 200 miles of single track is as follows:

General manager	Responsible for all operation and maintenance. Preferably a technical man	$6,000–$10,000
Chief engineer	Has full charge of construction and maintenance of way and structures	4,000– 5,400
Assistant engineer	Drafting and instrument work in field and office under direction	2,400– 3,000
Roadmasters	Preferably technical men	2,400– 3,600
Electrical mechanical engineer	Trained in mechanical and electrical engineering and in full charge of power house, transmission and equipment	4,500– 6,000
Assistant engineers	Perform drafting and design under direction	2,400– 3,000
Line superintendent	Preferably a technical man. Training for higher position	2,400– 3,000
Substation man	Duties as commonly understood	2,400– 3,600

The committee also makes recommendation as concerns engineers on the staff of the State Public Utility Commission as follows:

SALARIES FOR COMMISSION ENGINEERS

Proposed schedule of salaries for Engineering Department of State Public Utility Commission, for a state with a population of 5,000,000:

Chief Engineer .... $12,000 to $15,000

Such an engineer would be charged with the administration of the engineering department and engaged on valuation work, standards of service, inspections and investigations having engineering aspects, etc. He may or may not be assigned the duty of hearing cases, preparing opinions, etc. During his employment by the commission and for one year thereafter he should accept no employment from any utility subject to the jurisdiction of the commission.

Assistant chief engineer—acts as assistant to chief engineer	$9,000–$10,000
Chief of railroad division	8,000– 9,000
Chief of gas division	6,000– 7,500
Chief of telephone division	6,000– 7,500
Chief of water works division and mechanical engineer	6,000– 7,500

The above chiefs of departments are directly engaged on the valuation of public utilities within their own division, assisting in formulating standards of service and engaged on investigations and inspections having engineering aspects. They may or may not be assigned the duty of hearing cases, preparing rate schedules, opinions, etc. During their employment by the commission and for six months thereafter they shall accept no employment from any utility subject to the jurisdiction of the commission.

Chief of Service Division.................. $6,000 to $7,500

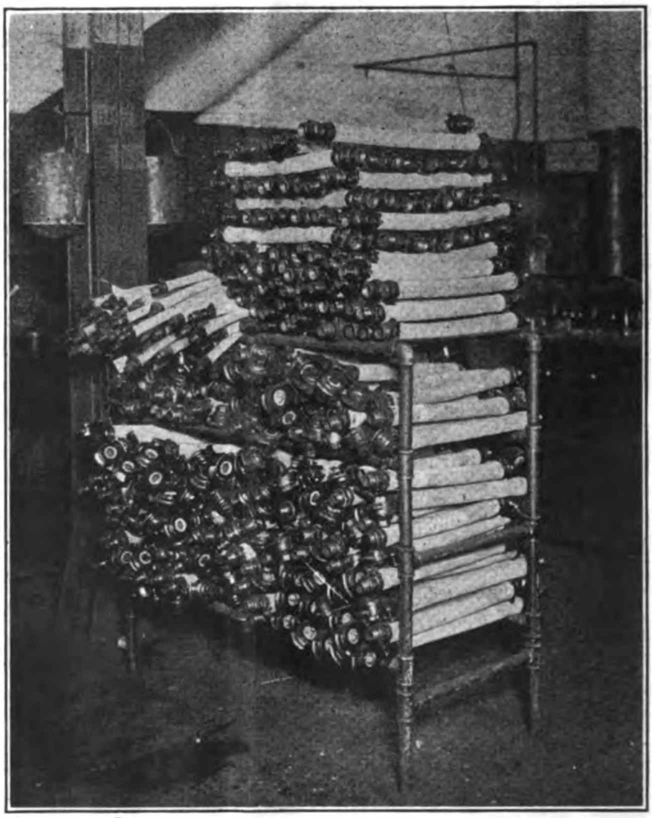
A chief of service division would be engaged in the enforcement of standards of service and in investigations and inspections having engineering aspects. During the employment by the commission and for six months thereafter, he shall accept no work from any utility subject to the jurisdiction of the commission.

Assistant engineers reporting to the chiefs of the above departments should be graduates of technical schools or with equivalent technical knowledge.

Grade 1.	Corresponding to a division engineer on a railroad in training and ability	$3,600–$4,800
Grade 2.	Corresponding in training and ability to an assistant division engineer on a railroad	3,000– 3,300
Grade 3.	Corresponding to instrumentman on a railroad	2,400– 2,700
Grade 4.	Corresponding to junior draftsman or junior instrument man on a railroad	1,800–2,100

Convenient Rack for Air-Brake Hose

A RACK constructed of 1-in. pipe, with the necessary T's and elbows, is in use at the Southern Division inspection and overhauling shop of the Brooklyn Rapid Transit Company, for holding and storing air-brake hose. The bottom of this rack is built solidly into the concrete floor and forms a very solid and substantial type of construction, as well as one which will not accumulate dirt and dust, common to all inspection shops.



AIR-BRAKE HOSE RACK CONSTRUCTED OF PIPE

The width of the rack is made just sufficient so that the coupling and nipples on the end of the hose will project outside. Three cross-pieces of pipe extend the length of the rack on which the various types of hose are laid. Each type of hose is kept separate for convenience and to assist the repairman in obtaining the proper hose without the necessity of looking through a large number of pieces. By locating such a rack in a place convenient to the inspection pit, much time and labor is saved to the repairman.

Steel-Tired Wheels and Axles

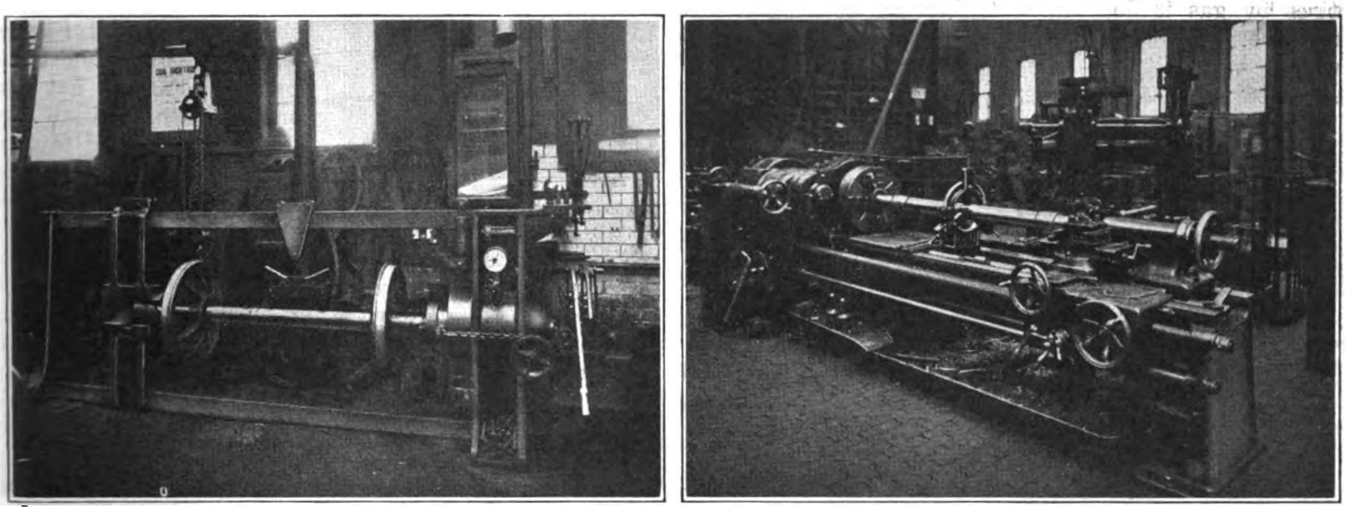
The Author Discusses Methods of Installing Wheels and Axles and Gives Special Attention to the Causes of Sharp Wheel Flanges — Good Track Maintenance Is Declared Essential to Good Car Life

BY H. VERNON
Belfast (Ireland) City Tramways

ALTHOUGH it cannot be asserted with reason that the inspection and maintenance practice of all tramways should be uniform, there are certain principles that can be followed by them. In comparing the life of axles and tires on one system with those obtained on others over an experience of thirteen years, we generally find that such comparisons are of little value, so many factors operating which may entirely vitiate the result.

We believe that there is but one test to apply to a steel axle or tire—the test of service. We make every effort to see that they are correctly fitted and exactly to gage before they are sent into service, not only to do justice to ourselves but also to the makers of the material. Our 4-in. axles are manufactured to the British standard specifications. We purchase them from the makers in the rough and machine them to suit our requirements.

The problem of holding car wheels on their axles is met by boring out the new wheel hub slightly smaller than the diameter of the axle, and forcing the wheel on in a hydraulic press. In turning the axle, we leave the wheel seat 16/1000 in. (by micrometer) larger than the bore in the wheel, giving the axle a slight lead for about ½ in. This usually gives us a pressure of about 10 tons per inch of axle diameter at the wheel seat. We have found it an advantage to make a radius of about ¼ in. in the leading end of the bore in the wheel, so that there is not the danger of the sharp corners of the hub pinching the axle when they are taking curves and loops. As our standard wheel fit is 4 in. in diameter by 4¼ in. in length, and the pressing allowance is 16/1000 to 23/1000 in. by micrometer, the maximum pressure on a 4-in. axle is 45 long tons.



HYDRAULIC PRESS IN BELFAST CITY TRAMWAYS SHOPS AT LEFT, FINISHING OFF JOURNALS AND WHEEL SEATS ON CAR AXLE AT RIGHT

Before axles are fitted, the journals and wheel seats are finished off in the lathe, by means of three hard steel rollers held in a steadyrest, which is bracket-supported and fitted to the lathe carriage. These rollers are hard-pressed against the wheel seat and fed along. We find that rolling and burnishing greatly improves the fitting of axles.

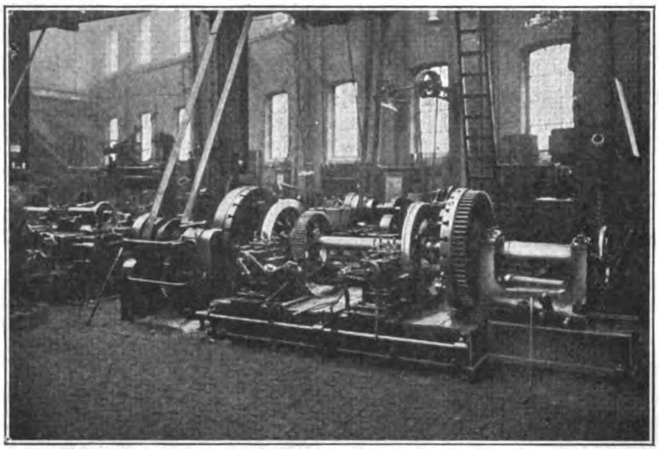
In forcing the axles into position, we use neat's-foot oil as a lubricant on the axle surface. It has been found that oil helps to prevent the corrosive action of the surfaces, which action increases the difficulty of starting the hubs when it is necessary to take them off. We have also found that 10 tons per inch of axle diameter does not always work out satisfactorily for all cases of pressed fitting, as both hubs and axles vary considerably in hardness. Some axles take 11 tons per inch to fit them; others less.

The question of pressure is not the only factor to be considered. The effects of the length of the axle fit, of the amount of metal around the bore, of the kind of metal and of the smoothness of the surface of both the bore and axle are also important. But the more care we take with the finishing of hubs and axles, and the smoother we make the fit, the less trouble is there in fitting them. We exercise great care in seeing that the wheel hubs are properly spaced on the axle. It is not sufficient that they be spaced to gage. They must be spaced at equal distances from the center of the axle in order to have proper end play for the motors. When wheels are pressed on it is difficult to stop the action of the press at the right moment, but by an arrangement of hollow blocks which fit over the axle, and a horseshoe cast-iron wedge regulated by a fine-pitched screw set in between the blocks, we gage them correctly.

Allowance must also be made for the closing in of the spoke type of wheel centers. To compensate for this springing action, the wheel centers are pressed onto the axles 1/16 in. less than the standard gage. Every wheel is numbered, and the same number is stamped on the axle, together with the date it was pressed on and the pressure shown by the gage. This number is recorded and filed for ready reference.

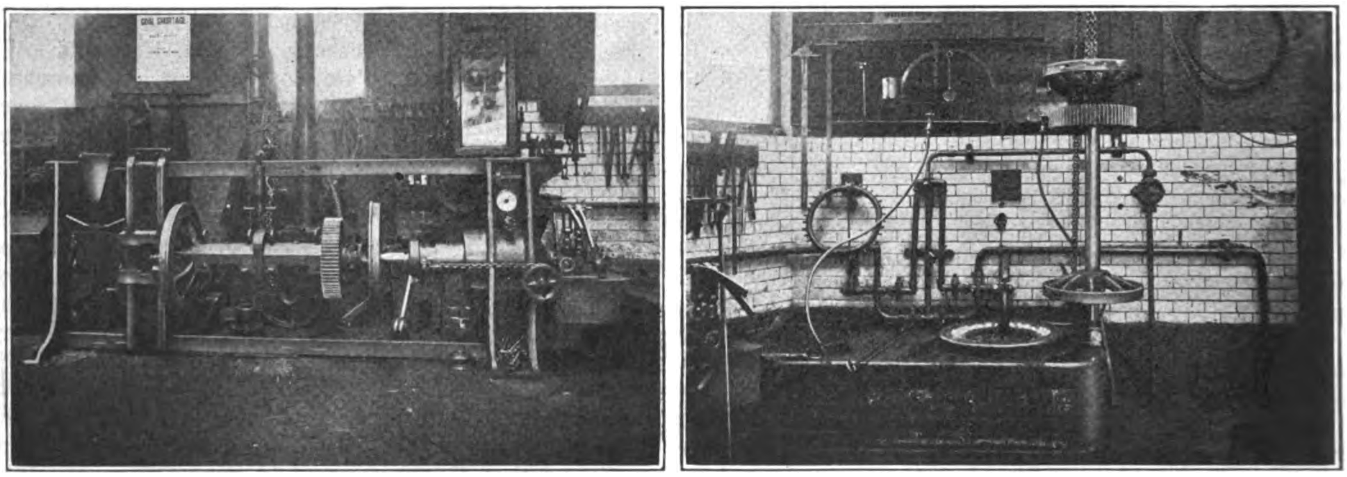
TIRE PRACTICE

Our tires, which we purchase in the rough from the makers, are made of Siemens acid steel. They are stamped with the maker's name and serial number in ⅜-in. letters in such a manner that each tire may be readily identified. When new, they weigh about 220 lb. and are rolled with a 1 in. in 20 in. taper of tread. Before shrinking on, we carefully pair and caliper them so as to get equal diameters. The heating of tires by gas is done in a furnace of simple design which we specially constructed for this purpose. It consists of three 2½-in. seamless hydraulic tubing rings, each of which is fitted with a row of gas jets or burners extending around it, placed horizontally so as to cause the flame to impinge upon the tire. The supply of gas and air to the burners is regulated by separate valves. In connection with the expanding ring for taking off worn-out tires, a cast-iron ring is provided with a flange over the burners to protect them from injury during the process of lifting wheels and axles in and out of the ring.



WHEEL LATHE FOR TURNING STEEL-TIRED WHEELS

A light overhead traveling crane is erected over the furnace by means of which, when the tire is at the proper temperature, the wheels and axles are lifted automatically and the bottom wheel is lowered into the tire.



METHOD OF GAGING POSITION OF WHEEL ON AXLE IN PRESSING AT LEFT,
APPARATUS FOR EXPANDING WHEEL TIRES AT RIGHT

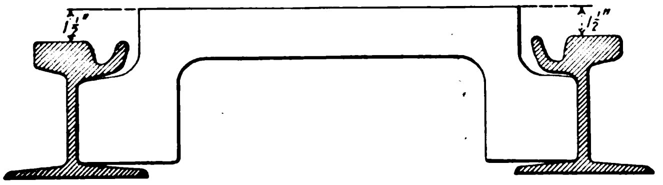
The 220-lb. tire is heated until its internal diameter is 3/16 in. larger than the wheel center. The temperature of the tire reached by this heating is approximately 500 deg. Fahr.

During this period the old tire is being expanded until it slips off the wheel center. Our worn-out tires weigh on an average 70 to 75 lb., and they slip off the centers when heated up to about 300 deg. Fahr. Expanding a tire off and shrinking another on is performed in 15 minutes. We can take off two old tires and shrink on two new ones at a cost of 2 shillings. A water-cooling service is supplied for cooling off the tires on the wheel centers. All wheels are gaged outside their rims at four points equally spaced on the circumference. If there is more than 1/16 in. of variation, the wheel rims are faced up true in the lathe before tires are fitted. The average life of our most successful make of tire used, up to the present, is 70,000 miles. During the life of a tire only about 50 per cent of its weight is worn away, 20 per cent is turned off in forming flanges and the rest is scrapped. Flange wear is one of the most important items we have to contend with, and all our efforts are directed toward saving the wheel flanges. Since we are able to use roughly about one-half the weight of the tire the problem of getting the longest life out of a tire before turning calls for careful study. Danger of car derailment at curves and heavy side oscillation generally sets the limit for flange wear. Although on some systems limit flange wear gages are used, we believe that while this may be a more desirable method and a means of saving tire metal if properly carried out, it has the disadvantage of demanding a larger number of spare cars or trucks and also wheel lathes in order to insure proper results. There are many causes which contribute to flange and tire wear. Generally speaking, they may be enumerated as follows:

1. The difference in diameter of wheels on the same axle, brought about by a difference in the quality of the metal or a difference in brakeshoe pressure.

2. Uneven shoe and wheel wear in the case of a common form of brake rigging where it is necessary to put the pivotal point, which does the equalizing between the opposite wheels on a brake beam, a little to one side of the center of the beam.

3. Tendency of a wheel flange to crowd the rail and become sharp as soon as one wheel has worn smaller than the other.



GAGE FOR DETERMINING CAR CLEARANCE OVER TRACK

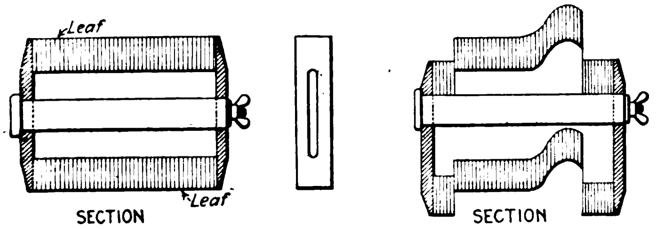
4. Sanding one rail only.

5. Running cars always in one direction. Coning the wheels will lessen the effect of such operation, but if the wheels are coned too much the cars are liable to rock.

6. Trucks out of square, propelling the cars from one side of the axle (single reduction rigid gearing) is the cause of much side thrust on curves and switches, etc.

Flanged brakeshoes, because of their abrasive action, cause a lot of unnecessary flange wear. The method of releasing outside-hung brakeshoes by release springs attached to the brakebeams is the cause of much unequal wear, both to brakeshoes and tires. This condition grows worse as the tires and shoes get smaller because the spring tension is increasing all the time. The many sharp curves on the Belfast system contribute largely to rapid flange wear, but if the metals of the rails and tires had the same resistance, as near as possible, the great wear both on rails and tire flanges at curves would be diminished.

The track should be kept up to its highest state of efficiency, first for public safety and second for keeping down the expense of car maintenance and overhead work. The track is the foundation of the system. If the cars run smoothly it is because the track is kept in a good state of repair. If, on the other hand, the track is in poor condition, the effects are transmitted through the wheels to the whole car.



LEAF OR LAMINATED GAGE FOR MAKING TEMPLATES OF WHEEL TREAD AND TIRE

This gage is composed of a number of thin plates of copper about 1/64 in. thick with a slot hole in the center. The plates are clamped together by means of a flat bolt and two thick plates at the outer end. The bolt has a wing nut and washer for tightening up. In applying the gage the bolt should be left slack so that the ends of the plates may rest on the surface required to be taken. When the surface is properly covered the bolt is tightened and the gage is removed whereupon the true outline of the surface will have been secured no matter how irregular it may be.

In order to check the wheel tire wear, we have fitted a limit gage at the ends of the overhauling pits at each of our seven depots as shown above. This track clearance gage is fastened across the pit, and cars must pass over it. By this means, we are able to see exactly what clearance there is left between motor gear cases and the track.

When wheels have been taken out at the car works, we use a leaf gage for making templates of the tread and tire. From this we draw a curve which represents exactly the contour of the tire. By taking another which represents the original standard tire section, and placing it beneath the curve of the worn wheel in such a way that the two curves do not intersect, we can determine the exact amount of metal to be cut away for securing a proper flange. An accompanying illustration on this page shows the details of construction for this leaf gage.

The policy of concentrating all wheel, axle and gear work under one head who is made responsible for getting every mile consistent with safety out of the tires and other parts gives excellent results. All that our depot foremen are expected to do is to see that the wheels are worn to, but not below, the scrapping point. All cars whose tires have reached the scrapping limit are sent to our car works where they are carefully examined before being taken out.

The equipment for turning steel-tired wheels consists of a Hulse & Company's wheel lathe, which averages five pairs of wheels a day.

New Grinder Helps to Keep Cars Running

EARLY last winter a new pit wheel-grinder was installed in the North Albany shops of the United Traction Company, Albany, N. Y. This machine is similar in construction to that described in the Aug. 17, 1919, issue of the ELECTRIC RAILWAY JOURNAL, page 277. The grinder has been placed in a special pit under one of the tracks in the car shop and is arranged for electric-motor drive. It has been found that with two men operating this machine the average flat spots found in a pair of wheels can be ground out in from twenty minutes to thirty minutes. A set of four wheels can be ground in one hour and eight wheels in two hours or less.

It is seldom that all the wheels under a car are flattened at the same time. Hence, for most cars one-half to one hour's work is found sufficient to put them in satisfactory running order again. Previous to the installation of this grinder when a car was taken out of service for flat wheels it might not be able to return again for several days.

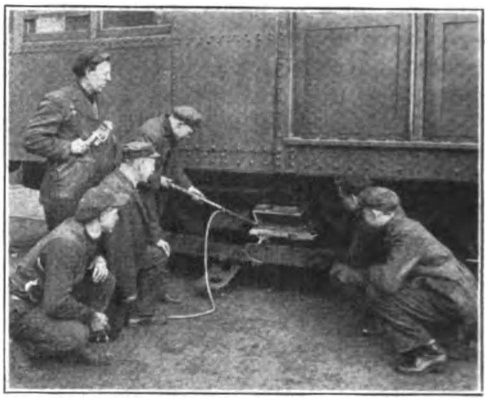
The new machine is supported on the right and left sides by strong cast-iron frames and is arranged for two emery wheels which can be moved up or down or horizontally by means of screws. After a car has been run over the pit it is jacked up and sections of rail are removed to permit the wheels to drop down onto the emery wheels. The workmen wear goggles during the operation and the particles of steel and emery which fly from the damaged wheel go into a steel box from whence they are drawn off through pipes by fan motors, thus keeping the working space free from dust. During the grinding operation the car wheels are turned very slowly by applying power to the motors in the usual manner.

The time and labor saved by this new device is very great, cars are returned to service much sooner and the company's engineers believe it has already paid for itself.

Some Mysterious Car Ailments

Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD



Applying the Brakes in Starting a Car

One line of an electric railway was experiencing considerable trouble due to the blowing of circuit breakers. There were no excessive grades on this line and the engineers of the company were somewhat puzzled to find a reason for such a phenomenon on one line while everything was apparently satisfactory on the others. Accordingly a man was detailed to watch the operation of the cars.

He discovered that there was a section of track which was very slippery and that the motormen had trouble in starting the light-weight cars at this point. They had received instructions to accelerate rapidly, which to them meant operating the controller rapidly. On this particular section of track it was the practice to notch up the controller very fast, and when the slipping point of the wheels had been reached to apply the brakes to keep the wheels from slipping. The reverse of this method was also found to have been applied in stopping the cars. The brake application produced a very rapid rate of retardation, and when the slipping point of the wheels was reached power was applied to prevent the wheels from skidding.

Preventing the Burning Out of Reversers

ON A CERTAIN electric railway property using electro-pneumatic control equipment the reversers which were installed underneath the cars were frequently burned out. The motormen operating this type of equipment were questioned and insisted that they were not abusing the equipment in any manner and that these burnouts occurred while the car was running along normally. Special investigations by the engineers of the manufacturer and the railway forces showed that it was possible for the reverser to throw entirely independent of the motorman, due to foreign matter lodging on the valve seat of the opposite reverser magnet valve, or due to false circuits caused by an accumulation of dirt and dust. These reversers were not designed to break or open the circuit, as the contacts were not provided with blowouts, and the construction was such that a violent short-circuit would occur whenever the circuit was opened on the reverser contacts. The magnets controlling the air supply to the air cylinders were cut out after the circuit for throwing the reverser was completed and the reverser had been thrown to its proper position.

In order to overcome this trouble and to eliminate any possible chance of the reverser throwing, the manufacturer has changed the connections so that the reverser magnet is now energized all the time that power is on. This change has been extended to the control equipment for both two and four-motor equipments and has reduced the number of burnouts considerably.

Coaxing a Multiple-Unit Equipment to Go Ahead by Reversing It

A CAR equipped with type-M control operated on a line having a loop at either end so that the car was operated from one end only. Its operation was satisfactory in this way, but one day there was a block on the line which required the turning back of the car from the downtown section. The motorman changed ends, threw his reverser and operated the car through the crossover and to his first stop satisfactorily, but when he tried to start the car again there apparently was no power, as the car would not operate. The motorman examined all his fuses and gave a rapid examination of other parts which apparently were all in satisfactory condition. He threw his reverser to the reverse position, then ahead, and applied power again and the car started satisfactorily. At the next stop the same condition occurred and when the motorman again operated his reverser the car worked O.K. He was forced to repeat this operation at each stop until he reached the end of the line. The car was then "shopped" for a closer inspection. All circuits were tested out with a bell circuit and they all rang out correctly. A blueprint of the connections was consulted for a possible solution, but still the trouble could not be located. The car was then turned over to the general "trouble man" with instructions to "stick to the job" until he had located the cause of the trouble. The cover was removed from the reverser and all fingers were tested and found to have the proper tension. All contacts were also found to be bright and free from dirt. On a very close examination, however, it appeared that one of the fingers was not touching the contact properly when the reverser was in the forward position. The reverser was operated several times, and it was discovered that there was a screw at that point which had loosened slightly so that the head projected above the contact surface. By watching the operation of the reverser, it was noticed that after it had been thrown from the reverse to the forward position the drum dropped back a trifle so that while in the first position the finger made proper contact, and when the drum had dropped back it rested on the head of the screw. The screw was then tested out in its loose position and it was found that the circuit would not ring to the contact plate. The screw was then driven in tightly and the equipment operated satisfactorily. The screw in its loosened position had held the finger from making proper contact. After the slight play in the reverser had taken place, which occurred each time the power was shut off the control circuit, the finger would ride up on the head of this screw. The seat for the screw was imbedded in insulation so that with this loose there was no contact for the current.

Accurate Resistance Tests Locate Trouble Where Inspection Fails to Do So

A CONSIDERABLE amount of trouble was experienced on a certain series of surface cars which were equipped with tapped-field-control motors and multi-unit control for two-car train operation. In the most severe cases motors flashed and the control contactors were welded in. In milder cases cars were reported for being "fast" or for armatures which were baked or open-circuited.

The tests commonly made by shopmen were applied at the inspection shops in an endeavor to locate the trouble but in vain, so a special investigation was started by the railway's engineers. In this detailed investigation resistance readings were taken of the fields of the various motors by means of a Queen dial "decade" testing set which measured the resistance of the field windings accurately. These readings showed that in the tapped-field position some motors were running with but 10 per cent of the full-field winding instead of 65 per cent, as was intended. The reason for this condition can best be understood by referring to the accompanying diagrams.

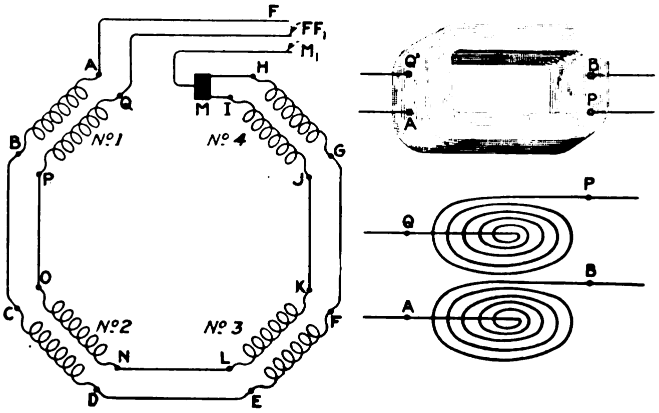
The first of these gives the schematic connection for the field windings of this particular type of motor. When operating on full-field position the circuit through the field windings would be from the terminal *F* through the windings *AB, CD, EF* and *GH* to *M* and then through the windings *IJ, KL, NO* and *PQ* to the FF_1 terminal. On the fifth and ninth positions of the controller, connections were made so as to cut out the first four windings just enumerated. In this position the field circuits started from M_1 and included only the windings *IJ, KL, NO* and *PQ*.

A second illustration shows an individual field coil with two terminals on each end. For the sake of clearness the windings as connected to the terminals are shown outside and below the field coil. Each field coil is made up of two distinct windings, there being no connection at all between the sections *AB* and *PQ*. The resistance of the winding between the terminals *A* and *B* is 0.018 ohm and between the terminals *P* and *Q*, it is 0.033 ohm. Using these values for the resistance of the various windings and referring again to the first diagram it will be seen that the resistance of the four windings from *F* to *M* is four times 0.018 ohm or 0.072 ohm, and the resistance from *M* to FF_1 is four times 0.033 or 0.132 ohm. When operating in full-field position the resistance will then be $0.132 + 0.072 = 0.204$ ohm. The action of the contactors in passing from the full-field to the tapped-field position cuts out 0.072 ohm or 35 per cent of the field windings, leaving 0.132 ohm or 65 per cent.

TABLE FOR LOCATING POSITION OF TROUBLE FROM RESISTANCE READINGS

Resistance in Ohm	From	To	Condition of Fields
0.204	*F*	*FF*	O. K.
0.072	*F*	*M*	
0.132	*FF*	*M*	
0.051	*F*	*FF*	First or second field shorted.
0.102	*F*	*FF*	Second or third field shorted.
0.153	*F*	*FF*	Third or fourth field shorted.
0.204	*F*	*FF*	No. 1 field reversed.
0.087	*F*	*M*	
0.117	*FF*	*M*	
0.204	*F*	*FF*	No. 2 field reversed.
0.102	*F*	*M*	
0.102	*FF*	*M*	
0.204	*F*	*FF*	No. 3 field reversed.
0.117	*F*	*M*	
0.117	*FF*	*M*	
0.204	*F*	*FF*	No. 4 field reversed.
0.133	*F*	*M*	
0 072	*FF*	*M*	

The trouble in the cases referred to was found to be due to two causes. First, in some cases a short-circuit had occurred between the two sections of some of the fields and secondly, some fields had been installed upside down and end for end which made the terminals come right for connecting but reversed the amount of resistance and the winding in the circuit from what was originally intended. In both of these cases motors would rotate properly, but as a wrong percentage of the field was being cut out in the tapped-field position trouble occurred. The severity of this depended upon the position of the field in the circuit.



AT LEFT, SCHEMATIC DIAGRAM FOR THE WINDINGS OF A TAPPED FIELD MOTOR; AT RIGHT, INDIVIDUAL FIELD COIL FOR A TAPPED FIELD MOTOR

In one case a short-circuit was found between *A* and *Q* so that in the full-field position the entire field windings would be short-circuited for this motor. In other cases short-circuits were found in field coils other than the first one in circuit. With a short-circuit between *BC* and *OP* the resistance between *F* and FF_1 was 0.051 ohm instead of 0.204 ohm. With a short-circuit between *DE* and *NL* the resistance between the terminals *F* and FF_1 was 0.102 ohm. By comparing these with the resistances that should have been indicated, the variation in the results will be understood.

In the cases where the fields were installed the wrong way around the resistance as read between the terminals *F* and FF_1 would be correct, that is, 0.204 ohm, but the readings between *F* and *M* and between FF_1 and *M* would vary as follows: First, if the No. 1 field coil was reversed, *F* to FF_1 would be 0.204 ohm, *F* to *M* would be 0.087 ohm instead of 0.072 ohm and from FF_1 to *M* would be 0.117 ohm instead of 0.133 ohm. If the second field coil was reversed the resistance from

F to FF_1 would be 0.204 ohm, from F to M would be 0.102 ohm instead of 0.072 ohm and from FF_1 to M the resistance would be 0.102 ohm instead of 0.133 ohm.

From the various readings taken the accompanying table was developed to show the various combinations of errors which occurred. By referring to this table it was possible to determine which one of the field coils was reversed from the results obtained by taking the resistance from F to FF_1, from F to M, and from FF_1 to M. The use of this table saved a great amount of trouble and enabled the work to be handled by inspectors who otherwise would not have been capable or dependable to locate the trouble by any other simple tests.

Open Circuits Cannot Always Be Located by Inspection

A CAR was pushed to the terminal depot and the motorman reported that it had suddenly gone "dead." As there must have been an open circuit somewhere, the inspector started to find it. He examined all terminals, gave all the leads a pull to make certain there were no loose connections, examined the grid resistors for broken grids, brush-holders for broken brushes and all contact surfaces for poor contact, but everything appeared normal. A lamp cluster used for "lighting out" circuits was then tried and the open circuit was definitely located in the field circuit of No. 1 motor. As all connections appeared normal it was thought that the field was open-circuited. The field leads were disconnected and the field was tested out separately with the lamp circuit and it was found "O.K." One of the leads, however, was found to be open. Eventually this open circuit was located inside the terminal. When the lead had been soldered into the terminal the insulation had entered the end of the terminal also. A poor job of soldering and the movement of the lead had caused the strands to break off close to the insulation. The heat from the open circuit had melted the compound in the insulation of the wire so that it stuck tight in the terminal. To all appearance the connection was sound and even a hard pull on the lead could not dislodge it.

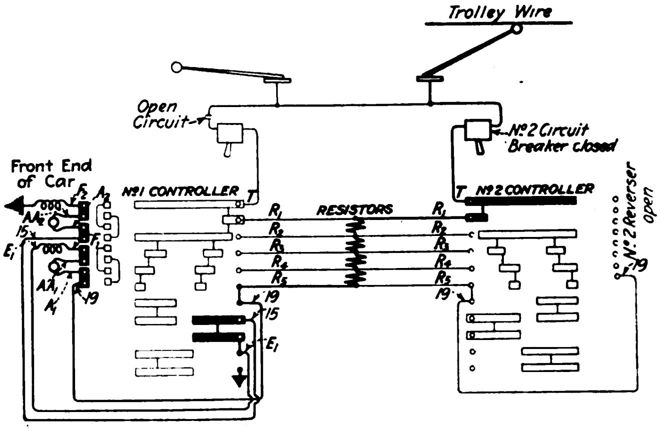
Frequent Derailments Had a Reason

A VERY serious derailment occurred on a trestle of an electric railway system. The car derailed was a single-truck closed type and was one of fifty-six similar cars operated by the company. This particular car had been reported for a number of derailments at curves previously and apparently was the only one having trouble of this nature. While to all appearances this car was the same as the others of its class, still it was evident that there must be some uncommon condition existing on this car different from the others of this type to cause the trouble. In checking up the record of the car it was found that the derailments had started shortly after the car was last overhauled. This led to the theory that some of the truck parts had been improperly reassembled. The car body was jacked up from the truck, and all parts of the latter were carefully examined. The truck was a Brill No. 21 E with the motor suspension bars resting on springs fastened to the side frames by suspension bar bolts. The inside faces of the motors were bolted rigidly to the motor suspension bars. The ends of these bars were slotted to receive the bolts that secured them to the side frames and to permit limited end play.

Inspection showed that these motor suspension bars had been replaced with new ones at the last overhauling of the car and the new bars had not been slotted to provide for the necessary end play. As a result, derailments were frequent and one proved most unfortunate.

Operating a Car from the Front Controller with the Circuit Breaker on That End Out of Service

DURING lunch hour at one of the shops of a large Eastern railway the men were telling of their various experiences in bringing in disabled equipment off the road. The controller repairman told of an interesting experience where the lead running from the trolley base to the circuit breaker had burned off. "Brought the car in by operating from the front end of the car where the lead was burned off and without making any temporary connections," he said. "How did I do it?" No one was able to tell how it could be done, so the controller man took them all out in the yard and showed them that it could be done.



SIMPLIFIED DIAGRAM OF CAR CONNECTIONS

The "stunt" used by the repairman is best illustrated by referring to the accompanying diagram, which shows simplified connections for the car equipment. The trolley pole on the rear of the car was used in the usual manner and the circuit breaker on the rear end was closed instead of the one on the front. Next the reverse drum in the rear platform controller was turned backward to an open-circuit position. This allowed the main drum to be operated and still kept the circuit to the motors open. The main drum of the rear controller was then placed in the first resistance position. Then by going to the front end of the car and throwing the reverse drum of No. 1 controller ahead and putting the main drum on the first point the motorman established a circuit from the trolley through the circuit breaker No. 2 on the rear end to the trolley finger in controller No. 2. From this T-finger current passed to the R-1 finger through the drum contacts of No. 2 controller and through the grid resistors to the No. 19 finger of the reverser in No. 1 controller. With No. 1 reverser thrown, current passed through No. 1 motor and through contacts E-1 and 15 to No. 2 motor and to ground. The circuit was thus established through the motors and the various steps of the resistors could be cut out as usual by operating No. 1 controller.

SECOND AND BROADWAY, GARY, IND., WITH SAFETY CAR IN FOREGROUND

Safety Cars in Gary Make Jitneys Unprofitable

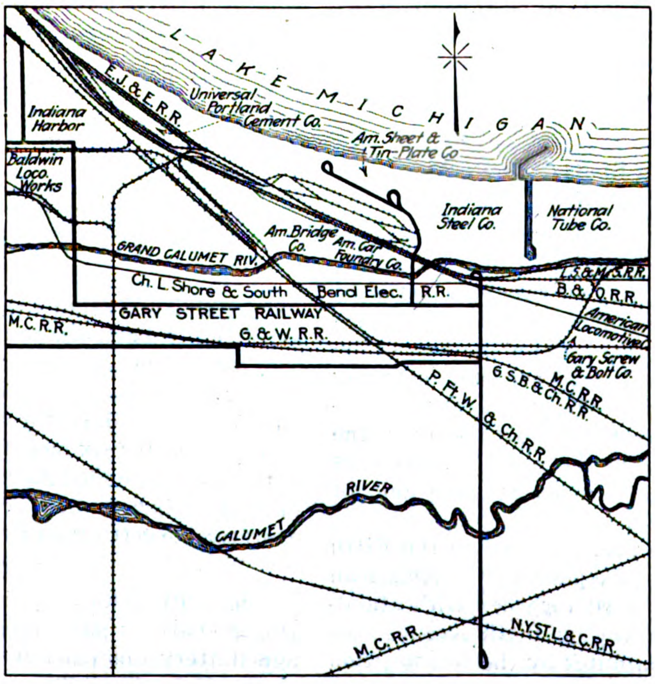
The Gary (Ind.) Street Railway Installed Ten Safety Cars on Feb. 2 on Its Line of Heaviest Traffic and Increased Car-Miles by 62 Per Cent with Gratifying Results

GARY, IND., is a city of 75,000 population. Within the city limits and surrounding territory are the United States Steel Corporation plants of the Indiana Steel Company, American Bridge Company and American Sheet & Tin Plate Company, and the plant of the National Tube Company under construction. These industries employ at present about 17,000 men and during the pre-armistice period employed approximately 21,000. During the past year the Gary Street Railway has ordered rolling stock to the extent of doubling its equipment due to the extraordinary war activity in its territory. Ten Birney safety cars were purchased. Of these eight were placed on the Broadway line serving the Indiana Steel Company. This company employs about 12,000 men and approximately 7000 of these are released at the street railway terminal at Second and Broadway between 5.30 and 6.00 p.m.

JITNEYS REDUCED BY A THIRD

Safety-car service was inaugurated on Feb. 2, after a week's publicity work through the local newspapers. The men were trained on the Fifth Avenue line on cars operated without passengers. The new cars on the Broadway line completely equip it for ordinary service and replace five 23-ton double-truck cars. A headway of seven and one-half minutes had been maintained on this line formerly with the exception of the last few months, when it has been impossible to keep up the service due to a lack of men. As a result the jitneys secured an even stronger hold on the traffic than ever before and prior to Feb. 1 about 100 jitneys were operating on Broadway.

With the new cars the headway was reduced to five minutes during the day. During the rush hours from 5 to 9 a.m. and 4 to 8 p.m. this service is supplemented by two-man-car tripper service, further reducing the headway to three and one-half minutes. To-day but about sixty-five jitneys are operating with much reduced patronage.


LAKE MICHIGAN
E.J.&E.R.R.
Universal Portland Cement Co.
Indiana Harbor
Am. Sheet & Tin-Plate Co
Baldwin Loco. Works
Indiana Steel Co.
National Tube Co.
Am. Bridge Co.
Am. Car Foundry Co.
GRAND CALUMET RIV.
L.S.&M.S.R.R.
Ch. L. Shore & South Bend Elec. R.R.
B.&O.R.R.
GARY STREET RAILWAY
M.C.R.R.
G.&W.R.R.
American Locomotive Co
Gary Screw & Bolt Co.
G.S.B.&Ch.R.R.
M.C.R.R.
P.Ft.W.&Ch.R.R.
RIVER
CALUMET
M.C.R.R.
N.Y.St.L.&C.R.R.

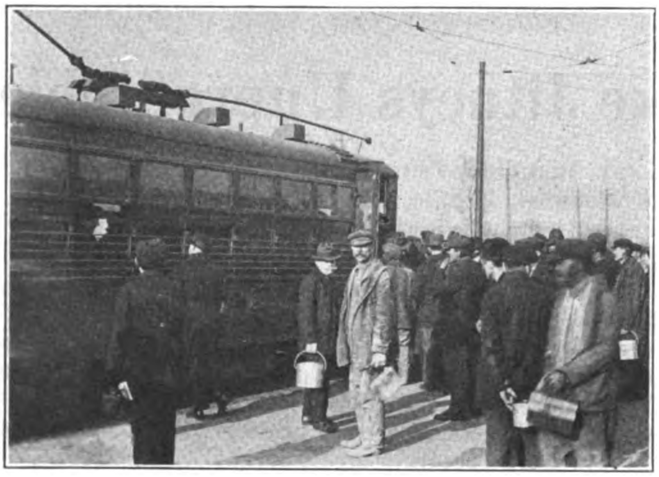
MAP OF GARY STREET RAILWAY SYSTEM SHOWING SAFETY CAR LINE

GRADE CROSSINGS ARE NO OBSTACLE

The Broadway line is straight for 5 miles and is double track for practically the entire distance, as is shown on the accompanying map. At one end it loops in front of the Indiana Steel Company's plant. Thence it passes through the heart of the business district of the city, extends beyond into what is considered one of the best residential sections of the city. Along the line are transfer points to all other lines. This line receives all classes of traffic amounting to an average of approximately 10,000 passengers per day. There are seven separate grade crossings on the Broadway line. Three of these are double track, main-line steam railroad crossings, one is a double-track electric interurban crossing and the others are single-track steam road freight and passenger crossings. These have not interfered with the service, however. The safety-car operator flags himself across by bringing his car to a stop, going upon the crossing and observing in each direction before proceeding, except during the rush hours when a flagman is stationed at each crossing.

GARY CARS WEIGH 13,000 LB.

The cars used at Gary are the standard Birney type. They were furnished by the American Car Company. They are equipped with two GE-258 motors, K-63 control and General Electric air brakes, and Gurney ball bearings. The total weight is 13,000 lb. The platform for the trolley base as used on many of the safety cars is not used here but one a few inches high and built up especially in the railway shop has been installed so that a 14-ft. pole could be used. This was necessary to take care of the greater height of the trolley wire at railroad crossings. The cars are arranged for double-end operation.



INDIANA STEEL COMPANY EMPLOYEES BOARDING CAR AT SECOND AND BROADWAY TERMINAL, GARY

BETTER SERVICE IS REFLECTED IN GREATER EARNINGS

In January, 1919, the last month under the old operation, the Broadway line operated 954 car-miles a day. In February with the new equipment this was increased 62 per cent, to 1,537 car-miles. The car-hours were increased 70 per cent. In spite of these increases, the power consumption was decreased 20 per cent including that used for heating the cars. The gross earnings increased 16 per cent, which is attributed entirely to the increased service resulting from the use of safety cars and if maintained will result in a net revenue gain of more than $40,000 per annum.

One of the safety cars was also installed on the Fifth Avenue line which operates to the plant of the American Bridge Company but this is used together with standard two-man cars. The headway on Fifth Avenue was reduced from twenty to ten minutes by the introduction of the safety car.

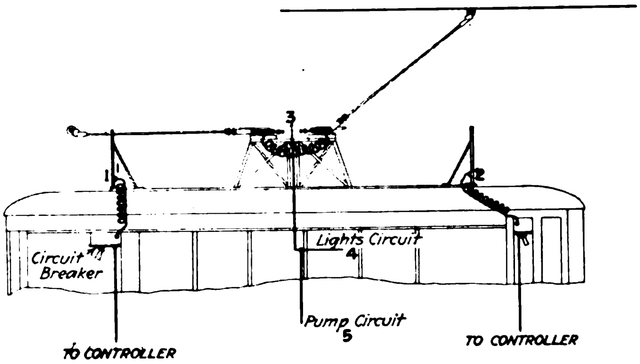
The men are pleased with the new cars for they receive a 10 per cent increase in their pay, making their wages approximately 50.6 cents per hour. The public and the city authorities are also pleased. The latter is indicated by the fact that when the Central Labor Union tried to get an ordinance through the council compelling the use of two men on the cars, due to grade crossings, etc., the proposal was immediately rejected.

Connections for Insuring Proper Position of Trolley Poles

BY C. H. COPLEY
Superintendent, Springfield Traction Company, Springfield, Mo.

PREVIOUS to the use of one-man cars by our system all our cars were equipped with one pole and were operated by two men. The changing of the trolley pole at the end of each trip was part of the duties of the conductor. When we changed to one-man operation considerable trouble was experienced due to the operator forgetting to pull down the front pole when changing ends. As a result, when the car was started up this front pole would catch in the overhead work and frequently tear the trolley wire down.

In order to make it necessary to pull down the front trolley pole before these cars could be operated, I arranged the wiring as shown in the accompanying diagram. With these connections it is impossible to operate the car unless the proper pole is on the wire. Instead of connecting circuit breakers to the trolley base these were connected to a hook at each end of the car. The two trolley bases were joined together by a jumper, and with the trolley pole on the rear end of the car in position on the trolley wire and the pole on the front end of the car under the hook, a circuit was established from the trolley wire through the rear and front trolley poles to the hook and then to the circuit breaker at the operating end.



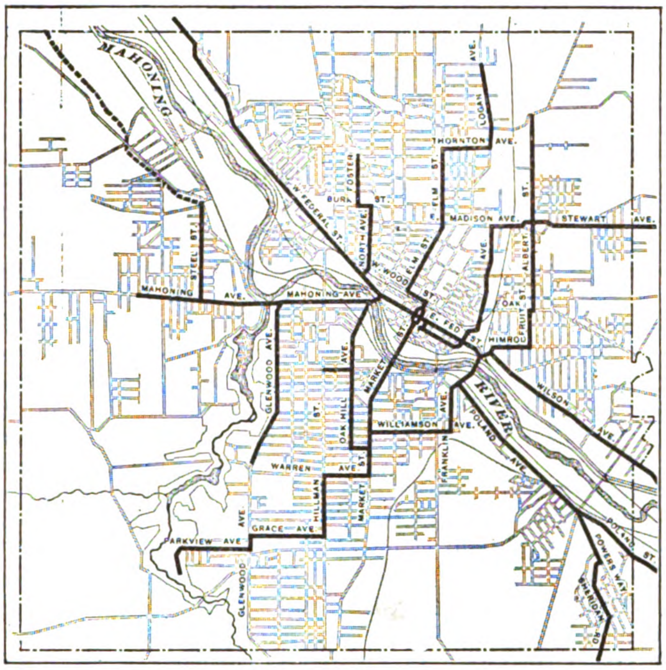
METHOD OF CONNECTING THE TWO TROLLEY POLES OF A SAFETY CAR SO AS TO INSURE THAT THE FRONT TROLLEY POLE IS DOWN BEFORE THE CAR IS OPERATED

This method of connecting the trolley poles has been adopted as standard for all our lines and has now been in operation for six months. During this time no trolley wire has been pulled down, no poles have been bent, nor have any delays been caused to the service by the operator forgetting to place the right pole on the wire.

The United Railway of Yucatan has received three storage-battery passenger cars from the Railway Storage Battery Company for use between Merida and Progreso, 23.6 miles. The total weight of the car equipped and with storage batteries is about 37½ tons, and it seats sixty-six persons.

Relieving Congestion at the "Diamond" in Youngstown

Company and Transit Commission Are Co-operating to Reduce Time Loss and Accident Hazard at Central Square


MAHONING
RIVER
THORNTON AVE.
LOGAN AVE.
FOSTER
BURR ST.
W. FEDERAL ST.
NORTH AVE.
ELM ST.
E. MADISON AVE.
STEWART AVE.
ST.
AVE.
ALBERT ST.
FRUIT ST.
OAK
HIMROD
E. FED. ST.
W. WOOD ST.
MAHONING AVE.
STEEL ST.
GLENWOOD AVE.
MARKET ST.
OAK HILL AVE.
WILLIAMSON AVE.
FRANKLIN AVE.
POLAND AVE.
WILSON AVE.
WARREN AVE.
HILLMAN ST.
GRACE AVE.
PARKVIEW AVE.
GLENWOOD AVE.
POLAND ST.
POWERS WAY
SHERIDAN RD.

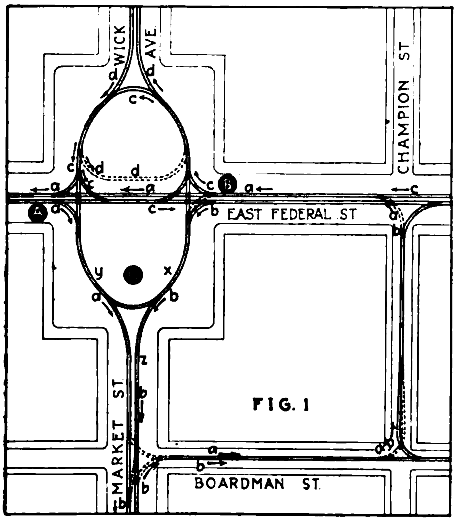
RAILWAY LINES IN YOUNGSTOWN, OHIO

As in most cities, traffic conditions in Youngstown, Ohio, are complicated by the desire of the patrons to be brought directly to the business center, locally the public square or "Diamond." Unfortunately, this square is small, being but 365 ft. x 220 ft. from curb to curb. It is divided into two equal plots by Federal Street, permitting a figure-8 track loop. (See Fig. 1.) All city lines, *i.e.*, those of the Youngstown Municipal Railway, come to this point as well as all of the Mahoning & Shenango Railway & Light Company's interurban lines except the Sharon line. The accompanying diagram of the loop shows in solid lines the existing track, and the map shows the relation of the loop to the city lines.

All loading and unloading in the loop is done on Federal Street. The lines which enter at *A* and use the north section of the loop are Mosher, South Side, Ohio Works, Glenwood Avenue, Mahoning Avenue, North Avenue and Woodland, and Girard and Warren interurban. At *B* the following enter, using the north section: Albert Street, East Youngstown, Poland Avenue and Poland Street Railway, as well as the Newcastle interurban. During the rush hours eighty-four city cars (three with trailers) and twenty-four interurban cars (eight with trailers) go through the loop between 5 and 6 p.m., and in the half hour from 6 to 6.30 there are fifty-three city cars (two with trailers) and eleven interurban cars (four with trailers). The congestion during this period is obviously very great.

So much for the conditions at the "Diamond." The vital question to the company and to the transit commissioner, Hon. William L. Sause, is how to relieve the congestion. Some things have been done; others are in process or in contemplation. One plan is to minimize the time required for loading in the loop. On the Youngstown-Warren interurban line, where Peter Witt

NORTH SECTION OF CENTRAL SQUARE OR "DIAMOND," YOUNGSTOWN, OHIO front-entrance, center-exit cars are used, this is accomplished by opening both entrance and exit doors in the loop and not attempting to collect fares in the city limits as the passengers pass the conductor. On Feb. 1 under the direction of Mr. Sause the Park and Falls line, which reaches the loop by way of Market Street, was removed from the loop proper and arrangements were made to "wye" the cars at point *C*, Fig. 1, in the manner shown in Fig. 2. The cars proceed northbound to point *x*, Fig. 2, unload their pasesngers, back to point *y* without reversing the trolley poles, load at point *y* and proceed southbound. The main objection to this plan is that cars must back against street traffic in a section where traffic is congested, particularly during the rush hours. To prevent accident the city maintains extra traffic officers at this point.



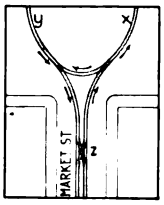
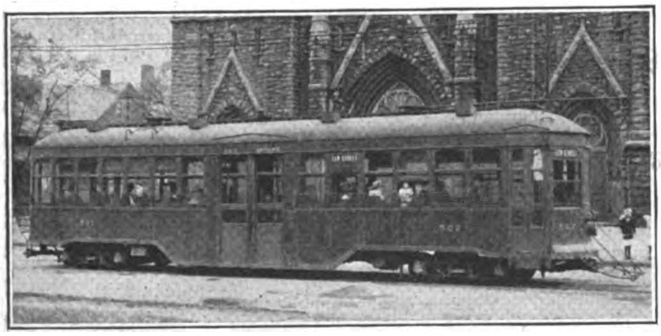


FIG. 1. PRESENT AND PROPOSED TRACK AROUND THE "DIAMOND," YOUNGSTOWN

FIG. 2. "WYING," THE PARK AND FALLS LINE CARS, YOUNGSTOWN

Mr. Sause proposes to locate a double crossover at point *z*, Fig. 2, to permit northbound cars to proceed directly to point *b*, where they would unload, then backing to point *x* (with traffic) for loading. This crossover involves a cost of about $7,500 and it may be installed when finances permit. In the meantime no serious accidents have occurred at the "wye."

For ultimate solution of the "Diamond" problem, J. B. Stewart, Jr., superintendent of the city lines, proposes the extension of the loop to include East Federal, Champion, Boardman and Market Streets, as shown in Fig. 1, in which the necessary new track is indicated by the dash lines. Under this plan there are four routes through the business center as indicated by the arrows and lettering in Fig. 1. One group of lines (Mosher, North Avenue, South Side, Woodland, Ohio Works, Mahoning Avenue and Glenwood Avenue) enter via West Federal Street and make the large loop as indicated by the letter *a* and arrows. The second group contains the Park and Falls line, which "wyes" as now (see *b*). Group 3, which can be traced by letter *c* and arrows (East Youngstown, Albert Street, Poland Avenue and Poland Street Railway) enter from East Federal Street and round the northern half of the old figure 8. The fourth group contain the Elmwood line for which a new loading and unloading track is provided as indicated by letter *d*.



STANDARD CITY CAR, YOUNGSTOWN

The rearrangement described would cost possibly $75,000 and it is not expected to be feasible for some time.

Institute of Metals on Condenser Tube Corrosion

THE Institute of Metals, of Great Britain, held its annual meeting in London near the end of March and received the fourth report of the corrosion committee. A quite important part of the report is concerned with the corrosion and the protection of condenser tubes. The report extends to great length, much research work is reported and many very technical points are discussed. The oral discussion by high officers of the British Navy and by condenser tube manufacturers added greatly to the breadth and scope of the treatment of the subject. But aside from the considerable prominence given to a preoxidizing process (in which it seems the Admiralty has long been interested) and the emphasis put upon the significance of full recognition by the manufacturers of their responsibilities during the making of tubes, seemingly nothing of commanding importance was brought out. Very little was conclusively established.

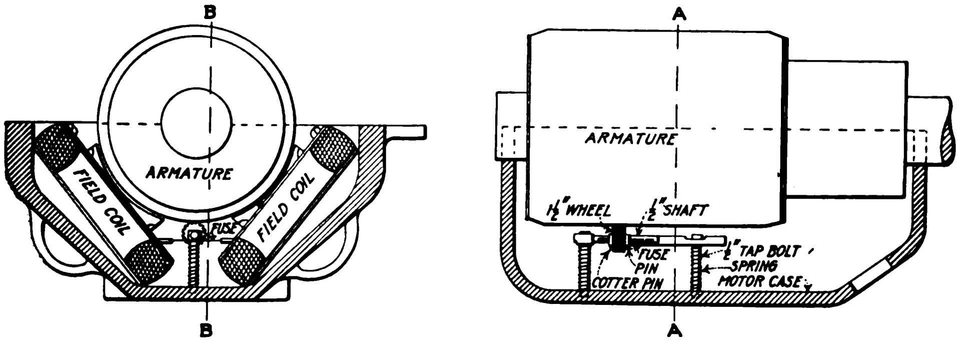
The methods used in the investigation and the tentative results presented appear not distinguished by practicality. From this aspect the whole discussion is far less impressive than the symposium on the cracking and corrosion of brass presented last June at the annual meeting of the American Society for Testing Materials. And indeed one of the most remarkable features of the British report is the lack of any reference to the really notable recent American work. It is true that in the oral discussion a British condenser tube manufacturer did refer to a change in his practice adopted because of American research work. And it is perhaps more interesting still to point out that this very change in his practice, the heat-treating of the tubes, has striking similarity to the means by which the preoxidizing process is effected, namely, the heating of the finished tubes in an oxidizing atmosphere for half an hour in the temperature range of 500 to 570 deg. Fahr. Recent American investigators feature annealing the finished tubes at temperatures somewhat higher than those just mentioned, and oxidizing has not attracted attention. The basic similarity, however, is striking.

The Federal Board for Vocational Education reports on May 5 that among the disabled soldiers now undergoing the re-educational process there are twenty-four studying architecture; thirty, chemistry; twenty-one, dentistry; fifty-eight, drafting; 178, engineering; two, foreign trade; nine, journalism; seven, languages; sixty-eight, mechanical drawing; eight, music; two, optical work; forty-nine, law; eight, teaching; four, theology; three, veterinary medicine; eight, wireless telegraphy.

New Device Prevents Rubbing of Armature on Pole Faces

A PATENT has been issued to Walter B. Uffert, New York State Railways, Rochester Lines, Rochester, N. Y., for a device to prevent an armature from rubbing on the pole pieces due to worn bearings, sprung shafts, hot bearings or other causes. It can be installed in either the older types of motors or the more modern interpole motors.

The device as shown in the accompanying illustration consists of a small grooved brass wheel mounted so that it will rotate. The wheel is equipped with a side contact which will make contact on the under side with a bare field jumper. This jumper can be either a bare wire or a strip of copper as is necessary to meet conditions. When the armature clearance is reduced to a dangerous point the laminations of the armature will come in contact with the small brass wheel, causing it to turn, and make contact with the field jumper. The contact of the laminations of armature with the small wheel will ground the wheel, which in turn will ground the field jumper, burning this off, and opening the motor circuit.



FUSE BREAKING DEVICE FOR MOTORS

Three cars in Rochester, one in Syracuse and one in Utica, are equipped with this device. In Rochester there have been four successful tests, where armatures were saved. In two of the cases the bearings were worn out, one had hot armature bearings, and one had a sprung armature shaft. In all these four cases the circuit of the motor affected was opened and the armature saved without injuring the other motor connections. These tests took place in GE-54, GE-80 and GE-67 motors.

Car Equipment Notes from Belfast

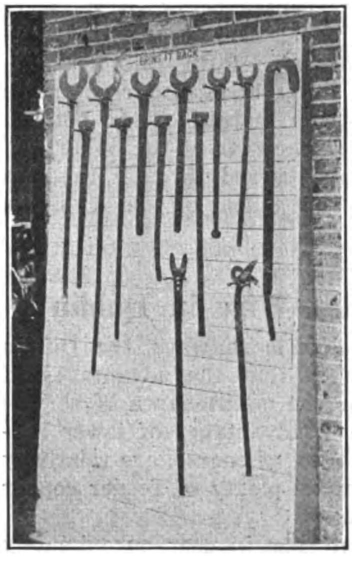
IN CONNECTION with the article on Belfast practices with "Steel-Tired Wheels and Axles," by H. Vernon, published elsewhere in this issue, the following supplementary notes made during January, 1919, may be of interest:

The steel-tired wheels now in use are of Baker manufacture, of 31¾-in. diameter, new, and 28½-in. diameter when retired after making 70,000 miles. With a 28½-in. car wheel the distance between the ground and the platform step is only 8 in. Axles are of ordinary steel, but heat-treated metal will be used when it becomes obtainable. Because of the poorer quality of gas obtained lately, it takes fifteen instead of twelve minutes to shrink on tires. British Westinghouse gears are now standard, but Belfast has always enjoyed long gear life, not more than 100 gears having been scrapped in the thirteen years of the Tramways' existence. This is an average of 0.026 gear per car per annum on the basis of 23,000 to 24,000 car-miles per car per annum.

Careful maintenance of bearings in line to avoid backlash is given as the secret of long life of gears so far as the user is concerned. Pinions recently delivered have been of unusually poor quality because of war conditions and average only nine months' life.

The standard trolley wheel is 4 in. in diameter and includes 1½-in. x ⅞-in. x ½-in. graphite bushings, both made by Fleming, Birkby & Goodall. The average wheel life is 6000 miles, of which 1000 miles is ascribed to the returning of the wheels. The flanges are restored to the original contour as soon as the grooves become too deep for safety in running under frogs and other special work. Trolley wheels are operated under a tension of 22 lb., the tension adjustment being definitely secured by a weight instead of spring regulation, which is considered less reliable. The graphite bushings are usually good for two wheels. For the motors, which are Westinghouse No. 200, 35 hp., Le Carbone brushes are used, Belfast's standard for thirteen years. Every car depot is provided with spring scales to see that the prescribed tension of 4 lb. to 5 lb. per square inch is maintained. The brushes average about six months life.

Conserve Workmen's Time by Having a Place for Every Tool



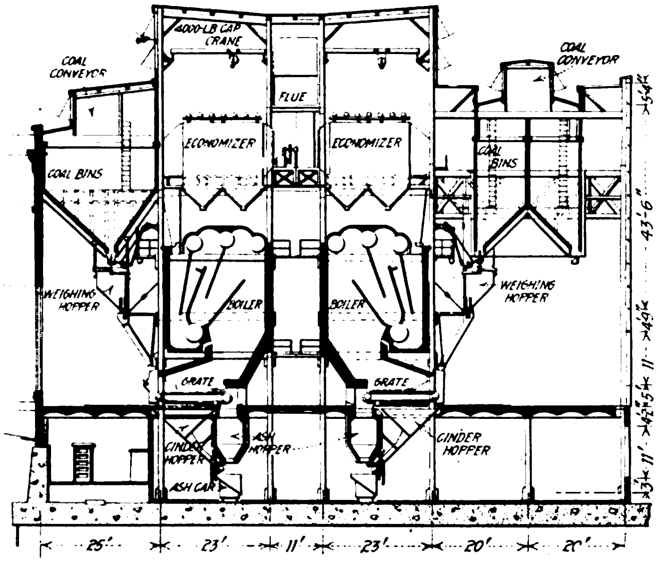
BOARD FOR SPECIAL WRENCHES AND LARGE TOOLS

THE many different special wrenches and large tools necessary in an electric railway shop for truck overhauling and where pit work is being done makes it a problem not where to put the tools but where to find them when wanted. In the shops of the Winnipeg Electric Railway much time of workmen has been saved by providing a tool board or rack for such tools in a convenient location. The front of this board is painted a light gray color and the exact outline of each tool is painted in black on the board so that the workman always knows where the tool belongs and can readily place it in its proper position. An accompanying illustration shows this board. No tools were on it at the time the photograph was taken. The brief instructions at the top of the board, "Bring it back," are very significant. They serve as a constant reminder to the workman every time he passes the board that tools have a proper place.

New Furnace Design

A Cleveland Company Puts the Stoker Under the Mud Drum in Order to Get the Desired Gas Flow

IN THE 1918 addition to the Lake Shore station of the Cleveland (Ohio) Electric Illuminating Company a new furnace design has been worked out. Its essential features are shown in the accompanying cross-section. Chain grate stokers are used, and instead of being placed in the usual way under the front of the boiler they are installed in the rear under the mud drum. An igniting arch extends under the mud drum, which sits rather high, its center being 15 ft. 8 in. above the floor line. The boiler baffling is of the type known as "Four-pass baffling." With this arrangement the gases in passing through the boiler enter the first bank of tubes at the top instead of the bottom. This puts the uptake also at the rear of the boiler and permits the gases that have passed through the two banks of economizers to be taken off in a single centrally located flue.



STOKER SET UNDER MUD DRUM OF BOILER WITH FOUR-PASS BAFFLING

Extra-Wear Trolley Wire in Dublin

LIKE many American electric railways, the Dublin United Tramways realize that the advantages of extra-wear trolley wire for the maintenance of service on busy streets offset the disadvantages of lower conductivity. Such disadvantages, of course, are relatively small when there is in parallel plenty of feeder copper which never wears out.

At this time the company has in use approximately 62 miles of Phono-Electric trolley wire, comprising 10 miles of No. 0, 50 miles of No. 00 and 2 miles of No. 000. This is more than one-half of the total mileage of 110 miles. In addition, the company has recently erected 10 miles of No. 00 phosphor-bronze wire to replace No. 0 Phono-Electric wire that had been in service ten years on a line with heavy traffic. This is the first Dublin installation phosphor bronze working under severe traffic conditions, so that it is not possible to forecast the results.

R. Tanham, electrical engineer Dublin United Tramways, advises further that in general "Phono" has been found to wear twice as long as hard-drawn copper of the same gage. In the matter of breakage, No. 0 and No. 00 have been found superior to copper. The No. 000 size, however, which is installed on Sackville Street, the main traffic artery, does not appear to possess the same freedom from breaks, which occur nearly always at frogs and crossings. This may be due either to some defects in the manufacture of this particular wire or to the unusually severe traffic conditions.

LETTERS TO THE EDITORS

Accurate Track Cost-Accounting Data Are Sorely Needed

BROOKLYN, N. Y., May 14, 1919.

To the Editors:

There never was a time in the history of the electric railway industry when the subject of costs was so important as it is to-day. But although all departments are affected, the tendency seems to be to think and talk only of the cost of platform time, as it naturally bulks large in the payrolls. The transportation department can usually tell at a moment's notice just what the cost for car crews was for yesterday's mileage, and very likely the mechanical people can tell the cost to a nickel for car repair labor on the ten cars put through the shop yesterday. But how many way men can tell the cost for maintaining any particular piece of track? The correct answer to this inquiry is probably "very few indeed," yet if it is important to know just what platform time and car repairs are costing, it is just as important to know what the maintenance cost is for track. True, we can probably find the cost from the comptroller's accounts for the heterogeneous lot of tracks entire with which most roads are blessed, but it is next to impossible to get any information in detail as to where the money was spent and, what is more important, why.

When the maintenance of way engineer asks for accounting in sufficient detail to secure this information he generally is told that it either can't be done or that it would cost too much. So he must continue to make a guess as to where the money goes. On the other hand, no modern manufacturing plant could be run a week, successfully, if its management failed thoroughly to analyze the cost details in every department, and such plants spend money gladly for the purpose of keeping accurate costs.

Records of construction and reconstruction costs for tracks on electric railways are fairly plentiful, and if they were not, it is a comparatively simple problem to estimate them. On the other hand, track maintenance cost records which have any value even on one system are almost as scarce as hens' teeth. Only once have we seen any such thing which we felt could be called dependable.

In view of the fundamental desirability of knowing the truth about costs, it would seem a most appropriate time for the Accountants' Association and the Engineering Association jointly to revive the subject of maintenance cost accounting with particular reference to the matter of track maintenance costs, because money spent in accurately determining the cost of maintaining the several types of track on any one system will more than repay the expenditure if it assists, as it surely will, in settling the question of what type of track is the cheapest to maintain on that property.

WAY ENGINEER.

Welding Special-Alloy Steel Rails

METAL & THERMIT CORPORATION

NEW YORK CITY, May 14, 1919.

To the Editor:

I was very much interested in your editorial entitled "The Relation of Rail Steel to Rail Joints on Electric Railways," published in the issue of May 10, but cannot but feel that the conclusions which you draw are just the opposite of what they should be if we are to look at the matter solely from the point of view of the best interests of the street railway companies. Instead of investigating the "relation of chemical analysis and details of manufacture of rails to the suitability of steel for adaptation of the several forms of joint welding now current," the object should be to adjust the welding processes so that successful welds can be made on the best steel for street railway purposes. This naturally implies first a careful investigation into the wearing quality of different kinds of rail steel and I have no doubt that in the end it will mean the adoption of a special alloy rail steel.

When a rail steel has been determined which will give the longest life in street railway service, the next step is to find a welding process which will weld the rails together so effectively that the life of the weld will be the same as that of the rail itself; nothing less than that should be considered.

Special-alloy rails are already coming into quite general use but there is no question also that they are the ones which are giving the greatest trouble from the point of view of most of the rail welding concerns. This difficulty not only can be overcome, but in my opinion has already been overcome, by at least one process which successfully welded a great many joints on Mayari steel rails in 1915. These, as your readers perhaps know, are a special-alloy rail containing nickel and chromium; the elements in question being contained in the ore which is mined in Cuba. The rails are considerably harder than ordinary steel rails and a much longer life is claimed for them. When it came to welding these rails, however, it was found absolutely impossible to do so by many well-known processes. One, however, was found to be entirely suitable, with the result that the joints welded four years ago as still in perfect condition.

With instances such as these in front of us, proving conclusively that special-alloy rails can be successfully welded, there certainly can be no occasion for reducing the quality of the steel or softening the rails simply to favor those welding processes which cannot successfully weld these alloy rails at the present time.

WILLIAM R. HULBERT,
Sales Manager Thermit Department.

The United Railways of St. Louis, Mo., is using the backs of transfers for carrying a safety message. A series of special illustrated advertisements is used for this purpose.

AMERICAN ASSOCIATION NEWS

Oct. 6-10 the Big Week

THE thiry-sixth annual convention of the American Electric Railway Association will be held at Atlantic City, N. J., on Oct. 6 to 10, 1919, on Young's Million Dollar Pier.

A convention committee has been appointed as follows: L. S. Storrs, New Haven, Conn., chairman; C. L. Henry, Indianapolis, Ind.; J. J. Stanley, Cleveland, Ohio; T. W. Wilson, Wilmington, Del.; E. P. Waller, Schenectady, N. Y., C. R. Ellicott, New York, N. Y., and L. E. Gould, Chicago, Ill.

This will be the first convention held since 1916. The armistice has been signed, the country is returning to peace conditions and a large and enthusiastic attendance is assured. The program will be selected with special reference to the needs of the industry, and the subjects to be considered will be of interest and value.

An exhibit will be held in connection with the convention, and detailed announcements as to arrangements in this connection will be issued later. The exhibit committee intends to make this feature of the meeting of special importance and value. The necessity of improved and economical methods of operation is known to every railway man, and the committee has in mind a visual presentation of modern economies covering both devices and methods.

Toledo Section Has 998 Railway Members

AT THE request of the editors of this paper D. H. Shapiro, assistant secretary Toledo Joint Section, has compiled a table showing the distribution of the membership of 1502 among departments and national associations. Excluding twenty-eight associate members who are not affiliated with particular societies, the active membership of 1474 divides thus: American Electric Railway Association, 998; National Electric Light Association, 426; National District Heating Association, 31; American Gas Association, 19.

The railway members are well distributed among the electric railway sub-departments and the heating and electrical departments as well. Mr. Shapiro attributes the large railway membership to the fact that a very considerable percentage of the employees are engaged in railway work. In addition it is possible that the small fee charged by the railway association has something to do with this.

Bulletin on Labor Turnover

A bulletin just issued by the United States Training Service of the Department of Labor, C. T. Clayton, director, Washington, D. C., contains a number of suggestions regarding the reduction of the labor turnover in the industries. Much of the blame for the turnover is laid at the door of the employer, the principal factor being the failure to obtain from workers a full measure of efficiency. Six reasons assigned for reduction in efficiency are: (1) Power failure; (2) failures of equipment and repairs and like limitations; (3) lack of instructions; (4) lack of training; (5) failure to supply material, and (6) personal slacking.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

A Railway for One Dollar

A Proposition That Ought to Satisfy the Most Truculent Advocate of Municipal Ownership

The fully equipped and operating electric railway at Merrill, Wis., has been offered to the city for the moderate consideration of $1 by the Wisconsin Valley Electric Company of Warsau. Except for a variation here and there, the property at Merrill has gone over the same route toward abandonment that the electric railways in many other small towns have traversed. The plan is to turn the road over to the city for operation with power supplied from the plant of the electric company. In the event that the city should decide to abandon service, the equipment would be turned back to the electric company for sale as junk.

HISTORY OF COMPANY

The franchise to operate in Merrill was granted on Dec. 9, 1889, for a period of thirty years. It was accepted on Dec. 30, 1899. The franchise accordingly expires on Dec. 30, this year. The enterprise has always been a financial failure. Nothing has been realized on the actual investment. Things were made worse for the company with the coming of the automobile. As an experiment 7-cent fares were put in with the approval of the local citizens and the Railroad Commission of Wisconsin. After four months' experience with the new fare the extra charge has not resulted in any increase in gross receipts. The loss for the current year is estimated at $5,000. Under these conditions the company will not ask for an extension of its franchise. Accordingly the company has written to the Mayor and Common Council to the effect that if it is desired by the city that the line should continue in operation it will be necessary for the city to operate the road after that date and thus absorb the deficit. The actual offer of the company as contained in the communication to the Mayor and Common Council is as follows:

> In view of the possible desire of the city to continue this operation and our desire to co-operate with the city in every reasonable way possible, we have, therefore, decided that we will offer this property to the city of Merrill for the consideration of $1. Such offer to be conditioned upon the city operating the line for at least a reasonable period and the property so offered to consist of all tracks, trolleys, cars, tools, etc., now used and useful in the operation of the line, but not to include any real estate or power-house equipment. We will, of course, furnish the necessary power for operation at reasonable rates, and in the event of acceptance on the part of the city, we are, of course, to be relieved of all future responsibility or expense of every kind or nature with reference to this property, exclusive of the obligation to furnish the necessary power as above stated.
>
> We are, therefore, bringing this matter to your attention at this time, so that it can receive your careful consideration in ample time for you to take such action as may seem best in the matter, before the expiration of our franchise on the date herein named. This property, of course, has a considerable value as a scrap proposition to this company, but before considering the sale of the property for this purpose at this time, we prefer to make an offer of a donation of the use of same to the city.

Commission Reorganization Program Completed

Governor Smith of New York has completed his legislative program for the reorganization of the Public Service Commission for the First District (Greater New York) by signing the second Foley bill which creates the office of Transit Construction Commissioner to administer subway and elevated construction work in the Greater City.

The first Foley bill, wiping out the five-headed commission which administered both construction and regulatory functions and substituting a single commissioner, with only regulatory duties, was signed recently and its approval was accompanied by the appointment of Lewis Nixon as commissioner.

The second bill was not accompanied by an announcement of who should fill the place and under the terms of the measure the Governor has twenty days to make the selection. The post pays a salary of $15,000 a year, and there is to be one deputy at $7,500.

Insist on Eight-Hour Day

Motormen and conductors of the Seattle (Wash.) Municipal Railway are taking steps to enforce the strict eight-hour day, with time and a half for all work in excess of eight hours.

The men have gone on record as unanimous in their demand for the strictly eight-hour day, and have taken action to enforce their demands by a strike if their claims are not allowed.

The trainmen also demand that as far as they are eligible the former employees of the railway division of the Puget Sound Traction, Light & Power Company, which the city purchased, be taken over by the city in a body, as they were given to understand would be the case. This latter demand will be taken care of by the city.

Thomas F. Murphine, superintendent of the municipal railway, is making an effort to work out new schedules to make all the runs come within the eight-hour day. He claims that the utilities department has no authority to pay the men time and a half for overtime. The men are now paid the regular rate for overtime, but the controversy is over the difference between straight time for extra work, and time and a half.

Chicago At It Again

Faint Hope That Enabling Legislation May Be Secured Looking Toward Traction Settlement

The first meeting of the local transportation committee of the City Council of Chicago, Ill., held on May 7, resulted in the speeding of plans for a settlement of the traction problem. This matter has been neglected since the tentative ordinance was defeated by the voters last November. Three bills for enabling laws have gone to the Legislature and two others are under way.

ALDERMAN PRESENTS PLAN

Negotiations with the companies are to be based on a plan suggested by Alderman U. S. Schwartz. His proposal contemplates a new municipal corporation which would have debt-creating power and the authority to issue securities for acquiring the railway properties. Through a board of control these securities would be offered for the existing bonds of the companies, and having additional security of the municipality behind them a lower rate of interest, perhaps 4½ per cent, would be possible. Thus the financing of the properties would result in reducing the fixed charges about $1,000,000 and the board would be less likely to require a raising of the rate of fare to pay the cost of service. It was suggested that the board should have a majority of members appointed by the City Council and the rest by the investors and the employees.

Walter Fisher, special counsel for the city, did not take kindly to the Schwartz plan, saying it probably would meet many obstacles in the Legislature and in the courts. He thought that previous decisions of the State Supreme Court indicated an unfriendly attitude toward such proposals, which would tend to increase the city's debt limit. However, the committee decided to seek enabling legislation so that time would be saved if an agreement can be reached with the companies on such a basis.

LEGISLATION SOUGHT

The three bills already filed at Springfield provide for authority to combine the surface and elevated roads; additional power for the city to build subways and for the city to lease and operate transportation lines. The Legislature will also be asked to create such a municipal corporation as the Schwartz plan contemplates and to give the city power to change rates of fare independent of the State Utilities Commission. Quick action will be necessary inasmuch as the Legislature is expected to adjourn about June 1.

Cleveland Railway's Franchise Renewed

Service-at-Cost Grant Extended for Ten Years—Changes That Were Made Are Explained

In renewing the franchise of the Cleveland (Ohio) Railway on April 7 the City Council extended its life for a period of ten years, from May 1, 1934, to May 1, 1944. As a matter of fact, the ten-year extension was the primary purpose of renewing the ordinance, since the franchise under which the company was operating provided that whenever the grant or any renewal thereof had less than fifteen years to run, the company would have a right to fix, charge and collect the maximum rate of fare mentioned in Section 22 of the franchise ordinance. This rate is 4 cents cash and seven tickets for a quarter, with a transfer charge of 1 cent and no rebate. In addition the city would lose control of the schedules and operation. In other words, had the franchise not been renewed before May 1, 1919, the company would have been able to operate under its own policies for the remainder of the franchise term of fifteen years. All rights retained by the city are enumerated in Section 9.

AGITATION FOR SIGNIFICANT CHANGES

While some of the members of the City Council desired to make important changes in the ordinance and Mayor Davis wished to take advantage of the opportunity to secure to the city certain features of control over the road that it does not now possess, the revision includes only such matters as were necessary to comply with ordinances that had been enacted independently from time to time by or as amendments to the original grant. A few portions, which applied only to agreements that have been finally satisfied or to companies which have gone out of existence, were omitted from the new draft.

Up to Section 8 the new ordinance is practically a duplicate of the old grant. This section, which related to the installation of pay-enter cars and the collection of fares has been replaced by the following:

> The company shall continue the most modern system of fare collection by fare boxes or otherwise.

MODERN FARE COLLECTION ASSURED

This gives the company the right to install any modern system that may be considered better than the present or an improvement over the fare-box system now in use.

Section 10 was amended by omitting the following words at the beginning:

> Immediately upon the taking effect of this ordinance.

This provided for the appointments of a street railway commissioner at once, as it stood, and might have resulted in complications. The section otherwise relates to the commissioner and his duties. No other change whatever was made in it.

In Section 16, which relates to the capital value of the company, the figures, applicable when the old franchise was written, have been omitted. The items of which the capital value shall consist are now described as follows in the renewal ordinance:

> (a) The bonded indebtedness of the company as described in amended ordinance No. 16238-A, Section 16, and any renewals thereof and additions thereto, made pursuant to the provisions of said ordinance.
>
> (b) The floating indebtedness of the company represented by bills payable as of March 1, 1919.
>
> (c) The residue of the capital value of the company as fixed by amended ordinance No. 16328-A with such additions thereto as have from time to time been made pursuant to the provisions of said ordinance.

FINDING THE CAPITAL VALUE

The figures mentioned in this section of the old ordinance, it will be seen, are made the basis for finding the capital value of the company. They included the bonded debt at the time, the floating debt, the appraised value of both the properties of the Cleveland Railway and the Forest City Railway, unsecured debts of the two companies, guarantees of one kind and another and a number of other items. Aside from this the section remains as it was.

Section 17, relating to debts of the Municipal Traction Company, was omitted entirely, as they have been discharged. Section 18 in the old franchise becomes Section 17 in the new one, as a consequence of this omission. The numbering of the sections follow this in regular order to No. 36, which was repealed. There Section 37 in the old ordinance becomes Section 35 in the new one.

INTEREST FUND PROVISIONS STAND

No change was made in the section relating to the establishment and maintenance of the interest fund (Section 16, new ordinance) with the exception of increasing the figures for car-mile allowance from 11½ to 19½ cents, to accord with resolutions that have been passed by Council from time to time, as necessity arose. A few lines were revised to improve the diction.

The figures for the maintenance fund in Section 20 (Section 19, new ordinance) were also corrected to accord with resolutions since enacted. They were increased 1 cent per car-mile. It was also necessary to change the references in the different parts of the ordinance because of the slight change in the section numbers. This was done where any section after number 16 was mentioned.

RATES OF FARE DEFINED

Section 21 (Section 22, old ordinance) deals with the rates of fare and to this was added Section 21-A, which covers the war rates authorized on Aug. 3, 1918, which are to continue for six months after the conclusion of the war. As was noted at the time, the action of the City Council provided a sliding scale of rates, as follows:

> Six cents cash, nine tickets for 50 cents, 1 cent for transfer and no rebate.
>
> Five cents cash, five tickets for 25 cents, 1 cent for transfer and no rebate.
>
> Five cents cash fare, eleven tickets for 50 cents, 1 cent for transfer and no rebate.
>
> Five cents cash fare, six tickets for 25 cents, 1 cent for transfer and no rebate.
>
> Four cents cash, five tickets for 20 cents, 1 cent for transfer and no rebate.
>
> After this, the rates named in the original franchise apply.

NEW RATES IN SUBURBS

New rates for the Euclid Avenue line east of East Cleveland are provided for in Section 21-B. Between Ivanhoe and Green Roads, the fare is fixed at 5 cents, but from any point on this line to any point in East Cleveland or in Cleveland, west of East Cleveland, the rate is to be 10 cents. Passengers are entitled to such transfer privileges as may be in force in East Cleveland and in Cleveland.

The first paragraph of Section 23 (Section 22, new franchise) was omitted. This portion described the manner in which the fare schedule should be put into effect and the steps that should be taken in case the interest fund was decreased by it. Since all this became history at the time, the matter was obsolete. The remainder of this particular section of the ordinance is retained as it was.

OTHER SECTIONS OMITTED AS UNNECESSARY

In Section 25 (Section 24, new franchise) the second paragraph providing for the extension of the Lorain Street line to the westerly city limits was also omitted, as that extension has been completed.

The last paragraph in Section 28 (Section 27, new franchise) was omitted, as it merely provided for the expenditure of a certain amount of money immediately after the old franchise took effect and this has, of course, long since been done.

In Section 30 (Section 29, new franchise) the last paragraph, relating to the extension of lines in Collinwood and Newburg City were stricken out, as the provision was no longer deemed necessary.

CLARITY BY CONDENSATION

Considerable superfluous matter was omitted from Section 35 (Section 34, new franchise). The sense of the section was not changed, but rather clarified by the omission. A slight revision was made in Section 43 (Section 41, new franchise) by the omission of the words between the word "expiration" and the word "or" in the third line from the last.

The company's letter of acceptance was changed in form to conform to the fact that there is only one company, while five existed at the time the original grant was formulated. It consisted merely of the omission of all the names except that of the Cleveland Railway.

With the aid of this brief explanation, it is believed that those who have copies of the franchise in its original form may be able to understand the conditions of the new grant without difficulty.

Both Parties Rebuked in Milwaukee

Legislative Investigating Committee Deprecates Company's Delay in Raising Wages and Commission's Dilatoriness in Deciding Rate Case

The special investigating committee of the Wisconsin Legislature, after inquiring into the matter of the strike of Milwaukee Electric Railway & Light Company trainmen on Jan. 1, 1919, has just reported its findings that the cessation of service was the result, on the one hand, of the company's failure to meet the just wage demands of the trainmen and, on the other hand, of the failure of the Wisconsin Railroad Commission to function expeditiously.

No Conspiracy

There was no finding of conspiracy between the company and its men, but the committee remarked that in no case should the commission be coerced into a decision by a party litigant. As to the company's ability to pay higher wages without a fare increase, the committee repeated the admission of the chairman of the commission that the company in 1918 was not earning much over 4 per cent on its invested capital, thereby sustaining the report of Hagenah & Erickson made at the request of the railway employees.

The case before the investigating committee arose as a result of the desire of the Milwaukee company and its Employees Mutual Benefit Association to have higher fares and therefore higher wages. In regard to this association, in which the employees have a gradually increasing influence, the committee report says:

> The company's policy in encouraging this association has largely contributed to bringing about among employees a commendable and general spirit of loyalty to the company and to the service. In and through the association the company management and the employees have come to stand upon a footing of mutual regard, forbearance, respect and confidence, a condition which cannot be too highly commended.
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> During the war period, while the cost of living was constantly rising, the demands for more wages became insistent. In April, 1918, a contract between the company and the association members was made as follows: The company agreed to employ permanently only persons who would become members of the association, and the association agreed to provide the company with a sufficient number of employees. The company agreed to continue its contributions toward the activities of the association, as in the past, and to contribute the services of a medical director to the association.
>
> ### Collective Bargaining
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> The company agreed to treat collectively with the members of the association on matters of wages, to make effective an eight-hour day, to increase wages (when the commission should provide funds therefor) on the basis of increased cost of living since the year 1914 and to adjust wages thereafter each half year, according to the cost of living, and to continue in operation the bonus pension system. It was mutually agreed that the members of the association of each department might elect representatives to a labor adjustment committee for the purpose of adjusting wages and conditions of labor, that the contract might be terminated by either party on six months' notice, that the company should not discharge an employee except for cause and that disputes between the association members and the company should be arbitrated.

After this contract was signed a committee of employees visited the Wisconsin Railroad Commission and endeavored to secure a decision on the November, 1915, petition of the company for increased revenues. Upon the representation of the committee after its return that a decision would be handed down not later than May 19, the company raised wages 10 cents an hour, effective May 1. On June 1 the commission increased the fares but, according to the company's contention, not sufficiently to allow a reasonable rate of return.

The men were only partially satisfied with their wages, and by August they were again agitating for a further increase. The company again applied to the commission for an increase in revenues, it being admitted by all parties in interest that the demands of the men were reasonable. Hagenah & Erickson made an audit for the employees and reported on Oct. 26 that the 1918 revenues amounted to only 3.84 per cent on invested capital and that the men's demands, if granted, would reduce this to less than 1 per cent. A period of inaction followed, although this finding was admitted to be in general accord with the commission's rulings, and the employees ceased work on Jan. 1.

Company Should Have Raised Wages

In regard to this general situation the legislative investigating committee now says that it was the unquestionable legal and moral duty of the company to maintain service on Jan. 1, even though it was necessary to comply with the demands for increased wages. Had the company done so and had such action resulted in a total or partial loss of the fair return to which the company is entitled by law, it would have become the plain duty of the commission to make such order with respect to rates as would enable the company to earn a fair return in the future and to recoup its loss. In the public policy so declared in the railroad commission law, it is said, is found ample protection to the company against ultimate loss in paying any reasonable standard of wages.

Temporary Increase Possible

The investigating committee finds that the company was able to increase temporarily the wages of the men according to their reasonable demands and continue the service, the conclusive evidence of that fact being that it did advance the wages and continue its service after Jan. 1. The committee adds, however, that it is fair to say that the company never at any time conditioned its continuance of the increased wage upon a favorable decision from the commission. The company demanded only that a decision be rendered so that, if unfavorable, it might appeal to the courts for a review.

In regard to the general question of commission relationship to wage demands, the investigating committee says:

> There is a sharp difference of opinion between the company and the Wisconsin Railroad Commission as to the power and duties of the commission with reference to wages. The company contends that the commission has the power and duty to pass on the question of wages as a factor in the administration of the railroad commission law, and that where the increased wage is determined upon by the commission it is its duty, as a condition precedent to the payment thereof, to furnish revenues lawfully required for that purpose. The commission contends that it has no power and no duties in regard to wages, except to consider them when paid as an operating expense.
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> It is the opinion of this investigating committee that the commission takes too narrow a construction of the law and that it has the power to consider wages the same as it has the power to consider any other factor in ordering service, and if this power is not sufficiently specific in the statutes as now provided the commission should be given that power. In other words, the commission should have full and comprehensive administrative jurisdiction to keep the wheels going and prevent cessation of service.

Commission Delay Criticized

In concluding its report the special committee remarks that although on April 4 the commission denied a fare increase no further cessation of railway service is assumed. The main difficulty in the situation, however, is still existent, for there appears to be a general lack of confidence in the ability of the Wisconsin Railroad Commission to administer the law. On this point the report says:

> There appears to be a general lack of confidence between officials of the city of Milwaukee and the members of the street car company in the ability of the Wisconsin Railroad Commission to administer the law. The city officials and the railway managers are equally suspicious of each other. The employees of the street car company and the public utilities are equally distrustful of the commission. The attitude of the company has been such as to make its employees hostile to the commission. The character of its advertisements have been such as to bring the administration of the law through the commission into public contempt. Likewise, the company may have brought upon itself the contempt of the commission. As there is no change of venue from the commission, this presents a serious question.
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> The beginning of the trouble probably came from lack of prompt decision on the part of the commission. That condition has existed for a long time. Decisions have been delayed seemingly for unreasonable periods. There can be little justification in a hearing pending from November, 1915, to June, 1918. But other decisions have been delayed much longer.
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> ### Commission Should Know
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> The commission has the power and jurisdiction to require books to be kept by the companies in the manner and form required by it, and to require reports from the companies in the manner and form and at the time demanded by it. By a careful checking of these reports, as filed, and prompt correction of errors, there would seem to be no reason why the commission should not be fully advised of the financial conditions of the companies at all times. Such a system would in itself furnish a valuable check on the management and the service of such companies.
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> By a full accounting system, the commission should have no serious difficulty in determining the general level of returns on invested capital from month to month and in maintaining that level by adjustment of rates and service. Hasty and ill-considered action should never be required, but reasonably prompt decisions are necessary to any system for administering justice.
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> It would be well to guard against unwarranted delay in the future by providing in the law that whenever any party deems its case to be unwarantably delayed, it may obtain in the circuit court an order to show cause why the commission should not be ordered to render a decision within a reasonable time to be fixed by the court.

Detroit Company Ready

Outlines General Conditions Under Which Needed Railway Improvement Can Be Secured by the City

A meeting of the members of the Street Railway Commission of Detroit, Mayor Couzens and the officials of the Detroit United Railway was held on May 9. The main points brought out were that the company was willing to build the needed extension on Twelfth Street and St. Jean Avenue, and a hint that increased fares would be demanded soon.

FARE DISCUSSION INCLUSIVE

The Twelfth Street plan provides for extending service of Trumbull cars 1 mile farther north on Twelfth Street. The St. Jean line will run from Jefferson Avenue north to connect with Kercheval, Mack, Gratiot, Grand Belt and Harper lines. The Epworth Boulevard extension was reported as two-thirds completed and construction progressing on the remainder. This line runs north from Warren Avenue to Grand River Avenue at Highfield and Joy Road.

The discussion of increased fares was not pursued to any definite conclusion as the meeting was called to discuss extensions and rerouting of present lines, not to consider fares.

The City Council instructed the corporation counsel to draft the agreement relative to the proposed extensions. The terms under which the new lines will be built provide that the city may take over the tracks at cost less depreciation whenever municipal operation is decided upon.

Councilman Nagel suggested the possibility of the city building and financing extensions and leasing them to the company, but Frank W. Brooks, general manager of the railway, expressed confidence that the two extensions could be financed with the company's present resources. He stated that $13,000,000 would ultimately be required to provide all extensions and improvements to service needed in Detroit and that the company could not provide for the improvements without an increase in fares.

SOME IDEAS ON FARES

Owing to the extension of the city limits, Mr. Brooks stated, double fares were necessarily charged in some sections of the city. This practice would be discontinued by the company if the city granted the universal 5-cent fare basis with universal transfers and workingmen's tickets to be sold at eight for 25 cents. It might be necessary, however, to charge for transfers. According to Mr. Brooks the lines are losing money at the present rates, but he declined to answer a question from Mayor Couzens as to how long the railway could operate under present conditions without going into receivership.

It was brought out by the company that the major part of the required expenditure was needed for the purchase of new equipment. The day-to-day agreement between the company and city was referred to by Mr. Brooks as "clouded." He also pointed out that additional capital could not be secured under such an arrangement.

No comment was made by the members of the Council on the proposal by Mr. Brooks for abrogating the franchises on the 3-cent lines. Mr. Brooks gave it as his opinion that these franchises could be abrogated by agreement. A five-year agreement was suggested as a guarantee of good faith.

The officials of the company were instructed to outline plans for better service in congested sections by rerouting certain cars, and to submit plans at the next meeting on May 23. Council members were opposed to breaking up east and west runs and were inclined to order present routing changed, but this action was forestalled by the company. In discussing this matter it was stated by Mr. Brooks that Woodward cars carry more passengers than the Broadway tubes in New York and hence through cars crossing Woodward Avenue would add to the congestion.

The officials of the company agreed to the extension from the Eight Mile Road to the Six Mile Road, or the Palmer Boulevard line under the same agreement as the others.

TURNBACKS CONSIDERED

The question of turning back interurban cars at the city limits was not agreed to by the officials of the railway and the matter was postponed for consideration at the next meeting when the company will be asked for proposed plans looking toward the relief of congestion caused by the interurbans.

Publicity Campaign Precedes Referendum

The business men and industrial leaders of Akron, Ohio, organized into the Citizens' Progressive Association of Akron, conducted during the week ended May 17 an extensive publicity campaign in favor of the Morse-Witwer ordinance, which will go before the voters on May 20, at a referendum election. The ordinance was passed by the City Council in March. It provides for a 6-cent fare, nine tickets for 50 cents on the city lines of the Northern Ohio Traction & Light Company and for a complete survey of the city's transportation problem to determine upon a comprehensive practical plan of transit development to keep pace with the growth of the city.

The referendum was asked by petition of opponents of the ordinance organized as the Car-Riders' League, and headed by ex-Mayor W. J. Laub. The railway is taking no part in the campaign. The Citizens' Progressive Association, which includes the city's leading men representing every industry and walk of life, has taken up the ordinance as a necessary part of the plans for civic improvements, industrial developments and adequate housing. Lee, Harris & Lee are directing the publicity campaign.

Pittsburgh Troubles Multiply

Employees Strike to Enforce Wage Demands While Creditors Clamor and Bond Interest Is Unpaid

The 3000 platform employees of the Pittsburgh (Pa.) Railways struck at midnight on May 14, leaving most of Allegheny County and part of Washington County dependent on jitney buses and the steam railroads for transportation. Up until midnight on May 15 neither the officials of the union nor the receivers of the company had made any move toward a settlement.

The cause of the tie-up was a dispute over the new wage schedule. The men demanded an increase of 12 cents an hour over the prevailing scale of 43, 46 and 48 cents an hour according to length of service. They had been receiving these rates under a contract which expired on May 1.

ARBITRATION CAUSE OF TROUBLE

The actual point of difference upon which the strike was called, however, was the method of arbitration to be used in the settlement. The men demanded a final binding arbitration before the War Labor Board. The receivers, who are in charge under the United States District Court, contended that as receipts of the company are not sufficient to meet the current requirements, let alone the increased demands that the proposed new schedule would entail, they could not enter into binding arbitration without the express consent of the court.

The union gave the receivers until midnight on May 14 to obtain this consent. The judges refused to authorize arbitration except on condition that the results of the arbitration should be subject to court review. The strike followed.

The wage increases the men demand would cause a direct additional labor cost of $1,000,000 annually, and if the pay of other employees were to be equalized the additional expense would be raised to $2,000,000.

In declining to grant the receivers authority to enter arbitration before the War Labor Board, the results of which should be binding upon the court, the judges took the stand that such permission would amount to delegation by a court of part of its particular functions to another body.

Permission to arbitrate was granted, with reservation on the part of the court of the duty of passing upon the findings of the board. As to the demand of the men that the receivers be permitted to agree in advance to accept the findings, the court held that to do this would bind not only the receivers, but the court itself, and "that it is beyond our power to part with any of the authority vested in us by the Constitution of the United States and the Acts of Congress."

Immediately after the court handed down its decision on May 13 the court issued an invitation to the union officials to meet with it and prepare an appeal to the War Labor Board, in accordance with the terms of the judicial permission—that is, that resultant findings should be passed upon by the court. On this suggestion the attitude of the men was that they would be required to submit their claims to a double arbitration, once before the board and then again before the court. A deadlock ensued and the men refused to meet the receivers.

The vote authorizing the union officials to call the men out was taken on May 9. The count was 2,637 to 21. Armed with this authority, the labor leaders on May 10 forced the receivers to agree to ask the court for permission to enter binding arbitration proceedings. The receivers presented their petition in court on May 12. The judges handed down their refusal in less than twenty-four hours, for the ultimatum of the union officials to the receivers on May 10 stated that the men would be called out at midnight on May 14 unless binding arbitration was agreed to by that time.

REVENUES INSUFFICIENT

At the time the receivers petitioned the court for the requisite permission one of them, S. L. Tone, presented a separate statement reviewing the financial history of the company for the past three years. He said that the difficulties the company was now experiencing arose from granting wage increases without making provision to meet the added expense incurred. He submitted that the revenues of the company were not sufficient to meet operating and maintenance demands; that bond interest had been defaulted and that even indebtedness incurred in the purchase of supplies and equipment had not been paid. He argued that creditors of the company for material delivered had just as valid a claim as the men, particularly in view of the fact that the men, through refusal to accept certain working conditions, had forced labor cost higher than reasonable complaisance on their part would have made necessary.

Conductorettes Properly Protected

The Lockwood bill extending the protection of the labor law to women and minors employed in connection with the operation of electric railways was signed by Governor Smith of New York on May 13. The new law, which takes effect immediately, prohibits the employment of females under twenty-one years of age on electric railways and provides that no female employees shall work before 6 o'clock in the morning or after 10 o'clock at night, nor more than nine hours a day for six days a week, and must be allowed one hour for meals. The Governor said:

> It has been urged to me that the signing of this bill might mean the loss of positions to some women. I cannot bring my mind to the position where I can be moved by that argument. I regard it as a matter of State duty to protect the health and provide for the welfare of women and minors who must work.

New British Labor Agreement

A general agreement between the tramway systems of Great Britain, represented by the Municipal Tramways Conference and the Tramways & Light Railways' Association, and the employees as represented by the National Transport Workers' Federation, was reached on March 20, 1919, subject to the grant by the authorities of an increase in fares before June 30. Without this grant, the agreement is terminable at one month's notice on either side. The agreement will mean for the London County Council tramways an additional annual expense for labor of £360,000. This is on a basis, for 1919-1920, of a wages bill of £2,421,250 and car mileage of 53,000,000, the figures for 1918-1919 being 48,052,801 car-miles and a wages bill of £1,888,600. An abstract of the agreement follows:

> The working week will consist of forty-eight hours, inclusive of signing on and signing off. Where railways in the past have had a week of fifty-four hours or less, the employees will receive fifty-four hours wages for forty-eight hours work. Where the companies have had a week of more than fifty-four hours, the employees are to receive for the reduced working week, wages equal to those received for the number of hours at present worked up to a maximum of fifty-seven hours. The employee must present himself, however, at the appointed time on each of his six working days, and the employers are at liberty to utilize his services in any way considered desirable if no work can be found on the cars, provided such work does not impinge on another man's job and is only of a temporary character. Overtime is to be paid for as mentioned below, and the men are to be guaranteed at least seven hours' work a day.
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> For work on Christmas in England and on New Year's Day in Scotland, double time is paid. On the four other general holidays of the year, time and a half is paid. On Sunday time and a quarter is paid. Overtime is carefully specified, but, in general, the rate is time and a quarter for the first two hours and time and a half for any additional work. If an employee works voluntarily on his seventh or "rest" day, he receives time and a quarter on the rate of pay prevailing that day. All employees have a six-day holiday with pay annually after twelve months continuous service, with an additional two days during 1920.

A Scramble for Improvements

The City Council of Seattle, Wash., and the utilities department have received urgent petitions from property owners on East Marginal Way providing for the construction of an electric railway to serve that district. The Industrial Association of the South End is backing the movement, insisting that the railway is essential not only to the industrial development of Seattle and the full usefulness of the investment approximating $3,000,000 in the Duwamish Waterway, but also that the line would pay by carrying the many employees of plants located along it, and the people of the South Park district.

The plan advocated is to build a connection with the elevated at Spokane Street down East Marginal Way, a distance of approximately 2 miles to a connection with the South Park car line at Eighth Avenue South, diverting the South Park traffic over East Marginal Way and relieving the crowded Georgetown line. The construction of the East Marginal Way railway was approved by the City Council last August in an ordinance providing for extensions, and a hearing on the petition for immediate construction will be held before the city utilities committee in the near future. It is pointed out that the cost of the line would not exceed $$75,000, with operating expense about $250 a day and income about $500 a day.

Chicago Men Apprehensive

The award of the War Labor Board to the employees of the Chicago (Ill.) Surface Lines, made as of Aug. 1, 1918, was for the period of the war. With the fare situation as it is in Chicago, the employees are becoming apprehensive lest occasion arise for going back to the old wage scale. The situation is reflected as follows in the *Union Leader*, the official journal for Chicago of the organized surface and elevated railway employees:

> If Chicago street car men are to be forced to return to a wage ranging from 30 cents to 39 cents an hour, which would mean a wage loss of 23 per cent to 43⅓ per cent, or any reduction from the present wage, it should be plain to everyone what will happen in this city. With war costs still prevailing, and going higher, these men cannot exist on a less wage than now paid. In fact, they are finding it difficult to support their families on the present wage, which is not sufficient to provide the necessaries of life and the comforts to which their wives and little ones are entitled. Reducing the wages of the Chicago street railway employees would mean a challenge to every worker in this city to protect his wage rights.

Wage Increase in Salt Lake

A decision awarding the employees of the Utah Light & Traction Company, Salt Lake City, a total increase in wages of $73,000 a year was reached recently by the board of arbitrators which has been considering the wage dispute between the company and its employees.

The award gives the carmen $60,000 a year increase, the shop and carhouse men $7,000, and the track men $6,000. Conductors, motormen and brakemen of the company, under the terms of the award, will receive 39 cents an hour for the first nine months' work, instead of 34 cents an hour for the first twelve months; 43 cents an hour for the second year, instead of 39 cents, and 47 cents an hour thereafter, instead of 42 cents.

An increase of 4 and 5 cents an hour is made in the rate of the shop and carhouse men, and an additional 30 cents a day to the track men.

The most important part of the award pertaining to hours and pay for overtime work provides that all regular runs of regular men shall not exceed nine hours where practical, and that time and a half shall be paid for work by regular crews who have completed a regular day's work and are then called out for extra work. A joint committee is provided for in the award to consist of representatives of the employees and of the company to work together in adjusting runs.

The new wage scale and other provisions of the award became effective on May 1.

Arbitration in Scranton Under Way

With Charlton Ogburn, examiner in charge of the electric railway department of the National War Labor Board, sitting as the fifth man and umpire, the arbitration of the dispute between the Scranton (Pa.) Railway and its employees was begun on April 29. The company's arbitrators are W. L. Connell and Attorney H. C. Reynolds; the union is represented by former Sheriff P. F. Calpin and former Deputy Sheriff John J. O'Malley.

At the opening it was explained that the representatives of the company and the men had agreed relative to most of the items contained in the demands and that the points at issue refer only to the wage scale, reduction of hours for certain workers and time and one-half for overtime. The principal demands follow:

Conductors and motormen, first three months, 58 cents an hour; next nine months, 59 cents; thereafter, 60 cents. Time and one-half is demanded for all work done in excess of the regular schedule runs.

Time and one-half for all crews on sweeper cars and each crew to include three men.

Eight-hour day for carhouse men, shopmen and power house men at the following schedule of wages:

Blacksmiths, 57 cents an hour; car inspectors, 68 cents; armature winders, 70 cents; men now classed as monthly men, 68 cents; blacksmiths, 71 cents; drill press men, 68 cents; pit men, 68 cents; car washers, 57 cents; fire men, 62 cents; oilers, 57 cents; pit helpers, 68 cents; painters, 68 cents; janitors and watchmen, 57 cents; controller men, 68 cents; pipe fitters and repair men, 68 cents and sprinkler men, 57 cents.

Eight-hour day for trackmen and track foremen and the following wage scale: Trackmen, 57 cents an hour; foremen, 64 cents an hour; teamsters, 57 cents.

News Notes

Something New in Taxes.—The new revenue bill in Louisville, Ky., designed to supply funds for the city to offset the saloon revenue, which will be lost after July 1, will include a provision that all street car advertising in the city shall be taxed $300 a year.

Wages Up in Alliance.—Motormen and conductors of the Stark Electric Railway, Alliance, Ohio, were granted an increase in wages on May 7. Men on the city lines in Alliance will receive an advance of 3 cents and those on the interurban line an advance of 4 cents an hour.

Peculiar Wreck on Ohio Road.—On April 30 several workmen were injured in a head-on collision between a work car and a freight car on the Columbus, Delaware & Marion Railway. A derrick on the work car fell across the trolley wire and the short-circuit this made set fire to the cars, which were destroyed before the apparatus sent by the Delaware fire department reached the scene.

Promise of Five Cents More an Hour.—A strike on the Toledo, Bowling Green & Southern Railway, Findlay, Ohio, was averted on May 8 through the promise of Charles F. Smith, general manager, that he would make a recommendation to the board of directors of the company that the men be granted an increase of 5 cents an hour in wages.

Five-Cent Wage Increase. — Conductors and motormen of the Cleveland, Alliance & Mahoning Valley Railroad, Ravenna, Ohio, have been granted an increase in wages of 5 cents an hour. The new pay schedule provides 40 cents an hour for the first year of service, 43 cents an hour the second year and 45 cents the third year.

Railway Displays Skyscraper.—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., is displaying a new window decoration in the form of a miniature skyscraper 7 ft. high and brilliantly lighted from the inside with electric lights. The model is taken from the Union Central Building in Cincinnati, which is 495 ft. high, reaching thirty-eight stories above ground.

Back Pay by May 24.—The receivers of the Rhode Island Company, Providence, R. I., have informed the officers of the union that, in the event of no appeal from the order of the court to pay the back wages due the car men being taken within the statutory time allowed, payment of such wages will begin on May 24, and be completed as soon as possible. The executive board of the union met immediately after the adjournment of the conference and unanimously concurred in the action of the union officers in accepting the receivers' proposition.

War Savings Society Started.—The British Columbia Electric Railway War Savings Society has been started with a branch at the head office. Each Tuesday every employee signing up will be called upon and given a thrift stamp or stamps for the amount he hands over. He can buy more stamps than he signs up for. As his thrift card is filled up, he will be able to buy a War Savings stamp with it. The next step will probably be the formation of War Savings societies in New Westminster, North Vancouver and the various other units of the company.

Wage Agreement on New York State Lines.—The New York State Railways and representatives of the employees have signed an agreement for a year. The agreement covers Rochester, Syracuse and Utica and calls for the same pay as during the last year. Under this agreement men beginning work on the cars will draw 41 cents an hour for the first three months. They will then be jumped to 43 cents an hour for nine months, and all men who have worked a year or more will get 45 cents an hour. Time and a half will be paid for overtime. This agreement is in accordance with the finding of the War Labor Board which was handed down last year.

Wage Disagreement in Sioux City.—The employees of the Sioux City (Iowa) Service Company have rejected the offer of a wage increase of 2 cents an hour, made as a compromise offer to the union's demand for an increase of 15 cents over the prevailing scale of 30 cents and 35 cents an hour. In the company's communication to the men it was stated the 2-cent raise would be allowed, although the present condition of finances did not warrant it, but the company made plain that it would not grant the nine-hour day and the clause for time and a half for overtime asked by the men. The union voted to submit a proposition for arbitration to the service company.

Improvements Planned in Quincy.—In compliance with the wishes of the City Council, the Chamber of Commerce and patrons of the company generally, the officers of the Quincy (Ill.) Railway, which is included in the Illinois Traction System, have agreed to install twenty-five new cars, to run cars more frequently on nearly all of the lines and to improve the roadway. The company has been anxious to make these improvements, but has been prevented by the war situation. At the request of the railway, President Fawcett of the local Chamber of Commerce has appointed a committee of city officials and business men to go to St. Louis and inspect the type of cars proposed for the Quincy lines.

Programs of Meetings

Arkansas Utilities Association

The date of the convention of the Arkansas Utilities Association has been changed from May 20-23 to June 10-12 on account of the dates in May conflicting with the convention of the National Electric Light Association at Atlantic City.

Hearing of Public Utilities Committee at Washington

The second public hearing of the public utilities committee of the United States Chamber of Commerce on means for relieving the electric railway situation will be held in Washington, D. C. on May 28-29.

The first hearing of the public utilities committee was held in St. Louis at the time of the meeting of the Chamber of Commerce in that city and was reported in last week's issue of this paper.

The purpose primarily is to secure testimony on the best form of street railway franchise, the future direction of prices, the mutual interest of the home-owner and retail merchant in good street railway service, possible future economies in operation, relief from special taxes and other extra burdens and service-at-cost franchise plans.

The hearings will be held in the rooms of the United States Chamber of Commerce in the Riggs Building, Washington

Financial and Corporate

$374,017 Deficit for Chicago Railways

Decreased Earnings and Higher Expenses Cause Loss of Almost Twice Net of Fiscal Year 1917-18

Another aspect of the heavy loss in gross earnings of the Chicago (Ill.) Surface Lines during the year ended Jan. 31, 1919, is shown in the recent report of the Chicago Railways. This part of the unified surface system suffered a decline from a net income of $409,975 in the preceding fiscal year to a deficit of $374,017 in the latest fiscal year. The Chicago Surface Lines include the Chicago Railways and the companies known as the South Side Lines, namely, the Chicago City Railway, the Southern Street Railway and the Calumet & South Chicago Railway.

INCOME STATEMENT OF CHICAGO RAILWAYS FOR YEARS ENDED JAN. 31, 1918 AND 1919

	1919	1918
60 per cent of residue receipts of Chicago surface lines...	$5,386,896	$7,207,762
Joint account expenses and adjustments applicable to previous years.......	198,831	368,205
	$5,188,065	$6,839,557
Interest at 5 per cent on valuation..............	4,501,960	4,418,135
Income divisible with city of Chicago...............	$686,105	$2,421,422
City's share, 55 per cent...	377,358	331,783
Company's share, 45 per cent	$308,747	$1,089,639
5 per cent interest allowance on capital valuation of property..............	4,501,961	4,418,136
Interest on bank balances...	31,146	66,992
Interest on treasury securities	78,778	79,592
Total income............	$4,920,632	$5,654,359
Deductions:		
Interest accrued on—		
First mortgage bonds...	$2,784,050	$2,784,050
Consolidated mortgage bonds...............	1,772,947	1,777,884
Purchase money bonds..	203,649	203,650
Interest on loans.........	19,475	....
Sinking fund reserve accrued................	250,000	250,000
Federal income tax on interest coupons........	42,000	60,000
Corporate expenses and adjustments...........	222,528	168,800
Total deductions.......	$5,294,649	$5,244,384
Net income.................	*$374,017	$409,975

* Deficit.

As shown in the ELECTRIC RAILWAY JOURNAL of April 5, 1919, the net income of the Chicago City Railway, which constitutes most of the other part of the unified system, fell from $1,501,384 in 1918 to $846,186 in 1919. These losses were the result of a loss of $404,535 in the gross earnings of the combined surface lines and an increase of $2,630,242 or 11.3 per cent in operating expenses, the expenses of conducting transportation alone advancing $1,675,139, or 15.5 per cent. Detailed figures for the combined lines, before the splitting of the residue receipts 40 per cent to the South Side Lines and 60 per cent to the Chicago Railways, were published in the issue of April 5.

The accompanying table gives the details for the Chicago Railways. This company's surplus carried forward from the year ended Jan. 31, 1918, after the deduction of $100,000 of interest on adjustment income bonds, was $411,143. This, with the loss for the latest year of operation, left a surplus balance of $37,126 on Jan. 31, 1919. This figure is secured without provision for interest on adjustment income bonds for the year ended on that date.

The chief items of the company's income are the 5 per cent interest return on the capital valuation as fixed by the ordinance, and its share (45 per cent) of the net receipts divisible with the city. The 5 per cent interest return provides for the interest on that portion of the bonded debt of the company which is equal in amount to and therefore covered by the purchase-price of the property. The company, however, has an outstanding bonded debt in excess of the capital valuation or purchase price. The result is that the only source (aside from miscellaneous income) from which can be paid the interest on these excess bonds is the company's proportion of the net divisible receipts.

During the six-months period beginning Aug. 1, 1918, when the wage award of the War Labor Board became effective, not even the 5 per cent interest on the capital valuation was earned. Thus for this period as a whole there were no divisible receipts. Consequently, since August the interest was hardly earned on the bonds covered by the purchase price, to say nothing of those not covered by the purchase price.

The capital account or purchase price of the property at the close of the year was as follows: Purchase price Jan. 31, 1918, $89,529,413; added during the year for capital additions to the property, $1,058,227; purchase price Jan. 31, 1919, $90,587,640. Only absolutely essential additions to the property were made during the year.

The condition of the renewals and depreciation reserve fund at the close of the year was as follows:

Amount in reserve fund Jan. 31, 1918....	$5,150,945
Additions to fund during year.........	1,948,305
	$7,099,250
Renewal expenditures during year.....	1,378,544
Reserve fund at Jan. 31, 1919...........	$5,720,706

This fund is an actual deposit in bank. It is the principal item of "cash and cash items" appearing in the balance sheet. No expenditures may be made from this fund except with the approval of the Board of Supervising Engineers as prescribed by the ordinance.

D. & H. Lines Suffer

Increased Burdens Bear Heavily Upon Electric Railway Subsidiaries of Company During 1918

Nothing in the adverse conditions of the last few years quite approximated the difficulties of 1918 for the electric railway subsidiaries of the Delaware & Hudson Railroad. The report of this company for the year ended Dec. 31, 1918, gives the following data in regard to the various controlled electric railway lines:

ALBANY INCOME DOWN $23,000

The gross operating revenues of the United Traction Company, Albany, N. Y., amounted to $2,530,057, operating expenses to $2,211,417 and net operating income to $124,835. These figures show an increase in operating revenues, as compared with 1917, of $71,209; an increase in operating expenses of $94,528, and a decrease in net income from operations of $23,008. Compared with 1913, operating revenues decreased $16,566, operating expenses increased $545,767, and net operating income decreased $552,926. The year 1918 shows a net deficit, after payment of fixed charges, of $132,740, an increase over the deficit of 1917 of $78,634, or 145.33 per cent.

HUDSON VALLEY DECREASE

The operating revenues of the Hudson Valley Railway, Glens Falls, N. Y., amounted to $803,344, the operating expenses to $695,153 and the net operating income to $62,127. Compared with 1917, operating revenues increased $100,969, operating expenses increased $174,052, and net operating income decreased $76,967.

To compare the calendar year 1918 with 1913, the later year showed an increase in operating revenues of $97,236; operating expenses, an increase of $220,266, and net operating income, a decrease of $132,925. The net deficit of 1918, after payment of fixed charges, was $118,364, an increase of $13,239, or 12.59 per cent.

The operating revenues of the Plattsburg (N. Y.) Traction Company were $33,907, operating expenses, $24,498, and net operating income $7,786. These data show a decrease of $4,972 in operating receipts, compared with 1917; a decrease of $3,919 in operating expenses, and a decrease of $1,235 in net operating income. The net income, after payment of fixed charges, was $1,695.

STILL ANOTHER DECREASE

The Troy & New England Railway, Troy, N. Y., had gross operating revenues aggregating $33,037, operating expenses of $27,090 and net operating income of $4,585. Compared with 1917, there was an increase in these revenues of $3,213, an increase in operating expenses of $7,442 and a decrease in net operating income of $4,229. The net deficit, after fixed charges, was $5,729.

Reorganization Filed

Plan Presented to California Commission Under Which Oakland & Antioch Railway Will Be Readjusted

The reorganization committee for the Oakland & Antioch Railway has filed with the California Railroad Commission a petition for an order approving the plan the committee has provided for the readjustment of the finances of the companies involved—the Oakland & Antioch Railway, the Oakland, Antioch & Eastern Railway and the San Ramon Valley Railroad. The plan provides for the organization of the San Francisco, Oakland & Sacramento Valley Railway as the successor company, and the issuance of first mortgage bonds and common and preferred stock in accordance with the agreement.

The total authorized bond issue will be $3,000,000. Not to exceed $1,950,000 of the par value of these bonds will be used or set aside for the purpose of carrying out the reorganization plan. The balance of the bonds, $1,050,000 par value, will remain in the treasury and may be issued for the purpose of defraying cost of additions and betterments. Furthermore, the deed of trust securing these bonds will provide that the remaining bonds will be issued only if the net earnings for the twelve months preceding have been at least one and one-half times the annual interest on the bonds outstanding plus one and one-half times the annual interest on the bonds to be issued.

COMMON AND PREFERRED STOCK

Six per cent preferred stock will be authorized to the amount of $1,500,000, par value. Not to exceed 13,300 shares of this stock will be issued for reorganization purposes; the balance, 1700 shares, will remain in the treasury to finance additions and betterments.

Common stock will be authorized to the amount of $4,000,000 par value, consisting of 40,000 shares of a par value of $100 each. The common stock is to be non-assessable.

Creditors having first and direct liens on the mortgaged property which are valid and enforceable at law, and are approved by the bondholders' committee, are to be paid in cash.

The Oakland & Antioch Railway bondholders, Oakland, Antioch & Eastern Railway bondholders and San Ramon Valley Railway bondholders are to surrender all bonds held by them, together with all unpaid coupons maturing on or after Jan. 1, 1915, and will receive therefor:

Twenty-year first mortgage 5½ per cent gold bonds of a par value equal to 20 per cent of the par value of the bonds now held by bondholders; 6 per cent preferred stock of a par value equal to 20 per cent of the par value of bonds now held by the bondholders, and common stock of a par value equal to 60 per cent of the par value of bonds now held by the bondholders.

Creditors whose claims are secured by bonds are to cancel their obligations, and receive for each bond new twenty-year first mortgage 5½ per cent gold bonds, preferred stock and common stock in proportions noted.

Holders of Oakland, Antioch & Eastern Railway 6 per cent four-year convertible gold notes come within the provisions of this subdivision. Each depositing noteholder will be treated as if each note was separately secured by its pro rata of all the bonds held by the Union Trust Company, San Francisco, as security for the entire "Four Year Convertible Gold Note" issue.

Creditors whose claims are valid and enforceable at law and are approved by the bondholders' committee are to cancel their claims and receive common stock remaining in the treasury after common stock has been distributed to bondholders and secured creditors.

The advantages claimed for the reorganization plan follow:

> The fixed annual charges are kept well within the net annual income of the road conservatively figured. Bondholders retain the full benefit of all the security they hold after providing only for such creditors as already hold a lien prior to their lien. Creditors are dealt with in the order of their equities and treated in accordance with their equities. Bondholders automatically, through stock ownership, secure the benefits of all increased earnings as they accrue. The company will be permitted in the future to maintain its road and equipment in a state consistent with the best possible service to the public. Provision is made for additions and betterments, with proper safeguards to the interest of bondholders and stockholders.

Dallas Outlook Bad

President Strickland Points Out Inadequacy of Income and Difficulty of Raising New Money

The Dallas (Tex.) Railway is in a bad way financially after eighteen months of operation under the service-at-cost franchises, according to J. F. Strickland, president of the company. During this time, Mr. Strickland says, the company has earned on its capital an average of 4.1 per cent a year, not one penny of which has gone for dividends but which has been used for improvements and betterments. The rate of return permitted under the franchises upon the agreed valuation is 7 per cent a year.

The Dallas Railway, according to Mr. Strickland, is financed by short-time notes amounting to practically the value of the property owned at the time the franchises were granted. These notes amount to $5,000,000 and fall due on April 1, 1922. With the present earning capacity, as disclosed during the eighteen months of operation, Mr. Strickland has little hope that he will be able to refinance the company when the notes fall due. The notes are held by a holding company and are not secured.

The only hope, Mr. Strickland believes, is that the holders of the notes of the Dallas Electric Light & Power Company, a subsidiary company of which Mr. Strickland is also president and which has shown earnings of 9 per cent during its term of operation under the service-at-cost franchise, will be sufficiently well pleased with the investment that they will be willing to take the notes of the traction company too.

HIGHER FARES FAILED ELSEWHERE

In answer to a direct question, Mr. Strickland stated he is opposed to increased fares, and that if it comes to a point where fares must be raised to avoid bankruptcy, he is through with the Dallas Railway. Increased fares, in his opinion, have proved unpopular wherever they have been tried, and the experience of those companies that have resorted to this plan for increasing revenues is that the plan has failed dismally. The unpopularity of the increased fare, coupled with its inconvenience, has almost universally resulted in decreased earnings through decreased patronage. In these days of automobiles, electric railways are compelled to cater to the public, for otherwise the electric carriers will get little business.

NEW MONEY HARD TO RAISE

Speaking of the possibility of the Dallas Railway raising funds for additional improvements, Mr. Strickland said the company had already been compelled to pledge its property for the loan of $1,000,000 for improvements required under the terms of its franchise. These improvements are now being made. This loan of $1,000,000 cost the company 10 per cent, as it was necessary to go to Scandinavian banking houses to get the money, for which 7 per cent had to be paid, and the bonds had to be discounted 3 per cent in this country, making the total cost 10 per cent. The whole Dallas property is pledged to pay this loan and the money borrowed to erect the Interurban Building, and it cannot be pledged for additional loans. Dallas will need extensions and improvements after the $1,000,000 now being spent is gone, but where the money is to come from is not known. The question, Mr. Strickland said, is one he will put frankly up to the public.

The gross income of the company has increased 33⅓ per cent during the last year since the jitneys were put out of operation, but during the same time the cost of operation has increased 46 per cent. While it is expected that the gross income will continue to increase for some time, it is regarded as highly improbable that the operating cost will be decreased to any material extent for many years, if at all.

One of the plans for relief that has been suggested is for the city to relieve the company of its paving obligations, which have been a heavy drain on the company's income.

Financial News Notes

Wants Line Reopened.—A petition for a hearing over the reopening of the Lee-Huntington line of the Berkshire Street Railway has been filed with the Public Service Commission.

Protest Against Abandonment of Ohio Road.—On April 30 the Commissioners of Hamilton County filed with the Public Utilities Commission of Ohio a protest against the abandonment of the Cincinnati & Columbus Traction Company's line. The hearing has been set for May 28.

Ohio Road Sold.—The Fishel & Marks Company, Cleveland, Ohio, is reported to have purchased the property of the Columbus, Magnetic Springs & Northern Traction Company, Richwood, Ohio, for $88,133, two-thirds of the appraised value. The road has not been operated since Jan. 1.

Interurban Merger Being Urged.—A merger of the Elgin & Belvidere Electric Company and the Rockford & Interurban Railway in the interest of through service and faster time between Elgin and Rockford, Ill., is said to be under way. The merger is being urged especially since Camp Grant has been made a permanent institution, with prospects of a steady volume of both freight and passenger business.

Representatives of Note Holders at Birmingham.—A conference of several of the large note holders of the Birmingham Railway, Light & Power Company, Birmingham, Ala., which is now in the hands of a receiver, was held recently in Birmingham. George Hooper Taylor and E. H. Rollins, bankers, Chicago, and others attended the conference. They conferred with City Commissioner J. Ellis Brown and asked a number of questions in regard to the service and how the business of the company was progressing.

Canadian Government Makes Payment.—It is announced that the Canadian government has paid to the Quebec Railway, Light, Heat & Power Company, Quebec, Que., the balance of the money owed it in connection with the sale of the Saguenay Railway, making, with the amount paid at the time of the sale, a total of about $3,400,000. The railway will use this money to reimburse the bondholders of the Saguenay Railway, which will benefit the Quebec company by relieving it of its obligation in the form of interest on the Saguenay bonds.

Committee Report Postponed.—The special committee named by the Indianapolis (Ind.) Street Railway, operated under lease by the Indianapolis Traction & Terminal Company, to devise a plan for reducing the fixed charges and eliminating sinking funds will report to the stockholders on June 2. The committee planned to submit its report on May 8, but it was unable to do so, and an extension of time was granted. The appointment of the committee was regarded as the first step toward the financial readjustment of the local Indianapolis lines. The matter was referred to in the ELECTRIC RAILWAY JOURNAL of April 26, page 840.

New Directors for Chicago Suburban Lines.—At a special meeting of the board of directors of the Aurora, Elgin & Chicago Railroad, held in Chicago, Ill., on May 3, R. M. Stinson of R. M. Stinson & Company, Philadelphia; Lewis B. Williams of Hayden, Miller & Company, Cleveland, and A. B. Conant of A. B. Conant & Company, Boston, were elected to the board of directors. Messrs. Stinson, Williams and Conant, who are members of the protective committee recently formed to safeguard the interests of the company's first and refunding mortgage bonds and three-year collateral trust notes, accepted places on the board of directors for the better protection of the interests which they represent.

Foreclosure Sale on May 24.—All of the property of the Parkersburg & Ohio Valley Electric Railway, Parkersburg, W. Va., which operated between Friendly and Sistersville, will be sold at public auction on May 24 at Parkersburg, by Judge M. H. Willis, New Martinsville, special commissioner. The object is to pay off the debts of the concern. The line has had a troublous career ever since its organization in 1903. After several years of operation by the interests that built it, the road passed into a federal receivership. Then the Tyler-Wetzel Traction Company leased the line and tried to operate it, but it proved unprofitable. No cars have been run on the line for several years. The road is advertised as being "valuable for its material or for consolidation with two adjacent lines of electric railway."

$4,500,000 Michigan Railroad Bonds Offered.—The Michigan Railroad, Kalamazoo, Mich., which owns and operates interurban railways in Michigan, has sold to the National City Company, New York, $4,500,000 of first mortgage five-year 6 per cent gold bonds. The bonds were offered on May 13 at 95 and interest to yield 7.21 per cent. The mortgage will provide for a sinking fund to retire semi-annually $50,000 of the issue. The company is required, under the mortgage, to expend annually or deposit in cash with the New York trustee in a general reserve fund not less than 20 per cent of its gross earnings for maintenance, repairs, replacements and renewals of the property. Net earnings are nearly 1.85 times the annual interest charges on the first mortgage bonds.

Electric Railway Monthly Earnings

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$83,717	*$57,862	$25,855	$20,217	$5,638
1m., Mar., '18	76,107	*47,448	28,659	19,621	9,038
12m., Mar., '19	949,857	*617,288	332,569	241,040	91,529
12m., Mar., '18	892,825	*527,164	365,661	231,360	134,301

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$3,994,180	*$2,625,592	$1,368,588	$1,556,053	‡†$139,737
1m., Mar., '18	3,649,670	*2,025,425	1,624,245	1,175,342	‡502,934
9m., Mar., '19	31,260,158	*21,655,806	9,604,352	13,384,175	‡†3,337,064
9m., Mar., '18	30,144,018	*16,896,992	13,247,026	9,998,674	‡3,656,733

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$267,284	*$194,902	$72,382	$39,880	$32,502
1m., Mar., '18	218,584	*141,476	77,108	40,980	36,128
12m., Mar., '19	3,036,775	*2,093,087	943,688	478,712	464,976
12m., Mar., '18	2,471,564	*1,600,615	870,949	489,600	381,349

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$229,801	*$149,028	$80,773	$27,966	‡$62,390
1m., Feb., '18	237,353	*141,189	96,164	28,238	‡77,509
12m., Feb., '19	2,916,386	*1,903,954	1,012,432	336,693	‡790,738
12m., Feb., '18	2,740,100	*1,534,565	1,205,535	347,427	‡906,024

PENSACOLA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$49,842	*$39,487	$10,355	$9,115	$1,240
1m., Feb., '18	35,228	*23,829	11,399	7,996	3,403
12m., Feb., '19	534,016	*390,561	143,455	102,220	41,235
12m., Feb., '18	368,874	*222,194	146,680	94,020	52,660

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.**

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec., '18	$741,742	§*$716,469	$25,273	$188,894	†$163,621
1m., Dec., '17	594,020	§*479,885	114,135	179,036	†64,901
12m., Dec., '18	7,667,129	§*5,127,035	2,540,094	2,218,187	321,907
12m., Dec., '17	6,023,509	§*3,576,593	2,446,916	2,152,051	294,865

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$96,399	*$82,917	$13,482	$25,356	†$11,874
1m., Feb., '18	85,198	*56,906	28,292	24,382	3,910
12m., Feb., '19	1,214,833	*908,972	305,861	305,291	570
12m., Feb., '18	1,002,397	*672,128	330,269	292,499	37,770

TAMPA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb., '19	$102,948	*$58,728	$44,220	$5,338	$38,882
1m., Feb., '18	87,102	*47,303	39,799	5,261	34,538
12m., Feb., '19	1,096,591	*639,299	457,292	61,722	395,570
12m., Feb., '18	992,187	*569,706	422,481	57,836	364,645

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$914,419	$672,932	$241,487	$162,156	$79,331
1m., Mar., '18	835,293	614,391	220,902	160,696	60,206
3m., Mar., '19	2,618,503	1,976,393	642,110	471,501	170,609
3m., Mar., '18	2,457,390	1,881,090	576,300	466,130	110,170

* Includes taxes. † Deficit. ‡ Includes non-operating income ** Revised report. § In December, 1918, $331,428; December, 1917, $150,706; twelve months, 1918, $539,189; twelve months, 1917, $180,706, included for depreciation.

Traffic and Transportation

Zones for San Diego

Suggestion Is Made for Five-Cent Stand-By Charge and Commutation Rates

The preliminary hearing of the San Diego (Cal.) Electric Railway before the State Railroad Commission on its application for an investigation into the affairs of the company came to an end on April 30 with the presentation of the suggestions of the company regarding the schedule of fares which should be allowed in order to afford the company sufficient revenue for its maintenance and an examination of the present condition of the company's roadbed in different parts of the city. The final hearing, based upon the commission's examination of the data which has been prepared and presented by the company, will be held on June 17.

A FIVE-CENT BASE

The suggestion of the company provides for the creation of a zone system by which the short and long hauls shall be differentiated, with a charge of 5 cents a ride for all journeys within the limits of the "inner" zone, and a fare of 10 cents for all rides of whatever length in the "outer" zone.

All fares for rides beginning and ending in the inner zone are to be 5 cents, including transfer privilege. The distance which may be traveled within this zone for 5 cents is approximately 3.3 miles.

The outer zone is to include all the territory from the edge of the inner zone to the limits of each car line, with the exception of the National City and Chula Vista line. The fare for all rides originating or ending in the outer zone, without regard to their length, will be 10 cents.

Patrons, however, may go for 10 cents through both zones into any part of the city with the same transfer privileges which are now extended. Thus, a patron may ride only ten blocks in the outer zone, and his fare will be 10 cents, or he may pass for the same fare from one end of the outer zone through the inner zone to the end of another portion of the outer zone.

STAND-BY CHARGE EXPLAINED

The reason for the foregoing plan is that a car, in serving the outside districts, is giving a "stand-by," or "ready-to-serve" service which must be continually maintained, and which is brought about by the expense necessarily incurred in sending a car over the entire line in order to reach a patron in the outlying districts. Under any other system, it is pointed out, patrons could ride for 5 cents over long distances, subjecting the company to a heavy surcharge, due to the necessity for maintaining service through both the inner and outer zones, without an adequate return on the investment or maintenance charges.

Modifications of the 10-cent fare are suggested, however, which will effect a material saving over the straight cash payment. The first of these modifications is based upon the belief of the officials of the company that the patron who uses a car at least twice a day is to be considered, as it were, a wholesale patron, to whom transportation is being sold in quantities, and who is therefore entitled to a wholesale price. To such a person it is the plan of the company to sell a commutation book with two tickets good for each day of the calendar month, the price of the book to be $4. The tickets will be good only for the day for which they are stamped, but they will be transferable and they will carry the present transfer privileges.

A second rate for the patrons will be a 7½-cent ticket, which will be sold in blocks of four or more. This ticket must also be used in the month in which it is bought and is transferable to other parties. It also carries the usual transfer privilege.

Wants Ten Cents in Cuyahoga Falls

At a special session of the Village Council of Cuyahoga Falls, Ohio, on April 30 a formal application for a new franchise of five years duration was presented by the Northern Ohio Traction & Light Company in a communication signed by A. C. Blinn, general manager, accompanied by a proposed franchise ordinance covering many points relative to operations, pavements, rights-of-way, etc., and containing the important fare question, as follows:

> A cash fare of 10 cents between Cuyahoga Falls and Akron.
>
> Five tickets for 30 cents good for transportation from any point in Cuyahoga Falls to a transfer point in Akron.
>
> One cent additional for transfers.

At the conference between the traction officials, the Councilmen and Mayor, and a citizens' committee, some time ago, the company was told that the village insisted on a 5-cent fare to a transfer point in Akron, and 1 cent additional for transfers.

The proposal of the company as submitted on April 30, apart from the 10-cent cash fare item, is 1 cent from being in agreement with the proposal of the village.

According to Mayor Taylor, who presided at the meeting, no franchise will be granted which calls for a fare of 10 cents, cash or otherwise, between Cuyahoga Falls and Akron.

The proposal of the company was referred to the Council as a whole.

Increase Not Contemplated

Motives of Philadelphia Rapid Transit Company in Advertising Fare Changes Misunderstood

No intention of asking the public of Philadelphia to subscribe to an increase in fare is intended by the Philadelphia (Pa.) Rapid Transit Company, according to statements made by officials. It is declared that the fare is to remain 5 cents a trip, plus the addition of 3 cents for a transfer, as it has been for years.

The statements were made in reply to numerous inquiries which have been made in regard to the placards which have been displayed in all cars for several weeks and which tabulate the fares of several leading cities, to wit: Boston, 8 cents; Pittsburgh, 7 cents; St. Louis, 6 cents; Philadelphia, 5 cents. The idea seems to have spread that this publication was leading up to a demand for a fare increase. An official of the company is quoted in the Philadelphia *Public Ledger as* follows:

> The whole idea of publishing this table and displaying it prominently in the trolley cars was to inform the traveling public exactly how cheap are the transportation facilities afforded them by our lines. There was no idea whatsoever of leading up to a demand for an increase in fares.
>
> The signs have been removed from the cars, and this removal, I understand, has given rise to suggestion that they were only used with the purpose of impressing upon the people of Philadelphia that they were the opening wedge of a propaganda for subsequent legislation leading to an increase in proportion to that now in effect in other large cities. But their removal had nothing to do with any such purpose, even if it was contemplated.
>
> We have substituted Willow Grove signs, because it is necessary to give the park and its free attractions all the advance publicity possible at this time of the year. It costs many thousands of dollars to provide these amusements, therefore it is readily apparent, or it should be, that we must avail ourselves of all possible means to advertise them properly.

Rainier Valley Line Wants Six Cents

The Public Service Commission of Washington recently notified Corporation Counsel Walter F. Meier of Seattle, Wash., that a hearing would be held in that city on the application of the Seattle & Rainier Valley Railway to increase fares on its lines. The company's new tariff, filed with the commission, provides for an increase of regular fare to 6 cents with a charge of 1 cent for transfers to other lines and charge of 2 cents on all transfers from other lines.

The purchase of this company's lines is proposed by the city to complete the municipal railway system. Negotiations were opened by the city when the purchase of the railway lines of the Puget Sound Traction Light & Power Company was approved last December. In anticipation of the purchase of the Rainier Valley lines, the Legislature at the request of the city of Seattle, passed a law permitting cities to operate railways outside the corporate limits. This permits Seattle to operate the Renton interurban line, which is a part of the Rainier Valley system.

Boston Elevated Service Improvements

Many Changes Carried Out Recently in the Interests of the Public and As Economies to the Company

C. D. Emmons, general manager of the Boston (Mass.) Elevated Railway, recently issued a press statement summarizing improvements in service on the Boston property since Dec. 1, 1918, and outlining work now in progress to better transportation facilities in the metropolitan district.

SEATING CAPACITY INCREASED

There has been an increase in seating capacity on the entire system of 6 per cent. In the Washington Street tunnel a 50 per cent increase in service has been provided, and in the Cambridge subway four-car service is now furnished in the rush hours. The East Boston and Chelsea service of the company has been increased by the addition of two-car train service in rush hours, through the East Boston tunnel. At Park Street, Boston, the subway service has been improved by the substitution of many two-car trains in rush-hour periods for single cars, and in the maximum hour 271 cars are now supplied at this important traffic center.

Deliveries have begun on 250 center-entrance cars lately ordered at an outlay of more than $3,000,000. From seventeen to twenty cars a week are now being painted in the company's shops, and this rate will soon be increased to twenty-five a week. A one-man car has been placed in test service in West Roxbury. Between Jan. 7 and May 5 the Board of Health inspected 8426 cars for cleanliness. Of these, 6909 were given 100 per cent, and only thirty-three were marked below 70 per cent, the "passing" mark. Of 8475 cars inspected for ventilation, 6909 cars were graded at 100 per cent, and thirty-four were marked below 70 per cent. Regarding overcrowding, 8960 cars were inspected, 7705 being given 100 per cent and only fifty-three below 70 per cent. In every case where a car was checked below the passing mark, the number of the car was taken and the condition was immediately remedied.

BUDGET SYSTEM ESTABLISHED

An important forward step has been taken in the establishment of a budget system, under which the company plans to expend $21,500,000 for improvements during the next five years. This was detailed in the ELECTRIC RAILWAY JOURNAL, Feb. 22, 1919, page 367. Within a few weeks the Everett elevated extension has been opened, representing a cost of $3,000,000, and shortening the running time between Malden, Everett and Boston by about five minutes and eliminating the necessity for changing cars at the Sullivan Square station in Charlestown.

The company is restoring to their jobs all returning service men from the United States forces. So far about 600 men have been reinstated, out of 1743 men who served in the war. Other improvements in the service include track rearrangement and reconstruction, new track laying, etc., totaling about $1,000,000 appropriation; rearrangement of ticket booths and provision of increased platform attendance at certain points; destruction of 500 antiquated cars formerly stored at Forest Hills; introduction of metal tickets; provision for rush-hour sale of metal tickets from bags in charge of extra employees stationed at subway entrances; a campaign against expectoration, and a closer following up of the causes of collisions. A minor but appreciated convenience is the provision of broken stone platforms at reservation stops.

London Proposes to Shorten Zones

On April 15 the London County Council voted to increase the fares on its tramway lines. At present routes are divided into sections of an average length of 0.6 mile, any three of which can be traversed for 1d., six for 2d., nine for 3d. and any further distance for 4d. It is now proposed to have the sections of an average length of 0.75 mile, two sections to be traversed for 1d., four for 2d., six for 3d., and eight or more for 4d. This would reduce the length of ride for a penny from 1.8 to 1.5 miles. The lengthening of the sections and the reduction of their number, it is thought, will give the conductors more time to collect their fares. Workmen's tickets are sold at a lower rate. The Council hopes that these revised fares will increase the revenue by £416,000.

Toledo Fares in Court

Judges Warrington, Knappen and Denison of the United States Circuit Court at Cincinnati, Ohio, heard arguments on May 7 in the appeal of the city of Toledo from the injunction order issued by United States District Judge John M. Killits restraining the city from interfering with the collection of a 5-cent fare by the Toledo Railways & Light Company.

Mayor Cornell Schreiber, who is an attorney, contended that the city is prevented from enacting legislation to regulate the rate of fare while the injunction is in force. Should it attempt such legislation it might be held in contempt of court. He also contended that the Federal Court has no jurisdiction in the case and that Judge Killits exceeded his authority when he granted the order.

Director of Law Ralph Emery told the court that the injunction was standing in the way of an adjustment of the differences between the company and the city. He asked that the decree be reversed.

George D. Welles, representing the company, charged that Mayor Schreiber had always been hostile to the company and to prove his contention quoted from Mayor Schrieber's speeches both before and after his election as Mayor. He also asserted that the injunction does not prohibit the city from enacting rate legislation.

The long fight between the company and the city, extending back over years, is too familiar to most railway men to require comment. The company has been endeavoring in every way to secure a renewal of its franchises on terms that will allow it to operate on a fair margin of profit and give the service that the city should have. The court took the case under advisement.

Louisville-Detroit Freight Service

Handling of freight by electric railway between Louisville, Ky., and Detroit, Mich., is promised through arrangements by A. F. Vandegrift, acting traffic manager of the Louisville Board of Trade, for the completion of plans for an interurban freight station in Louisville by the Inter-State Public Service Company, which operates across the Ohio River into Indiana. The extended freight service is promised by Aug. 1.

New tariffs will be made covering movement of freight into Indiana and Ohio except stations on the Chicago, Lake Shore & South Bend Railroad, and to stations on such lines in Ohio as the Ohio Electric Railway, the Dayton & Troy, the Dayton, Covington & Piqua, the Western Ohio, Toledo & Indiana and the Toledo & Western.

Storage Battery Cars at Point Shirley

The Point Shirley Street Railway, operated by the Boston, Revere Beach & Lynn Railroad, has placed two storage-battery cars in service on its 1.2-mile line between Winthrop Beach and Point Shirley, superseding gasoline passenger trucks previously used. Recently patrons of the former company petitioned the Public Service Commission on behalf of improved service.

The line was originally served by a gasoline-electric car and later by a Federal storage-battery car. Last fall, after about four years service, the battery became worn out and the auto-bus service was inaugurated by the company. This was unsatisfactory and the patrons asked the commission to require the company to install an overhead trolley line. The commission refused to order this, on the ground that the cost of so doing, including power-plant facilities and the purchase or alteration of cars necessary would be about $45,000, an expenditure which the company was unprepared to make and which the traffic did not justify.

The company purchased two cars from the Third Avenue Railway, with electrical equipment, and has installed batteries supplied by the General Lead Battery Company, Newark, N. J. The new service, started on May 1, has been a great improvement over the auto-bus.

Transportation News Notes

Hearing on Transfer Charges.—The Public Service Commission of the Second District of New York will hold a hearing at Syracuse on May 19, on the petition of the New York State Railways for authority to charge 1 cent for transfers in Syracuse.

Protests Fare Increase.—The Chamber of Commerce of Clarksburg, West Va., has announced it will file a protest with the Public Service Commission against the proposal of the Monongahela Valley Traction Company to increase fares from a 5-cent and 6-cent rate to a flat 7-cent rate.

Six Cents in Bluefield.—A decision was announced by the Public Service Commission of West Virginia on April 9 under which the Appalachian Power Company was authorized to increase fares on its railway line in Bluefield from 5 cents to 6 cents, but with twenty tickets for $1 and fifty school tickets for $1.50.

Wants Interline Dispatch Rates.—Application has been made to the Public Service Commission of Indiana by the Marion & Bluffton Traction Company, Bluffton, Ind., for the establishment of interline merchants' dispatch rates from points on its line to points on other electric railways in Indiana and for readjustment of the rates between any two points on the company's road.

Alton Fares Stand.—The Public Utilities Commission of Illinois has issued a final order denying the application of the Alton, Granite City & St. Louis Railway, Alton, Ill., for an increase in fare on the Alton city lines to 8 cents. The same order covers the Venice, Granite City and Madison local service where a similar increase was asked. Alton now has a 7-cent fare. Citizens protested against any further increase. The increase was also opposed by the Board of Trade of Alton.

Hearing May 20 on St. Louis Fares.—The Public Service Commission of Missouri has decided to hold a hearing on May 20 in St. Louis to consider the application of the United Railways for an extension of the 6-cent fare beyond June 1, on which date it automatically expires. The applications of the United Railways and of the Missouri Electric Railroad, a subsidiary road, for a continuance of the present rates of fare in St. Louis and St. Charles Counties will be heard at the same time.

Asks Seven Cents in Davenport.—The Tri-City Railway, Davenport, Iowa, is asking the City Council to call a special election at which a 7-cent fare will be voted on. The fare is now straight 5 cents. In addition to asking the increased fare the company is asking that the Fourth Street line be discontinued. This line parallels the two main lines through the business section and has lost money for years. It serves Suburban Island, a summer resort and park. The park line will be maintained according to the plan and traffic handled by transfer from the Third Street line.

Appropriations for Fare of City Employees.—An ordinance introduced in the City Council of Seattle, Wash., provides for the payment of fare of policemen and firemen who use the municipal railway from the general fund. The ordinance stipulates that the utilities department shall be paid monthly at the regular 5-cent fare for all policemen and firemen carried. The amount is to be determined by a check twice a year of the number of policemen and firemen riding. The ordinance carries an appropriation of $20,000 for the Police Department and $18,000 for the Fire Department.

Six-Cent Appeal in Johnstown.—A petition for an increase in fare from 5 cents to 6 cents will be filed by the Johnstown (Pa.) Traction Company, according to a statement given out by General Manager Scott S. Crane. The petition will include the provision that when the increase is granted, the present zone system will be done away with and a universal transfer system installed. This will tend to eliminate much of the inconvenience now caused workingmen, who have to pay a double fare from their homes to the shops. It will permit a person boarding a car at one end of the city to ride to the extreme other end by the payment of one 6-cent fare, instead of the 10 cents now necessary.

New Transfers Unsatisfactory.—After a brief tryout the new transfer system of the Kansas City (Mo.) Railways proved unsatisfactory. The public objected to it and the conductors rebelled against the burdens which it placed upon them. The company will continue the new slips, as it has a supply on hand, but will punch nothing but the time, as has been done with the old slips. The new system was in use only two days. At the end of the first day several conductors resigned. The second day many conductors refused to punch the slips as required. They merely passed the transfers out to the passengers. Under the system as now modified patrons are not required to announce their place of transfer, but may change cars wherever they wish.

Must Answer Fare Complaint.—The Public Service Commission of Pennsylvania on May 12 dismissed the demurrer of the Philadelphia Rapid Transit Company in the case of the Northwest Business Men's Association of Philadelphia against the company, and directed the company to file an answer within fifteen days. The original case involves the complaint of the business men's association against the alleged discriminatory rates of fare in Philadelphia, the complaint being based on the way the company gives out transfer tickets on certain lines and does not extend the same privilege on other lines. The company demurred on the ground that the commission has no jurisdiction in the matter because of the 1907 agreement between the city and the transit company.

Skip Stops on Municipal Line.—The skip-stop plan will be introduced on the Seattle (Wash.) Municipal Railway on the Phinney Avenue line, between North Eighty-fifth Street and Lake Washington Canal. A survey of the line has been made under the direction of T. F. Murphine, superintendent, and the system will go into effect as soon as the signs have been put up. The stops will be staggered. There are now 197 stops on the line from the terminus on North Eighty-Fifth to the downtown loop. It is proposed to eliminate fifty-eight stops. The average distance between stops now is 376 ft. Under the proposed system, the distance between stops will be 540 ft. The present time of thirty-eight minutes to make the run one way will be cut down so as to effect a saving of eight minutes on the round trip.

Change in Freight and Commodity Rates.—The Public Service Commission of Indiana has authorized interurban railways operating in Indiana to readjust their class freight rates and commodity rates so that the readjusted rates, zones, and classifications shall be on parity with those used and in effect by steam railroads operating in Indiana. E. I. Lewis, chairman of the Indiana Public Service Commission, says that the new rates will be lower than the present rates for all hauls of more than 80 miles, lower than most hauls of more than 60 miles and somewhat higher for hauls less than 60 miles. The new rates represent no general increase, but only readjustment all the way through. The increases will not generally exceed 5 per cent of the present rates, but the decreases on the long-haul business are considerable.

Car Ticket Agencies in Atlanta.—Seven private agencies for the sale of car tickets to the public and to conductors have been established by the Georgia Railway & Power Company, Atlanta, Ga., which is operating under a 6-cent fare with seventeen tickets for $1. Among these seven agencies every route in Atlanta is provided with one or more ticket reservoirs that its cars pass on every trip. The order of the company requests conductors who purchase books at these sub-agencies to use bills in payment, rather than small change, and so to be as little trouble as possible to the people who are handling this service for the company. Conductors are required to start their runs with $10 worth of books, which are issued to them on credit. They can replenish their supply while on duty by purchasing from representatives of the company at downtown points. These new sub-agencies will provide against emergencies overtaking conductors out on their routes.

Personal Mention

Mr. Townley Heads A. I. E. E.

Manufacturer, Former Railway Operator, Elected President of American Institute of Electrical Engineers

Calvert Townley, assistant to the president of the Westinghouse Electric & Manufacturing Company and formerly vice-president of the Connecticut Company, New Haven, Conn., was on May 16 elected president of the American Institute of Electrical Engineers.

Since leaving the operating railway field Mr. Townley has maintained an active interest in railway operation, being at present chairman of the American Electric Railway Association committee on electrolysis. He is chairman of the public policy committee of the A. I. E. E. Mr. Townley was graduated from Yale University in 1886 and later received the degree of mechanical engineer from that university. Immediately after graduation he joined the technical staff of the Westinghouse Electric & Manufacturing Company and from the first showed an interest in electric railway problems. After securing extensive experience in the company's works at Pittsburgh, he was transferred to the Boston office in 1895. Nine years later he took charge of and consolidated for the New Haven Railroad the electric railways which that company had recently purchased in Connecticut. After the formation of the consolidated company he was elected its vice-president. This position he resigned in the summer of 1911 to take up his present work.

CALVERT TOWNLEY

In connection with his duties with the Westinghouse Company Mr. Townley also served for a time as president of the Lackawanna & Wyoming Valley Rapid Transit Company, Scranton, Pa., and its subsidiary companies, representing the Westinghouse interests in that property.

Fred D. Fauser, claim agent for the Peoria (Ill.) Railway, included in the Illinois Traction System, has accepted the position of chief claim agent for the St. Louis (Mo.) Terminal Railroad Association.

Edward M. Hunt, assistant counsel and director of the Trenton & Mercer County Traction Corporation, Trenton, N. J., has returned from overseas, where he was a captain in the service of the American Red Cross in France.

Leon C. Smith, Columbus, Ohio, has been provisionally appointed chief inspector by the Public Utilities Commission of Ohio to succeed James B. Dugan, who recently resigned to become superintendent of the Lima division of the Ohio Electric Railway. Mr. Smith has been assistant to Mr. Dugan.

Robert R. McCoy has been appointed superintendent of the southern division of the Illinois Traction System, with headquarters at Staunton, Ill. Mr. McCoy has recently been discharged from military service. He has been serving the Illinois Traction System at Springfield, Ill., for a number of weeks as trainmaster.

Roy W. George has been appointed superintendent of Division B of the Georgia Railway & Power Company, Atlanta, Ga., succeeding J. M. Means, who has become assistant superintendent of transportation. Mr. George is only thirty-five years old. He became connected with the company at Atlanta in 1902, but left the service for three years and returned in 1906. He was appointed dispatcher in 1915

E. A. Wetmore, who resigned as treasurer of the Boise Valley Traction Company and the Idaho Power Company in July, 1918, has since that time been connected with the ordnance department of the War Department. At present he is supervisor of the finance section of the Ordnance Department for several war contracts which are now being concluded. These are being carried out in Alabama. Mr. Wetmore has not determined upon his future plans, but may return to the electric railway business.

L. M. Helmreich, until recently assistant engineer to the Public Utilities Commission of Missouri, has been appointed engineer of the newly organized Arkansas Corporation Commission to take charge of the general supervision of the utilities operating in that State. He will establish headquarters at Little Rock. Mr. Helmreich was formerly head of the Ranken Mechanical School of St. Louis. He was graduated from the University of Missouri with the degrees of mechanical engineer and electrical engineer.

Edison Medal to Mr. Lamme

A. I. E. E. Award for Meritorious Achievement in Electrical Science Goes to Chief Engineer Westinghouse Company

Benjamin G. Lamme on May 10 was awarded the Edison medal by the American Institute of Electrical Engineers for meritorious achievement in electrical science, electrical engineering, and the electrical arts. In making the award the institute refers particularly to his work as pioneer in alternating current railway development. Mr. Lamme has been chief engineer of the Westinghouse Electric & Manufacturing Company for more than fifteen years. He was born in Springfield, Ohio, fifty-five years ago, and was graduated from the Ohio State University as a mechanical engineer in 1888.

Almost immediately after graduation Mr. Lamme entered the testing department of the Westinghouse Company and he has been continuously with the company ever since. During thirty years he has invented and designed many important pieces of alternating and direct-current apparatus, including railway generators and motors, and holds about 140 patents, many of which are of fundamental importance. In 1900 he was made assistant chief engineer of the company, becoming chief engineer three years later.

B. G. LAMME

Aside from Mr. Lamme's personal engineering activities he acts in an advisory capacity to the whole engineering interests of the company, and is chairman of the company's committee which passes upon new inventions and appliances. He is the author of many technical papers presented before engineering societies. In 1915, upon nomination of the A. I. E. E., he was appointed by the Secretary of the Navy to membership on the Naval Consulting Board, where he served during the period of the war.

J. M. Means has been appointed assistant superintendent of transportation of the Georgia Railway & Power Company, Atlanta, Ga. Mr. Means has been in the service of the company and its predecessors since 1895, with the exception of six years spent in government work. He was appointed division superintendent of the company in 1909. His appointment as assistant superintendent gives the transportation department two assistant superintendents, C. H. Mathews having served in that capacity since January, 1911.

J. L. Murphy has been appointed industrial representative of the Georgia Railway & Power Company, Atlanta, Ga., including the Atlanta Gas Light Company, the Atlanta Northern Railroad and all other subsidiary companies, both inside and outside the 7-mile zone. The industrial representative will work to secure closer relations of co-operation and mutual benefit between the management of the company and its employees. He will try to secure the carrying out of the contracts between the company and the labor unions or associations, not only in letter but in spirit. To this end he will confer with the committees representing the unions and with the rank and file of the employees. He will report direct to the chairman of the board of directors, or the president.

Edward D. Ransom has resigned as assistant engineer for the mechanical department of the Brooklyn (N. Y.) Rapid Transit Company to accept the position of sales engineer in the New York electrical department of the H. W. Johns-Manville Company. Mr. Ransom received his technical education at Union College, Schenectady, where he was graduated in 1910 with the degree of Bachelor of Engineering. He entered the service of the Brooklyn Rapid Transit Company in 1912 as wireman at the Thirty-ninth Street general construction shops. He later served as testing inspector and in 1915 was promoted to the position of assistant engineer. Since that time he has been engaged in operating engineering work for the company. Mr. Ransom has contributed several articles on car equipment maintenance to the ELECTRIC RAILWAY JOURNAL.

Lynn B. Milam has been appointed by Mayor Wozencraft of Dallas, Tex., as supervisor of public utilities to succeed M. N. Baker, who resigned with the change in city administration. The appointment has been confirmed by the City Commissioners. Mr. Milam was born in South Dakota, and his parents moved to Texas shortly afterward. He was educated in the public schools of Dallas, and later attended Drury College at Springfield, Mo., and took a course in law at the University of Texas, where he received the degrees of A. B. and LL. B. He entered the newspaper field, but after working for a short time in Dallas and Austin he gave up newspaper work and began the practice of law. He has specialized in corporation law and was associated with the Dallas firm of Thomas, Milam & Touchstone. Mr. Milam had no experience in traction matters other than in the practice of law until his appointment as supervisor of public utilities.

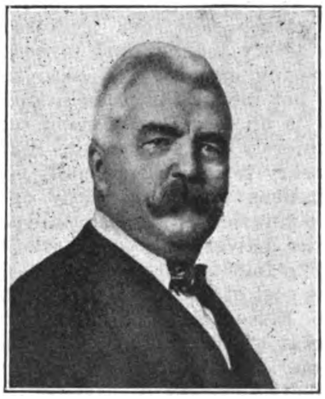
Obituary

Prepayment Inventor Dead

Duncan MacDonald, Inventor and Former Manager of Montreal Street Railway, Died May 8

Duncan MacDonald, formerly manager of the Montreal (Que.) Street Railway, who invented and patented the pay-as-you-enter system of car operation adopted in Montreal in 1905, died of tuberculosis at St. Agathe on May 8.

The great work for which Mr. MacDonald will always be remembered by the industry was his development of the pay-as-you-enter car in conjunction with W. G. Ross, then general manager of the Montreal Street Railway. It took a great deal of courage to believe that the public as well as the operators would appreciate the benefit of changing from collection within the car to collection on the platform. Mr. MacDonald and his associates, however, acted on the theory that the change would be successful if it was accompanied by improvements in car construction and service that carried assurance to the public that the modification of fare collection practice was intended primarily for their advantage. Thus the inauguration of prepayment was the impulse which led to such remarkable improvements in the design, equipment and operation of rolling stock on the city railways in the United States and Canada.



DUNCAN MACDONALD

Mr. MacDonald was born on June 17, 1859, at St. Thomas, Que. He was educated at Rimouski College. He entered electric railway work as a conductor when he was twenty years old and served as roadmaster, inspector, assistant superintendent, engineer and general manager of the Montreal Street Railway. His continuous service at Montreal was broken, however, during the period 1902 to 1904 when he was employed as managing director for 400 miles of tramway in and around Paris, France.

Mr. MacDonald resigned his position as general manager at Montreal on July 5, 1912, and opened offices there to devote his time to various interests with which he was identified. On April 6, 1914, he was elected a member of the Board of Control by the city of Montreal and served as a controller for two years. In the civic elections of April 3, 1916, he was a candidate for the office of Mayor but was defeated. He retired to private life in 1916. He was president of the Montreal Tunnel Company, Montreal; president of the South Shore Land & Improvement Company; vice-president of the Dominion Park Company and, following the development of the prepayment car, was president of the Prepayment Car Sales Company.

Paul Lüpke, one of the pioneers in the electrical industry, died on Feb. 9. Mr. Lüpke was born in Osnabrück, Germany, in 1861, and was educated at the local Real-Gymnasium and at the Royal Polytechnic Institute, Stuttgart, Württemberg. Prior to coming to the United States in 1884 he had been connected with the Siemens & Halske Works in Charlottenburg and the Allgemeine Elektrizitäts-Gesellschaft in Berlin. At the time of his death Mr. Lüpke was in charge of the extensive library of the three companies which make up the Public Service Corporation of New Jersey, besides being editor of *Service*, the official publication of the corporation. For many years he was superintendent of the southern division of the Public Service Electric Company at Trenton, N. J.

Emil Swensson, for twenty years a consulting engineer of the Manhattan Elevated Railway, New York, and for nearly as long a technical adviser of the Pittsburgh (Pa.) Railways, died on May 13 in his home in Pittsburgh. Mr. Swensson was born in Sweden and was educated in the government technical schools of that country, coming to the United States shortly after graduation. He started as a draftsman, but soon became division engineer of survey and construction for the ill-fated South Penn Railroad project. Later he was connected with the American Bridge Company, but resigned from that company to take up private practice. One of Mr. Swensson's most important works was his study of the Pittsburgh traction situation several years ago. At that time he prepared, at the behest of Mayor George W. Guthrie, a report recommending improvements in construction and treating of subway propositions, that has since proved one of the standard documents in the never-ending discussion of transportation in Pittsburgh. Mr. Swensson designed or helped design many buildings in Pittsburgh, Chicago and New York. He also was widely known as a bridge engineer. He is survived by his widow, a daughter and three sons.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES . BUSINESS ANNOUNCEMENTS

Better Market Ahead

With Last of Liberty Loans Over Money Should Be Freer for Industry

One, and perhaps the greatest, of the difficulties that lie in the path of the electric railway purchasing agents is that of getting the necessary money. For some time the money market has been in the position of not wanting to place long loans. The demand of the government for money has made it necessary for the banks and other financial interests to keep their assets quick for the government. Now the last of the Liberty Loan campaigns is over. In this drive the banks and other interests with large sums of money to invest were not required to place as much money in the Victory Notes as they had expected. Consequently, the day of freer money for the industries among which must be included the electric railways appears to be nearer.

Easier money should mean greater expenditures by the electrics and therefore better market conditions. For some time the market has been open almost wholly for maintenance equipment. There now seems a possibility of a new equipment market opening up soon in appreciable volume.

Fare Register Outlook Hopeful

While Discussing General Business Conditions, John F. Ohmer Tells of Increasing Production

Well-defined prosperity ahead was the keynote of an interview on general business conditions in the Dayton *Sunday Journal* with John F. Ohmer, president of the Ohmer Fare Register Company, being one of a series with Dayton business leaders. The following paragraphs taken from the interview are particularly interesting.

"There is going to be," said Mr. Ohmer, "a great scarcity of labor within the next few months.

"Unfortunately, there is a tendency among too many people to believe that a reduction or curtailment in the amount of production is necessary in order to stimulate the demand for labor. They overlook the fact that we must have greater production in order to reduce the cost of manufacturing.

"Because of the depleted world stocks I can see no hope of a reduction in the high cost of manufacturing or the high cost of living for another year, after which we will enter into a plane of business never before experienced, and this will continue for several years.

"In our own business we still are engaged in filling our contracts for the government, but we are gradually tapering down this production for government purposes and proportionately increasing the production of our own commodities, the demand for which is very good at this time. With the final development of new things in our line, the outlook is most hopeful."

Automatic Substation Equipment Demand Increasing

Factory Production at Capacity with Sales Largely to Long Interurban Systems

One of the more recent developments in electric railway work is the automatic substation. Its utilization, at first rather slow, has increased in a satisfactory manner and present manufacturing capacity has been reached. It is not meant that substation equipment is up to manufacturing capacity, but merely the automatic equipment necessary to convert manually operated substations to automatically operated. While rotaries are running about three months delivery the automatic control is up to four and five months.

The cost of automatic equipment cannot be given as any fixed percentage of the cost of the remainder of the substation. That is, the cost to equip with automatic control a 600-kw. station would not be double that for a 300-kw. station. There would be a slightly higher cost for the larger capacity contactors, buses, etc., but nothing in proportion to double. The difference in cost for substations of different voltage, however, runs in the neighborhood of 10 to 15 per cent increase for the higher primary voltages.

To offset the cost of the automatic equipment there is found reduced labor costs for operation, smaller substation equipment and better copper distribution along the line. Labor charges in substation operation are considerable and the main feature of this equipment is the reduction in labor.

Frequently the capacity of the station equipment may be reduced under automatic control to about 80 per cent on the direct-current side. This may mean considerable saving in copper and equipment.

Large interurban lines have special adaptation for this automatic equipment, as the substations run for rather long periods of time without load. The West and Middle West have taken to this equipment more than has the East, and naturally so, as there is more heavy interurban traffic in these sections.

Outlook on Prices

Price of Labor Cannot Yet Come Down, Says Roger W. Babson—Few Radical Declines Looked For

A recent statement by Roger W. Babson, dealing with the outlook on prices, states that "No single question appears to bear more vital relation to the speedy return of nation-wide prosperity than the question of prices. With each month that has passed since the signing of the armistice, developments have tended to upset preconceived ideas as to exactly what would happen. The one outstanding fact is that in spite of the most highly competitive conditions, brought on by a scarcity of orders in many industries, prices have not materially receded, excepting for raw materials.

"Many who have pinned their faith to lower prices are pointing to declines in the cost of a few raw materials like cotton, wool and leather. They forget that wearing apparel and other manufactured products, before reaching the public, have gone through so many hands and processes, all requiring labor in its broadest sense, that the final cost is largely determined by the labor cost. We should not forget that 75 per cent or more of the total cost of most commodities consists in labor in some form or other. The price of labor cannot come down in this country as long as we have the present potential scarcity of workers, great latent demand for goods, high taxation and world scarcity of food.

"Exactly what will happen to prices in the near future no one can of course definitely foretell. However, expectations which are entertained as to speedy and radical declines, except where profits can be shown to be excessive, are apparently based more on hope than on a careful study of the law of supply and demand. Raw materials and foodstuffs will be lower; but otherwise we surely are on a new price level for some time to come. There is little likelihood of a sudden fall in manufactured goods in the near future beyond the elimination of war prices made necessary to stimulate production in high cost plants."

Guy Insulators Slightly Higher

In the market for line material there has been reported an increase of 5 per cent in the price of high-voltage porcelain guy insulators. No special increased domestic demand has been noted. Factory deliveries have been given as two weeks. On line material in general, however, there has been a favorable increase in foreign demand.

Trade Opportunities Abroad

A man in Switzerland (No. 29,115) desires to secure an agency for the sale of electrical apparatus such as dynamos or electric locomotives. Correspondence may be in English. A firm in this country (No. 29,153) with a branch in Italy, and also proposing to open offices in other European countries, desires to secure agencies for the sale of electrical railway equipment, insulated wires and cables. Where the item is numbered, further information can be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., by mentioning the number.

Rolling Stock

Madison (Wis.) Railways announces its intention to purchase fifteen one-man safety cars.

Richland Public Service Company, Mansfield, Ohio, has ordered two sets of General Electric air brakes for cars formerly equipped with hand brakes.

North Branch Transit Company, Bloomsburg, Pa., announces that there is under construction for that road one trailer dump ash car and one two-motor work and ash car.

Cincinnati Traction Company, Cincinnati, Ohio, announces through vice-president Walter A. Draper that an order has been placed for 105 new double truck, pay-within type, four-motor cars.

Recent Incorporations

Bay City Southern Railroad, Lansing, Mich.—Articles of incorporation will be filed with the Michigan Railroad Commission by the Bay City Southern Railroad, which plans to construct a combination gas and electric line to connect Lansing, Dewitt, St. Johns, Mape Rapids, Middleton, Perrinton, Ithaca, St. Louis, Breckenridge, Wheeler, North Wheeler, Midland, Bay City, west and east sides, 125 miles. The road will be capitalized at $1,000,000. It is reported that the proposition involves the purchase of the Lansing-St. John's line of the Michigan United Railways and the Midland-Bay City branch of the Michigan Central Railroad.

Franchises

Sacramento, Cal.—The Pacific Gas & Electric Company has asked the City Commission of Sacramento for a ten-year extension of its franchise on J Street between Second and Third Streets.

Detroit, Mich.—The Detroit & Lake St. Clair Railway (a part of the Detroit & Port Huron Shore Line Railway) has been granted a thirty-year franchise by the City Council to construct a double track on Fisher Road and Grosse Pointe Boulevard, from Jefferson Avenue to Weir Lane.

Trenton, N. J.—The Trenton & Mercer County Traction Corporation has received permission from the City Commission of Trenton to construct double tracks on Mulberry Street and Center Street.

Track and Roadway

Trinidad, B. W. I.—According to Consul Baker, Trinidad, British West Indies, is seeking more up-to-date equipment for its railways. Plans are under way to improve yard and shop lighting and two oil engine lighting generators of about 50-kw. capacity each are needed. Stations are to be lighted by a battery system at present used on the cars. Hand brakes are to give way to air equipment.

Municipal Railway of San Francisco, San Francisco, Cal.—Work will be begun May 20 on the relocation of the tracks of the Union Street line of the Municipal Railway. The double track on Union Street will be extended from Franklin Street to Van Ness Avenue and a new connection will be made between the tracks in Vallejo Street and in Van Ness Avenue by a double track out of Vallejo Street into Van Ness. All the present track in Franklin Street and in Vallejo west of Union will be removed. The new route of the Union Street cars will be from Vallejo Street into Van Ness Avenue and northerly along Van Ness to Union and then west on Union.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—The Fort Wayne & Northern Indiana Traction Company will double-track its line on Calhoun Street between Creighton Avenue and Pontiac Street.

NEW YORK METAL MARKET PRICES

	May 1	May 15
Copper, ingots, cents per lb	15 37½	16 00
Copper wire base, cents per lb	17.25 to 18 00	17.25 to 18.00
Lead, cents per lb	5.00	5.00
Nickel, cents per lb	40.00	40.00
Spelter, cents per lb	6.45	6.40
Tin, cents per lb	†72.50	†72.50
Aluminum, 98 to 99 per cent., cents per lb	31.00 to 33.00	32 00

† Government price in 25-ton lots or more f.o.b. plant.

OLD METAL PRICES—NEW YORK

	May 1	May 15
Heavy copper, cents per lb	13 50 to 13.75	13.50 to 14.00
Light copper, cents per lb	11 00 to 11.25	11.00 to 11.25
Heavy brass, cents per lb	7.50 to 8.00	7.50 to 8.00
Zinc, cents per lb	5.25 to 5.50	5 00 to 5.25
Yellow brass, cents per lb	6.50 to 7 00	6.50 to 7.00
Lead, heavy, cents per lb	4.00 to 4 25	4.25 to 4 37½
Steel car axles, Chicago, per net ton	$23 00 to $25 00	$23.00 to $24 00
Old carwheels, Chicago, per gross ton	$21 00 to $22 00	$21.00 to $22 00
Steel rails (scrap), Chicago, per gross ton	$17 00 to $17 50	$16 50 to $17.00
Steel rails (relaying), Chicago, gross ton	$17 00 to $17 50	$16 50 to $17.00
Machine shop turnings, Chicago, net ton	$6.00 to $7.00	$6 00 to $6 50

ELECTRIC RAILWAY MATERIAL PRICES

	May 1	May 15
Rubber-covered wire base, New York, cents per lb	20	20
Weatherproof wire (100 lb. lots), cents per lb., New York	23 00 to 23.25	23.00 to 23.25
Weatherproof wire (100 lb. lots), cents per lb., Chicago	23.75 to 37.35	23.75 to 37.35
T rails (A. S. C. E. standard), per gross ton	$49.00 to $51 00	49.00 to 51.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	$47 00 to $49 00	47.00 to 49.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$45.00 to $47.00	45.00 to 47.00
T rail, high (Shanghai), cents per lb	3	3
Rails, girder (grooved), cents per lb	3 75	3.75
Wire nails, Pittsburgh, cents per lb	3.25	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3 35	3 35
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	2.75	2.75
Tie plates (brace type), cents per lb	2.75	2 75
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb	3	3
Angle plates, cents per lb	3.90	3 90
Angle bars, cents per lb	3.90	3.90
Rail bolts and nuts, Pittsburgh base, cents per lb	4 35	4 35
Steel bars, Pittsburgh, cents per lb	2 35	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4 20	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.25	5.25
Galvanized barbed wire, Pittsburgh, cents per lb	4.10	4.10

	May 1	May 15
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.70	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount †	80%	80%
Car window glass (single strength, first three brackets, B quality), New York, discount	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount	81%	81%
Waste, wool (according to grade), cents per lb	14 to 17	14 to 17
Waste, cotton (100 lb. bale), cents per lb.	8 to 13½	8 to 12½
Asphalt, hot (150 tons minimum), per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton		
Asphalt filler, per ton	$30.00	$30.00
Cement (carload lots), New York, per bbl	$2.90	$2 90
Cement (carload lots), Chicago, per bbl.	$3.05	$3.05
Cement (carload lots), Seattle, per bbl.	$3.13	$3.13
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.61	$1 59
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.68	$1.61
White lead (100 lb. keg), New York, cents per lb	13	13
Turpentine (bbl. lots), New York, cents per gal	78	78

† These prices are f. o. b. works, with boxing charges extra.

Bangor Railway & Electric Company, Bangor, Me.—Work is progressing on the reconstruction of the Center Street line of the Bangor Railway & Electric Company. This is the first of a series of improvements to be made by the local company during the present year, including the reconstruction of its line on Garland Street.

New York Municipal Railway, Brooklyn, N. Y.—Among the first official acts of Lewis Nixon, who was recently appointed Public Service Commissioner for the First District of New York to succeed Travis H. Whitney, Charles S. Hervey and Frederick J. H. Kracke, was the awarding of a contract to Thomas Crimmins Contracting Company, New York, for the installation of tracks in the Sixtieth Street Tunnel portion of the Broadway subway, at $94,073. This line connects the Brooklyn Rapid Transit subway in Manhattan with the existing elevated lines in the northern portion of Queens over which the Brooklyn Rapid Transit possesses trackage rights in connection with the Interborough Rapid Transit Company. Commissioner Nixon has also urged the Board of Estimate and Apportionment to give its early approval to a contract for the completion of the elevated portion of the Pelham Bay Park branch of the Lexington Avenue subway, which is urgently needed to provide rapid transit for the extreme eastern portion of The Bronx. Commissioner Nixon also directed the beginning of operation of a new portion of the Culver elevated railroad in Brooklyn from Kings Highway to Avenue X.

Richland Public Service Company, Mansfield, Ohio.—A report from the Richland Public Service Company states that it has just ordered 105 tons of 100-lb. A.R.A. type A rail for 3500 ft. of track reconstruction, 600 International twin steel ties and one left-hand branch-off and one diamond turnout.

Grand River Railway, Galt, Ont.—The Grand River Railway contemplates the reconstruction of 7½ miles of track between Preston and Kitchener with 80-lb. rails.

Power Houses, Shops and Buildings

Arizona Power Company, Prescott, Ariz.—A 4000-volt electric power transmission line will be erected by the Arizona Power Company from its power station near Highball to Phoenix, 70 miles. The purpose of the proposed line is to provide auxiliary power for the system of the Pacific Gas & Electric Company at Phoenix. The company also has other important extensions to its power system under consideration.

Iowa Southern Utilities Company, Centerville, Iowa.—David G. Fisher & Company, Davenport, Ia., who now control the Iowa Southern Utilities Company, plan important improvements to the power plant of that company at Centerville.

Tri-City Railway & Light Company, Davenport, Iowa.—The Moline & Rock Island Manufacturing Company, a subsidiary of the Tri-City Railway & Light Company, has asked for bids on the erection of a $40,000 concrete stack, 237 ft. high, with an inside diameter at the top of 13 ft. 6 in. Eight steel stacks now serve the boilers at this plant. The concrete stack will replace them.

Springfield (Mass.) Street Railway.—A contract has been awarded to E. J. Pinney by the Springfield Street Railway for the alteration of its carhouse on Bond Street at a cost of about $15,000.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.—Plans have been completed by the Grand Rapids, Grand Haven & Muskegon Railway for the construction of a portable automatic substation at a cost of about $30,000.

Kansas City & Leeds Electric Railway, Kansas City, Mo.—The Kansas City & Leeds Electric Railway, which proposes to construct a line from Kansas City to Leeds, will erect an interurban station at Thirty-first and Hardesty Streets. The structure will be 300 ft. x 125 ft., six stories and basement, of terra cotta, steel and reinforced concrete with composition roof. The cost will be about $150,000.

Trade Notes

Ohio Brass Company, Mansfield, Ohio, announces that on May 1, its Chicago office moved from 508 Fisher Building to 1217 Fisher Building, 343 South Dearborn Street.

Capt. J. A. McIntosh, who has been in the service overseas with the Tank Corps, has returned to his former position in the engineering department of the Ohio Brass Company.

Wheeling Condenser & Engineering Company, Carteret, N. J., reports that in the month of April it manufactured and shipped 879,900 lb. of seamless drawn brass and copper condenser tubes.

E. C. Camp has been elected assistant treasurer, assistant to the president, of the Solar Metal Products Company, Inc., Columbus, Ohio. He continues his work as sales manager in charge of sales and advertising.

Railway Improvement Company, New York City, announces that Stone & Webster have placed an order with them through Roscoe Reed, receiver, for a complete equipment of coasting recorders on their Paducah, Ky., property.

Bittman & Battee, Inc., manufacturers' agents, 84 Second Street, San Francisco, have been appointed representatives of the Hazard Manufacturing Company of Wilkes-Barre, Pa., manufacturers of steel and wire rope, electric wires and cables, etc.

Major Rowland Tompkins, A. E. F., formerly associated with Almirall & Company, Inc., New York City, has become a member of the Shevlin Engineering Company, Inc., 110 West Thirty-fourth Street, New York City, manufacturer and contractor for the installation of boiler-plant equipment.

Ross F. Hayes, for the past twelve years Eastern manager of the Curtain Supply Company, of Chicago, has been appointed general sales manager of the company. Mr. Hayes will make his headquarters at his former office, 30 Church Street, New York, and will also act as Eastern manager of the company.

J. N. Ebling has returned from service with the American Expeditionary Forces in France and has resumed his duties as president of the Railway Specialties Corporation, 30 Church Street, New York City. He announces that D. A. Munro, former secretary of the corporation, is no longer connected with it.

Western Electric Company, New York, N. Y., reports several changes in its organization, to take effect June 1. Among them, J. M. Skinkle, formerly with the engineering department, has been appointed assistant manager of the government department with headquarters at New York; J. A. Pizzini, formerly sales manager at the New York office, has been appointed assistant manager at the same place; W. J. Drury, until recently manager of the Cleveland office, succeeds Mr. Pizzini; A. M. Collins, formerly sales manager of the Detroit office, succeeds Mr. Drury, and A. R. Maynard, until recently with the sales department in Chicago, succeeds Mr. Collins.

William J. Norton of Norton, Bird & Whitman has completed his work as general superintendent of the Aberdeen Proving Ground Contract of the Maryland Dredging & Contracting Company, and, in addition to his offices in Chicago, Baltimore and Boston, has opened offices in the Astor Trust Building, 501 Fifth Avenue, New York City, where he will continue his consulting work on utility rate regulation problems. In addition, in association with The Withington-Roberts-Wright Company, of Cleveland, Ohio industrial architects and engineers, he will engage in general industrial engineering, including certain large construction projects upon which preliminary surveys are now under way. It is of interest that Travis H. Whitney, who has just retired as chairman of the New York City Public Service Commission, will become counsel to Mr. Norton and his associates, occupying offices with them at 501 Fifth Avenue, New York City, and will also be associated with them in projected enterprises.

New Advertising Literature

Trading With China.—The Guarantee Trust Company of New York City has issued a pamphlet entitled "Trading with China," in which are set forth methods found successful in dealing with the Chinese.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, May 24, 1919 *Number* 21

Possible Reforms Are Denied to Private Companies

DEVELOPMENTS in Seattle since the municipality took over the transportation system give a somewhat amusing illustration of the difference that a point of view makes. For years the privately operated company in that city struggled along against adverse circumstances, getting no substantial help from the local authorities. Conditions there were practically the same as with other railway properties in all sections of the country. Immediately upon securing possession of the system, the city, under the direction of the superintendent of public utilities, quickly found ways to put into effect methods of economy which would have been thought improper concessions when the system was privately owned. Among the changes which have either been made effective or are contemplated are: Abolishing of all free rides, including city officials, firemen and policemen; inauguration of skip stops; prohibition of the parking of automobiles in the business district, and abandonment of non-productive feeder lines. Here we have a repetition of the policy of the federal government after it had taken over the steam roads and suddenly found it necessary and practicable to advance passenger and freight rates, although the Interstate Commerce Commission could not see its way clear to do this before. The changes made in Seattle are only part of what could be done for public utilities elsewhere. When the public has the whip hand, however, it does not believe in making concessions to the privately owned or operated companies. The people do not seem to realize that the betterment of their communities is bound up in the transportation systems. Perhaps a few more cases like that of Seattle will help to convince them that these companies have been seeking only justice, and what is fair for one is fair for another. These instances may not be without beneficial results.

Federal Commission Authorized

WE WELCOME the news of the approval by the President of a federal commission to take up the problems of the electric railways and to be composed of representatives of the departments of Commerce, Labor and the Treasury, the municipalities, the commissions, the bankers, the operators and the operatives. The matter is of national importance for several reasons. One of these is because any general impairment of the country's local transportation systems is bound to have a serious effect on all business and commerce. A second reason is that the securities of these companies are very widely held by individuals and institutions throughout the country and form the basis for credit which is being imperiled by the present situation. A third incentive to federal action is found in the interests of the three hundred thousand employees of these properties. We hope the proposed investigation will speedily remove the obstacles which in various municipal and commission jurisdictions have prevented electric railways from securing rate justice.

New York Law Makes Employment of Women Impracticable

THE welfare workers of New York have had their way and there is now on the statute books of that State a law which provides that women employees of transportation companies cannot work more than nine consecutive hours a day, fifty-four hours each week, six days each week, or before 6 a.m. or after 10 p.m. The result of this must be the practical disappearance in New York of women from a field which afforded higher pay and less arduous conditions than many other lines of work open to them. The exigencies of city traffic absolutely necessitate "swing" runs and as long as there is a morning and an evening peak the employee who is not permitted to work more than nine consecutive hours cannot fit into schedules which such circumstances require. A possible alternative would be to give them short runs as morning or evening trippers, but as these runs would amount to not more than from three to five hours a day, it is hardly possible that this plan would afford at the hourly rate sufficient remuneration to the employee to make these runs worth while. An especially unfortunate feature of the situation is that the law applies not only to women conductors but to women ticket choppers and ticket sellers as well. While the use of female help on the cars is of recent introduction, many of the ticket sellers have been in the employ of the Brooklyn Rapid Transit Company for years, and they suddenly find themselves deprived of remunerative employment through no wish of their own or of that of the employing company.

While the field for women in railway service has its limitations, it is undoubtedly true that the women have made good in this line of work in New York to the extent that they have been employed. According to all accounts man labor will continue scarce, and for this reason the transportation companies would probably have kept its women employees in service as well as because it felt gratitude to them for having helped out in an emergency. But now that the law has made this impossible the best they can do is to wish the women good luck and the speedy acquisition of other remunerative work.

Retain Policy of Stop Omissions

AN OPERATING company in the East, in service improvement news prepared for the local dailies, announced recently that it had restored many of the stops discontinued during the height of the war for the purpose of fuel saving. Granting that the addition of stopping points is sometimes a local convenience, it seems unfortunate, none the less, to be obliged to restore these unless a company finds it impossible to continue to operate at a profit on the limited service plan.

We believe that emphasis should be laid upon the improvement to the service as a whole and to that of particular neighborhoods resulting from curtailment of stops, and that the restoration of stops should never be taken as publicity material for illustrating service betterments. In countless instances the lengthening of space between stops results in faster transit even for the patrons of a company who walk a greater distance to or from their cars. No sensible manager would advocate utterly unreasonable distances between stops, but it is easy to demonstrate that before the war stops on many systems were far too close together, and now that the public has become used to the change, it seems a great pity to attempt to revert to the old practice. The public, as well as the company, is the gainer by the operation of a plan of restricted stopping points.

Bigness Brings Its Own Problems

THE Toledo joint company section of the American Electric Railway and other national associations contains practically 1000 electric railway members. The very magnitude of this membership must impose heavy burdens upon the local management because the interests of the members are so diversified. The same situation is facing other company sections on a smaller scale, and will confront more as the membership expands under the relief from war-time pressure. A good salesman can get people into a company section, or into any worthy organization for that matter, but it takes an administrator of experience and judgment to maintain the interest of the members and continue to benefit them after they have joined. A few thoughts along this line may prove suggestive.

Section meeting programs should combine instruction and entertainment, each in such measure that the average attendant goes home feeling more kindly toward his associates and with a thought in his head which he can apply in his daily work. During the war the tendency seems to have been to run largely to entertainment, presumably as an offset to the depressing conditions of every-day life, but the company section will fail of its main purpose if it does no more than entertain its members. On the other hand, heavy lectures are out of place at the meetings because the men are tired after a long day's work and instruction for them must be put into tabloid form, sugar-coated. Entertainment of large groups is easier than instruction, hence the danger of overdoing the amusement features. To simplify the instruction work it may be wise to divide very large sections into departmental groups for various discussions, with general gatherings for social purposes.

We hope and believe that the company section movement will soon take a spurt. But a spurt is only a means to an end. Long-run success depends upon the thought that is put upon the devising of programs of real merit.

Is the Trolley in Danger of Becoming Extinct?

IN ITS ISSUE for May 17 the *Literary Digest* presents a rather miscellaneous collection of clippings relating to the present electric railway situation under the heading "Is the Trolley in Danger of Becoming Extinct." While the general impression given by the article is a fair picture of the electric railway business at the moment, the reader is left somewhat in the air as to whether the country is soon to be deprived of its electric railway service, some other transportation agency displacing it.

The thoughtful railway man asks himself frequently: "How long can we continue to give service under the present conditions?", but he hopes and believes that conditions are going to be ameliorated soon. The *Digest* says: "The vanishing trolley car may disappear completely if present tendencies continue." Quotations show that this conclusion is based in part at least upon a statistical article in one of the New York daily papers, in which the writer intended to demonstrate the urgent need of the utility for help in the present crisis, rather than to suggest its possible doom.

The *Digest* was undoubtedly influenced also by an erroneous report that "Five hundred members of the American Railways Association" (whatever that is) "recently got together and passed resolutions urging the traction managers everywhere to 'lend all possible aid in the promotion of legislation to bring about the public ownership of all electric railway lines.'"

Now with all due appreciation of the gravity of the present situation, we cannot overlook certain facts bearing upon the situation. We feel, in fact, as did Mark Twain when he said that certain reports of his death were greatly exaggerated. As for the "vanishing" characteristic of the trolley car, statistics fail to disclose it. The Census Bureau figures just issued show a total of nearly 103,000 cars in use in 1917 as compared with slightly more than 94,000 in 1912. A canvass made by this paper a few months ago checked closely with the above as to total and showed that more than 2400 cars were ordered in 1918. These numbers are not as large as the public and railway managers would like to see, but they do not indicate that the electric railway is a vanishing quantity. It is safe to say that there is more demand for electric railway transportation, taking the country by and large, than ever before. The only trouble is that the public does not realize fully yet that the railways are subject to the higher cost of operation which affects every other industry and that they must have more money. Higher net earnings, based on a system of higher fares, would cure all the railways' present ills. Until they are secured, the electric railways cannot give the service which the public needs. Some will pass into the hands of receivers and a few of the weaker lines may be abandoned, not in favor of any substitute but because they are prevented from charging an adequate fare. It is this very permanence of the electric railway as a whole which is an added reason for its fair treatment by the public.

Track Spiral Standardization Deserves Further Consideration

ABOUT one year ago the columns of this paper contained a number of communications relating to the securing of greater uniformity in track spirals. The subject is still before the committee on way matters of the American Electric Railway Engineering Association, ond it may not be out of place to comment upon the sentiments so far expressed. In the first place, we are inclined to the view that in the general consideration of this subject the main object has been partly overlooked, and that there has been much criticism with but little of helpful suggestion. While it is interesting to consider reasons why it would be impracticable to adopt a set of track spiral standards it is more important to point the way to ultimate adoption of such standards.

We take it to be the object of the committee's investigation, first, to determine whether it is possible to find or develop a suitable system of spirals. Since there are three principal manufacturers' spirals now largely used, it may safely be said that it is possible. Second, the fact that most railways use some of these three spirals indicates that standards are not only possible but also very desirable.

If we are to get anywhere there must also be an agreement in effect that some sacrifices are necessary in obtaining the object sought; hence the problem should be approached with an open mind and in the spirit of compromise. Perhaps the system of spirals proposed by E. M. T. Ryder was, to some extent, too radical in outlining a comparatively new system throughout. In view of the discussion thereon we think it very likely that the committee should abandon the attempt to produce something entirely new, particularly because the system proposed by Mr. Ryder does not vary much in final results from existing systems. Would it not be better to take a census of the use of the three manufacturers' spirals and, with the most popular one as a basis, to settle upon the few modifications needed to provide for American Electric Railway Engineering Association switch pieces and then adopt it as a standard? It would thus be possible to utilize existing patterns, which practically every manufacturer already has, for the several manufacturers' spirals in current use. In the meantime it must be taken for granted that no single standard can be put in effect universally overnight.

In connection with the foregoing suggestion that one of the existing manufacturer's standards be selected it is to be remembered that one contributor to the discussion last year made the suggestion that the railway companies should use exclusively the spirals of the largest three steel companies. We feel sure that most companies already use those of one of the three, although a few large railway systems have adopted their own spirals, which may or may not be the same as any one of the manufacturers' spirals. Meanwhile it is well known that the manufacturers want a standard but have been unable quite to agree as to which one of their own to select. Here, then, is the chance for the way committee to accomplish results, particularly in view of the fact that the manufacturers have stated more than once that they would be willing to adopt, as standard, any one of the three principal spirals if the Engineering Association would only make the selection. Why not take them at their word?

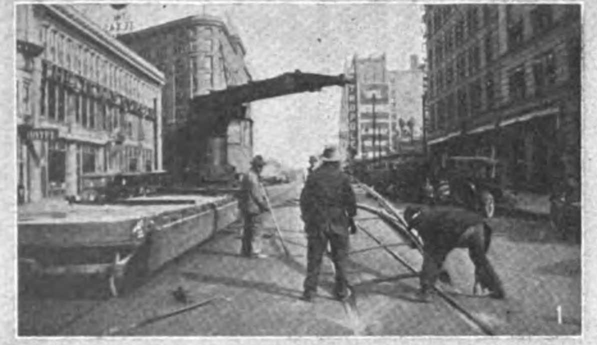
In making the selection the committee should not lose sight of the fact that the manufacturers' spirals do not provide sufficient length to permit the insertion of A. E. R. E. A. switch pieces in plain ends. There should be a sufficiency in range to meet average conditions and perhaps the plain ends may need some revision in any case. All data should be figured to the inside gage line and, if possible, the system of rotation should be made to conform with that of the American Railway Engineering Association. Meanwhile, Victor Angerer's suggestions in regard to using fewer and longer chords and cutting out unnecessary refinements should be borne in mind.

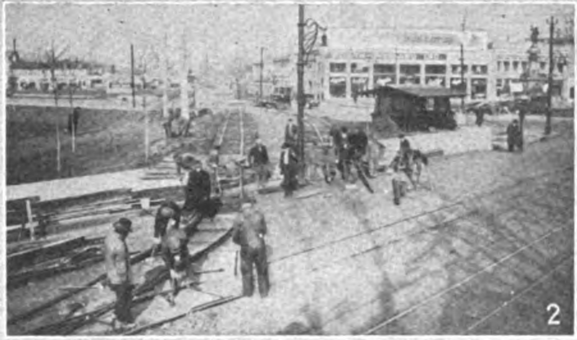
Electric Railways Can Profit by N. E. L. A. Committee Work

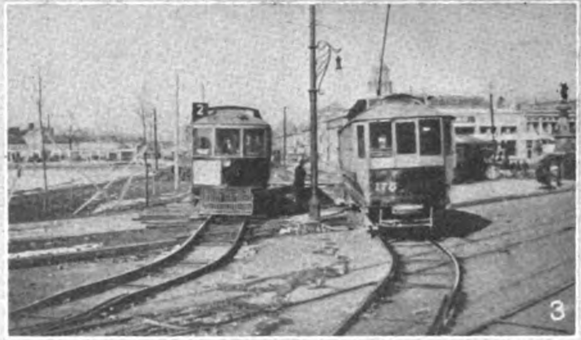
ELECTRIC railway engineers who have anything to do with the generation or distribution of electric power appreciate the thorough work done each year by the committees of the National Electric Light Association which study this part of the field of that society. At least they appreciate this work if they are familiar with it. The power end of the electrical business is so large, so technical and so vital to the welfare of that industry that we may properly look to the N. E. L. A. for the most thorough and comprehensive studies in the power field. The results of the activities of the prime movers, electrical apparatus, underground construction and other committees are particularly valuable this year and we are, therefore, giving considerable space to abstracts of them in this issue. The reports themselves are very voluminous and they should be studied in detail by specialists.

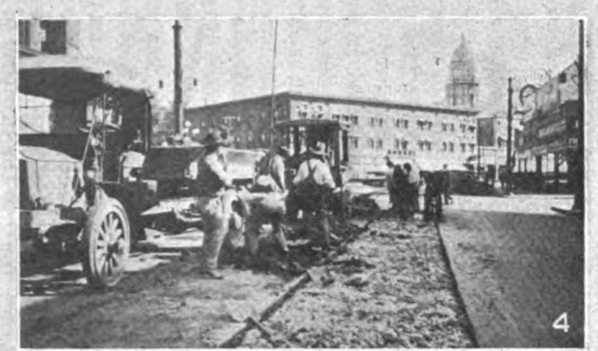
War-time conditions have imposed unforeseen difficulties upon both the manufacturers and users of electrical apparatus of all kinds. This situation is clearly evident in the reports. There have been notable improvements in turbines, boilers and their furnaces, electric generators, cables, etc., but the difficulties of obtaining good material and first-class workmanship have been reflected in the operating records. Turbine trouble has been all too prevalent, due not to faulty design but to the impossibility of getting into a finished machine what the designers intended. A considerable number of generator fires were reported, due presumably to the difficulty of securing first-class operation, combined, no doubt, with the same shortcomings as appeared in turbines. In power distribution, war industries have superimposed high load-factor loads on distribution cables, reducing their carrying capacity as judged by pre-war standards.

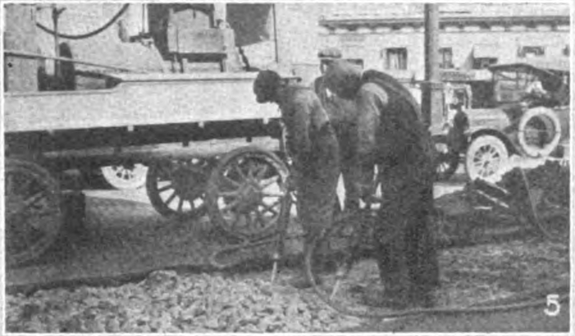
All in all, the war period has been a hard one for the producer of electric power, but he has, to speak broadly, risen marvellously to the emergency. Power generation was considered so vital to the prosecution of the war that the industry was highly favored by the government. Such limitations as surrounded it were necessities of the time. The manufacturers and operators who devoted their energies during the war period to the insuring of an adequate and reliable power supply performed a patriotic duty of no mean magnitude.

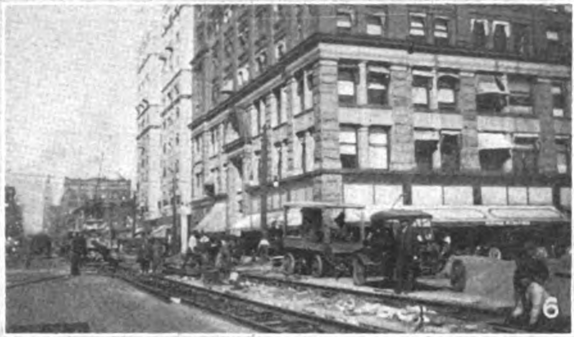


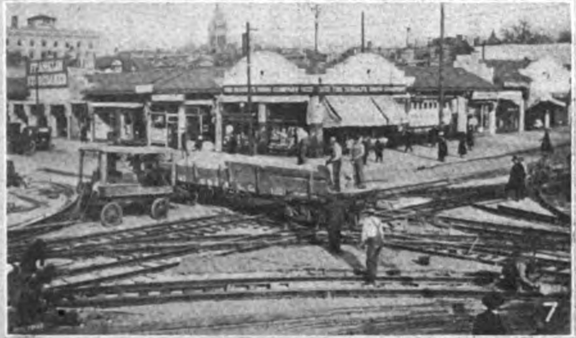


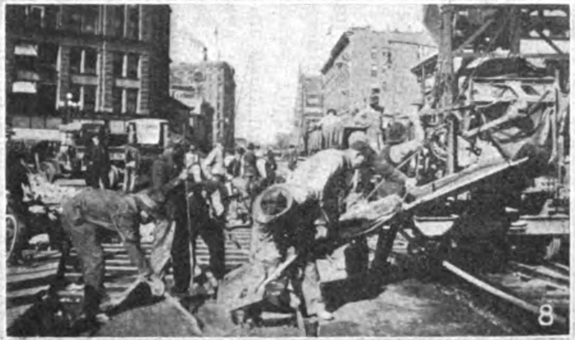


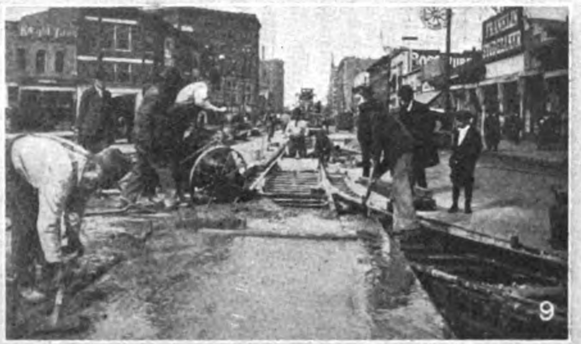












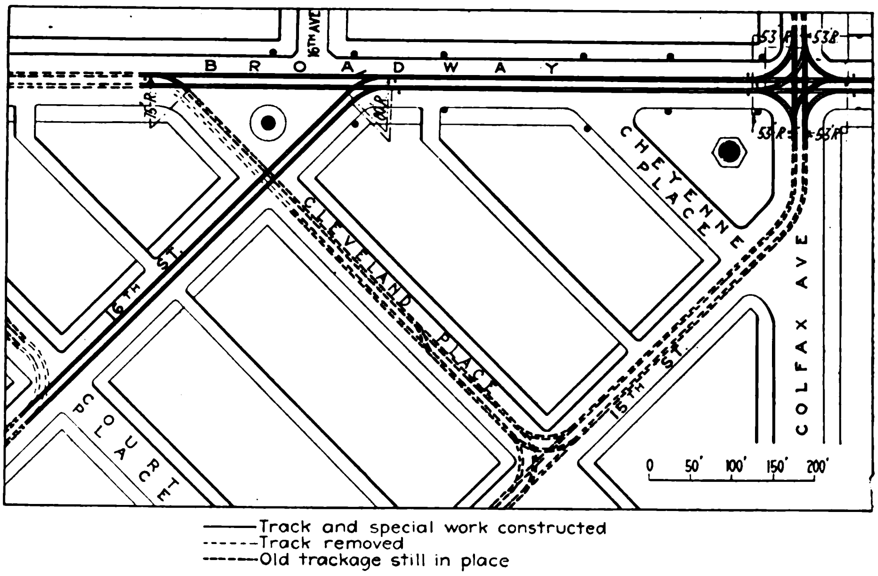
Utilizing Modern Track Construction Apparatus on an Important Reconstruction Job in Denver, Col.

No. 1, Placing temporary track to permit shunting of cars around intersection. No. 2, "Shoo-fly" in position across corner of Civic Center. No. 3, Cars operating over temporary track. No. 4, Cutting out asphalt paving. No. 5, Breaking up paving foundation. No. 6, Track in place ready for concreting. No. 7, Construction work at intersection in full swing. No. 8, Concrete train pouring the mix. No. 9, Concreting-in the special work. Other views of this track construction job are shown on the following pages.

Using Modern Appliances in Track Construction

A Recent Contract Job in Denver Furnishes an Illustration of How Up-to-Date Equipment Gives Speed and Economy in Construction

BY W. L. WHITLOCK
Office Engineer Denver (Col.) Tramway

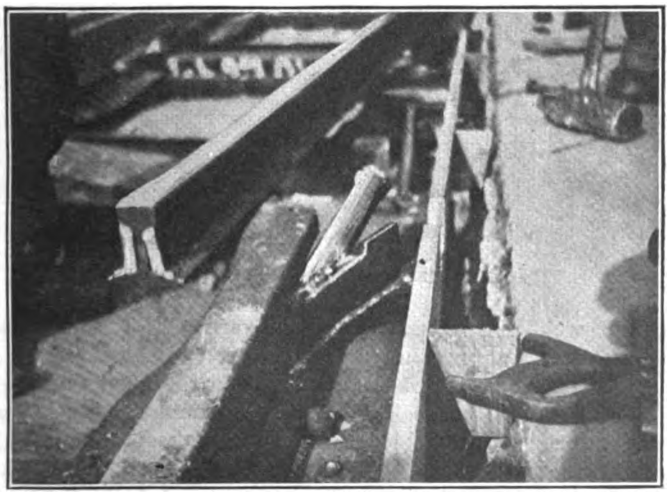


SITE OF THE TRACK RECONSTRUCTION JOB IN BUSY SECTION OF DENVER

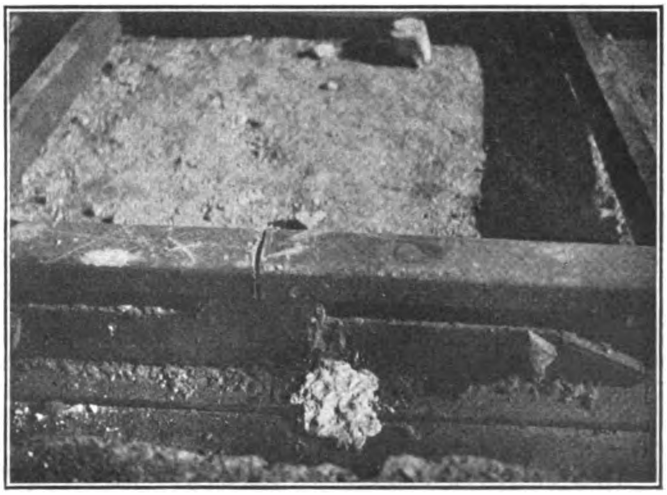
IN A RECENT track construction job the Denver Tramway departed from its usual practice in that it let the track construction end of the job by contract, something that had not been done on this system for fifteen years. The contract was let on account of the scarcity of labor and the necessity for completing the work within a specified time. All of the rail, ties and special trackwork had been purchased and delivered, and as the Public Utilities Commission had ordered the work done there was only the labor shortage to prevent its speedy completion. The Tramway allowed the contractor the use of its track construction tools and equipment in order to facilitate the work.

The equipment mentioned is listed below, and the list is interesting as an indication of the advance made during the past fifteen years in the art of track construction. It comprised one 5-ton, one 3-ton and one 1-ton auto truck of the self-dumping type; pneumatic paving and concrete cutters; 3-ton crane car (see issue of this paper for April 20, 1918); oxy-acetylene cutting outfit; reciprocating and Atlas rail-grinders; Indianapolis arc welder; concrete tram as described in this paper on Oct. 6, 1918; mechanical pusher for unloading dirt from flat cars; portable rock crusher and conveyor; Lincoln bonding machine; pneumatic tie tampers; portable crossovers; temporary lamp clusters, and camera for making progress records.

The largest layout of special work, located at Broadway and Colfax Street intersection, was of 100-lb. A. R. A. rail, cast-manganese construction. The special work at the other three locations was likewise of cast manganese but of 80-lb. rail section. All of the special work was built by William Wharton, Jr., & Company. The tangent track construction consisted of 80-lb. A. S. C. E. rail, with Apex-welded joints and International twin steel ties. The entire track structure was imbedded in concrete of a 1 : 2 : 3 mix, using crushed rock as the aggregate. The cast-manganese layouts already mentioned were supported on 9 in. of crushed rock ballast and long-leaf Texas pine treated ties. The paving was 1:2:3 concrete also with crushed rock



WELDED JOINT SAWED THROUGH, PART OF PLATE BEING REMOVED WITH AID OF WEDGE

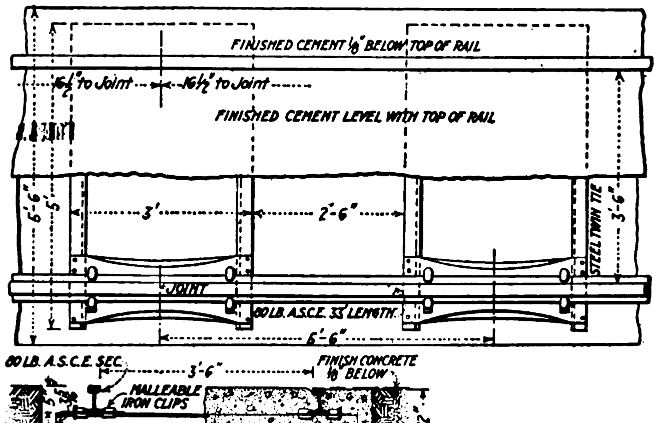


JOINT BROKEN BY RAIL CONTRACTION AND REPAIRED BY ELECTRIC WELDING aggregate. All of the construction was in streets paved with asphalt.

The several parts of the job were done in the following order with a view to utilizing to the maximum extent the several labor-saving devices.

First the field engineers marked the trench lines and the asphalt paving was cut out both by the pneumatic tools and manual labor. The paving was loaded direct to the auto trucks and hauled to a near-by dump. The men with the pneumatic tools dropped back after a stretch of asphalt had been cut out and broke up the concrete paving base. The broken concrete was stored for the time in the devil strip between the tracks. Later it was loaded on flat cars and taken to the materials yard where it was broken up in the portable rock crusher for use as ballast or street surfacing as required. There was but little dirt excavation, and such dirt as was removed was placed in the devil strip and loaded on flat cars after a temporary track had been laid. It was then hauled to the dump where the mechanical pusher, operated by the crew of the work car, was utilized in unloading it quickly.

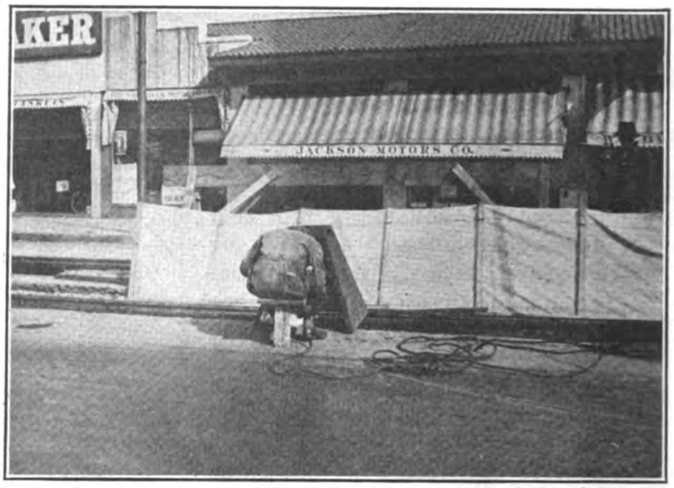
THE NOW FAMILIAR GAS CUTTING TORCH IN OPERATION


FINISHED CEMENT 1/8" BELOW TOP OF RAIL
16½" to Joint
16½" to Joint
FINISHED CEMENT LEVEL WITH TOP OF RAIL
6'-6"
5'
3'
2'-6"
STEEL TWIN TIE
3'-6"
JOINT
80 LB. A.S.C.E. 33' LENGTH
5'-6"
80 LB. A.S.C.E. SEC.
3'-6"
FINISH CONCRETE 1/8" BELOW
MALLEABLE IRON CLIPS
STEEL TWIN TIES
12"
SUB GRADE
5'
5'-6"

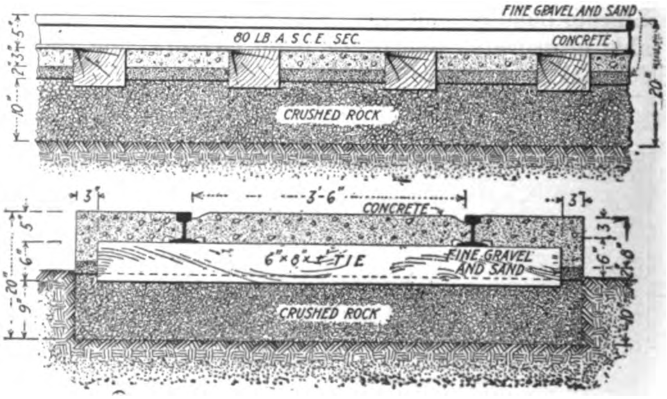
TRACK CONSTRUCTION WITH STEEL TIES

Only one track was constructed at a time, and work on the second track was not begun until a temporary track had been laid in the first trench. The rail for the first track was hauled to the job by means of the auto truck and dolly, and was distributed along the trench. This truck also brought up the steel ties and small material from the yard.

Before the track construction was commenced the trench was flooded with water for two nights to test for holes or sumps. After this test had shown the foundation to be satisfactory the steel ties were placed on 4-ft. centers and the rail was laid. It was originally intended to clip the rail to the steel ties, bolt up the joints, surface and align the track temporarily and then weld the joints. A small section of track was laid according to this plan, but when it was examined prior to welding the joints were found to be not absolutely tight as is necessary in this type of construction. The base of the rail made a tight joint but at the ball the rails were slightly open. After several suggestions had been tried out the rails were finally unclipped from the ties and two track jacks were used to bring the joint up square. One jack was used under each rail after the joint had been bolted up temporarily. The joint was then welded. After this experience all of the track was welded before the rail was clipped to the ties.


KER
JACKSON MOTORS CO.

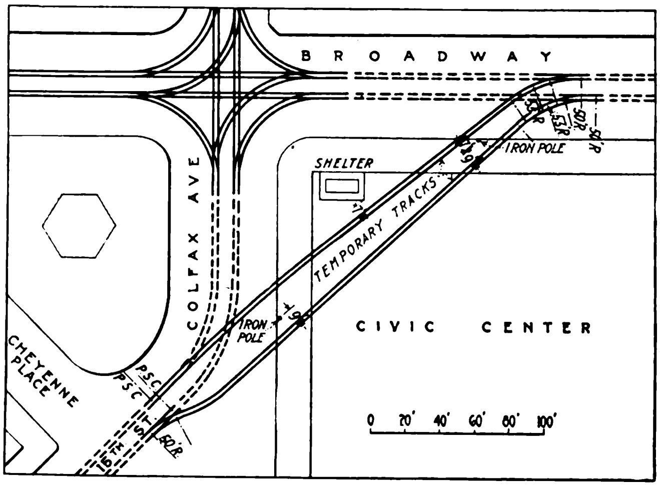
PROTECTION FOR EYES OF PASSERSBY FROM WELDING ARC ON RAIL BASE


FINE GRAVEL AND SAND
80 LB. A.S.C.E. SEC.
CONCRETE
CRUSHED ROCK
10"
2"
3"
5"
20"
3"
3'-6"
3"
CONCRETE
6"×8"×8' TIE
FINE GRAVEL AND SAND
CRUSHED ROCK
5"
6"
9"
20"
3"
6"
8"
10"

TRACK CONSTRUCTION WITH WOOD TIES

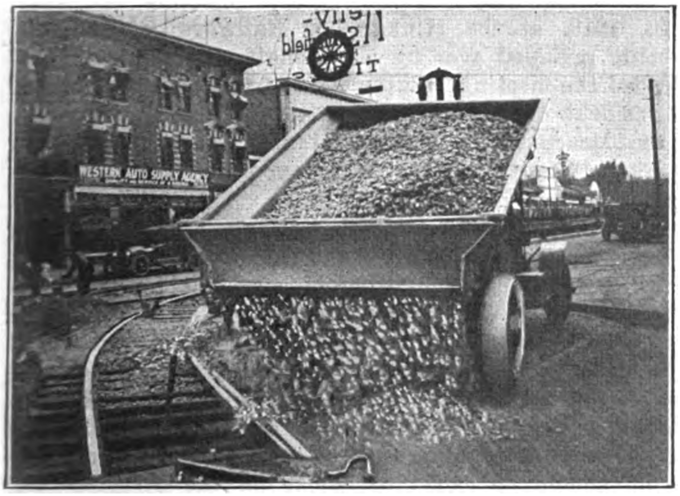
After the track was welded it was surfaced for temporary operation, being blocked up between steel ties by means of wood blocks in order to keep the weight off the steel ties.

The paving material and dirt removed from the second trench were loaded direct to flat cars operating on this temporary track. After the second track trench was completed and the ties and rails for this track were delivered by means of work trains the materials removed from the first trench (broken concrete and dirt stored in the devil strip) were loaded on flat cars and removed. The crushed rock ballast for the special work was delivered by means of auto trucks and dumped directly into the trench as needed with the exception of the Broadway-Colfax layout.

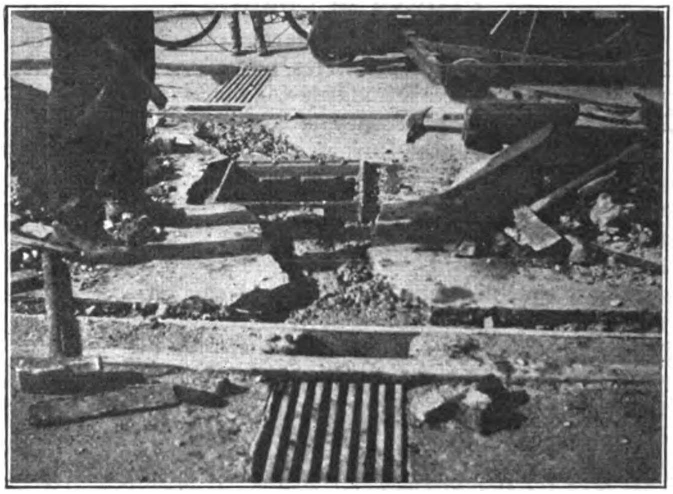


TEMPORARY "SHOO-FLY" TRACK ACROSS ONE CORNER OF THE CIVIC CENTER

The oxy-acetylene cutting equipment was used to cut the rails of track at connecting points to avoid the necessity for removing the track back to the joints and thus to save the expense of additional track and paving removal. In the construction of the last-mentioned layout it was necessary to divert the cars from this location to facilitate the work. This was done by means of a temporary or "shoo-fly" track laid across one corner of the Civic Center. Temporary crossovers with shop-built 65-lb. curved rails were used as turnouts and laid directly on the paving, tie rods being used to hold the curves to gage. Sixty-five-pound rail and second-hand ties were used on the lawn portion of the Civic Center in a shallow trench. As this location is a heavy transfer point a temporary platform of 3-in. x 12-in. x 16-ft. planks was laid and suitable lights were provided as a matter of public safety. No trouble developed from the operation of the "shoo-fly" although there were several heavy snowstorms and some cold weather during the short time of the service.



DISTRIBUTING BALLAST ALONG THE TRACK BY MOTOR TRUCK



TRACK DRAIN FOR PREVENTING FLOODING OF SWITCH BOXES

We had two tests of the holding power of the welded joints; one premeditated, the other accidental. As we had had no experience with the welded joint we desired to know just how strong the welds were. One joint, selected without knowledge of the welders, was cut through several days after welding by means of a hacksaw, and one rail was removed. This gave a cross-section through the middle of the joint and indicated a satisfactory character of weld. On the remaining half of the joint the plates had to be removed to make place for another pair. For this purpose a heavy sledging steel point was inserted between the plates and the rail and a laborer with a heavy sledge was told to "knock 'em off." The plates finally came off but the steel plates bent before the weld would break. This test satisfied us as to the holding power of the weld.

The second test was caused by a sudden drop in temperature. Despite the fact that the track was opened at each end, sixteen joints broke from contraction. The break in each case was in the plate and not in the weld, indicating that the welds were stronger than the plates. On the following day the temperature rose and as the rails expanded the cracked plates came together again until only a very small seam was visible. The arc welders used carbon rods and burned these cracked places out until there was space large enough to furnish a holding place for new metal. The places were then rewelded, with entirely satisfactory results.

No trouble was experienced with the joints other than those mentioned and as far as can be observed the joints that broke and were rewelded are holding as well as those originally good.

We selected two joints, one that had broken and had been rewelded and one that was perfect from the start, for future observation. Before the track was concreted a street box with a removable lid was placed at each of these joints. This will permit observation of the joints under traffic without the necessity for tearing out any paving.

Several additional items in regard to this work may be mentioned for purpose of completeness. One which is illustrated in an accompanying picture shows the canvas strips set opposite the welding work to supplement the box used regularly by welders to protect the eyes of passers-by from the light of the arc. This box did not give sufficient protection because the welding was along the base of the rail as well as under the ball and the boxes rested on the ball only. The canvas strips did away with the objection made by people on the street that the arc shone out under the boxes.

Electric track switches of both the Cheatham and Kitt types were used and track drains consisting of open gratings were placed ahead of all switches. These drains were connected to near-by catch basins by means of 6-in. tile pipe. All electric switches were connected to the drains by tile pipe to insure proper drainage, and suitable clean-out boxes were provided to facilitate the cleaning of the tile drainage line to the catch basins. This cleaning is usually done by means of a 1½-in. hose connected to a fire plug.

The Lincoln bonding machine was used in bonding all joints of both tangent track and special work, using No. 0000 U-bonds. In addition all special work was "jumped out" by using four No. 0000 annealed trolley wires for each rail. Cross bonding on tangent track was accomplished by arc welding the steel ties to the base of the rail with spot welds, thus utilizing the steel ties as bonds.

The overhead line construction on this work consisted of tubular steel poles set in concrete with No. 00 iron trolley wire over all special work and No. 00 copper trolley wire over tangent track. The steel poles will also be used to carry the street lighting equipment owned by the city, which bore a portion of the cost of the construction. These poles form a part of the general layout of the street lighting systems in use in the business district.

Standard Electric Railway Specifications Printed in Spanish

IN ORDER to facilitate commerce between the United States and foreign countries by gathering together and making available standards for materials of various kinds, commercially acceptable and representing good American practice, the Bureau of Foreign and Domestic Commerce, of the United States Department of Commerce, has started the publication of a series of bulletins covering industrial standards for materials. Industrial Standard No. 32 presents the text of the standard specifications for quenched carbon steel track bolts as adopted by the American Society for Testing Materials, and Industrial Standard No. 41 contains standard specifications for wrought solid carbon steel wheels for electric railway service. These are printed in Spanish and English on facing pages.

This series of publications will include standards prepared by the government and by technical societies and other organizations, which will be translated into various foreign languages. Publication in this series indicates that the standards are working standards, subject, however, to amendment as new scientific data are obtained. The standards referred to are drafted by committees of the American Society for Testing Materials, on which both the consuming and producing interests are represented. Editions of these standards are sold by the superintendent of documents, Government Printing Office, Washington, D. C., at 5 cents per copy.

Belgium Looks Forward to Railway Electrification

All Through the Long Period of Conflict the Little Country Continued to Plan for Its Post-War Development

IN REVIEWING the transportation plans of the Belgian government, the *Engineer*, London, says that in 1916 Mr. Seghers, the then Belgian Minister of Railways, whose offices were at Havre, appointed a commission to report to the Belgian government on the advisability of electrifying the Belgian State Railways after the war. This commission was composed of several important Belgian business men, engineers, and of the heads of the railway department then in France. In addition, the chief engineers of the French State Railways and of the Midi Railway, and Philip Dawson, were asked by the Belgian government to allow their names to be added to the commission.

Several sittings of the commission were held at Paris, and as a result recommendations were sent to the Belgian government advocating the electrification of considerable portions of the Belgian State Railways. In view of the absence of accurate data, owing to the occupation of Belgium by the enemy, this report could only be considered an interim one, and it was obvious that the final report could only be sent in after the Germans had been driven out of Belgium. This end having been achieved, a new commission was appointed to study and report not only on the question as to the advisability of electrifying a part or the whole of the Belgian railway system, but also to investigate and report on the problem of unifying the supply of electricity for all purposes all over the country, having regard to the important position which the railways, if electrified, would occupy as consumers of electrical energy.

This commission held its first meeting on April 10, 1919, at the Ministry of Railways in Brussels, being presided over by Mr. Renkin, the minister who called the meeting. Baron Ancion was again appointed president of the commission, and Philip Dawson and Mr. Mazen, chief mechanical and electrical engineer French State Railways, were appointed the two vice-presidents.

As a result of the Brussels meetings, this commission has unanimously recommended that it will be of public utility to prepare immediately a scheme for the electrification of the Brussels-Antwerp line and of the lines in the immediate neighborhood of Brussels. It has also recommended that a definite scheme for this electrification should immediately be prepared by the engineers of the Belgian State Railways, and that as soon as it is ready a further meeting of the commission should be called to advise on the carrying out of the scheme.

The commission has also unanimously recommended that the first scheme should be prepared on the understanding that all the railways within, say, 40 miles of Brussels must, of necessity, be very shortly electrified, and that eventually electrifying the Brussels-Arlon line is advisable. As soon as the preliminaries in connection with these projects have been prepared, the commission will investigate the means for co-ordinating existing electric supply undertakings and erecting new super-power stations.

N. E. L. A. Epitomizes Electric Power Situation

Reports of Prime Movers, Electrical Apparatus and Underground Distribution Committees Presented at Atlantic City Convention This Week Are Abstracted

As THIS issue of the ELECTRIC RAILWAY JOURNAL goes to press the National Electric Light Association is meeting in annual convention at Atlantic City, N. J. Abstracts of committee reports dealing with power matters are given this week. In a later issue a summary of the convention as a whole will be given.

Status of the Steam Turbine and Tendencies in Design

The report of the committee on prime movers discusses various phases of the problem of selecting turbines with proper regard to the size of the system as a whole, and includes information as to the operating records of large-sized turbines, together with statements submitted by manufacturers reviewing progress during the past year. The development of condensers, boilers, superheaters, stokers, economizers and power-station auxiliaries is covered in detail, and the wider use of boiler and turbine-room instruments is recommended as a means of checking operating conditions. Storage and handling of coal are discussed and several of the newest installations are described. Mention is made of the possibilities of the use of pulverized fuel and lignites. Further discussion of the advantages and disadvantages of higher steam pressures is included and brief reference is made to the proposed scheme of extracting by-products from raw fuel before firing under boilers.

On the subject of water power there is a general discussion of development in this line during the past year and the tendency to go to fewer and larger units is noted. Improvements in details of general design are listed and the record of progress as submitted by manufacturers is included.

In the gas field the production of fuel oil from various fields in the United States is shown in tabulated form and attention is directed to the fact that, while the development of Diesel engines has been mainly in the field of marine engineering, improved design features are being incorporated in engines of this type for land plants. Reference is made to the Bureau of Mines Bulletin No. 156 for exhaustive investigation and reports on the Diesel engine.

WHAT IS THE LIMIT IN TURBINE SIZE?

With the above outline of the prime movers' committee report as a whole in mind a few details may be taken up for elaboration. During the past two years there has been a marked increase in the number of large turbine units in operation, particularly the horizontal, single-shaft type of approximately 30,000-kw. capacity. It would appear that with the present constructional problems of prevailing frequencies and speeds and the recognized factors of safety, efficiency and cost, the size of systems to-day will hardly warrant units of this type larger than 30,000-kw. capacity.

Among the very large electric railway power plants the Interborough Rapid Transit Company, New York City, heads the list with a generating capacity of 389,000 kva. and a single unit of 70,000-kva. capacity. The Boston Elevated Railway has 122,500-kva. capacity and 35,000 kva. in a single unit. The corresponding figures for the Brooklyn Rapid Transit Company are 139,850 kva. and 30,000 kva.; those for the Pennsylvania Railroad, Long Island City, N. Y., are 78,000 kva. and 21,000 kva., and those for the New York Central Railroad, New York City and Yonkers, are 60,000 kva. and 20,000 kva. The Twin City Rapid Transit Company has a total capacity of 65,000 kva., with 20,000 kva. as the capacity of the largest unit. These examples are cited simply to show the present trend in generator capacity.

Continuity of service is an essential in the modern power plant and each company must decide for itself as to how far it is safe to go in the installation of large generating units. The fact is to be remembered, however, that certain of the large machines have records of continuous performance and output which surpass anything previously considered possible. For example, one 25,000-kw. unit operated at 67 per cent load factor during a fifty-one-day run without shutdown; another machine of the same size has completed two seventy-seven-day runs at 67 per cent load factor in one instance and 70 per cent in the other, while one of the 35,000-kw. units operated at 65 per cent load factor for a seventy-day run without shutdowns.

WAR CONDITIONS WERE REFLECTED IN TURBINE TROUBLES

Some troubles have occurred in the operation of horizontal-type single units of 20,000-kw. capacity and above during the three years of experience with these machines. During this period, however, both manufacture and operation have been carried on under most adverse conditions as affecting labor and materials.

In analyzing the causes of trouble indicated by the operating records of these machines, it appears that labyrinth packings and thrust bearings have probably contributed to the major part of large turbine operating difficulties. While these troubles in themselves have caused a considerable loss in operating time, they have also been responsible in a number of instances for the development of more serious troubles, such as excessive vibration of parts, breaking of buckets, and dangerous rubbing of stationary and moving elements which in extreme cases have resulted in permanent deflection of shafts.

The most serious situation that has developed in the types and sizes of units under consideration, however, has been the number of quite recent turbine-wheel failures. In several instances these accidents have resulted in the complete wrecking of the units concerned. The situation is now a critical one and while any statement at this time would be premature the committee wishes to indicate the necessity for early action both in safeguarding against further possible failure of machines now in operation and in definitely reaching solutions of those problems which involve important features of design and construction.

In general, however, the records of operating performances of these larger-sized units, while too incomplete for definite conclusions, do indicate that there is every reason to expect as high a standard of performance for the recent types of large-capacity single-shaft units as the standard which had been attained in the operation of machines of earlier designs and smaller capacities.

STAND-BY CAPACITY IS LESS NECESSARY THAN FORMERLY

The subject of "stand-by" or "floating" operation of a turbine, *i.e.*, running it at or near zero load, is of special interest to companies having steam plants connected to transmission systems normally fed by hydroelectric power. It appears that the operation of steam turbines with no load in parallel with hydroelectric systems is tending to become less frequent, not only on account of the necessity for rigid economy, but because hydroelectric plants and transmission lines are becoming more and more reliable. It is, in general, only for the most important load and with inferior hydroelectric system operation that this stand-by operation is advisable.

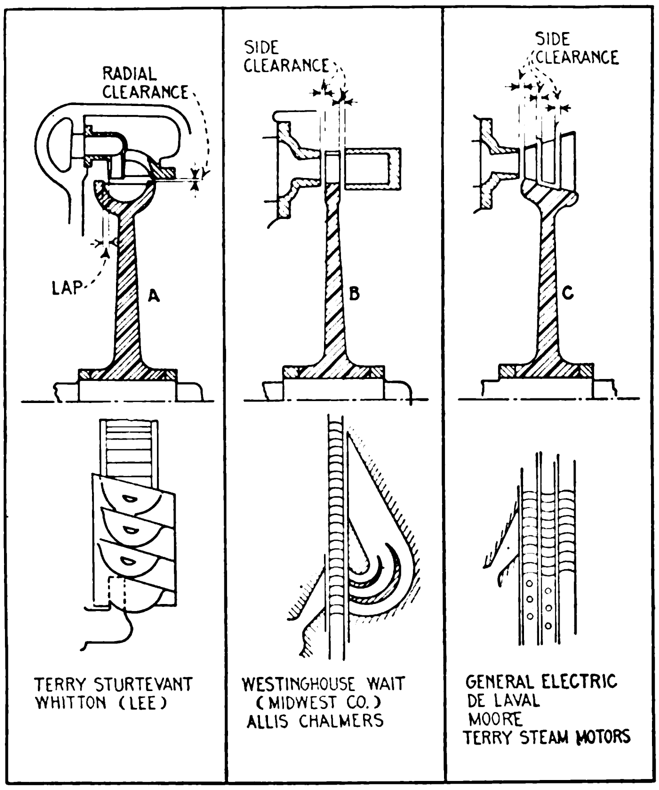


FIG. 1—DESIGN FEATURES OF VARIOUS CLASSES OF SMALL STEAM TURBINES

When the floating service becomes necessary, great care and skill should be exercised in keeping steam plant costs at a minimum; this is especially necessary with steam plants not specially designed for economy during stand-by operation, but even in stations planned specifically for such service, a considerable saving can usually be made by careful study of operating methods.

In an appendix to the section of the report dealing with steam turbines considerable attention is given to the small machine for driving power plant auxiliaries. The impulse principle is said to be used exclusively for all small machines, as the reaction or Parsons type is commercially impracticable below, say, 500 hp.

Four distinct types of machines are now extensively used, the principles of which are shown diagrammatically in Fig. 1. These are: (*A*) The helical flow type; (*B*) the single-wheel re-entering type; (*C*) the multi-wheel velocity stage type, and (*D*) a group which consists of multi-stage machines made up of several pressure stages incorporating one or more of the principles enumerated above, or using the straight Rateau principle having only one velocity stage per pressure stage. The operating characteristics of small turbines are illustrated in Fig. 2.

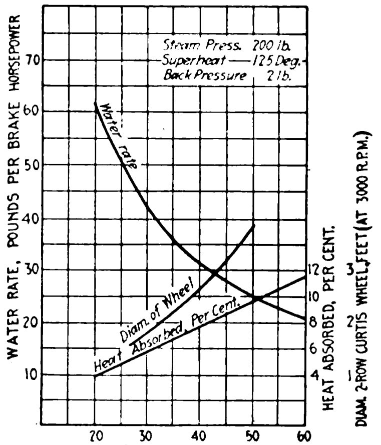


FIG. 2—OPERATING CHARACTERISTICS OF SMALL STEAM TURBINES

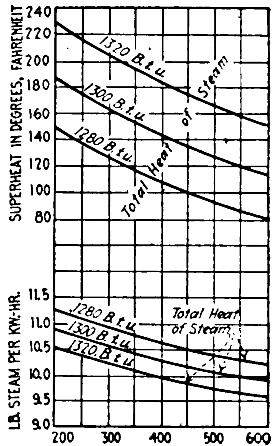


FIG. 3—WATER RATE OF 60,000-KW. TURBINE AS AFFECTED BY STEAM PRESSURE

CONDENSER IMPROVEMENTS WERE LARGELY MECHANICAL

While the necessities of war have constrained condenser development to a certain extent there has, during the war period, been developed the steam air ejector.[1] The unqualified success of this device at sea has shown that it will occupy a prominent place in future condenser installations. Several firms are manufacturing air ejectors applicable to replace the present reciprocating or hydraulic air pumps.

In the installation of ejectors some caution must be used because the exhaust contains all of the air that has been pumped out of the condenser. It is not safe to discharge the steam and air from these ejectors into heaters of the present type. There should be installed a large surge tank into which the make-up and the discharge from the air ejectors is carried. The tank should have a free atmospheric vent for the discharge of the air, allowing the water from the tank to overflow into the heaters.

During the last two years a number of the larger condensers installed on General Electric turbines in power stations have been put on spring supports without expansion joints, and this method appears to be very satisfactory. The Westinghouse Company recommends hanging the condenser from the turbine foundation, which is also satisfactory as it accomplishes practically the same results as the springs. In one case where the condenser was located 50 ft. below the turbine, and there was an unusual amount of expansion in the exhaust piping, the expansion joint was of the mercury type.

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[1] A typical ejector was described in the issue of the ELECTRIC RAILWAY JOURNAL for March 16, 1918, page 533.

Boiler Room and Fuel Practice from the Conservation Standpoint

AMONG the topics considered by the committee most important for attention this year were some recent tendencies in connection (a) with boiler-setting design and baffle material, (b) with cleaning and other routine operations on boilers, (c) with superheater operation and (d) with feed-water regulator application.

In the use of insulating brick in boiler settings the limitations, if evident at all, occur in that portion of the setting which is nearest the furnace or subject to the highest furnace temperatures and consequently the greatest expansion and contraction strains. Operators feel that the furnace walls should be solid, well bonded and homogeneous.

There is a recent tendency toward building the furnace walls of solid firebrick. Until some more satisfactory refractory material is developed than those now available it may be necessary to depend to a certain extent on the radiation of heat through the furnace walls to cool and preserve the furnace lining. There has been some experimental work in progress regarding the materials used for baffles, and there seems to be a demand for a baffle which, compared with the usual type, is tighter and more readily renewable or repairable; one which can be placed at any desired angle with the tubes.

The problem of how to design the side and bridge walls of the boiler furnace so as to necessitate a satisfactory minimum of brickwork maintenance and boiler outages is one on which considerable progress has been made. The present-day demand is for a furnace lining which will withstand the high furnace temperatures and blow-torch action, the constant heating and cooling effects, and the abrasive action of the fuel bed.

Among the diversified means in use for preserving furnace linings the following may be mentioned: The use of ventilated walls; the use of special refractory materials; the application of steam jets along the grate at the side walls; the water cooling of ledge plates and water backs; the use of high-temperature cements.

WHEN IS A BOILER OVERLOADED?

In recent large central station designs maximum boiler ratings of from 250 per cent to 400 per cent have been used. The tendency toward higher boiler ratings has led operators to feel that boilers in general should be operated at much higher ratings than in the past. This is a justifiable conclusion if not carried too far.

A boiler is often spoken of as being overloaded when in reality it is the stoker which is being forced beyond its proper limits. Generally speaking, the capacity which can be developed by a boiler and stoker unit is limited only by the amount of coal which can be burned by the stoker equipment. The capacity of the boiler is mainly a question of how high a flue temperature may be tolerated. A restraining influence on the maximum possible rating is the fact that the boiler and stoker must be designed to operate at maximum efficiency over as wide a range as possible.

The problem of draft loss at high boiler rating is an important one. Sometimes users of underfeed stokers are disappointed in the capacity of their boiler installations due to the fact that the stack or fan does not provide sufficient draft to take away the gases from the furnace. The character of the boiler feed water also may readily become a limiting factor in the boiler rating developed. As a general proposition extremely high boiler ratings are desirable only in connection with plants equipped with surface condensers.

From information received by the committee from some of the largest stations in the country, it appears that the normal and maximum forcing rates for boilers average 140 per cent and 200 per cent respectively. The highest boiler ratings available are used in the estimates for steaming capacity during the annual peak load periods which may be of limited duration.

SOOT BLOWERS ARE INCREASINGLY POPULAR

There is a general movement toward the use of mechanical soot blowers in cleaning external heating surfaces in boilers. Properly selected soot-blowing equipment makes a highly profitable investment notwithstanding the fact that this apparatus is not regarded as being wholly satisfactory under severe operating conditions. Where fairly high boiler ratings are developed some trouble is encountered in maintaining the soot-blower elements located nearest the furnace, regardless of type of construction used, and care is necessary to locate these elements so that they will not be subjected to a destructive heat.

Recent labor conditions have turned the attention of operators toward the subject of feed-water regulators with the result that for average boiler plant conditions and for plants containing more than three or four boiler units, a wise selection of feed-water regulators may now be regarded as standard practice. Generally speaking, the most satisfactory type is one which does not aim at a constant water level but which takes advantage of permissible variations to aid in caring for fluctuating steam demands on the boiler. With the advent of modern boiler plant improvements and the higher grade of labor necessary to maintain and use them properly, operators do not regard the necessary care and maintenance of feed-water regulators as being as much of a burden as heretofore.

THE SUPERHEATER NEEDS REGULAR ATTENTION

The matter of relative attention given to boilers and superheaters is one which deserves mention. The superheater is frequently overlooked by the boiler-cleaning and repair crew because it seldom needs cleaning or repairs. It should be as carefully inspected and watched as any other portion of the boiler.

The question of pressure drop through superheaters is one which frequently causes operators some little concern. A superheater is necessarily designed to produce a certain amount of pressure loss at low rating, otherwise the steam might short-circuit through the nearest tubes and permit the farthest ones to become burned. Superheaters are usually designed to operate at rated boiler capacity with from ½ to 1½ lb. pressure loss. Since the pressure loss increases as the square of the velocity a 1-lb. loss at rating would mean a 4-lb. loss at 200 per cent rating and a 9-lb. loss at 300 per cent rating.

A superheater as such is a very efficient piece of apparatus, but as a boiler or evaporator it not only becomes a source of loss through loss of superheat but may be the cause of high maintenance cost as well. At 200 lb. pressure and 100 deg. superheat 1 per cent of moisture in the steam entering the superheater causes a loss of 17 deg. of superheat. As a result of a questionnaire on superheater practice it appears that the superheater continues to be an adjunct fitted to a more or less inflexible design of boiler and there should be a closer co-ordination of superheater design with boiler design.

GETTING RID OF ASHES AND CLINKER

On the matter of stokers and grates the committee feels that the most important developments in the underfeed type of stokers are the power dump grates and the clinker grinders. Of these the latter is more important.

Besides the grinder developed by the manufacturers several companies have installed grinders of more or less special design. It is essential in these installations to provide sufficient depth of ash above the grinder to protect it from the hot clinkers, and so to proportion the opening leading down to the grinder that clinkers will not bridge across this opening and prevent the ash from getting down to the grinder.

The forced-draft type of chain grate is being used more extensively than heretofore and has been successfully used in burning low-grade fuels high in ash.

There is an increasing tendency to sectionalize stoker drive on underfeed stokers. On some recent installations consisting of thirteen retort stokers the stoker was divided into four sections each driven by its own motor. By sectionalizing the stoker drive the operating force can maintain a more uniform thickness of fire across the stoker.

A PASSING WORD ON THE ECONOMIZER

In the economizer field progress has been made during the past three years in the development of types for pressures of 300 lb. or higher, using extra heavy cast-iron or "semi-steel" tubes and improved designs for headers, joints and other details: A few high-pressure steel economizers are in use in this country and a large number abroad. With the higher cost of fuel, economizers will doubtless come into much wider use. It is impossible to make any general statement concerning the advisability of installing economizers in connection with a boiler plant; each case has to be considered by itself, taking into account all factors, such as cost of fuel, cost of economizers and especially the load factor under which the boiler plant is to operate.

ECONOMICS OF POWER STATION AUXILIARY SELECTION

The increasing price of fuel and the determined conservation drive during the war have been responsible for considerable improvement in the application of basic underlying principles to power station auxiliaries. After due consideration has been given to required reliability and reserve capacity the auxiliary problem resolves itself into one of maintaining steam balance on varying load with the maximum possible auxiliary brake-horsepower from exhaust steam discharging to heater.

The smallest thermal cost for auxiliary power is expended when steam auxiliaries having a minimum consumption per brake-horsepower are used up to the limit of feed water and absorption capacity and the balance of auxiliary power required is taken from the main busbars.

The fundamental principles have been applied according to the following general scheme: (1) Dual system, which is part steam and part electric, with duplicate circulating-water equipment, or pumps equipped with induction-motor drive on one end and steam turbine with variable-speed governor on opposite end to control proportion of power by steam. (2) Straight electric drive from the main unit, bleeding the intermediate stages of the main prime mover for steam to heat the feed water. (3) Straight steam drive, using all steam possible to heat feed water, the balance being fed to the low-pressure stages of the main prime mover. (4) Straight electric drive with house turbines, as much of the auxiliary load as possible being carried on a comparatively large turbine exhausting to the condenser heater, the balance being carried on the main prime mover.

Among other topics taken up by the committee with respect to the operation of the power plant proper, the following particularly deserve mention:

First as to exciter drive, the larger units are generally equipped with direct-connected exciters, whereas the smaller plants employ motor drive for use in connection with voltage regulators. Steam-driven exciters are very generally used for stand-by only.

The majority of plants still prefer the open type of heater on account of the better elimination of entrained air and gas in the condensate and make-up. However, the elimination of oil seems to be the deciding factor in favor of closed heaters where used.

In stoker fans a decided improvement has recently been made in the efficiency of fans over a wide range of loads, and they are well adapted for either motor or steam drive. The selection of type of drive is largely a matter of heat balance.

Boiler feed pumps are generally made turbine-driven, with the differential pressure governor to maintain a predetermined relation between the water and steam pressures. It is generally found necessary or desirable to maintain some automatically controlled differential pressure, particularly when used on a system with automatic feed-water regulators.

In general steam auxiliary specifications call for operation at full capacity with a maximum drop of about 50 lb. in steam pressure. Electric auxiliaries are usually specified to operate on 10 per cent voltage variation in either direction.

SAFEGUARDING COAL IN STORAGE

Coal storage is given careful attention in the committee report this year. With reference to storage it is pointed out that coal does not deteriorate seriously unless it heats sufficiently to fire in some part of the pile. Furthermore, if a pile fires in one or more places all of the coal in the immediate neighborhood of the fire is absolutely ruined as far as gas and coke-making is concerned, although it can still be used as fuel for boilers.

For the prevention of spontaneous combustion the following remedies have been successfully tried: (1) The exclusion of air, which can be attained by storing under water, storing in airtight bunkers or storing a mixture of sizes so proportioned that the air spaces between the lumps are completely filled, successive layers of coal being further tamped to eliminate air spaces; (2) storage in piles small enough in size to allow the heat to be radiated as fast as formed; (3) provision of sufficient ventilation to carry away the heat of combustion by storing only lump coal which offers sufficient air passage through the pile to cool the coal, or by installing a system of ventilating ducts carrying air to all parts of the pile to remove the heat as formed.

OPERATING THE BOILER PLANT FOR HIGH EFFICIENCY

In the last two or three years great advance has been made in the development of CO_2 recording machines, but these are still far from ideal for firemen's use.

The principle of the CO_2 recorder is excellent in that it gives a direct measure of air required to utilize the utmost heat value of the fuel, and gives therefore an indication of the most efficient combustion. But good over-all efficiency does not necessarily follow from good combustion efficiency, since it is affected by the condition of the surfaces of the boiler. As an indication of this condition it is necessary to use a flue thermometer in conjunction with the CO_2 recorder.

In boiler operation it is desired to have information in regard to the flow of air, and many methods have been devised for measuring this. In some cases it has been determined by means of pitot tubes and in some cases by orifices in the pass to the air chamber, and in still others by using the boiler setting as an orifice. The method of boiler operation utilizing steam-flow and air-flow meters and flue thermometers offers a most promising solution to the question of boiler operation at the present time. If it is perfected to a greater degree it will develop the principle of the remote control of boilers. We are entering into a period when one man will operate all the boilers from a central point.

The steam-flow meter has progressed greatly since the last report of the committee, and its accuracy as now designed can be maintained within 2 per cent. These meters may be depended upon for a perfect indication for the boiler room and may also be used in many cases for the sale of steam.

SOME THINGS A WELL-EQUIPPED BOILER ROOM CONTAINS

Coming now to a discussion of the over-all efficiency of the boiler plant, it may be noted that the instruments used have progressed in proportion with those used for individual boiler operation. Very suitable meters have been designed for measuring the feed water supplied to the boiler; also meters for measuring water that is drawn from the boiler in the form of blow down. Furthermore, recording automatic scales have been developed for recording the weight of coal passing over belt conveyors or through hoppers, so that it is possible to run continuous over-all boiler-room tests.

Automatic instruments for measuring coal, however, have not reached the stage of perfection which could be desired. as in order to keep them reasonably accurate they must be continually adjusted. For this reason many plants equipped with the modern boiler of increased size are using the coal larry with the well-known platform scales.

Recording thermometers are coming into more extensive use in various parts of the plant. The installation of economizers calls for the employment of these and they have proved accurate and essential for efficient operation at this point.

As a matter of fact, regarding all turbine and boiler-room instruments, the recording type is becoming popular and shows good results from the point of view of decreased cost of operation of the plant.

Progress in Producing and Transmitting Electric Power

The report of the committee on electrical apparatus this year covers particularly the control of fires in generators, some special phases of switchboard and transformer practice, substations with special reference to outdoor substations and automatic substations, power factor correction, and apparatus for special fields, including electric furnaces, welding and the mining field.

The committee points out that the rapid increase in the use of very large generator units brings with it the necessity for satisfactory means for protecting them from the effects of external trouble and for provisions to minimize the effects of internal troubles. Increased attention is now being given to relay protection of a nature promptly to disconnect a unit which has failed, and also to fire extinguishing equipment which will minimize the damage from a generator breakdown, if this results in burning.

In connection with fires originating within the generator shell of turbo-generators of the inclosed type, the problems are to determine means of minimizing the occurrence of such fires, to limit the extent of the damage, and to provide effective fire-fighting equipment.

CLEANLINESS IS ESSENTIAL IN THE OPERATION OF GENERATORS

In preventing fires, the inspection and cleaning of generators at more frequent intervals seem to be very desirable, and every precaution should be taken to limit the amount of dirt and oil which may enter the generator. Many companies have standardized on the installation of air washers. As to frequency of inspection and cleaning it would appear to be desirable to clean machines at least once a year. The use of additional insulation on armature coils of generators is reported as having reduced fire hazard, and the grounding of the neutral of the three-phase system solidly or through resistance is rapidly becoming standard practice.

In the line of protective equipment it is also becoming standard practice for manufacturers to bring out both ends of each phase winding of an armature to the generator terminal board so as to permit the installation of current transformers to operate protective relays. Many companies approve the installation of balanced relay protection and have adopted it as standard practice on all new generator installations and on older generators where the expense involved is not too great. The field switch is usually opened by means of an auxiliary switch on the main oil switch or by an auxiliary relay, so that there will be no chance of the field being opened before the armature has been disconnected from the system. Balanced relay protection is preferred to reverse power protection because the installation of reverse power relays is somewhat complicated in comparison with the very simple connections for balanced relay protection.

PUTTING OUT A GENERATOR FIRE

In the methods thus far adopted for extinguishing electrical fires, water, steam and carbon tetrachloride have been used. Water and steam are looked upon at present with favor.

For the ready application of water to the generator winding the usual practice is to provide pipe rings which are fastened at each end of the generator inside the end bells. Perforations are located in these pipes so as to throw a fine spray of water over the entire windings and over the air gaps.

In applying steam to generator windings two plans are used: (1) Steam pipe is arranged inside the end bells, perforated so that numerous jets will impinge directly on the end portion of the windings and into the air gap as in the case of water. (2) Perforated steam pipe is located in the air inlet of the generator.

It will be necessary after applying water to the generator windings to dry them out before placing them in operation again. Experience has demonstrated that generators may be sprayed with water for some time with no serious damage if they are thoroughly dried out before being again placed in commission.

The practice of installing some form of permanent fire-extinguishing equipment is gaining headway.

OTHER HIGH SPOTS IN ELECTRICAL POWER PLANT EQUIPMENT PROGRESS

The sub-committee on switchboards reported that active steps have been taken during the past few years to put the matter of capacity rating of switches on a more logical and uniform basis. It pointed out that air break switches should be rated very liberally with regard to current-carrying capacity on account of their rapid deterioration resulting from high temperatures.

The sub-committee showed pictures of an automatic air disconnective switch for use with oil circuit breakers. This opens slightly after the contacts in oil have opened and on closing makes contacts slightly in advance of the contacts in oil. The development was prompted by a desire to obviate the accidents such as have occurred all over the country with the manually-operated disconnective switches.

The sub-committee on transformers this year revised its booklet on transformer standards. It has worked in co-operation with a similar committee of the Electric Power Club, representing the manufacturers, with resulting co-ordination in efforts of operating companies and manufacturers toward perfecting standards acceptable to all interests involved.

POSSIBILITIES OF AUTOMATIC CONTROL ARE RECOGNIZED

While the report of the sub-committee on substations is largely taken up with substations of the industrial type, automatic control also received attention.

With respect to overload protection it is stated that practice varies widely. Many companies protect the entire substation with oil circuit breakers and some with fuses, with no selective overload protection for individual units; while others in addition use fuses with individual transformers. One company uses an automatic high-voltage air circuit breaker with overload trip coils on each pole of the switch to protect the entire substation. One company uses no overload protection of any description on the high-voltage side of 11,000-volt, 22,000-volt or higher-voltage substations, treating the transformer as part of the line. The overload protection is provided usually in the form of an automatic oil circuit breaker on the low-tension side.

The sub-committee calls attention to the fact that while seven direct-current railway substations of 1000-kw. capacity and above, and more than thirty between 300-kw. and 600-kw. capacity, have been in automatic operation for some time (not including one 3000-kva. synchronous condenser and one 1500-kw. hydroelectric generating plant which operate entirely automatically) only one lighting company reports substations operating semi-automatically on 115- to 230-volt direct-current networks. However, in reply to a questionnaire query "If you have no alternating-current or direct-current substations in operation do you consider the idea practicable as applied to modern capacity substations?" almost without exception the answers were in the affirmative.

Two companies report that they are experimenting with an automatic reclosing oil circuit-breaker arrangement on feeder circuits. A third company has a small capacity transformer indoor type distributing substation with induction feeder regulators and automatic reclosing oil circuit breakers. These breakers are provided with special control relay equipment designed to reclose the circuit breaker immediately after it opens on overload. Should the circuit breaker reopen it will be again closed for a total of three operations all within a few seconds. After three such operations the main control relay opens the circuit of the closing coil of the circuit breaker and thereafter it is necessary to close it by hand. There have been no complaints from consumers on account of the rapidity with which the circuit is reclosed.

The sub-committee gives careful attention to the subject of power factor correction which is becoming increasingly important on account of the growth of certain kinds of central station loads which have inherently low power factor. As most electric railway load on the alternating-current side consists of synchronous converters it will not be necessary to go into details of this phase of the report.

LABOR-SAVING DEVICES IN CONDUIT CONSTRUCTION

In the field of underground distribution the committee on this subject finds that a marked change has occurred in the load curve of central station companies due to their taking on large blocks of load to serve industries working on a 24-hour basis. All classes of equipment have therefore been obliged to operate as a higher load factor than before. The result has been an unusually large number of cable failures, with the resulting necessity for careful attention to the matter of rating cable capacity.

In the line of artificial cooling of ducts little development work appears to have been done, although it is usually possible to obtain relief in case local hot spots develop by means of some sort of artificial cooling. More attention is being given to dielectric losses in cables with a view to minimizing this loss.

The Zone Fare in Practice

BY WALTER JACKSON

BELFAST—Part II

How Two Successful Fare Increases Were Worked Out on Scientific Basis and the Net Surplus Was More Than Quadrupled—Fares Are Easily Collected and Accounted For with Zone-Numbered Tickets

BELFAST CITY HALL

THE first half of this article, published in the ELECTRIC RAILWAY JOURNAL of May 10, 1919, alluded to successful fare increases made by the Belfast City Tramways. How these were accomplished will now be indicated. Prior to May, 1917, the penny fare was almost universal in Belfast, and only a few long rides cost 2d. Beginning April 7, 1917, J. S. D. Moffet, general manager, presented to the city a series of reports covering a graded-fare plan. Eventually a schedule was accepted whereby about ½ mile was cut off the original penny stages and 1½d., 2d. and 2½d. stages were introduced. The first series of changes, on May 21, 1917, proved a great success, particularly the 1½d. stage, as the accounts for the fiscal year ended March 31, 1918, prove. Further heavy burdens, however, in the shape of increased war bonuses and greatly inflated prices of materials made it necessary in May, 1918, to consider a second revision of fares in which it was imperative to aim at the general principle of giving not more than a 1-mile ride for 1d. Additional reports, therefore, were presented about the end of that month. These reports furnished fuel for heated discussion and eventually (July 1, 1918) resulted in the adoption of an "end-on" 1d. per mile (actually 1⅛-mile on the average) scheme, with one 1½d. stage from Castle Junction (the central point) on each section.

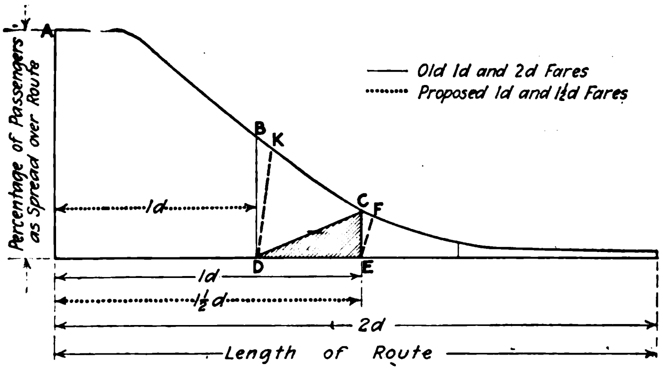

Old 1d and 2d Fares
Proposed 1d and 1½d Fares
Percentage of Passengers as Spread over Route
Y
A
B
K
C
F
D
E
1d
1d
1½d
2d
Length of Route

FIG. 1—THE EFFECT OF INCREASING FARES AND REDUCING STAGES IN BELFAST

1. Hatched triangle C D E shows portion of penny passengers converted to 2d. passengers if 1d. stage were reduced in length from *E* to *D*.
2. Triangle K C D shows portion of penny passengers from which extra revenue might be derived if 1½d. stage were introduced. Area C F E D shows the portion of 2d. passengers from which revenue would be lost if a 1½d. stage were introduced.

This revision also has been remarkably successful, as the following comparative figures for the nine months ended Dec. 31, 1917 and 1918, show:

	Dec. 31, 1918	Dec. 31, 1917
Revenue	£324,000	£260,000
Expenditure	203,000	164,000
Net surplus	32,000	7,000

The table on page 1010 shows the division of passengers, according to fares paid, for the weeks ended Nov. 17, 1916, Nov. 16, 1917 and Nov. 15, 1918. The figures given certainly indicate that the fares were increased without decreasing the riding. It will be observed,

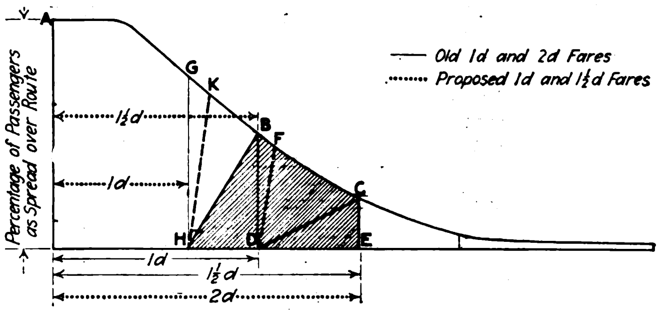
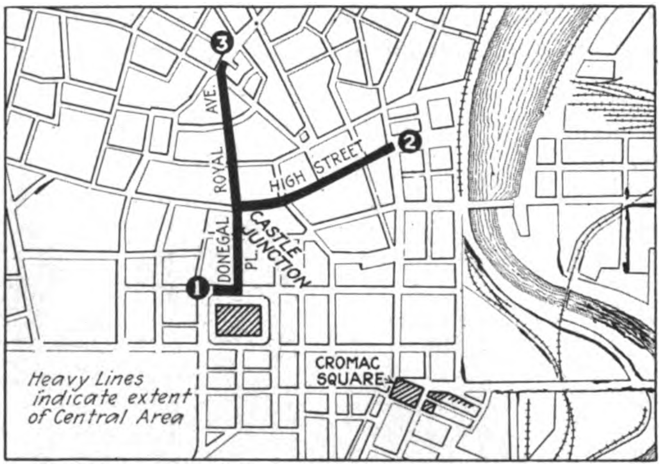

Old 1d and 2d Fares
Proposed 1d and 1½d Fares
Percentage of Passengers as Spread over Route
Y
A
G
K
B
F
C
H
D
E
1½d
1d
1d
1½d
2d

FIG. 2—THE EFFECT OF A FURTHER REDUCTION IN LENGTH OF 1D. STAGE AS SHOWN IN FIG. 1

3. Area B H D E C shows portion of 1d. and 1½d. fares converted to 2d. passengers if 1d. stage were still further reduced in length from *D* to *H* and 1½d. stage abolished.
4. Triangle K B H shows portion of penny passengers from which extra revenue might be derived and area B F D H the portion of 2d. passengers from which revenue would be lost if a 1½d. stage were introduced.

especially, that 20.6 per cent of the travel is made up of 1½d. passengers who formerly paid 1d., and that enough old 1d. passengers are now paying 2d. to raise the ratio of 2d. passengers from 6 per cent to 16.3 per cent of the total passengers carried. Had it been possible to give all the car-mileage desired, the travel would have been still better.

Preliminary to introducing the 1½d. Mr. Moffet made graphical studies such as those shown in Figs. 1 and 2, which are reproduced merely to suggest his general plan without going into details. In these he determined (1) the effect of converting a given number of penny passengers to 2d. passengers if the penny stage were shortened in the proportion shown; (2) the effect of converting a given number of penny passengers into 1½d. passengers as compared with the number of the 2d. passengers that would be lost thereby; (3) the portion of 1d. and 1½d. passengers converted to 2d. passengers if the 1d. stage were still further shortened and the 1½d. fare abolished, and (4) the portion of 1d. passengers from which extra revenue might be derived compared with the portion of 2d. passengers from which revenue would be lost if a 1½d. stage were introduced.



CENTRAL OVERLAP AREA IN BELFAST

In general, Fig. 1 was made to prove that people will not pay more for a ride—when it is not a necessity but a convenience—if they think it is cheaper to walk. Fig. 2 shows the dangerous condition that might arise if the losses exceeded the gains. As in the case of the American passenger, psychology must be reckoned with. The long rider who is asked to pay 4d. instead of 3d. is less disturbed than the short rider who is asked to pay 2d. instead of 1d., because the latter sees riding as a convenience or even a "luxury" (to use Mr. Moffet's term) with which he can dispense if he so desires. Although Mr. Moffet, when dealing with the second revision of fares, gave a detailed list of stages and their lengths, he also prepared a diagram to show any inequalities. This diagram, as reproduced in Fig. 3, calls for no lengthy explanation. Along the top line are set out distances up to 5½ miles, with the ½-mile points also shown. Down the left-hand margin of the diagram the various routes are tabulated together with the stages. The stages from the city center appear at the top in every instance, and the others follow consecutively. From left to right there are six columns. Those containing solid lines (black in original), namely, the first, third, fifth and six (half-size) columns, represent 1d., 2d., 3d. and 4d. stages respectively. Those containing

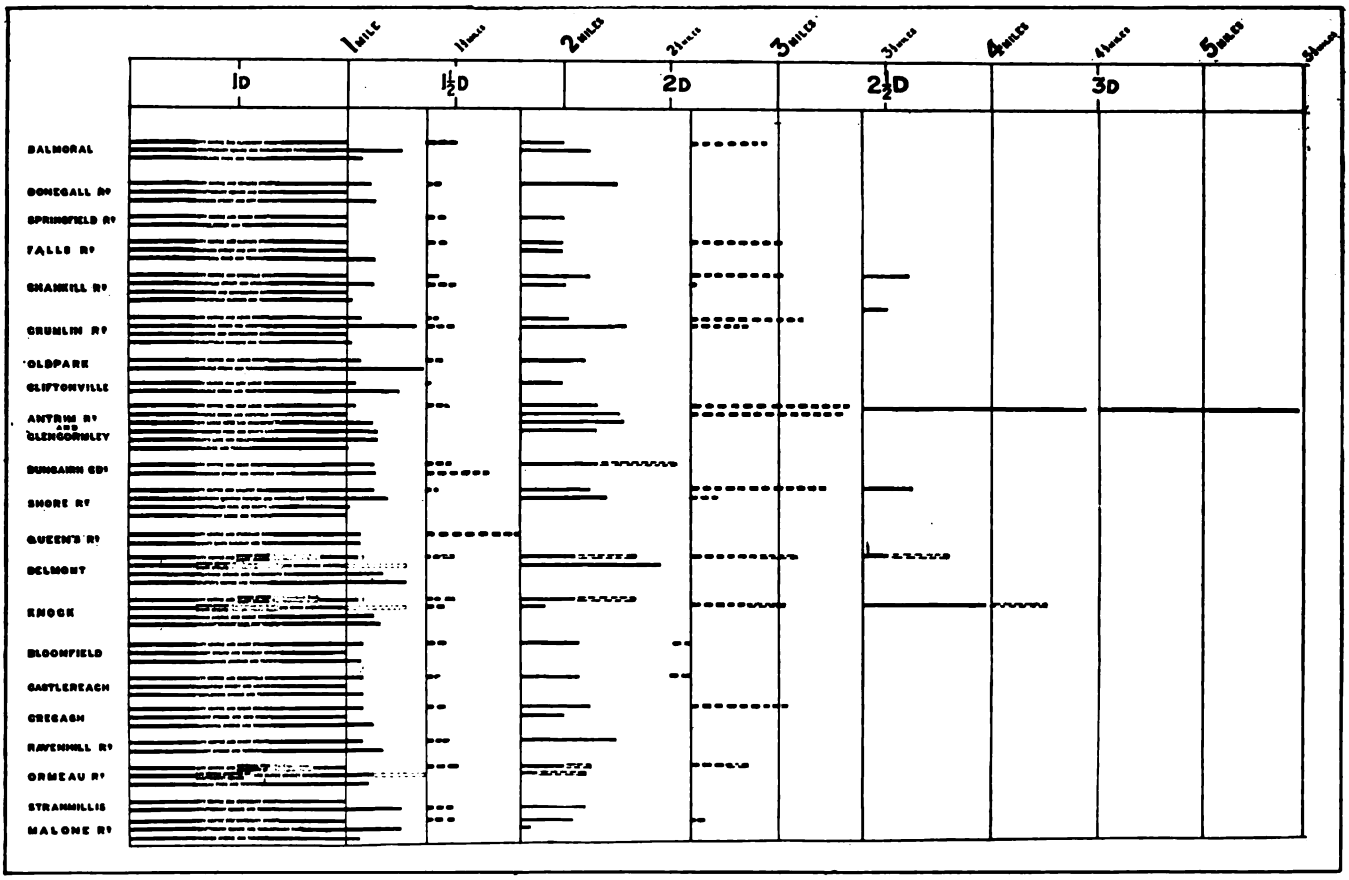


FIG. 3—RELATIVE LENGTHS OF STAGES IN BELFAST

broken lines (red in original), namely the second and fourth columns, represent 1½d. and 2½d. stages. The dotted lines show the difference in length of stage common to alternative routes, the full lines showing the length via the more direct route and the dotted line that via the longer route.

Of the group of 1d. routes between the mile (5280 ft.) and 7200 ft., the majority are well within 6000 ft. The 1½d. stages run between 7200 ft. and 9480 ft.; the 2d. stages, between 9480 ft. and 13,680 ft.; the 2½d. stages, between 13,680 ft. and 18,000 ft. and the 3d. stages between 18,000 ft. and 24,000 ft.; the only 4d. stage is 28,880 ft. long.

In one of the 1918 reports on the fare question, Mr. Moffet concluded with the following significant statement showing that electric railway men in the United Kingdom do not look upon the zone system as a hard and fast proposition but as something that must be worked out in accordance with the conditions peculiar to a given community:

> It has been suggested that stages should be fixed upon an exact mathematical basis of 1 mile for 1d., but such a proposition . . . is not a practical one, and therefore not one that I could recommend, as it would debar or prohibit my bringing to bear on the subject any skill, knowledge or experience which I may possess in such matters.

LOOKING ACROSS CASTLE JUNCTION, THE BUSIEST SECTION OF BELFAST

Moreover, in connection with a proposal to make a traffic point at Cromac Square ⅜ mile or less than 2100 ft. from the center, the general manager reported:

> Cromac Square is too near the city center. During the rush hours and meal times cars arrive at this point with practically as many passengers as they can hold, and they leave quite full. Consequently, there would be no advantage in fixing a stage there to encourage additional traffic which could not be accommodated. The fact that the cars still leave this point at such times loaded up to their fullest extent proves that the new fares have not stopped the wareroom and shop girls, or at least those who did ride, from traveling as before.
>
> Penny stages cannot be made from Cromac Square without reducing the fares below what they were before the Council decided to raise them. Moreover, corresponding overlapping stages which could not be refused would be demanded on all other routes, with the result that the whole business would be reduced to a huge farce.
>
> With regard to overlapping stages generally, I am of the opinion from my experience with such stages that in no case should they be fixed nearer than ⅜ to ¾ mile from the center.

There is now established in Belfast a central area of approximately 1140 ft. radius in which riders from one side of the city are permitted to board or leave the cars before or after they pass through Castle Junction. This gives an overlap area through the business section of the city. In order to enable the conductor to collect all his fares within so small an area and to avoid congestion, the railway has established three loading points besides Castle Junction at the following places (see accompanying map): (1) City Hall; (2) Albert Memorial, and (3) North Street. The central area shown on the accompanying may covers the triple-armed section, about 960 ft. along Donegall Place, 1140 ft. along Royal Avenue and 1320 ft. along High Street.

SPECIAL FARES AND DISTRIBUTION OF RIDERS

In addition to the standard fares, the following special low-rate fares are in vogue for children and workmen:

CHILDREN'S FARES

1d. stage for ½d. through special ticket.

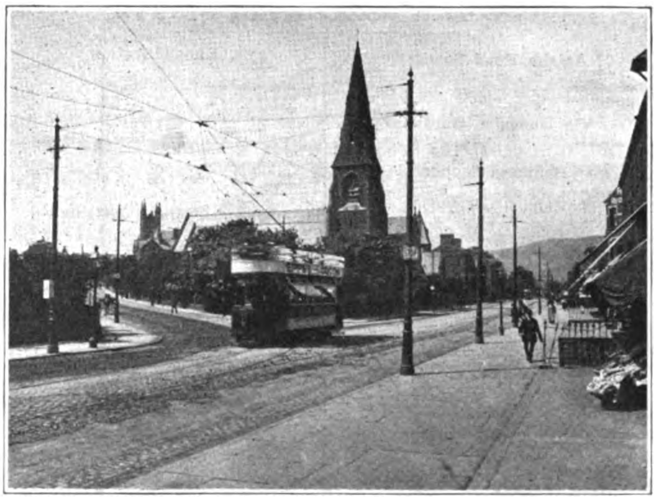
1½d. and 2d. stages through purchase of regular 1d. ticket, which is punched for the permissible additional number of stages.

2½d. and 3d. stages through purchase of regular 1½d. ticket, which is punched for the permissible additional number of stages.

4d. stages through purchase of regular 2d. ticket, which is punched for the permissible additional number of stages.

WORKPEOPLE'S FARES

1d., 1½d. and 2d. tickets are obtainable for 1d., 1½d. and 2d. stages, for 2½d. and 3d. stages and for 4d. stages respectively, with a minimum fare of 1½d. across the city center on special through cars.

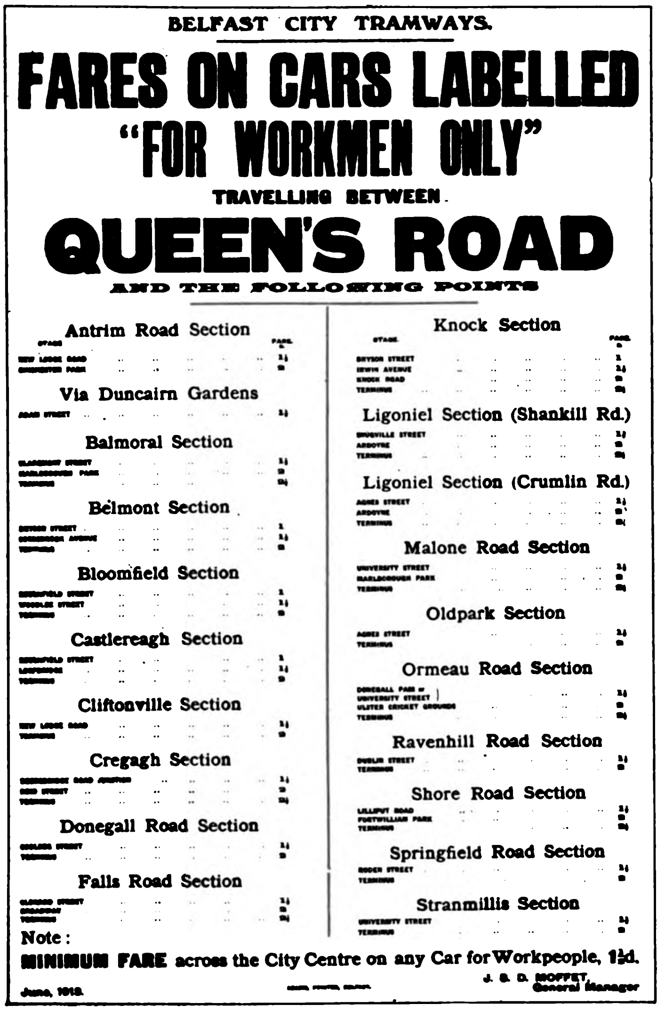


JUNCTION OF CLIFTONVILLE AND ANTRIM ROAD SECTIONS NEAR CENTER OF CITY

Workmen's roundtrip tickets are not used at Belfast. Workpeople's fares in theory are available, for example between 5 and 8 a.m. on cars labeled "For Workmen Only" but not different from standard cars in equipment or upholstery. As a matter of fact the actual workmen's morning traffic is from 5 a. m. to 6.30 a. m. during which period anyone who boards the cars buys a regular ticket and gets the additional riding as in the case of children's tickets. These early cars go direct to the shipyards via Castle Junction, as explained in Part I in the issue of May 10 in connection with rush-hour through-routing in Belfast. Between 6.30 and 7 a.m. no workmen's cars at all are run, as the cars are returned to the depots immediately after being unloaded at the yards. This class of riding, naturally, is too costly to be encouraged. At present, it is about 7.8 per cent of the traffic, and with the shorter workday may disappear altogether.

On the Glengormley line the management is trying to reserve the through cars for through passengers during rush hours by charging a minimum fare of 2d., somewhat as the Jacksonville (Fla.) Traction Company tried to keep short riders off the cars to Camp Johnston. The result of the Belfast experiment to date has been contrary to the expectation that there would be an increase in the revenue from this plan. A recent week-day showed that while the 2d. fares had increased from 517 to 768—a gain of 502d.—the penny passengers had dropped from 1138 to 567—a loss of 571d.—making a net loss of 69d. The increase in 2d. passengers was caused, of course, by the reservation of accommodation for this class of passenger, while the decrease in penny riders might be due to a greater choice of cars from the city than to the city.

There is little free riding in Belfast. At one time city employees rode at very low rates, but Mr. Moffet argued successfully that it was no more logical for the tramways department to carry these employees practically free than it would be for the electricity department to give electricity to the street railway. Except for some charity concessions, as to the blind, free riding on the Belfast lines is confined to tramway employees "to and from work or when on duty." For this purpose, they are furnished with a vivid red porcelain disk, duly numbered, which is worn like a wrist watch! Colored tokens of celluloid are sold for postmen and others at full price in lots of say £5.


BELFAST CITY TRAMWAYS.

FARES ON CARS LABELLED "FOR WORKMEN ONLY"

TRAVELLING BETWEEN

QUEEN'S ROAD

AND THE FOLLOWING POINTS

Antrim Road Section

Via Duncairn Gardens

Balmoral Section

Belmont Section

Bloomfield Section

Castlereagh Section

Cliftonville Section

Cregagh Section

Donegall Road Section

Falls Road Section

Knock Section

Ligoniel Section (Shankill Rd.)

Ligoniel Section (Crumlin Rd.)

Malone Road Section

Oldpark Section

Ormeau Road Section

Ravenhill Road Section

Shore Road Section

Springfield Road Section

Stranmillis Section

Note:

MINIMUM FARE across the City Centre on any Car for Workpeople, 1½d.

June, 1918.

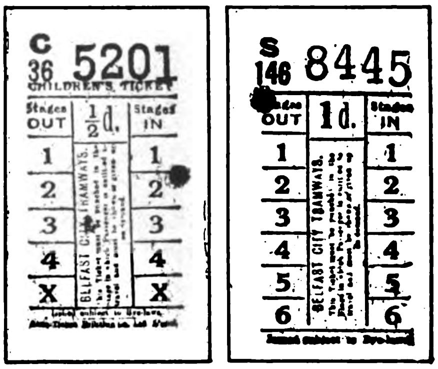
J. & D. MOFFET, General Manager

TELLING WHAT TRAVEL ON "WORKMEN ONLY" CARS WILL COST

Unlike the usual fare receipt, the Belfast tickets show the stages by numbers instead of names. By printing the maximum number of stages on a ticket of given denomination, the railway can use the same ticket on all lines where the given rate of fare prevails. The management, after many years' experience with this system in London and the Provinces, finds that the great mass of riders soon become familiar with the stage numbers on their every-day routes, while the stranger suffers no special inconvenience because it would be only a matter of chance that his destination was a stage boundary. In any event, there is no reason why the stage numbers, with the cheapest ticket numbering most prominent, could not be put on the poles if such identification was considered to be desirable. The tickets, two of which are illustrated, are similar to those which Mr. Moffet and his special traffic assistant, W. T. Young, introduced when they were operating the West Ham Corporation Tramways. In addition to the usual serial number the tickets have so-called "service" numbers which identify the conductors more readily than would otherwise be possible.

The method of fare collection is that usual with the ticket system.

The punches now being introduced are the latest type of the Ticket Punch & Register Company, Ltd., London, and these are rented at about $2.75 a year. With these punches, no registration can be effected without a standard thickness of ticket. To get at the punchings, it would be necessary for the conductor to destroy a tiny seal. Dishonest conductors are prosecuted but are fined rather than imprisoned. Compared with the citizens of other cities, those of Belfast appear to be well supplied with silver—too well supplied—as not more than 40 per cent of the passengers tender the exact copper fare. Disputes concerning the fare to be paid are not likely, for the rates are plainly displayed on posters, such as one for workmen's fares reproduced herewith. The traffic by-laws and regulations are also printed in a tiny red book carried in every car—more, however, as a matter of compliance with the law than as a matter of necessity.



SPECIMENS OF STAGE-NUMBERED AND SERVICE-NUMBERED TICKETS USED IN BELFAST

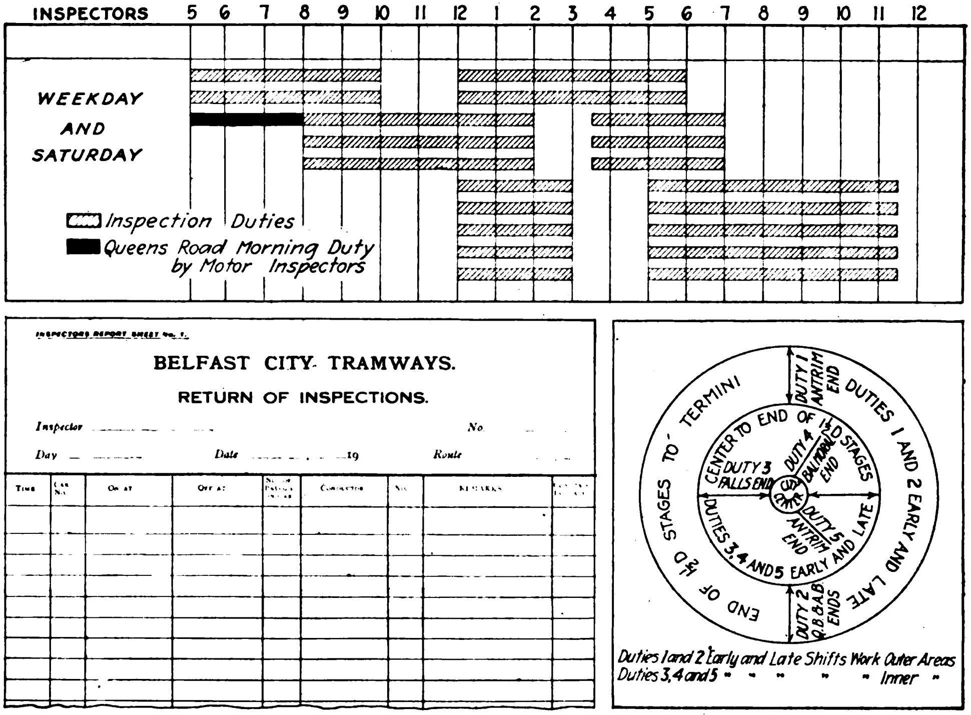
Ten ticket inspectors are employed. With the coming of the present management, the work of these men was systematized and definite report forms were introduced. This raised the number of checkings from less than 2000 to 10,000 per month. The inspector makes his report on the "Return of Inspections" sheet illustrated in Fig. 4, each report as to car boarded being initialed by the conductor. From these reports, the traffic department prepares two abstracts (daily and monthly), one showing the number of inspections per car and the other the number of inspections per conductor. These reports show from one to nine checks a day with an average of three to four for the system as a whole.

The work of the ten ticket inspectors is laid out according to Fig. 4 and the accompanying table, from which it will be seen that their duties or shifts are varied according to traffic conditions:

TIMETABLE OF TICKET INSPECTORS

Between 5 and 8 a.m., three are on duty.
Between 8 and 10 a.m., five are on duty.
Between 10 a.m. and 12 noon, three are on duty.
Between 12 noon and 2 p.m., ten are on duty.
Between 2 and 3 p.m., seven are on duty.
Between 3 and 3.30 p.m., two are on duty.
Between 3.30 and 5 p.m., five are on duty.
Between 5 and 6 p.m., ten are on duty.
Between 6 an 7 p.m., eight are on duty.
Between 7 and 10.30-11 p.m., five are on duty.

At the start of the day's work, each inspector (identified by duty number) is assigned a certain starting point, one group working around on an inner radius and the other group working around on an outer radius as shown in Fig. 4. There is considerable rivalry among the ticket inspectors, for it is possible to compare their output under like conditions and the figures are posted on the bulletin boards, although without comment. Thus the report for Jan. 19, 1919, showed inspections as follows: Maximum, 48.5; minimum, 25.8, and average, 33.5.


INSPECTORS
5
6
7
8
9
10
11
12
1
2
3
4
5
6
7
8
9
10
11
12
WEEKDAY AND SATURDAY
▨ Inspection Duties
■ Queens Road Morning Duty by Motor Inspectors
TERMINI
TO STAGES OF END OF 1½D STAGES
DUTIES 1 AND 2 EARLY AND LATE
DUTY 1 ANTRIM END
DUTY 2 Q.B. & A.B. ENDS
CENTRE TO END OF 1½D STAGES
DUTY 3 FALLS END
DUTY 4 BALMORAL END
DUTY 5 ANTRIM END
DUTIES 3, 4 AND 5 EARLY AND LATE
CITY HALL
Duties 1 and 2 Early and Late Shifts Work Outer Areas
Duties 3, 4 and 5 " " " " Inner "

INSPECTORS REPORT SHEET No. 1.

BELFAST CITY TRAMWAYS.

RETURN OF INSPECTIONS.

Inspector .... No. ......

Day .... Date .... 19 Route ......

Time	Car No.	On at	Off at	No. of Passengers on car	Conductor	No.	Remarks	[illegible]

FIG. 4—TEN TICKET INSPECTORS MAKE 10,000 CHECKINGS A MONTH

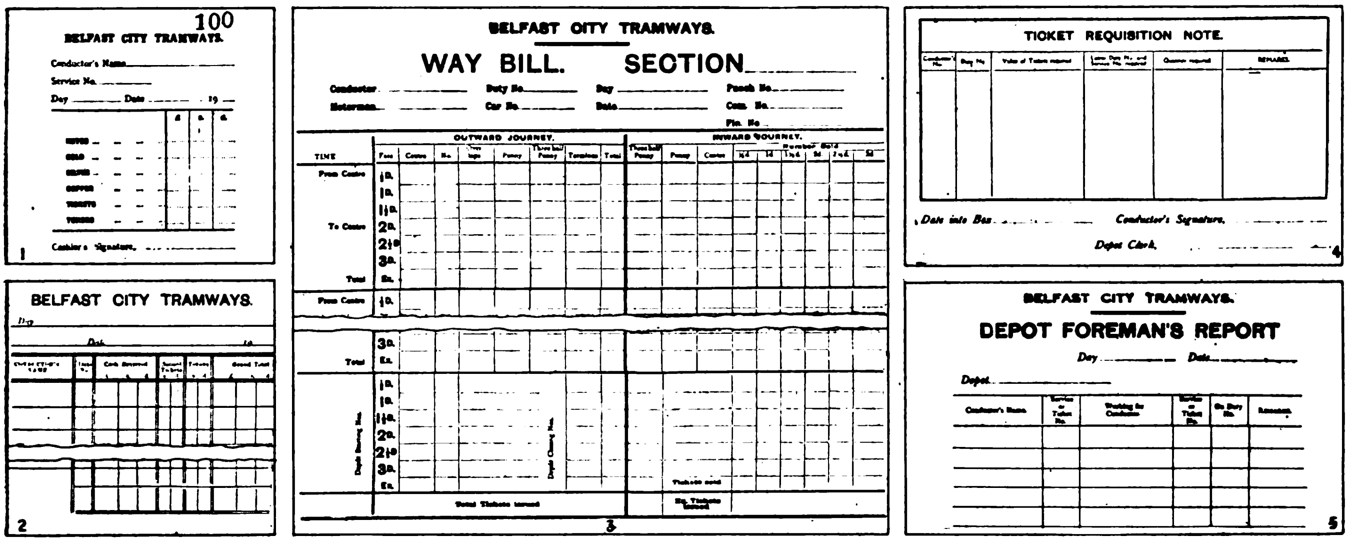
At top, chart showing hours inspectors are on duty. At left ticket inspector's report sheet. At right, chart used to assign duties to traffic inspectors.

HANDLING CONDUCTORS' RETURNS AND ACCOUNTING FOR TICKETS

All cash and ticket transactions between the conductors and the traffic department are carried on through eight depot cash clerks. These clerks, who are discharged soldiers, handle everything—the punch, bag, money and tickets—and also carry stocks of tickets as drawn from the main ticket storeroom.

A conductor desiring a supply of tickets makes out a "Ticket Requisition Note" as shown in Fig. 5 and presents it to the depot clerk. The latter draws the supplies from a bin reserved for this particular conductor's stock. Belfast uses the 10,000 ticket-of-each-class system, each conductor receiving his tickets in serial order until the supply is exhausted. The practice is to keep 2000 tickets ahead at the divisional car-house, while the remaining tickets stay at the main ticket storeroom to be drawn upon by requisition from the depot clerks. Evidence that the local stocks need replenishment is afforded by sending on the conductors' requisitions as filled.

Each conductor on beginning his day's work receives from his depot clerk a way-bill which shows the terminal times for the entire day. The conductor himself writes in the starting numbers of his tickets in the



100

BELFAST CITY TRAMWAYS.

Conductor's Name ....
Service No. ....
Day .... Date .... 19 ...

Cashier's Signature. ....

BELFAST CITY TRAMWAYS.

Day ....
Date 19

Grand Total

BELFAST CITY TRAMWAYS.

WAY BILL. SECTION ....

Conductor .... Duty No. .... Day .... Punch No. ....
Motorman .... Car No. .... Date .... Com. No. ....
Pin. No. ....

OUTWARD JOURNEY. INWARD JOURNEY.

TIME
From Centre ½d. 1d. 1½d.
To Centre 2d. 2½d. 3d.
Total Ex.

TICKET REQUISITION NOTE.

Date into Box .... Conductor's Signature. ....
Depot Clerk. ....

BELFAST CITY TRAMWAYS.

DEPOT FOREMAN'S REPORT

Day .... Date ....

Depot ....

Conductor's Name	Service or Token No.	Working for Conductor	Service or Token No.	On Duty No.	Remarks

FIG. 5—FORMS USED IN BELFAST TICKET ACCOUNTING

No. 1—Receipt for money and ticket returns.
No. 2—Depot clerk's summary of daily receipts.
No. 3—Way-bill for day's work.
No. 4—Conductor's ticket requisition.
No. 5—Depot foreman's report of ticket issues.

space provided at the lower left-hand corner and also the closing numbers in the space opposite. At the top of the waybill are the identifications relative to the crew, the tickets, the duty (run) and the punch numbers. The remainder of the page and the three pages following are available for the sales report of each of the various trips.

Conductors are supposed to make blind returns, but it is fairly certain that they count their returns. At one time, it was customary for the men to drop their canvas money and ticket bags into a safe with a zig-zag entrance. This was superseded by the present conductor-to-clerk arrangement because too many complaints about shorts resulted. Sometimes the conductor forgot to deposit anything! Now all returns are counted in the presence of the conductor. On accepting the return, the clerk gives the conductor a receipt (see illustration) for all the money, tickets and tokens received. The duplicate of this receipt stays in the receipt book, which is sent to the traffic department headquarters the following morning together with a summary of all cash, tickets and tokens received from the individual conductors. This summary sheet is also illustrated in Fig. 5.

The punches are opened and resealed by the depot clerks. It is not considered necessary to count the punchings, except in cases of suspected dishonesty, as the check of tickets sold compared with the opening and closing numbers of the punch is sufficient. As a matter of fact, the reports of the ticket inspectors indicate that it scarcely pays to have a checking system for other than the moral effect, because the losses due to dishonest conductors are so small.

In addition to the eight depot clerks, whose duties are by no means confined to the handling of the conductors' returns, there are three girls at headquarters (ticket dispatching department) engaged in issuing tickets to the divisional car depots and also in checking the reports of the traffic inspectors, etc. Five male clerks in the audit department are also employed from 9 a. m. till 12 noon on the cash returns and certain traffic sheets, after which they are engaged in general accounting duties. Thus both the tickets and the returns for a traffic of about 250,000 passengers a day are handled through the part-time service of three girls in the ticket department, five male clerks of the audit department and eight depot clerks, or sixteen people in all.

ORDERING, STORING AND DISTRIBUTING TICKETS

Tickets are ordered from the Auto-Ticket Printing Company, Ltd., Liverpool, in lots of 3,300,000, numbered from 1 to 330 inclusive, thus giving 10,000 per "service" for a given denomination. The following lots are numbered A1 to A330 and so on through the alphabet so that by the time the alphabet is completed all the earlier letters will have been worked off. As the tickets are often delivered irregularly, a book is kept of all the numbers on order, arranged vertically. As a given group is received a blue line is drawn alongside, while a red line is drawn alongside the gaps to serve as a reminder that the tickets are not arriving in order of use.

The tickets are stored in individual bins for each conductor according to his service number and issued in the order of the serial numbers. A stock sheet in each bin shows what tickets of this 10,000 group per denomination have gone out and what tickets are still in. A continuous inventory is thus secured from the data shown by the conductors' requisitions to the carhouse clerks or depot foremen and by the latters' daily reports of tickets issued to regular conductors or their substitutes (see Fig. 5). Of the 330 ticket-service numbers, 284 are permanently assigned to regular conductors, grouped largely according to depots, and the remaining numbers are spare for extras.

CLASSIFICATION OF BELFAST PASSENGERS ACCORDING TO FARES PAID

Fare, Pence	Week Ended Nov. 17, 1916	Per Cent	Week Ended Nov. 16, 1917	Per Cent	Week Ended Nov. 15, 1918	Per Cent
½	144,811	10.60	111,226	7.63	85,408	5.8
1	1,135,342	83.00	1,016,361	69.75	736,063	49.6
1½	....	.....	220,332	15.12	304,764	20.6
2	82,332	6.00	82,596	5.67	242,611	16.3
2½	....	.....	19,276	1.32	80,932	5.5
3	4,717	0.40	7,406	0.51	23,793	1.6
4	....	.....	....	.....	9,005	0.6
	1,367,202	100.00	1,457,197	100.00	1,482,576	100.00

NOTE—First revision of fares, May 21, 1917; second revision, July 1, 1918.

Although the individual bin system is the basis of the ticket distribution, it is not rigidly adhered to as it may sometimes be desirable for the conductor of a busy line to work off some of the tickets of a less busy man. Due entry of such exceptions is made not only on the individual stock sheets but also in a ledger. Consultation of this stock ledger shows immediately what ticket-service number and serial numbers were used by a given conductor on a given day. It is enough to have a ticket to find out quickly by what conductor it was issued and on what day. In fact, it is possible almost to identify the individual trip without recourse to the waybill statistics.

CONDITIONS OF EMPLOYMENT

Besides the three traffic regulators and ten ticket inspectors the supervisory staff includes four motormen's inspectors. The present platform staff numbers 650. About 260 men who volunteered are still waiting demobilization. Upon their return they will be restored to their old positions as far as practicable, and then the tramways will be in position to give more service. There are no women conductors.

Aside from the 30s. weekly war bonus, the scale of pay is as follows:

First twelve months	4¾d. per hour
After twelve months	5¼d. per hour
After two years	5¾d. per hour
After three years	6¼d. per hour

After five years, long-service bonus of ½d. per hour

It is evident from the foregoing figures that, upon the basis of the maximum sixty-hour week, a man in service more than two years and less than three actually gets more war bonus (6d. an hour) than regular pay, which is 5¾d. an hour. This comparison will give some idea of how the wages account has risen in Ireland as elsewhere.

Regular working hours are fifty-four to sixty a week, but time on Sundays is counted as 25 per cent extra. Each regular service man, according to an agreement with the union, must be paid for a minimum of nine hours for every day on duty. Working hours are figured from fifteen minutes before a man leaves the depot to fifteen minutes after he returns to the depot. In all cases this non-platform time must be spent at the carhouse. A material portion of fifteen minutes is also counted as a quarter of an hour. If a man is relieved at any place other than his relief point, he is paid for the time taken by his car to reach his relief point. Conductors who commence or complete their day's work at a point on any car route away from their depot are credited with the time taken in proceeding between that point and the depot for the purpose of personally obtaining or depositing their punches.

The men are divided into three classes according to seniority, namely gold-band men, letter men and red-band men. The gold-band men, who are the oldest, are assigned to morning and afternoon shifts, the meal relief and night shift being taken by the letter men. The red-band men take out extras during the morning, noon and evening rushes, working from two to three hours each period. Under normal conditions, every man has one day off in seven.

Mr. Moffet is a strong believer in telephone control, having worked out such asystem while general manager of the West Ham Corporation Tramways. He hopes to get one for Belfast when the outlook for both expenditures and deliveries is better than now. The same viewpoint applies to the installation of car-checking devices, which he advocated and used for nearly a decade when he was connected with the Rochdale Corporation Tramways.

Railways Are Agents of the Public*

The Main Task which Confronts Both Operating Men and Manufacturers Is to Sell This Idea of "Agency" to the Car-Riding Public

BY HARLOW C. CLARK
American Electric Railway Association

WHAT is the matter with the American electric railways? This question can be answered in three words—it is broke. But electric railways should not act broke. I cannot convince myself that the great business of furnishing local transportation offers so few possibilities that there is nothing in its future except bankruptcy and abandonment. I believe that with determination, with courage and with intelligence, the problem can be solved. I believe that in the readjustment of income and outgo, these methods are possible and should be followed—first, that the outgo should be reduced to its lowest possible level, and, second, that the income should be increased so as to cover the necessary expense of doing business. I believe that to accomplish this result a survey of the field is necessary to determine just what service the public now requires of electric railways, and I believe that this survey should be made in disregard of the kind of service electric railways have in the past furnished.

New factors have entered into the situation. Recent statistics show that there is one automobile for every eighteen persons in the United States. This method of transportation has pre-empted a part of the field that was formerly occupied by the electric railways, and although the electric railway riding habit, which increased twenty-five rides per inhabitant between 1902 and 1907, and fifteen rides per inhabitant between 1907 and 1912, increased but three rides per inhabitant between 1912 and 1917, and it is perfectly well known that the deceleration is continuing, I have failed to find anywhere an investigation, or a statement, or an opinion, as to how, if at all, the service formerly furnished communities by electric railways should be modified in view of this feature of the situation. It is obvious that there is nothing that we can do to prevent in any degree the competition the privately owned automobile furnishes. It is equally obvious that if our riders are being taken away from us by this method of transportation, we cannot afford to give the service formerly furnished. What, then, is the function that we should perform?

To-day the job before the electric railway man is a job of merchandising, a job of finding out what the people want and giving it to them. I have read many statistics and have listened to many comments as to the effect of increased fares upon the riding habit. In most discussions of this subject, figures play a principal part. In very few of them has there been any attempt to study the underlying reason for this falling off in travel when fares are increased.

There is in the United States to-day, as far as I know, no street car fare which in terms of the individual's income is larger than was the 5-cent fare when it was willingly and freely paid by the inhabitants of the United States ten or even five years ago. Hence—as any merchant or any manufacturer would do under similar circumstances—one of the first things that should be done is to ascertain the causes for the falling off in income under those increased fares, if such a falling off is found to be a fact, and when these causes are determined to fit the service to the needs of the community and the habits of the people so that it can be furnished under rates of fare which they will pay.

ALLIANCE WITH THE CAR RIDERS

If the electric railway industry is to be put on a stable and firm foundation, it must form an alliance, offensive and defensive, with the car rider and not the man who uses the automobile. In one form or another, service-at-cost is here. The owners of electric railways securities can no longer expect, if they ever expected, to receive a return upon their investment greater than will attract money into the enterprise. Capital's return being thus limited to the minimum that will keep private enterprise in public service, it is evident that it is to the car rider's interest that every impost, tax, license charge or cost of operation be reduced to its minimum.

There are not a few gentlemen, both in and out of the industry, who advocate the public subsidization of electric railway transportation. It is, perhaps, possible that this in the end may be necessary, but it would seem a measure of common sense that before such a radical step is resorted to, the charges levied against the cost of transportation for the benefit of others than those persons using the transportation should be eliminated. There may have been a time when such taxes and imposts were levied against the owners of the property and taken out of the profits that would have otherwise accrued to these owners, and under those circumstances it may have been possible to defend them as proper charges. Under existing circumstances, however, there is no such defense.

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*Abstract of address delivered before New England Street Railway Club, May 22, 1919.

If the alliance of which I have spoken is formed, if the car rider can be persuaded that his interest and that of the company which furnishes him street car service are identical, the battle which we are waging in behalf of the industry is half won. We are then approaching the firm foundation for the structure of public relations which we hope to erect, for what electric railways as corporations cannot do, electric railways acting as the agents of their patrons can do.

That is the first big idea that must be "sold" to the public, or that portion of the public which constitute the body of car riders. It is not such an extremely difficult task. It has been done in the city of Cleveland, where under the original cost-of-service plan the car rider has come to recognize the fact that his street-car service cannot be loaded up with charges that should properly be borne by the community as a whole or some particular part of the community without directly affecting the car fare.

I presume that the average street railway pays out in taxes, licenses, paving and other charges at least 8 per cent of its gross receipts, and I should estimate from the statements of a large number of companies that I have examined that at least 6 of this 8 per cent is paid because these companies are street railway companies and would not be paid were they engaged in any other business than that of furnishing public service. In addition, there is each year paid in fixed charges a very considerable item, necessitated by capitalization of the cost of paving and other construction incurred entirely for the benefit of the community and not of the car rider.

Now it is a matter which very closely concerns the man who uses the street car, whether he shall be compelled to pay through increased car fare these charges from which he reaps no benefit. It equally concerns him whether the city authorities co-operate in every measure that will make for economy and efficiency in the operation of the system.

FOUR PARTNERS IN PUBLIC SERVICE

It has been said that there are four partners in the furnishing of public service by private corporations:

First—The public, which receives the service;

Second—The employees, who receive wages;

Third—The government, which receives taxes and license fees;

Fourth—The owners, who receive a return upon their investment.

Although it is necessary because of the magnitude of the operations which electric railways carry on, to talk in large figures, the proposition is after all, when reduced to its lowest terms, a very simple one. It is, in the end, a question of a fair division of the fare received—how it shall be apportioned. It is apparent that if one of the so-called partners secures an undue share, it is at the expense of the other partners, and this is an idea that should be driven home with all the force at our command. There can be to-day no contention that the owner-partner is receiving an undue share. In most instances, this partner is receiving nothing!

Before one can in any way indicate how either railway men or manufacturers can assist in putting the electric railway industry upon a firmer basis, he must in some general way, at least, indicate what this firmer basis is and how it can be approached. I am going to suggest these general heads:

1. That a determination be made of just what functions street railways—in view of the changing conditions in transportation, brought about by the development of the automobile—should continue to perform in their communities.
2. That, these functions having been determined, it be decided what of the service now being performed can be abandoned if such abandonment is indicated as necessary.
3. That the relations between the companies and the communities be readjusted upon a basis which will give to the private operators of the property a fair and just and assured return upon their investment, with additional incentive for economy and initiative in management.
4. That the corporations performing these services be considered and treated as agents of the car-riding public, and every form of tax, license and impost which is now levied against them upon the plea that it is being paid from the profit of the owners be removed.
5. That public co-operation be sought in securing the most efficient and economical operation possible through the speeding up of schedules, use of one-man cars, proper traffic regulations and such public privileges as may be justified upon the ground that the street car is performing a transportation service for the largest portion of the community.
6. That with these conditions assured, the service to be performed be prescribed by the car-riding public through public authorities and that the fare to be charged be automatically regulated by the cost of furnishing the service so prescribed.

This is, of course, a very general program. I have not attempted to go into details. I have not discussed the zone or the flat-rate system of fares, or the policy of charging for transfers. The experience in this country as to zone fares is limited. Some interesting experiments are being undertaken, and it is hoped that before long the country will have the benefit of the trial in New Jersey of a unique system of charges based on a stand-by charge plus a distance charge.

This question of a method of levying street car fares, however, is in my opinion very largely a social question. I believe it so closely affects the civic and social life of every community that the primary consideration in the determination of the method of charging, whether by zones or by flat rates, is a social question and not entirely one of expediency for the street railway. Moreover, I am not convinced that conditions in all communities of the country are so nearly similar that what is advisable as to fares in one would be advisable in all others. There are "local conditions," but underneath these "local conditions" there are certain general conditions which apply universally, and so I believe it is possible to arrive at certain general principles that will apply equally wherever street railways are operated.

These principles, as I see them, I have just stated. They are based entirely upon the theory—and I believe it to be more than a theory, I believe it to be a fact—that the furnishing of local transportation is a public function which for purposes of convenience and economy and efficiency can best be furnished by private enterprise and private initiative. In the development of the electric railway industry, this basic fact has been lost sight of by the owners and operators to a very large extent and to a very much greater extent lost sight of by the public itself, which has come to regard the corporations furnishing this service as private enterprises engaged not in a public business, but in a private business whose main purpose is the making of undue and exorbitant profits.

AGENCY THEORY MUST BE RECOGNIZED

It is evident that there can be no satisfactory adjustment of conditions until this impression or belief—for it is more than an impression—has been removed and the local transportation companies are looked upon by the public as their agents receiving a reasonable and just compensation for their services, but acting for the public in the performance of the duties imposed upon them. As long as the public holds any other view the settlement of electric railway problems is going to be impossible, and I conceive it to be the main task which confronts both railway men and manufacturers to exert their efforts towards "selling" this idea of agency.

How can it be done? It can be done, as every other idea that has captured the public mind has been put over, by the printed and spoken word. It can be done if the man at the head of each property thinks it is the thing to do, and if he in turn convinces the men under him that it is the thing to do, and they in turn convince the people with whom they come in contact that it is the thing to do, and they in turn convince other people that it is the thing to do.

SERVICE TO THE FORE!

It can be done if, in every written or spoken utterance of the owners and operators of electric railways and of the manufacturers interested in electric railways, the idea is kept clearly in mind and the thought of service is kept prominently to the fore. For, after all, what the car riding people of the United States want is "SERVICE." People use street cars for two reasons, because they have to, and because they want to. It would be interesting to know how the division of street car riders on American electric railways stands as between those who have to ride and those who want to ride. It is probably true that companies will always get the riders who have to ride, or at least until some other mode of transportation comes to relieve them of the necessity of riding on the electric lines. It is equally true that unless the electric railways make people want to ride, they will not secure or retain the second class of riders.

The job of making people want to ride seems to be a job of making the service such as will make it easier to ride than to walk or to use another sort of vehicle. That means frequency, it means comfort, it means convenience, it means speed and it means uninterrupted schedules. A very large part of this program cannot be carried out without the co-operation and active assistance of the public who patronize the service.

I have no fear of the ultimate effect of such fares as are necessary to cover the cost of service. I know that for years people have willingly and cheerfully paid the unit fare of 5 cents. I am equally certain that any fare necessitated by the cost of service in the immediate future will not, in terms of income, be in excess of the nickel. I believe that if it is possible for other industries to educate people to the higher price level that now maintains and is to maintain, it is possible for the electric railway industry to do so.

I believe that once the public is impressed with the fact that electric railway companies are its agents and are deriving from this agency no unjust or undue compensation and are performing the task to the best of their ability, the friction which now exists will be removed. Then the public will unite and co-operate in an effort to readjust its relations with the companies so that the end which we all seek—a just return for the owners and efficient service for the communities—will be achieved.

Southwestern Association Starts Up

Meetings of the Association Are Resumed with a Lively Discussion in Galveston of Current Operating Problems

THE fifteenth annual convention of the Southwestern Electrical & Gas Association was held in Galveston, Texas, on May 12-14. The convention in general was organized in the form of separate section meetings for electric light and power, for gas and for electric railway groups in the mornings and a general session later in the day. Burr Martin, vice-president and general manager Texas Electric Railway, Dallas, and vice-president of the association, was acting president in the absence of President W. A. Sullivan, general manager Shreveport Railways.

The opening address at the first session was given by I. H. Kempner, Mayor of Galveston. Mr. Kempner said that the present city administration had been criticised because it permitted an increase in lighting rates and street car fares, but that the increases were allowed because the city officials were shown that the demands of labor for increased wages were justified on account of the increased cost of living. He was convinced that the right thing had been done, although the officials might suffer for it.

Acting-President Martin spoke in part as follows:

> Public utilities have the right to expect to prosper, and we should work to educate the public to realize that rate increases have to be made if the efficiency of the utilities is to be maintained. Public confidence is the greatest asset which the public utilities can have. Without it the managers are fighting a losing fight. They may go against public opinion for a while, but they will suffer sooner or later. It has been the policy of too many to care little for public opinion, and then they wonder why better results are not obtained.
>
> Before changes are made or a new system installed you must try to view it from the point of view of the public and strengthen public opinion in your favor. There can be no success without the managers keeping in touch with the public. Impress upon the public that its welfare is dependent upon your success. There are a few who realize this fact, but the rank and file must be educated. The attitude of the managers of utilities has been too impersonal."

H. S. Cooper, secretary of the association, stated that the membership had decreased during the last year. There are seventy-five or eighty utilities in Texas which are not represented, and Mr. Cooper urged that efforts be redoubled to increase the membership.

ONE-MAN CAR SUCCESS

David Daly, manager Houston Electric Company, presided at the first meeting of the electric railway section on May 13. Practically the entire session was devoted to discussion of the practicability and the efficiency of the one-man car. Mr. Daly said that the economy which was obtained through this type of car was great and that the profit should be split among the public, the employees and the company itself. In his opinion the day is gone by when the public will let any company get the big end of the profit resulting from an innovation, and more cars and service first should be uppermost in the minds of utility operators.

G. S. Brush, of the Houston Electric Company; A. F. Townsend, manager Eastern Texas Electric Company, and W. T. Montgomery, of Monterey, Mexico, described the service given by their respective companies. Mr. Montgomery, in relating his experience in Mexico, said that the government had taken over the roads in 1914 with the result that the cars were almost worn out. It was in this condition that the railways were given back to private operation in 1917. Mr. Montgomery then introduced a makeshift Birney car by closing the back end of the ordinary street car, and he put these cars on the better lines of the company in the section occupied by foreigners.

OPERATING PRACTICES DISCUSSED

Skip stops, flagging over steam railroad tracks, transfers and collection of fares were discussed at the second section meeting for electric railways. C. I. Plummer, of Dallas, told of the savings which had resulted through the introduction of the skip-stop in that city. The average rate of speed had been increased from 8.75 to 9.85 m.p.h., and there had been a 20 per cent saving in the wear on the brakeshoes. The skip stop is in effect except on rainy days, and it is used until 10 o'clock at night. Mr. Daly declared that he favored the skip-stop practice and hoped the public would become educated as to its benefits.

In regard to flagging Mr. Daly stated that street cars have as much right to the street as steam railroad trains, if not more. Electric railways have been too much inclined to give the railroad trains the right-of-way because they are heavier and can smash the cars to bits. H. M. Smith of Port Arthur and Mr. Martin discussed the adoption of means for placing the responsibility for accidents at steam railroad crossings more on the motorman instead of partly on the conductor.

F. O. Greyson, of St. Louis, told of the introduction of metal tickets in many cities as a result of the increase of fares above 5 cents. These tickets eliminate the inconvenience caused by the making of change in pennies. They can be registered in a specially prepared box register.

The elimination of transfers was discussed, but it was declared that such action would be an injustice to some patrons, particularly factory employees who often live at considerable distances from their places of employment. It was stated that it would be sure to result in public agitation, which would be unpleasant for the railway companies.

"Standardization" was the subject of an address by Milton H. Wagner, representing the United States Bureau of Standards, Washington, D. C. Mr. Wagner declared that there should be a universal safety code throughout the country in order to prevent many unfortunate accidents. He said that safety first should be at all times uppermost in the minds of not only the general public but also all the employees of public service corporations.

E. P. Schoch, head of the department of chemistry of the University of Texas, gave an address on Texas lignite. Mr. Schoch said Texas has one-third of the total lignite supply of the entire nation. In his estimation a capital of $250,000 will be necessary to finance a trial plant to determine the fuel value of lignite. The United States government has promised $100,000 for this purpose, the University of Texas has set aside $20,000 for the plant, and approximately $50,000 is expected to be contributed by the lignite miners. He thought that utility organizations should be sufficiently interested in the project to appoint a committee to consider the question of contributing. The suggestion was not acted upon.

TEXAS' MOST URGENT NEED

First prize for the best-written answer to the following question—"What is the most urgent present need of the public utilities of Texas, and how can it be best and most quickly fulfilled?"—was given to G. H. Cushman of San Antonio. Mr. Cushman declared that a public service commission which would give stable rulings on rates and remove the question from politics was the most urgent present need.

The following officers were elected: Burr Martin, Dallas, president; A. Hardgrave, Dallas, first vice-president; C. E. Calder, Dallas, second vice-president; A. H. Warren, El Paso, third vice-president; H. S. Cooper, secretary, and T. B. Walker, Dallas, treasurer. Mr. Hardgrave was chosen chairman for the electric railway section for the ensuing year. The following executive committee was chosen: Burr Martin, Dallas; A. Hardgrave, Dallas; B. E. Calder, Dallas; A. H. Warren, El Paso; H. C. Morris, Dallas; R. Meriwether, Dallas; S. R. Bertron, Jr., Houston; F. D. Murphy, Houston, W. B. Tuttle, San Antonio; G. H. Clifford, Fort Worth; A. F. Townsend, Beaumont; C. H. Couser, Houston, and Howard Smith, Port Arthur.

Country's Coal Supply Not Inexhaustible

THE coal resources of western Pennsylvania will have been practically exhausted sixty years from now if the present rate of increase in consumption is maintained, E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, declared in an address before the Purchasing Agents' Association of Pittsburgh at its annual banquet on the evening of May 9.

"Generation of electricity at the mines would decrease transportation waste 35 per cent," Mr. Herr asserted. "A corollary benefit would be the release of much rolling stock for other uses and a consequent reduction of investment demands for railroad equipment."

Not only the Pennsylvania fields but even the newer coal territories are measurably near exhaustion, according to Mr. Herr. Unexpected inroads have resulted from war demands, he explained.

"I am referring, however, only to the present available supply," he qualified. "The world contains a coal reserve that under pressure of greater and greater necessity could be utilized and would last probably 1500 years. That is no excuse for waste, though. We must not, through prodigality, force coming generations to use the power of the sun and the ocean if less expensive energy can be left available to them for their use."

President Acts to Aid Car Lines

Cables Approval of a Federal Commission to Investigate Problems of Electric Railways After Situation Is Presented by Secretaries—Members of Commission Not Yet Named

ON MAY 20 announcement was made at Washington that President Wilson had cabled his approval of the plan of Secretaries Redfield and Wilson for the creation of a Federal Commission to investigate the problems of the electric railway systems of the country. It is well known that the burdens under which the electric railways are suffering, through no act of their own, but brought on entirely as the result of the war, have been thoroughly understood and appreciated at Washington since the present condition of affairs began. As long ago as Feb. 19, 1918, President Wilson, in replying to a letter from the Secretary of the Treasury on the subject, expressed the belief that everything reasonably possible should be done to maintain the public utilities at their maximum efficiency and the hope that the state and local authorities would respond promptly to the necessities of the situation. The National War Labor Board also, in practically all of its decisions, urged that adequate relief, in the way of increased rates, be allowed to the railways to compensate for the increases in wages awarded.

Recent receiverships of a number of important electric railway companies with the inevitable impairment of service possible to be rendered by them, coupled with evidences of further probable cases of insolvency on the part of important systems, have emphasized in the minds of the administration the need for prompt action. In consequence, the secretaries of the Departments of Commerce and Labor recently cabled to the President at Paris the accompanying letter, reciting the situation, referring to the national aspect of the situation and recommending the appointment of a federal investigating committee. The secretaries point out that the committee will not be considered an intrusion upon the functions of either state or municipal governments as both the National Association of Railway and Utility Commissioners and the Conference of Governors and Mayors had requested federal aid and federal consideration of the problem of preventing the financial disaster threatening the industry.

The President's approval of the plan establishing this commission insures its appointment, and it is expected that its composition will be announced at an early date.

It was stated at Washington on May 22 that Secretaries Redfield and Wilson are now considering the personnel of the commission, and as soon as a list of suitable names is decided upon they will be cabled to the President as suggestions to aid him in making the appointments.

Letter to President from Secretaries Redfield and Wilson

DEPARTMENT OF COMMERCE

Washington, D. C., May 15, 1919.

Dear Mr. President:

The Electric Railway problem to which your attention has been called on several occasions has recently assumed such serious national proportions as to warrant the prompt attention of the Federal Government. Already fifty or more urban systems, representing a considerable percentage of the total electric railway mileage of the country are in the hands of receivers. The communities affected are among the most important—New York, Providence, Buffalo, New Orleans, Denver, St. Louis, Birmingham, Montgomery, Pittsburgh, Memphis, Ft. Wayne, Des Moines, St. Paul, Spokane, Chattanooga.

Other large systems are on the verge of insolvency, for the industry as a whole is virtually bankrupt. The continued shrinkage in the value of hundreds of millions of electric railway securities held by savings banks, national banks, life insurance companies and by the public at large threatens to embarrass the nation's financial operations. Furthermore, the withdrawal of this industry's buying power, which is said to rank third in magnitude involves the unsettlement of collateral industries, naturally entailing labor dislocation that will affect hundreds of thousands of employees.

The return to normal conditions is being hampered and the efforts of the Government to avert strained conditions in finance, labor and commerce are being less fruitful of satisfactory results than should be expected, if some solution of the electric railway problem were in view.

What the solution is, may, we believe, be evolved by a thorough investigation of general franchise and operating conditions in their relation to rates, including service-at-cost plans, state and municipal taxation, local paving requirements, and internal economies that may be effected.

We, therefore, propose and recommend the appointment by you of a Federal Board or Commission, whose duty it shall be to study and report upon the entire problem, in order that the State and Municipal authorities and others concerned may have the benefit of full information and of any conclusions or recommendations that may be formulated. Such a study will, in our opinion, exert a helpful and constructive force in this critical period of the industry's existence, and will aid in the readjustment. If you would make such an appointment before June 30th, your Contingency Fund could be used to defray the expenses, which would be about $10,000.

The National Association of State Commissioners has always invited Federal aid in this matter and the recent Conference of Governors and Mayors adopted a resolution recommending Federal consideration of the problem of preventing the financial disaster threatening this industry.

We propose that such a commission shall be made up of one representative of each of the following groups: Treasury Department or War Finance Corporation; Deparment of Commerce; Department of Labor; National Association of State Commissioners; American Cities League of Mayors; Amalgamated Association of Street and Electric Railway Employees; American Electric Railway Association; Investment Bankers Association of America.

We respectfully urge your authorization for such a Commission, to be followed by your formal proclamation upon the selection of personnel.

Cordially yours,

[Sgd.] WILLIAM C. REDFIELD,
Secretary of Commerce.
[Sgd.] W. B. WILSON,
Secretary of Labor.

POWERS OF SUCH A COMMISSION

The powers which such a commission may actually exercise are, of course, limited. There seems to be some confusion in the daily press on this point, perhaps because of the earlier notices of a proposed Federal Public Utilities Commission which was to have power to regulate and determine local rates as a war measure. Whatever powers of this nature might have been possessed during the war, it is generally expected in Washington that the present commission will have no such power, but that it will be created for the sole purpose of making an economical study of the electric railway situation. Undoubtedly questionnaires will be issued to the various roads, asking for information with reference to their financial and operative conditions, the burdens imposed upon them by local regulation and franchise requirements, the amount of their outstanding stocks and bonds, etc. The replies received from companies will then be tabulated with a view to determine the conditions of the industry to-day, the causes of its failing revenues and the remedies which will be applied. It is possible also that hearings may be conducted. An outline of the possible work of such a commission is contained in a report recently rendered to the Investment Bankers' Association of America by its Committee on Public Service Securities, of which O. B. Willcox is chairman. This report will be found in abstract below.

REPORT OF INVESTMENT BANKERS' COMMITTEE

"There has been a good deal of discussion relative to the establishment of a federal board or commission on street railways. It has been proposed that such a board might have the same advisory powers with respect to street railway fares, franchises, etc., as the War Labor Board had with respect to wages. The Federal Government would have no power over street railway affairs, except in cases of interstate railways which are now under the Interstate Commerce Commission, and at most advisory. While a Federal Board might be influential in acting in the rôle of arbiter in specific cases, it could not be expected that it would deal promptly or in time to be of much value in the hundreds of cases in which the street railways find their revenues inadequate for payment of operating expenses and a fair return on capital. On the other hand, an investigation of all the facts and a statement of principles by a board with the prestige of appointment by the President as a federal agency would undoubtedly be of great help in reaching a solution of the street railway problem.

"At a meeting of the committee on Public Service Securities held in New York on April 10, 1919, after a discussion of the whole subject, the chairman was instructed to send the following letter to Roger W. Babson of the Department of Labor.

At a meeting of the committee on public service securities of the Investment Bankers' Association of America, held to-day, the chairman was instructed to advise you that the committee has welcomed your statement that the United States Department of Labor is addressing its efforts toward finding some method by which the relations between the street railways, the car riders and the public authorities will be put on a more satisfactory basis.

It is common knowledge that the abnormal increases caused by the war, in wages, costs of fuel and materials, and taxes, without corresponding increases in revenue, have resulted in such decreases in the net earnings of local transportation companies that they are unable to pay their operating expenses, taxes, and a fair return on the investment, and that while other industries have advanced their charges to offset increased costs, the revenues of the transportation companies have not been increased in the same proportion, and that the street railways of the country are in a perilous condition, many of them facing bankruptcy.

For example, a special commission for an investigation of problems relating to the street railways appointed pursuant to an Act of the General Assembly of Connecticut has just reported that: "A summing up of the evidence presented to this commission shows that with the exception of 12.8 miles of street railway in the state out of a total of 828 miles all of the lines are either in the hands of receivers or are insolvent, and must have their service to the public either partially or completely discontinued and portions of their lines abandoned and sold for junk unless substantial temporary relief is furnished through adequate legislation by the General Assembly of 1919. If proper action is not taken by this assembly it will be too late to remedy the neglect in 1921 and an irreparable injury will be done to the vital transportation arteries of the state, causing suffering, personal loss, depreciation and discontent to a large and most valued portion of the population of the state who have as a result of street railway facilities purchased, built or rented their homes along the street railway lines or near them and are dependent upon these lines for getting to and from their daily work, obtaining provisions and supplies, as well as being in many cases investors in the securities of the street railway lines passing their properties."

The whole country is interested in adequate local transportation at fair rates and the expansion of that service to meet the growing demands of increasing population and expanding industry. The difficulties of the local transportation systems are not confined to one section of the country, but are general all over the United States, and are therefore of national interest, and in all parts of the country these difficulties seem to be due to the same general causes and should be susceptible to common remedies, and remedies must be found promptly to prevent enormous losses to investors, to industry, and to the nation.

These difficulties appear to require a readjustment of the relations between the street railways, their employees, the car riders, and the public, which can hardly be accomplished piecemeal, but only by a general knowledge of all the facts and a general recognition of the principles which should govern those relations.

There is nobody nor authority either competent to make a thorough and impartial investigation of the facts or of sufficient dignity and importance to give such weight to its findings and recommendations as would promise acceptance throughout the country.

This committee therefore recommends the early appointment by the President of a federal board on street railway conditions, on which there would be representatives of the United States Department of Labor and other interested departments of the Government, of the street railway companies, of the American Bankers' Association, the Investment Bankers' Association of America, and the Chamber of Commerce of the United States, and of the National Association of Public Utility Commissioners, with adequate statistical and clerical assistants, for the investigation of the facts concerning street railways and the reasons for their present condition, and with instructions to state the principles which should govern the proper relations between the street railways, their employees, the car riders, and the public generally; in order that the people may have adequate transportation at fair rates, the rights of the public may be fully protected, the investors in street railways may be protected against loss, and new capital may be provided to meet the increasing demands upon the transportation systems in the interests of industry, the growth of the communities served and the health and welfare of urban populations.

This committee will ask William G. Baker, Jr., the president of this association, to appoint a member of the association to confer with you on the subject.

"Mr. Babson has acknowledged the letter with the statement that it has his approval and that he is in hearty sympathy with the efforts of the association for settlement of the street railway problem."

Apparatus for Loosening Storage-Battery Plates

A special steam generator has been developed by the Hauck Manufacturing Company, Brooklyn, N. Y., for use in unsealing and cleaning storage batteries. It is provided with six jets, three of which are controlled by a valve. Steam is forced from the jets through the vents direct into the cells. The generator can be operated either by kerosene or gas. The complete equipment comprises also a 1-gal. wax-melting vessel, a 35-lb. lead-melting pot and a lead mold.

Sidelights on the Zone Fare—Home Owning by British Workmen

Lower Wages and Difficulty of Securing Freehold Land More Potent Reasons for Lesser Development of Home Proprietorship Than Street Railway Fare

By Walter Jackson

THE writer would never have thought of preparing this particular article had not some street railway managers who have grown up with the universal fare expressed to him their firm opinion that home-owning by workmen in the United States was largely the result of the 5-cent fare and, conversely, that lack of such ownership in Great Britain was due largely to the graduated fare. Such an assertion might be expected from a real estate operator fearful of losing that "unearned increment." Street railway men will serve their industry but poorly by falling for the land dealer's point of view.

It is true that home ownership is more common here than in Great Britain. Yet why should we jump to the conclusion that the difference is due to the principle of charging by distance for a car ride? May not such vital things as wages and the availability of land and capital have something to do with the case? To own his home the workman must first save enough money. Then he must see if the house that he wants to build can be put up within a reasonable distance from his work. Finally, he wants the land to belong to him outright to avoid giving the building and other improvements to a landowner after the expiration of the leasehold. All of these steps are harder in Britain than America.

Most of the houses owned by American workmen have been located within 5-cent fare territory, but it is safe to assert that the buyers paid a good bit more for the land if they bought after the tracks were down than before. If anyone believes that the real estate operator failed to capitalize on the rate of fare, let him compare the difference in the cost of a lot in any district of suburban New York one hour out by the one-fare trolley with a similar lot in a district one hour out by the distance-fare railroad. This difference can best be expressed in the rental values of two houses exactly alike. The city house will rent for $40 and the country duplicate for say $30 a month. The city dweller will pay out probably $3 a month for car fare to and from work. Hence, if the country dweller pays three times $3 for his monthly commutation ticket he will still be $1 a month to the good, with fresher air thrown in for good measure. While there are other factors that lead to one choice or the other, we may be sure that the real estate operator thoroughly understands the game of capitalizing for his benefit any improvement in the quality, quantity and cost of transportation.

The accessibility of freehold land is another important factor in promoting home building by individuals. In the United States one may readily buy land outright instead of leasing it. Furthermore, suburban land which may be cut up into building lots is more readily available. In an old country like England much of the land is held by great estates or the municipality. Hence it is not so easy for a land company to stake out new suburbs. A contumacious owner or some ancient law relating to the inviolable "common" or public land are British hindrances to suburban growth that have no relation whatever to rates of fare. It is worthy of note also, that municipal house-building projects contemplate only the renting of houses because the cities do not want to give up freehold rights.

Yet in spite of the double handicap of lower wages and land-holding difficulties, the Britisher's innate desire to possess a "castle" all his own cannot be utterly stifled. Timely proof of this comes to hand through the final report (1919) of the Housing Financial Assistance Committee of the Ministry of Reconstruction, such aid being necessary because private construction is financially impracticable.

This statement notes that for the year 1916 there reported to the Registrar of Friendly Societies 1467 building societies whose total membership was 628,285, whose total assets in mortgages were £58,000,000 and in other securities £80,000,000, and whose total liabilities to shareholders and depositors were £61,500,000. During 1916 these societies advanced only £5,000,000 on mortgages compared with £9,000,000 during 1913, the year preceding the war. Over one-half of the total amount outstanding on mortgage consisted of sums of £500 or less advanced on the security of small house property. For such societies the committee recommends:

> That local authorities should be empowered . . . to guarantee the repayment of mortgages made by approved building societies upon houses built hereafter, where the advance made exceeds two-thirds of the value of such houses; such guarantee not to exceed 80 per cent of the cost thereof, and to remain operative only so long as the outstanding loan is in excess of two-thirds of the value of the houses for the time being.

In addition to these straight-out building societies, Great Britain has 1300 co-operative distributive societies some of which have undertaken in the past the building of houses or the financing of their purchase for letting and selling on installments to members or through loans to members. These co-operatives now have an investment of £9,000,000, either in house property or on mortgage. It is not likely that these organizations will be able to do much new building unaided. The committee therefore recommends aid under houses value limitations similar to those suggested for the building societies.

A third builder for which aid is recommended is the Lands Improvement Company, a body incorporated under the improvement of lands act of 1864 to assist landowners to build cottages as a part of the equipment of their estates. It is proposed "That the improvements of lands act should be amended so as to permit the Lands Improvement Company to charge a rate of interest on loans not exceeding 6 per cent subject to income tax, or not exceeding 4½ per cent free of income tax."

Under the small dwellings acquisition act of 1899, local (municipal) authorities may "advance to residents or intending residents in their area, in order to enable them to purchase for occupation houses not exceeding £400 in value, a sum not exceeding 80 per cent of the value of such houses. In the case of freeholds and leaseholds for ninety-nine years unexpired, the advance is not to exceed £300 and in other cases £240. For various reasons comparatively small use has been made of the act.

The committee thinks that with the present great shortage of houses the small dwellings acquisition act would be bettered by being amended as follows:

1. In view of the increased cost of building, the present

limit of value of £400 should be increased to £500 in the case of freehold houses and leasehold houses where at least 99 years of the term is unexpired, the present limit of £400 being retained in the case of other leasehold houses.

2. In the case of all future mortgages, loans should be permitted up to 85 per cent of value in place of the present limit of 80 per cent of value.

3. In the special case of new houses built after the war, local authorities should be empowered for a period of seven years after the termination of the war, to advance up to either 85 per cent of the value, or 80 per cent of the cost to the first purchaser, whichever shall be the greater.

4. The maximum loan limit of £300 in the case of freeholds and leaseholds for ninety-nine years unexpired, and of £240 in the case of other houses, should be abolished.

5. Local authorities should be empowered to reconvey a mortgage, made under the act, by a simple receipt indorsed on the mortgage deed, in the same way as building societies may now do.

The committee also discussed the granting of like aid to private builders, but concluded that the danger of exploitation and the difficulties of administration made this impracticable. However, municipal authorities might make certain co-operative arrangements with local builders within the scope of financial aid from the State. It also discountenanced aid to landowners and employers who wish to build cottages, if they insist upon such houses remaining "tied," namely, on lease to the tenant.

Perhaps, the foregoing makes dry reading to an electric railway operator, but it is well for him to be apprised through these official sources that the shortage of houses in Great Britain, whether owned or leased by workmen, certainly is not ascribed to the zone fare by those who are in the position to know.

Devices Used in Conduit Construction

SUPPLEMENTING the abstract of the N.E.L.A. committee report on power distribution given elsewhere in this issue, the following notes regarding devices used in conduit construction are worthy of mention. The sub-committee on this subject says that pneumatic cutting tools for removing pavements preparatory to conduit installation have been used to a slight extent with satisfactory results. It is expected that this class of tools will come into more general favor.

There is practically general use of power-driven concrete mixers, their use being most economical on jobs where more than twenty-five or thirty men are employed.

Kerosene torches and furnaces appear to have passed through the experimental stage and are coming into general use. A number of companies are changing over from gasoline to kerosene.

A satisfactory portable outfit for pumping out manholes has been developed, the apparatus consisting of a well-known rowboat motor with the propeller replaced by a small high-speed pump. The outfit weighs only 125 lb.

The cable grip in one form or another is in general use and attention is called to a cable-pulling eye for use where the bore of the duct is only slightly greater than the cable diameter. The eye is made of $\frac{5}{8}$-in. round steel and is connected to the cable by stripping back the lead and insulation about 7 in., wrapping the conductors securely around the shaft and soldering them fast. The lead sheath is then bent back into its original position and wiped with solder to make a smooth and moisture-proof joint.

Estimating the Life of Curved Special Work

BY M. BERNARD

IN A STUDY of special work layouts with reference to their most economical design and also in the determination of schedules of future renewals extending over a period of years, it is clearly advantageous if not absolutely necessary to have a knowledge of the probable life of special work. Not finding such information available, the writer while employed by one of the large Eastern electric railways, investigated the age and life records of more than 100 curved special-work layouts from which it appeared that the life of such layouts varied in the following manner:

Special work in which the life is determined by the curved component parts has a life expressed in terms of years approximately equal to the number of the template required for plotting the curve, the standard scale being 1 in. equals 8 ft. Thus with a connecting curve having a radius of 40 ft., as the plotting would require the use of a No. 5 template, the life could be approximately five years under average conditions, say, 100,000 cars per year.

Expressed in more general terms, the life of curved special work in terms of years is equal to the radius in feet divided by eight. From the investigation it was found also that the average life in terms of cars is equal approximately to 12,500 cars for each foot of radius. Local conditions should, of course, be given some weight in deciding on the probable "car-life," such as intensity of traffic, speed of cars, etc.

A comparison of the varying car traffic at a large number of locations disclosed a tendency for special work of the same general type to have a greater car life at a location having a traffic of, say, 50,000 cars annually, than at a location where the car traffic amounted to 150,000 cars. This is analogous to the fact that material which fractures under twenty blows delivered in one minute will withstand more than twenty blows if these are spread out over two minutes. For similar reasons special work over which the maximum speed is 6 m.p.h. will have a greater car life than where the speed limit is 12 m.p.h. As a rule a trailing tongue switch and mate will have less life than a facing tongue switch and mate in the same double-track branch-off. In any study of the relative efficiency of special work the question to be decided should not be the life expressed in terms of years but rather the life expressed in terms of car wheels. The rule described in the foregoing will not apply, of course, where the traffic over the straight is far in excess of that over the curved run.

Manufacturers Prepare Organization Plan

REPRESENTATIVES of the manufacturer members of the American Association met in New York on May 13 and practically completed the first draft of a constitution and set of by-laws for an association of manufacturers to be affiliated with the American Association. This preliminary work will be concluded at a meeting to be held on or about June 2. The proposed constitution will be submitted to the manufacturer members in the near future. Its purpose is to provide machinery by means of which the manufacturer members of the American Association may be able to perform certain definite functions for the benefit of the industry.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

New York Women Protest

Consider Recent Legislation Fixing Their Hours a Grave Injustice—Companies Do Their Best

Results unexpected, at least in some quarters, followed closely the signing of the Lockwood bill by Governor Smith of New York. This measure, referred to in the ELECTRIC RAILWAY JOURNAL for May 17, page 978, prohibits the employment of females under twenty-one years of age on electric railways and provides that no female shall work before 6 o'clock in the morning or after 10 o'clock at night, nor more than nine hours a day for six days a week and must be allowed one hour for meals.

Unexpected Results Follow

It is said that the sponsors of the bill had in mind the protection of the conductorettes. However that may be, the immediate effect of the bill was to militate, more particularly in Brooklyn, against women ticket sellers, many of whom have been in the service of the Brooklyn Rapid Transit Company from ten to more than twenty years. Evidently the Governor was cognizant of the fact that the bill would affect some of the women seriously, for in giving his approval to the measure he said that he regarded it as a matter of State duty to protect the health and provide for the welfare of women and minors who must work.

No sooner had the measure become law than the rumor mongers got busy. In their minds the newspaper reporters in about three days discharged from railway service in Greater New York more women railway employees than had been in the service of the companies since the first woman was put to work. Accounts also appeared in the papers of meetings of protest which if they could be believed would certainly fix forever as a fact the assertion that hell hath no fury like a woman's tongue.

Facts, Not Fancies, in Brooklyn

The facts, however, so far as Brooklyn is concerned, are contained in the letter of Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, to Lewis Nixon, Public Service Commissioner. This letter, dated May 21, stated that out of a total of 1500 women affected by the new law only fifty-two had actually left the service through resignation induced by the curtailment of their hours of service, and that no women have been discharged. Mr. Garrison said:

> The company has endeavored in every way possible to retain all the women employees that it is possible to retain and still comply with the law.
>
> A little consideration will lead to the conclusion that it is impracticable in the operation of an electric railway to comply with this act and retain the women in their present employment, shifting them, not in accordance with any rules of seniority, or in any way to fit in with the proper operation of the system, but in a way to discriminate against the men and in favor of the women, which would quickly cause us to lose all of the experienced and long-service men employees of the company.
>
> We could not, as the law requires, work the women during the daytime the consecutive hours required by the law. We have endeavored in every way possible to retain all women employees that it is possible to retain and still comply with the law.
>
> On the elevated and subways the law affected the following number of employees: Guards, 326; car cleaners, 52; ticket agents, 1026, and porters, 38, totalling 1442.
>
> In respect of the 326 women guards, we have not discharged any, but we are only able to afford these women the number of working hours of from three to five hours in length at the hourly rate for such labor, as against an average of nine hours with the hourly rate which they have heretofore enjoyed. Of these 326 women guards, fifty do not care to work the shorter hours and have resigned. None have been discharged. Eventually, it seems to me, they will all resign because the number of hours we can give them will not, at the hourly rate, afford them sufficient remuneration to make it worth their while to stay.

The New York Railways, operating in Manhattan and the Bronx, is negotiating with the State Industrial Commission as to what course it must take with its present women employees. In the meantime it has stopped the engagement of any new ones.

Council Approves Chicago Bills

The City Council of Chicago, Ill., on May 19 gave unanimous approval to four bills which had previously been sent to the State Legislature to provide enabling legislation for the solution of the local transportation problem. While it is expected that the Legislature will not be in session many weeks more it is hoped that with all interests united behind the proposed laws the measures will be passed. The City Council will then have time to work out a new ordinance with the companies and the way may be paved soon for unification of the surface and elevated roads and the construction of subways.

One of the bills filed in the Legislature is designed as the basis for a service-at-cost franchise. This seeks to amend section 12 of the State public utilities act as follows:

> The charges fixed for the service rendered by it by means of any such public utility by any city shall be high enough to produce a revenue sufficient to bear all cost of maintenance and operation and to meet interest charges on bonds and certificates issued on account thereof and to permit the accumulation of surplus or sinking funds to amortize, in whole or in part, outstanding bonds and certificates, and to provide and maintain special funds for maintenance, repairs, renewals and depreciation, and for damages, insurance, emergencies and other similar purposes. Any such city shall have power to contract with the holders of such certificates or with any trustee for the benefit of said holders that it will so fix said charges.

Windsor Strike Settled

Men Decide to Return to Work at Old Rates Until Voters Pass on Fare Increase

After having called for 200 militiamen to quell the strike of trainmen on the Sandwich, Windsor & Amherstburg Railway, Mayor E. B. Winter of Windsor, Ont., and officials of the other border towns were successful in bringing the striking employees and company officials together in negotiations which resulted in the resumption of service on all lines. Troops were called by telegram after the company had made an unsuccessful attempt to run cars manned by strikebreakers. No serious rioting was in evidence, but in many cases the strikebreakers were induced to desert the cars and join the strikers.

Service Ordered Resumed

The Dominion Railway Board ordered service resumed. After the men voted to return to their cars at the regular wage scale until the electors voted on a by-law allowing the company an increase in fares, the officials of the railway consented to compromise.

All strikers will be re-employed, including officers and agents of the union discharged just prior to the beginning of the strike. The men will get the increase in wages asked for provided the by-law is passed allowing the company to charge a 5-cent fare with 1 cent for each transfer issued. On the other hand, the men yielded in their demand for recognition of the union and the forced resignation of Superintendent Hayes.

Under the present agreement the railway sells six tickets for a quarter and issues transfers free. If the increased rate of fare is allowed by the voters, the men will be paid a minimum wage of 40 cents an hour during the first six months of service and a maximum of 50 cents.

Vote on Fare By-Law

Although members of the Councils of the various border municipalities concerned favor allowing the company to charge the increased fares, a difference of legal opinion regarding the right of the Councils to grant the increase led to the decision to submit the by-law to the voters of Windsor, Walkerville and Sandwich on June 14. In municipalities where the company operates without franchise, no action will be taken by the electors on the question of the proposed increase in fares. The railway is controlled by the Detroit United Railway. It operates 41 miles of road,

Buffalo Still Up in the Air

Governor Vetoes Local Service-at-Cost Plan Because He Favors State Commission—Meanwhile City Puts Commission Power Over Rates Up to Court of Appeals

Governor Smith on May 16 vetoed the bill to permit the city of Buffalo, N. Y., and the International Railway to agree upon a service-at-cost plan. He took the position that the bill did away with the control which the State had spent years in establishing. In expressing his disapproval Governor Smith said:

> The contract, if this proposed statute be valid, once made, can only be altered by the joint consent of the parties, viz., the city and railway, and the bill provides that all acts or portions of acts not consistent therewith, including the provisions of the railroad law and the public service commissions law, shall have no application to said city, or to any company or companies, parties to the contract hereby authorized.
>
> This measure thus in effect abrogates all authority or control now exercised under the laws of the State over the International Railway, not only in the city of Buffalo, but for that large area of surrounding country in which it operates. Regulatory powers are taken from the Public Service Commission and are allowed to be a matter of contract between the railway and the city, which contract can only be altered or amended by the consent of the railway.

The proposed bill had been passed by the Legislature at Albany, and the taking of evidence by three arbitrators chosen to determine the amount upon which an agreement might be based had been completed. The valuation work done now appears to be useless unless the arbitration commission should go ahead and submit findings for possible future use.

ONE AVENUE MAY BE OPEN

There may still be one means of relief for the International Railway through a revision of fares by the Public Service Commission for the Second District. The opportunity arises through a case before the commission which involves a matter of law that has now been taken by the city to the highest State court, the Court of Appeals. The company had promised that it would make no effort to secure a rate decision from the commission pending the outcome of the arbitration proceedings, but Governor Smith's veto apparently has reopened the company's side of the matter.

The case in question got into the courts through the refusal of the commission to receive the answer of the International Railway to a rate complaint filed with the commission several years ago by the municipal authorities. At that time the city wanted the 5-cent fare reviewed with the aim of getting a 3 or 4-cent fare in Buffalo. The company, however, secured an injunction prohibiting the commission from hearing the case because of the provisions of the Milburn agreement between the city and the company.

For almost four years the case was idle until the company sought to renew the negotiations by seeking to file an answer and inviting the commission to make an investigation to determine an equitable rate of fare. The city sought to withdraw its complaint, and the commission refused to receive the company's answer. Recently, however, Justice Rudd of the New York Supreme Court granted a writ of *mandamus* directing the commission to receive the company's answer.

The city immediately took an appeal to the Appellate Division of the Supreme Court, which last week handed down a decision sustaining the company. Inasmuch as the proceedings by stipulation were amended so as to treat the case as one of *certiorari* rather than *mandamus*, the Appellate Division annulled the determination of the Public Service Commission and remitted the proceedings to it for consideration. It gave leave for an appeal to the Court of Appeals and certified the following question—Has the commission jurisdiction and power, under the facts shown, to regulate the rate of fare to be charged? The city of Bucalo has made the appeal, and the case will be argued at the present term.

These proceedings have to do with the urban rates of the International Railway. They should not be confused with contemporaneous proceedings regarding interurban rates, over which, as noted elsewhere this week, the commission has just been held by the Supreme Court to have the power of regulation.

Pittsburgh Strikers Return

Receivers Gain Their Point—Pitiless Publicity of Receivership Proceedings in Courts Drives Company's Plight Home to Public

The strike of the platform employees of the Pittsburgh (Pa.) Railways, declared on May 14, came to an end Sunday afternoon, May 18. The demand of the men for a raise of 12 cents an hour from the present scale of 43, 46 and 48 cents is to be heard by the War Labor Board. The decision of that body will be subject to review by the United States District Court, under which the receivers of the railway are operating.

This settlement is almost exactly that proposed by the receivers after the court had declined, on May 13, to consent to arbitration before the War Labor Board, the results of which should be binding on the court. The officials of the union had insisted that before they would enter arbitration they must have assurance that any award made in their favor would be accepted by the receivers and the judges. The court, ruling upon this demand, on receipt of a petition of the receivers for instructions, held that it could not grant the demand as such action would amount to delegating part of its constitutional and statutory authority to a non-judicial agency, the War Labor Board. Whereupon the union officials called the men out, although the receivers again offered to submit the question to the Labor Board, the award to be subject to judicial approval.

LABOR DEPARTMENT CALLED IN

On the afternoon of May 17, after the men had been out two and a half days, the executive committee of the union in a conference with the receivers arranged by representatives of the State labor department, agreed to submit to the men a proposal that the strike be lifted and their demands heard by the War Labor Board. It was to be understood the court would review the decision of the board and that if it should reject the award or fail to act upon it within twenty days after receiving it, the union would have the right to strike again. Any award in favor of the men was to be retroactive to May 1.

The proposal was voted upon at a union meeting on Sunday afternoon. It passed with a shout. Within an hour the first cars were on the streets and by midnight service was about normal.

The demands of the men are now up to the War Labor Board, an application for a hearing having been filed on May 14 by Receiver C. A. Fagan and Attorney George E. Alter, of counsel for the receivers. The outcome of these proceedings is being awaited with intense interest in view of the possible wide effect they may have. The present scale in Pittsburgh is one the War Labor Board established as practically a uniform rate of pay. Now the men ask a 25 per cent increase. In some quarters this is taken to mean that a wave of similar demands will follow all over the country if the Pittsburgh employees are successful in their demands before the board.

MEN SAY THEIR CASE IS DIFFERENT

The Pittsburgh men, however, maintain that they intend to plead a special case before the board, based upon the argument that living costs are so much higher in Pittsburgh than elsewhere that what constitutes a living wage in any other city cannot be so construed in Pittsburgh. In support of this they are collecting cost data among themselves.

The position of the receivers before the board will be that the Pittsburgh Railways cannot pay the men more at the present 5-and-7-cent-areas tariff. They will show that not only has the company defaulted in its bond interest, but that it is indebted for materials bought long ago and altogether unable to meet the demands of local and State authorities for service.

Any mention of an increase in fares in Pittsburgh is a signal for a storm of protest. Not once during the strike did anyone connected with the railway even hint at such a possibility. When this matter was put up to the receivers by newspaper reporters the receivers would simply lift their hands.

The Pittsburgh public never before, however, has been so near an understanding of the difficulties of the railway. Thanks to the publicity attendant upon receivership proceedings, which load the papers with so much traction news that the readers are forced to absorb some of it, a large section of the public realizes how things stand. This probably accounts for the general coolness toward the cause of the strikers, manifested during the suspension of service. Everyone was grimly aware that any raise to the men seemed certain to be paid for directly by the riders.

Business was disarranged much less by this strike than by previous ones. The steam railroads and improvised auto buses did surprisingly well in supplying transportation in the emergency.

Employees Favor Company Participation

At a special election held on May 3 members of the Employees' Benefit Association of the Brooklyn (N. Y.) Rapid Transit Company voted down a number of proposed amendments to the constitution and by-laws of the association, the result of which, if carried, would have been entirely to dissociate the management of the association from the management of the Brooklyn Rapid Transit Company.

The outcome of the election leaves the organization of the Employees' Benefit Association as previously constituted, and continues, for the time being at least, the close relations between the company and the association.

John F. Porter, chairman of the board of departmental trustees, surface transportation department, commenting on the opposition to the amendments developed by the vote, said:

> The outcome of the election was not at all surprising to the older employees and older association members of the surface department, nor was it particularly surprising to association members of upward of a year's standing. The fact is the men were satisfied with the association as it was, and as it is, and they were not disposed to do anything so radical as would be implied in the step of taking the association entirely out from under the jurisdiction of the management of the company and turning it over to purely elective officers.
>
> The association has prospered as it has been conducted during years past and all its benefits have been regularly paid; its restaurant service and other services to employees have been maintained regardless of whether they were actually self-sustaining or not; and a handsome surplus has accumulated in the association treasury.
>
> The amendment providing that each member of the association who, in addition to his regular dues, paid the sum of 25 cents a month would be given a life insurance policy for $1,000 under the company's group insurance plan, of course, constituted a strong attraction, but not, apparently, sufficiently strong to induce the membership to launch forth on a career independent of the company when its past career, under the guidance of, and in friendly co-operation with, the management has proved so successful.

Following the inquiry of the War Labor Board into conditions of employment on the lines in Brooklyn that board reported that the Employees' Benefit Association was dominated by the management. The company later announced that it was prepared to comply with the recommendations of the board to remove all company control over the association. The vote of the members of the association on May 3 puts the employees formally on record as opposed to the plan to make it impossible for the management to take an interest in the affairs of the association.

M. O. Bill Passed

The people living in the communities bordering the route of the Taunton, Norton & Attleboro Street Railway may provide for the maintenance and continuance of the road, according to a bill which has passed the Legislature of Massachusetts.

The bill gives the cities of Taunton and Attleboro and the towns of Mansfield and Norton the right to purchase and hold shares in the road to such an amount as the Public Service Commission may determine or may purchase or take by right of eminent domain the tracks, poles, trolley, feed and stay wires or other property of the company. This they may do either jointly or each may act independently.

It is necessary in the case of the towns of Norton and Mansfield that two-thirds of the residents of each town gathered in special town meeting called for the purpose within five years shall vote in favor of the action. A two-thirds vote of the Council in Taunton and Attleboro is necessary for the action to be legal in those cities.

Each of the communities is authorized under the act to borrow money outside the legal debt limit. The bill has been examined by leading residents of the cities and towns interested and has met with general approval.

Relief Bills Still Under Consideration

Measures looking toward the relief of Massachusetts electric railways along financial lines are still held up in the Legislature, which bids fair to continue its present sitting for at least a month or two more.

The Bauer bill providing for the acquisition and operation of the lines of the Bay State Street Railway in Lynn by that city, and furnishing free transportation therein, has been given leave to withdraw by the committee on street railways.

Attempts to prevent the Boston Elevated Railway from giving the zone-fare system a trial have failed in the present session.

The bill sponsored by C. V. Wood, president of the Springfield Street Railway, and providing that cities and towns be enabled to extend financial aid to railways, is still in committee.

A favorable report has been presented on an order requesting the trustees of the Boston Elevated Railway to furnish the Legislature with a statement of the company's financial condition when public management began and on Jan. 1, 1919, together with a valuation of the property of the company as of the latter date.

Random Shots from Seattle

Service on the municipal elevated line in Seattle, Wash., long awaited as a means of expediting transportation to and from the big industrial district in the South End, cannot be inaugurated for at least two months, according to the city engineering department. It is now considered likely that the service will be delayed until Aug. 1. The trestle viaduct, with tracks, overhead wires and all other construction necessary is completed, but the connections with existing tracks at either end of the trestle have not been finished. The postponement is caused by the delay in obtaining material for the special work.

A bill recently introduced in the City Council, and referred to the finance and city utilities committees, provides for a bond issue of $790,000 for extensions and betterments to the municipal railway system. Two bills were also introduced which provide for limiting the issuance of bonds under two different ordinances for railway extensions. One limits to $100,000 bonds planned under an ordinance which provides for $125,000 of bonds. The other limits to $550,000 a bond issue authorized for $1,200,000. All these bills were referred to the finance and city utilities committees.

Thomas F. Murphine, superintendent of public utilities, favors the construction of a railway extension up Thirty-fifth Avenue Southwest, if the residents of that district will make a proposition to the city to buy the utility bonds which must be floated to finance the enterprise. The extension is estimated to cost $60,000. It will serve a large district that is now without adequate railway facilities.

Mr. Murphine has ordered placards placed in all the municipal cars, notifying the public of the ordinance regulating the conduct of passengers. The ordinance makes it a misdemeanor to smoke on cars, enter the car except through the gates, refuse to pay fare, attempt to use a transfer to which one is not entitled, throw refuse on the floor, etc. The penalty is a fine of not more than $100, or not to exceed thirty days in jail, or both.

The employees of the Seattle (Wash.) Municipal Railway are to be paid time and a half for overtime, providing the Council as a whole passes an ordinance which the chairman of the finance committee has requested the legal department to prepare. If this ordinance is passed, the threatened railway strike will be averted, and the long-drawn-out controversy between the city and the trainmen will be ended. Following repeated failures to induce the City Council to authorize the payment of overtime at the rate of time and a half, a meeting of railway men was called to discuss the question of a walkout, but it is believed the men will accept the proposed ordinance as a guarantee of good faith. The ordinance will become a law in thirty days, but will be effective from May 15.

News Notes

Dallas Supervisor on Traffic Study.—Lynn B. Milam, supervisor of public utilities of Dallas, Tex., has announced that he will visit New Orleans, Cleveland, Detroit, and other cities for the purpose of studying electric railway operation with a view to increasing the efficiency of the Dallas lines and improving the service wherever possible.

Mayor Vetoes Franchise.—Mayor Edward Parks of Warren has vetoed the ordinance granting a twenty-five year franchise to the Mahoning Valley Railway, included in the system of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, on the grounds it does not permit the Council to go before the Public Utilities Commission on that and other questions which concern the community in general.

Jail Sentence for Gouging Railway.—On a charge of selling coal to the Richmond Light & Railroad Company, Richmond, Staten Island, N. Y., at a price above the government's fixed figure. a coal operator of Formania, W. Va., was sentenced to sixty days in jail and fined $2,500 in the United States District Court at Baltimore recently. The indictment recited that the dealer had sold the Richmond company 2643 tons of bituminous coal on Aug. 30, 1917, at $2.90, when the price, under the Presidential order, should have been $2.

Buses for Detroit.—Double-deck motorbuses, similar to the Fifth Avenue buses in New York City, will be in operation in Detroit before the end of this summer, according to Richard W. Meade, former president and general manager of the New York Coach Company, now president of the Detroit Motorbus Company. The company will operate under the ordinance of March 26, 1918, licensing motorbuses, and under present plans of the corporation, which will be financed and directed by Detroit men, the first fleet of probably twenty buses will give service in Jefferson Avenue, with one terminal at the Campus Martius and the other near the plants of the Hudson and Chalmers Motor Car Companies, with a later extension to Grosse Pointe.

Rhode Island Employees Wait.—The threatened strike of the employees of the Rhode Island Company, Providence, R. I., unless payment of the back wages due them was made on May 3 did not materialize, owing to the decision of the union officials in conjunction with the receivers of the Rhode Island Company to wait for the expiration of the thirty-day period in which appeals from the decision of the court might be taken. The employees voted overwhelmingly in favor of the drastic action, but the time of calling the strike was left in the hands of the officers of the union and the latter were convinced of the advisability of deferring positive action until the expiration of the time allowed by law for the filing of appeals. The receivers advised the union leaders that immediately upon the expiration of the thirty-day period the wages, payment of which was ordered by the court, would be promptly distributed.

Wages Before Utility Commission.—Wage demands of the organized employees of the United Railways, St. Louis, Mo., will be submitted to the Public Service Commission of Missouri as a board of arbitration. The men will not suspend work. This was decided by vote of motormen and conductors. The plan is in accordance with the suggestion of Rolla Wells, receiver for the railway, who on May 5, in reply to demands of the employees for an increase, stated the financial conditions of the company would not permit higher wages and suggested the union take the matter up with the Public Service Commission, pointing out that the commission could empower the United Railways to increase its fares and thereby create revenue to provide for an increased wage. After considering the letter from Receiver Wells the executive committee of the union decided to submit the matter to the international body. This was done. Mr. Mahon recommended that the men accept the proposal of the receiver.

Programs of Meetings

Important Hearing in Washington

The public utilities committee of the United States Chamber of Commerce will hold its second electric railway hearing in Washington, D. C., on May 28 and 29. The hearing will be opened at 10 a. m. in the Riggs Building.

Those who are expected to be present to give testimony in regard to various factors in the present electric railway situation include the following: Charles E. Elmquist, president National Association of Railway and Utilities Commissioners; Fielder Sanders, street railway director, Cleveland, Ohio; Halford Erickson, of Hagenah & Erickson, Chicago, Ill.; L. R. Nash, Stone & Webster, Boston, Mass.; W. C. Culkins, street railway director, Cincinnati, Ohio, and Walter A. Draper, vice-president Cincinnati Traction Company.

New York Electric Railway Association

The annual meeting of the New York Electric Railway Association will be held at the Fort William Henry Hotel, Lake George, on Saturday, June 7. The business session will begin at 10 a. m. and two topics will be discussed.

The first will be the fare situation in New York State with particular reference to the extent to which the decision in the South Glens Falls case and the recent decision by Judge Hinman in the International Railway case affect the rule of practice as laid down in the Quinby case. The subject will be introduced by Morris Cohn, Jr., of Cohn, Chormann & Franchot, attorneys for the International Railway in the rate case mentioned.

The second subject is the attitude of the State Industrial Commission on self-insurance under the workmen's compensation law. The principal speaker on this subject will be O. G. Browne, assistant secretary of the Self-Insurers' Association.

The annual banquet will be held at 7 p. m. The speakers will include Job Hedges, receiver of the New York Railways, Brig. Gen. Frank T. Hines, chief Transportation Service United States Army, and Dr. Frank Buffington Vrooman, who will speak on "Big and Little Bolsheviks."

The entertainment committee of the New York Electric Railway Association has arranged for the use of the Glens Falls Country Club, which is located about 3 miles south of the Fort William Henry Hotel, by the association members on Friday afternoon, June 6, Saturday, June 7, and Sunday, June 8. Association members will be admitted to the club house and grounds by showing their badges.

The Hudson Valley Railway will transport members of the association between Lake George and the Country Club free of charge, the association badge being their means of identification to the conductor in charge of the train.

Motor boats will be provided for the use of the ladies who desire to make a trip on Lake George.

Automobiles will be furnished for a trip on the Bolton Road which runs along the west side of Lake George, from the Fort William Henry Hotel to the Hotel Sagamore grounds.

A victory championship baseball game will take place on the afternoon of June 7 at 2 o'clock on the hotel grounds between the railway and supply men.

Arrangements have also been made with the management of the hotel for dancing on Friday evening, June 6, and after the dinner on Saturday evening, June 7. Card games have been arranged to take place in the hotel in the event of inclement weather on Saturday afternoon.

In addition the association has secured the services of Robert Perkins to sing during the banquet. Other talent will also be provided. A special car from New York direct to the convention will leave Grand Central station at 12.25 a. m. on June 7 and will arrive at the Fort William Henry Hotel in time for the morning session. Those desiring accommodations on this car should make applications promptly to W. G. Kaylor, Westinghouse Traction Brake Company, 165 Broadway, New York. After arrival at Lake George, delegates will make their own arrangements for returning, but the transportation committee states that if there is sufficient demand for a car to leave Lake George Saturday evening after the banquet, one will be run.

Financial and Corporate

Hard Year in Jersey

Public Service Corporation Suffered Further Loss in Net Because of Operating Costs

Serious as were the burdens of utility operation during the calendar year 1917, they were as nothing to those encountered in 1918. Such is the summary of the last year's experiences as given in the 1918 annual report of the Public Service Corporation of New Jersey, Newark, N. J.

The operating revenue of the electric railway, electric light and gas subsidaries increased $5,706,496 or 12.1 per cent during 1918. The operating expenses, however, including amortization charges and taxes, rose $6,399,015 or 20.9 per cent. The non-operating income showed a substantial gain, but the net result for the subsidiaries was a loss of $638,398 or 13.1 per cent in net income. The final result for the combined 1918 holding company and subsidiary returns was a net income of $1,820,430 as compared to $2,377,399 in 1917. Dividends at 6 per cent aggregating $1,799,976 were paid in 1918 as compared to dividends at 8 per cent aggregating $2,399,968 in 1917.

INCOME STATEMENT OF PUBLIC SERVICE CORPORATION OF NEW JERSEY FOR CALENDAR YEAR 1918

Operating revenue of subsidiary companies....	....	$52,997,838
Operating expenses and taxes................	$33,824,826	
Amortization charges...	3,113,558	36,938,384
Operating income......	....	$16,059,454
Non-operating income...	....	472,518
Gross income............	....	$16,531,972
Income deductions of subsidiary companies (bond interest, rentals and miscellaneous interest charges).......	....	12,320,529
Net income of subsidiary companies...........	....	$4,211,443
Public Service Corporation income from securities pledged (exclusive of dividends on stocks of operating companies) and from miscellaneous sources.	$2,040,242	
Less expenses and taxes.............	148,575	1,891,667
		$6,103,110
Public Service Corporation income deductions:		
Interest on perpetual interest bearing certificates................	$1,203,046	
Interest on Public Service general mortgage 5 per cent bonds......	1,875,000	
Interest on 5 per cent collateral notes.......	375,000	
Interest on miscellaneous obligations..........	551,214	
Amortization of debt discount and expense....	233,050	
Other contractual deductions from income....	45,370	4,282,680
Net income of Public Service Corporation and subsidiary companies.	....	$1,820,430
Appropriation accounts of subsidiary companies:		
Amortization of new business expenditures prior to Jan. 1, 1911...............	$40,330	
Adjustments of surplus account...........	376,129	416,459
		$1,403,971
Appropriation accounts of Public Service Corporation (exclusive of dividends)—credit....	....	1,258,325
Net increase in surplus before payment of dividends.............	....	$2,662,296

In 1918 the operating revenues of the railway subsidiaries increased $1,437,736 or 7.4 per cent. Full details regarding operating expenses are not given in the annual report. The number of passengers carried dropped from 476,974,983 in 1917 to 451,220,806 in 1918, or 5.4 per cent. The company had a 1-cent charge for transfers which went into effect on Aug. 1, and a 7-cent fare in addition which became effective on Oct. 15.

The increase in railway revenue between Oct. 15 and Dec. 31, 1918, during which period of time the 7-cent fare with a 1-cent charge for a transfer was in operation, was 22 per cent as compared with corresponding period of the previous year. This confirmed almost exactly, it is said, the predictions and estimate of the officers of the company in their testimony before the Board of Public Utility Commissioners in the rate case.

The effects of the fare increases, besides the traffic decline, were an increase in the average fare per passenger from 3.82 cents in 1917 to 4.31 cents in 1918 and an increase in passenger receipts per car mile from 32.44 cents in 1917 to 36 cents in 1918. Miscellaneous statistics follow:

	1918	1917
Revenue passengers......	*353,190,897	361,187,782
Transfers and passes.....	98,029,909	115,787,201
Total passengers........	451,220,806	476,974,983
Percentage of passengers using transfers........	20.0	21.9
Average fare per passenger (cents)...........	4.31	3.82
Car miles..............	54,039,150	56,087,403
Car hours..............	5,698,089	6,021,225
Passengers per day......	1,236,221	1,306,781
Passenger receipts per car mile (cents)..........	36.00	32.44
Passenger receipts per car hour (dollars).........	3.41	3.02

* Excluding passengers paying for transfers.

There has been an increase in the number of jitneys in the cities served by the Public Service Railway and in the volume of business done by these vehicles. In regard to this matter the annual report says:

> No such competing service should be allowed, certainly without being obliged to obtain from the same board that has jurisdiction over the railway a certificate of public necessity for its existence. This question sooner or later will have to be determined as a matter of State policy. In almost every other State the question has been fairly met, the State policy decided and the existing electric railway systems protected from the competition of irresponsible jitney traffic. The people of New Jersey must eventually realize that if the jitney traffic is to be fostered and encouraged, the inevitable result will be higher rates for the public to pay upon existing electric railway systems and a stagnation in their future development.

The railway claim department in 1918 spent $986,039, amounting to 5.11 per cent of the gross receipts. This was a much larger sum than was expended for similar purposes the year before, but war conditions account for the increase. Steam railroad congestion added immeasurably to street traffic, owing to the more general use of motor trucks; the labor turnover was responsible for an abnormal number of inexperienced men, and mounting costs of labor and material were directly reflected in the expenditures for repairs of vehicles damaged in accidents.

The net expenditure charged to the fixed capital accounts of the various subsidiaries in 1918 amounted to $4,639,907. Of this amount $1,403,848 was for the railway department.

Leases Terminated

Rhode Island Contracts Set Aside—Further Hearing to Be Held on May 28

Leases under which the Rhode Island Company, Providence, R. I., operated the electric railways of the State have been declared terminated on April 21 by Presiding Justice Tanner in the Superior Court of Rhode Island, the companies affected being the Rhode Island Suburban Railroad, the Pawtucket Street Railway and the Union Railroad, all of which are owned by the United Traction & Electric Company.

The court also ordered the receivers of the Rhode Island Company to pay $50,000 on account to the lessor companies, to which upward of $330,000 is now owed by the Rhode Island Company for rentals. May 28 was set for a further hearing on electric railway affairs and on that date the principal issue will be the appointment of a master to determine what properties belong to the lessor companies and what to the Rhode Island Company.

No desire was expressed by the counsel for the lessor companies actually to take over property leased to the Rhode Island Company, inasmuch as it is to the benefit of the lessors to have their properties operated by the Rhode Island Company receivers rather than not operated at all. The lessors petitioned the court so that the leases by their terms might be formally terminated, enabling the lessors to protect their interests by determining what property belonged to them and arranging for return of such properties in case the Rhode Island Company is reorganized or some other distribution made of the lines.

The Rhode Island Company failed to pay rentals due the lessors between the dates of Jan. 30, when a temporary receiver was appointed, and April 21. Under the terms of the leases this failure to pay forfeited the leases. Meanwhile the receivers will retain possession by consent until May 28 at least, and later on new leases may be drawn.

Jersey Tax Valuations Announced

Utility corporations in New Jersey this year, consisting of 294 corporations and three individuals, will pay municipal franchise taxes amounting to $2,991,334, an increase of $722,387 over the assessment levied in 1918.

In the group of utilities there are twenty-nine electric railways, paying a tax of $960.910; 114 water companies, $168,974; 100 gas and electric companies, $1.416,029; thirty-five telegraph and telephone companies, $429,249; three district telegraph companies, $3,495, and sixteen sewer and pipe line companies, $12,674.

Previous to the enactment of Chapter 17 of the laws of 1917, the rate of tax levied against all classes of utility corporations except electric railways was 2 per cent. Electric railway corporations were assessed at the rate of 5 per cent of the gross receipts. Under the 1917 act the rate on utilities, other than electric railways, whose receipts are in excess of $50,000 was increased by 1 per cent each year, beginning with 1918, until the maximum of 5 per cent is reached. Therefore, the rate this year for this class of utilities was 4 per cent.

New York Franchise Tax Held Valid

In an unanimous decision the Appellate Department of the Supreme Court, Third District, recently held that corporations in New York State subject to the franchise tax of 3 per cent, based upon "the entire net income," are not entitled to deduct the amount of tax paid to the federal government on account of excess profits before computing the amount payable to the State.

With respect to the State statute, the court said:

> This is not an income tax; it is a franchise tax. It is a tax for the privilege of doing business in a corporate form in the State of New York, and the only relation of the federal act to the statute of New York is the basis for the computation of the State tax.
>
> The State franchise tax thus assessed bears equally upon every like corporation within New York. It does not constitute a double franchise tax, though the national government makes use of the same foundation in levying an income tax.

The original ruling of the State Tax Commission, that no deduction of federal taxes would be allowed in computing the 3 per cent franchise tax, is thus sustained.

Only Five Legal Investments

Each year the Massachusetts Public Service Commission transmits to the bank commissioner a list of electric railway lines in Massachusetts whose bonds are legal investments for savings banks, they having annually earned and properly paid, without impairment of assets or capital stock, dividends equal to at least 5 per cent on their outstanding capital stock in each of the preceding five years.

This year the list is the smallest on record, containing only five companies, out of a possible fifty-four companies operating in the State. This compares with seven last year and nine the year before, while in 1913 the number was thirteen. Among the eight companies that have fallen by the wayside in the last half dozen years are the Bay State Street Railway, Worcester Consolidated Street Railway and Springfield Street Railway.

Although the Boston Elevated Railway is paying the dividends prescribed, this is being done under State guaranty. The road is not earning the dividends.

New Officers for Iowa Southern Company

David G. Fisher, head of David G. Fisher & Company, public utility engineers of Davenport, Ia., was elected president of the Iowa Southern Utilities Company at a reorganization meeting of the board of directors on May 15, a meeting which marked the formal change in financial control of the utility.

Mr. Fisher organized his company in 1909 and soon afterward began to purchase and operate public utility plants. The majority of his holdings have been in Iowa. He secured a minority interest in the Iowa Southern when it was organized in 1916 and purchased control a few weeks ago.

The new officers and directors of the Iowa Southern Utilities Company are:

President, David G. Fisher, Davenport, Ia.

Vice-president, John C. Meiners, Milwaukee, Wis.

Secretary, L. C. Bernhard, Milwaukee.

Assistant secretary, G. E. Peck, Centerville, Ia.

Treasurer, J. C. Johnson, Davenport.

General manager, J. C. Johnson.

Directors, David G. Fisher, E. F. Bulmahn, Davenport; John C. Meiners, John E. DeWolf, Milwaukee; Frank S. Payne, Centerville.

D. C. Bradley and J. P. Bruckshaw, Centerville, who have been directors of the company for many years, retired. Mr. Bradley was one of the organizers of the company. He and Mr. Payne sold control to the Fisher Company.

Extension of the 200 miles of transmission line was decided on at the reorganization meeting. Two additional towns, Shannon City and Tingley, Ia., are to be added this summer to the thirty towns already furnished with electric power. This extension will be approximately 20 miles long and will be run from Diagonal, Ia.

Wants P. R. T. to Lease Line

As a solution to the trouble between the residents of the northeastern section of Philadelphia and the Frankford, Tacony & Holmesburg Railway, relative to the complaints of inadequate service, antiquated and poorly ventilated cars, the proposition has been made that the line be operated by the Philadelphia Rapid Transit Company. A. Howard Jones, an engineer connected with the commission, said he had conferred with President Mitten and G. A. Richardson, superintendent of transportation of the Philadelphia Rapid Transit Company, regarding leasing the railway and had submitted a proposition to the company, which is now being considered.

Financial News Notes

Receiver for Colorado Road.—George M. Taylor, Colorado Springs, Col., was appointed receiver of the Colorado Springs & Cripple Creek District Railway on May 10 by Judge Robert E. Lewis of the Federal Court, acting at the request of the bondholders' protective committee.

Formal Application Made.—Lindley M. Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Company, made application before Judge Mayer of the Federal District Court on May 15 to approve an immediate issue of $15,000,000 of 6 per cent receiver's certificates maturing on June 1, 1920.

New Potomac Electric Power Issue.—The District of Columbia Public Utility Commission has authorized the Potomac Electric Power Company, which is controlled by the Washington Railway & Electric Company, to issue and sell $1,750,000 of general mortgage 6 per cent five-year gold bonds, dated July 1, 1918.

Bay State Makes Purchase.—The Georgetown, Ipswich & Rowley Street Railway, sold at auction at Salem, Mass., on May 14, became part of the Bay State Railway system for a $30,000 consideration. I. H. Glidden, Boston, representing the reorganization committee of the Bay State Street Railway, was the only bidder for the road.

Foreclosure Proceedings Started.—Foreclosure proceedings against the New Orleans Railway & Light Company, New Orleans, La., for collection of interest on an issue of $6,500,000 gold mortgage bonds, payable on May 1, have been filed in the United States District Court at New Orleans by the Empire Trust Company, New York, as trustee for the mortgage.

Sold Under Foreclosure.—The Selma (Ala.) Street Railway was sold under foreclosure recently to the Selma Electric Railway, of which D. L. Gerould, Warren, Pa., will be president. W. E. Nees will remain the superintendent of the company and will have general charge of operation. Hugh Mallory will represent the stock and bond holders and will be managing director.

St. Petersburg Line Reported Sold.—The St. Petersburg & Gulf Railway, St. Petersburg, Fla., in the hands of receivers since May, 1918, is reported to have been sold to a syndicate headed by Messrs. Beeching, Webster and Disston, Philadelphia, Pa. The superintendent of the road is L. J. Wells, the superintendent of construction is J. S. Wilders, and the master mechanic is Edward Morton.

Subsidy Approved.—The Massachusetts Public Service Commission has approved the action of the town of

Swansea in voting to give $1,825 to the Swansea & Seekonk Street Railway. The sum represents a tax of $1 for each $1,000 of assessed valuation. The road was formerly known as the Providence & Fall River Street Railway. It was sold for junk in 1917, but escaped being scrapped when citizens along the route raised $80,000 for its purchase.

Negotiating for Power Plant.—The Hagerstown & Frederick Railway, Frederick, Md., is reported to be negotiating for the purchase and control of the Northern Virginia Power Company, Winchester, Va. The latter has about 150 miles of transmission lines, the main generating station being at Millville, on the Shenandoah River. The company also has a steam generating plant at Berkeley Springs, W. Va., and a hydro-electric station at Capon Springs, W. Va.

Sale for Taxes.—On June 2 various parcels of real estate and personal property belonging to the Rhode Island Suburban Railway and the Union Railroad, Providence, R. I., will be sold to settle claims of the city for unpaid taxes due on July 29, 1918. The levy upon the property was made by City Treasurer Lee and is one of many made against property upon which assessed taxes remain unpaid. The Rhode Island Suburban Railway owes the city $6,387 with interest and the Union Railroad is required to pay $8,391 with interest.

Sale of Lorimer Road June 10.—Attorney John E. Hamlin, master-in-chancery of the St. Clair County Court and attorney for the receivers of the Southern Traction Company, East St. Louis, Ill., has been ordered by Federal Judge George W. English to sell the right-of-way, rails and all other property of the railway at public sale on June 10. Based upon the report of appraisers appointed by the court a minimum price of $300,000 is fixed on the property. Claims aggregating $1,500,000 are pending against the company, and of this amount the principal items are held by the Lorimer-Gallagher Construction Company, Chicago, Ill., of which former Senator Lorimer is the head. The road has been partially completed between East St. Louis and Belleville and right-of-way has been secured beyond Belleville.

Tucson Receiver Reports.—Edwin F. Jones, who was recently appointed receiver of the Tucson (Ariz.) Rapid Transit Company, as noted in the ELECTRIC RAILWAY JOURNAL of March 29, 1919, has reported to the court that when he took possession the outstanding capital stock totaled $500,000, and the outstanding funded debt $114,000. The single-track mileage was 4.35 miles. For March, 1919, the gross income showed a gain of $216 over the same month of last year, while expenses rose $572. Some time ago the company secured from the State Corporation Commission the right to increase fares from 5 cents to 8 cents, with a small reduction for quantity sales, and the effects of this order are just beginning to be felt. It has manifestly caused a small increase in passenger revenue at the expense of traffic, the passenger total being 13,319 less in March, 1919, than the year before. It still remains to be seen, the receiver says, whether the public will ride at an 8-cent fare.

Common Stock Dividend Passed.—Directors of the Washington Railway & Electric Company, Washington, D. C., on May 15 passed the quarterly dividend of 1¼ per cent on the common stock of the company which would have been payable on June 1. The quarterly dividend of 1¼ per cent on the preferred stock will be paid on June 1 as usual. There is $6,500,000 of common stock, the annual dividend on which at 5 per cent has amounted to $325,000. The company began paying dividends on the common stock in 1909, when 1 per cent annually was paid. The distribution was increased until in 1913 a dividend of 7 per cent was paid. The 7 per cent distribution was continued until last year, when the rate was reduced to 5 per cent. William F. Ham, president of the company, said: "The board, realizing the extremely serious conditions brought about by the failure to receive adequate or sufficient revenues properly to maintain and operate its properties, has adjourned for one week to consider what further steps should be taken properly to conserve the interests of the company."

Mexico Properties Returned.—Confirmation has been received in Toronto, Ont., the home office of the company, of the report from Mexico that the Mexico Tramways has been returned to its owners and General Manager G. R. G. Conway has again taken control. Mr. Conway holds a like position with the Mexican Light & Power Company, an allied organization which had not been taken over by the government, and he was, therefore, on the scene ready for the change. The period of government possession of the tramways has been an anxious one for the shareholders, as not only have they received nothing, but the bond interest and charges have been accumulating. The company has received none of the money collected by the government from the operations of the tramways during that time, except a small amount to pay the underlying bond interest of the Mexico Electric Tramways, Ltd. In 1916 joint action was taken by the bondholders of the Mexico Tramways, Mexican Light & Power Company, and the Pachuca Light & Power Company and their subsidiaries to protect the whole situation. As yet the company has not received a full report and does not know the present physical condition of the property. No bond interest or dividends have been paid since 1913, and no annual statements issued.

Electric Railway Monthly Earnings

BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$27,408	*$17,537	$9,871	$3,459	$6,412
1m., Mar., '18	20,321	*10,962	9,359	3,501	5,858
12m., Mar., '19	293,231	*165,753	127,478	41,920	85,558
12m., Mar., '18	236,118	*123,837	112,281	38,413	73,868

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$42,924	*$32,559	$10,365	$5,357	$5,008
1m., Mar., '18	39,516	*30,124	9,392	5,254	4,138
12m., Mar., '19	533,843	*403,445	130,398	63,575	66,823
12m., Mar., '18	476,976	*327,068	149,908	63,240	86,668

COLUMBUS (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$95,306	*$54,970	$40,336	$30,279	$10,057
1m., Mar., '18	96,195	*41,609	54,586	27,700	26,886
12m., Mar., '19	1,183,546	*607,239	576,307	349,882	226,425
12m., Mar., '18	1,139,255	*444,655	694,600	315,463	379,137

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$106,782	*$65,676	$41,106	$12,972	‡$28,258
1m., Mar., '18	87,459	*49,131	38,328	11,851	26,477
12m., Mar., '19	1,200,367	*717,750	482,617	152,209	‡332,307
12m., Mar., '18	961,980	*535,977	426,003	130,968	‡321,104

EL PASO (TEX.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$128,112	*$89,738	$38,374	$7,283	$31,091
1m., Mar., '18	107,532	*68,350	39,182	6,389	32,793
12m., Mar., '19	1,308,008	*926,611	381,397	81,850	299,547
12m., Mar., '18	1,273,511	*814,316	459,195	68,571	390,624

JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$92,738	*$85,070	$7,668	$14,146	$6,478
1m., Mar., '18	78,899	*51,080	27,819	14,139	13,680
12m., Mar., '19	992,079	*796,993	195,086	177,938	17,148
12m., Mar., '18	733,980	*501,123	232,857	168,660	64,197

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$277,721	*$173,290	$104,431	$25,237	‡$88,777
1m., Mar., '18	299,172	*173,024	126,148	25,279	‡110,452
12m., Mar., '19	2,894,934	*1,904,218	990,716	301,279	‡804,437
12m., Mar., '18	2,839,727	*1,593,416	1,246,311	310,741	‡993,070

PENSACOLA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$46,047	*$39,817	$6,230	$7,855	†$1,625
1m., Mar., '18	37,035	*23,787	13,248	7,093	6,155
12m., Mar., '19	543,028	*406,592	136,436	89,310	47,126
12m., Mar., '18	380,689	*229,982	150,707	81,687	69,020

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$107,843	*$87,298	$20,545	$24,911	$4,366
1m., Mar., '18	94,377	*64,355	30,022	23,278	6,744
12m., Mar., '19	1,228,299	*931,915	296,384	286,926	9,458
12m., Mar., '18	1,019,522	*683,811	335,711	273,366	62,345

TAMPA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$106,694	*$63,502	$43,192	$4,547	$38,645
1m., Mar., '18	92,931	*50,945	41,986	4,264	37,722
12m., Mar., '19	1,110,354	*651,856	458,498	52,258	406,240
12m., Mar., '18	995,353	*573,696	421,657	49,135	372,522

* Includes taxes. † Deficit. ‡ Includes non-operating income.

Traffic and Transportation

Mayor Opposes Increase

Louisville Official Against Fare Advance—Railway Plans Economies to Avert Disaster

Mayor Smith of Louisville, Ky., has announced that he will oppose any effort on the part of the Louisville Railway to increase its fares. The Mayor has issued a long statement reviewing the affairs of the company. This he concluded in part as follows:

> So far as the stockholders of the railway company are concerned, some of the arguments advanced are sentimental rather than sound. For instance, it has been urged that widows and orphans depend on the company's dividends for a livelihood. It is not just to compel the less fortunate, who are in greater numbers, to pay increased fares in order to provide dividends for the few more fortunate. It has been further urged by some of the stockholders that they are entitled to a dividend on their stock, and the citizens of Louisville ought to pay it in the shape of increased fares, because the government has increased their operating expenses. This argument is not sound for several reasons.
>
> 1. There will be sufficient income to pay dividends irrespective of the over-capitalization of the company, as shown below.
>
> 2. The Supreme Court of the United States has established the rule that a corporation is entitled to a reasonable dividend based on a reasonable valuation of its property and that reasonable valuation depends on its reasonable worth and does not depend on some extravagant price that might have been paid for the property nor upon bookkeeping.
>
> It is apparent that originally in 1890, the chief value of the stock was based on the franchise which was given by the citizens of Louisville to the railway, and if it is true that at the present time the railway has so improved its property out of its earnings and so materially added to its assets physically that its present capitalization is fair, it follows that the railway has for many years made enormous profits, when based on a reasonable valuation of its property, according to the rule of the Supreme Court of the United States.
>
> During all of these fat years there was no thought of lowering the fare, but on the other hand, whatever profits were made were used either to give a real value to the securities already issued or as a basis for further stock issues. Therefore, if it has had fat years at the expense of the people of Louisville, it ought not to complain when a lean year arrives; that is, lean only when compared with its large profits in times gone by.
>
> Finally, last fall, the company, in its written memorandum, urged that if the increased fare were allowed, it would only produce an increased revenue of 15 per cent, or about $532,000, but the company probably would need help only for a year or two. It is apparent that the railway does not now need that help, for instead of losing $297,574, the probability is it will gain $438,660. It will be better off by $736,234 than it thought at that time. And when it is further considered that its own expert shows it a way to save $287,300, making a total of $1,023,334, which is the sum by which it will be better off than expected, it is no longer necessary to raise $532,000, which the railway urged was all the increased fare would produce.
>
> For the above reasons, I shall oppose any effort to increase fares.

T. J. Minary, president of the railway, when asked what steps the company would now take, said he had not yet read the Mayor's statement and could not say what the company would do. Mr. Minary was quoted as follows:

> The entire matter as to the increased fares is in the hands of a committee composed of John W. Barr, Judge Alex Humphrey, Oscar Fenley and myself, and it is probable we will give out a statement as soon as we have fully digested the Mayor's statement.

Later the railway in a letter to Mayor Smith agreed to his proposal that every effort toward economy and efficiency in management be exhausted before the appeal is renewed for an increase in fares. In a communication to the city railway officials have pointed out many places in the present schedule where duplication of service could be eliminated at a saving, and where service on some of the lines could be reduced. Attention was also called to antiquated provisions of the franchise that require service on some lines that is out of proportion to the need, and co-operation of the city authorities has been asked toward rearranging schedules. The Mayor said:

> I shall assist in every way possible to put into effect the reasonable economies proposed by the railway. I appreciate the splendid spirit of co-operation exhibited in the letter from the company. I am sure the people of Louisville will appreciate it and meet these proposals in the same fine spirit in which they are offered.

New Fare Schedule Allowed

The Public Service Commission of Massachusetts, on May 14, decided to allow the new schedule of fares of the Massachusetts Northeastern Street Railway, Haverhill, Mass., to become effective. The new schedule provides for a 10-cent cash fare or a 6-cent ticket fare in lots of five for 30 cents. The present cash fare is 6 cents, so that the new schedule does not represent an increase if tickets are used by the patrons of the road. The commission suspended the new schedule until May 15, but David A. Belden, president of the road, announced on May 15 that the schedule would not be put into operation until May 19.

No changes are made in any of the zones, or in any of the tickets at present in use. The new tickets will be obtainable from conductors on the cars and are good at all times. In case a conductor runs short of tickets a passenger will pay the 10-cent cash fare and will be given a 4-cent rebate check by the conductor. This rebate check will be redeemable.

Because of the question raised at the public hearing on the new schedule regarding school tickets, the schedule has been changed so that tickets for school children will be sold at one-half the ticket fare, or 3 cents. For resort and park riding, special blocks of tickets will be made up at the 6-cent rate and will be obtainable from the company offices and agents, so that a passenger can purchase a strip of tickets good for a round-trip passage to any park or summer resort without having extra tickets left over.

Fare Case Still in Courts

Ottumwa Company Plea for Justice on Fares Before Supreme Court of Iowa

The Supreme Court of Iowa had not at last report rendered a decision concerning the appeal of the Ottumwa Railway & Light Company from the decision of the Circuit Court compelling the company to resume the collection of a 5-cent fare.

DATES BACK TO 1918 STRIKE

In October, 1918, the trainmen of this company appealed to the War Labor Board for an increase in wages. The company joined with the men in the appeal, stipulating that any award of the board should be conditional upon the financial ability of the company to pay the increase decided upon. About the middle of December the War Labor Board handed down a decision increasing the wages of the trainmen about 30 per cent, and stipulating, as the company had requested, that this increase should be conditional upon the financial ability of the company to pay the increased wages. The company was not at that time in a position to pay the increase until an increase in fare was granted.

About one week before Christmas the trainmen notified the company that a strike would be called on Dec. 22 unless an increase in wages in accordance with the findings of the War Labor Board was granted prior to that date. The company appealed to the city commission in a request for a 6-cent fare, but the appeal was refused. The company then stated its case to the Business Men's Association, after which the business men appealed to the City Commission. This request also was refused by the city commission.

STRIKE AS A WEAPON

The trainmen went on strike on the Saturday before Christmas at 9 a.m. At the same time the power-house employees notified the company that they would strike within the next three days. The prospects of an entire shutdown of the railway system caused the City Commission to reconsider the case, and on the following Monday a resolution granting the 6-cent fare was passed by two of the commission against the non-concurrence of the Mayor in the decision. This resolution provided that the 6-cent fare should remain in effect until the peace treaty was ratified.

CASE BEFORE SUPREME COURT

The city election last April resulted in the overwhelming defeat of the three commissioners, and the last act which they performed was to rescind the 6-cent fare resolution. The company then appealed to the Circuit Court, but was refused the petition, and a 5-cent fare was resumed. Appeal was then taken to the Supreme Court of Iowa. Hearings on the appeal began on May 12 at Des Moines.

Buffalo Interurban Fares Can Be Raised

Supreme Court Justice Holds That General Public Policy Makes Restrictions of Quinby Case Inapplicable to Interurban Rates

A decision, important not only because it gives promise of partial rate relief for the International Railway, Buffalo, N. Y., but also because it helps to clarify the general rate-making situation in New York State, was handed down last week by the Albany special term of the New York Supreme Court.

The case arose through efforts of the cities of Tonawanda and North Tonawanda and the village of La Salle to secure writs prohibiting the Public Service Commission for the Second District of New York from investigating the reasonableness of certain interurban rates, the new tariff filed on Jan. 29, 1919, having been suspended pending the investigation. The municipalities contended that the company was bound by the interurban rates fixed in connection with the consents granted for the construction of its lines between Buffalo and Niagara Falls.

PRIOR CASES INVOLVED

In order to understand the situation clearly it is necessary to recall that in the Quinby case in Rochester (223 N. Y. 244) the New York Court of Appeals, the highest court in the State, ruled early in 1918 that for various reasons the New York Legislature could not be deemed to have unmistakably granted to the commissions whatever power it possessed over rates stipulated in local electric railway franchises. In January, 1919, however, the Court of Appeals ruled in the South Glens Falls case (225 N. Y. 216) that under the regulatory law the commissions have power to increase gas rates over those stipulated in grants of location. In the present International Railway case the cities relied in great measure upon the Quinby case and the company upon the Glens Falls case. The present decision by Justice Hinman, therefore, serves to point out the interrelationship of the International Railway and the two former cases.

GLENS FALLS NOT REVERSAL OF QUINBY CASE

In denying that the Glens Falls decision constituted a reversal of the earlier Quinby decision, Justice Hinman referred to the way the Glens Falls decision had pointed out the distinguishing elements of the Quinby case, and he added:

> In the latter (Quinby) case, the railroad company had to obtain the consent of the municipal authorities (Constitution, Art. 3, 18); a maximum rate of fare within the city of Rochester was imposed by the consent; this agreement was confirmed by a later contract; the contract was expressly recognized by the Legislature in Section 173 of the railroad law (L. 1910, Chap. 481); in Section 181 of the same law a provision was inserted which prohibits a railroad operating in any incorporated city or village from charging more than a 5-cent fare for a continuous ride within such city or village; and in 1915 the Legislature amended the charter of the city of Rochester and added a new section which provides that all street surface railroads operating therein should not charge more than 5 cents.
>
> All of these things influenced the judgment of the court in the Quinby case, as interpreted in the Glens Falls case, in reaching the conclusion that the general language of the public service commissions law, Section 49, was not adequate to overcome the fair inference, at least, conveyed from the special provisions of law in the charter and other acts, that such power had not been included in the jurisdiction of the commission.
>
> Thus the court has not said in unequivocal terms that the language of Section 49 cannot be interpreted in a proper case to confer jurisdiction in the Public Service Commission to deal with rates of fare established by agreement with local authorities. The decision in the Glens Falls case indicates, rather, that the rule in the Quinby case is not to be extended, but is to be applied only to those cases which rest upon similar facts in all respects.

INTERNATIONAL CASE STILL DIFFERENT

As for the present case involving commission regulation of interurban rates of the International Railway, Justice Hinman considered that there was no similarity between the Quinby case and this. The municipal charters and State law did not confer upon Tonawanda, North Tonawanda or La Salle the power to fix fares within or without their limits; there was no legislative recognition of the consents or fares involved in such consents, and there was no statute fixing interurban rates of fare.

There remained only the effect of the constitutional provision regarding consents. In regard to this Justice Hinman pointed out that the high-speed line between Buffalo and Niagara Falls had been constructed upon private right-of-way, that the rates of fare involved in the case were interurban only and that the property did not come within the scope of the term "street railroad" as used in the constitutional provision relative to consents. Continuing he said:

> The constitutional provision was intended to confer upon the localities power to impose conditions, if at all, pertinent to the grant of such consents so far as the municipality had a city purpose to protect not inconsistent with the public interests of the State at large. The fixing of interurban rates of fare is normally a legislative function to be exercised in the interest of the general public, beyond the control of any city in the absence of clear warrant of authority therefor. It certainly was not intended to permit a city to invade the sovereignty of the State, where, as in the fixing of interurban rates, the rights of other municipalities and the inhabitants of the State generally are involved, and where thus a State issue rather than a local concern is clearly indicated. This compels the interpretation that the constitutional provision was not intended to cover such a contingency as arises in this case, and that the Legislature has never meant to leave any such unusual power in any municipality under the sanction of the constitutional provision but has reserved full authority in itself for that purpose and has given such power to its own agent, the Public Service Commission.
>
> Surely the Court of Appeals in the Quinby case referred to agreements coming within the purview of the constitutional provision and not to agreements which could not be sustained as coming within its fair and reasonable intendment and as to which, on grounds of general public policy of the State, the police power of the State must have been reserved in the absence of clear constitutional or statutory provision to the contrary. Just as it was intended by the constitutional provision to protect the city in matters of local concern, so, in the absence of clear warrant to the contrary, the Constitution should be interpreted to protect the State and its inhabitants in all matters of State concern.

Justice Hinman, therefore, was convinced "that the constitutional provision in question was not intended to protect those cities in the making of such agreements as to those interurban fares, that the agreements in question are not dignified by any constitutional local power, as in the Quinby case, and that, as in the Glens Falls gas case, the Public Service Commission has been given jurisdiction to investigate and fix reasonable rates." He therefore denied writs of prohibition against the commission.

Akron Fare Measure Defeated

The Morse-Witwer ordinance providing for a 6-cent fare on the railway lines of the Northern Ohio Traction & Light Company was repealed on May 20 in the referendum at Akron, Ohio. The vote was 10,563 to 2394. Only four precincts out of 114 were in favor of the ordinance. The proposal had the support of only one of three newspapers. One paper opposed the measure and one was non-committal.

The ordinance, revocable after one year, was intended as a temporary measure only to give an opportunity for further study with full examination of the affairs of the Northern Ohio Traction & Light Company looking toward the ultimate framing of a new franchise ordinance.

The winning arguments seemed to be that the light and power departments of the company were highly profitable, that the company had $2,000,000 surplus available for electric railway improvements; that it had increased dividends last year on the common stock from 5 per cent to 7 per cent, and that the present franchise provided sufficient power to compel extensions and the giving of adequate service.

HOW THE FORCES DIVIDED

The results of the referendum indicate a sharp division along lines not apparent during the campaign. The Car Riders' League, led by Mayor Laub, polled votes in the great Goodrich, Goodyear, Miller, Firestone, Kelly-Springfield and other rubber plants which overwhelmed the Citizens' Progressive Association, which was organized by leading manufacturers, bankers and business men to foster the ordinance as a necessary part of the plans for civic improvement.

It was the first referendum in Akron. The city administration, which is Democratic, favored the ordinance, whereas Mr. Laub was the leader of a faction of Republicans, which now may become formidable. During the week ended May 17, the Citizens' Progressive Association which, as explained previously, represented men in every industry and walk of life, conducted an extensive publicity campaign in favor of the ordinance. In this campaign the railway company took no part.

Interline Express Rates Wanted

Representatives of the ten interurban electric railways in Indiana have appeared before the Public Service Commission of Indiana and requested permission to establish in that State a general system of line and interline express freight rates.

Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, presented the opening and general statement of the interurban railways and explained that what the electric lines in Indiana wish is authority to establish a system of express business somewhat similar to that formerly operated by old line express companies having contracts with interurban lines and later abandoned by the federalized express companies in so far as shipping over electric lines is concerned.

The plan does not contemplate unified operation by the companies as a whole, but merely the co-operation of each line. The proposed rates, according to Mr. Henry, would be somewhat higher than the present rates which the companies charge, but lower than the federalized rates on steam lines.

The only protest against the proposal was made by the City Council of Shelbyville, Ind., which objects to any increase of rates over those now in effect for the company service of the kind now available to Shelbyville.

The proposed rates are as follows: Rates on all local traffic; that is, single line traffic 150 per cent of the first-class freight rate. Rates for interline traffic; that is, for two or more lines, 120 per cent of the first-class freight rate for the same distance on a local haul.

The companies request a minimum of 40 cents on local business and 50 cents on interline business. The companies also ask to establish certain line and interline commodity rates on such articles as empty ice cream containers, empty bread baskets and the like.

The co-operating lines are the Indianapolis & Cincinnati Traction Company; Union Traction Company of Indiana; Terre Haute, Indianapolis & Eastern; Interstate Public Service Company; Indiana Railways & Light Company; Fort Wayne & Northern Indiana Traction Company; Fort Wayne & Decatur Traction Company; Fort Wayne & Northwestern Traction Company; Winona Interurban Railway and the Marion & Bluffton Traction Company.

Smoking Again an Issue in Chicago

During the epidemic of influenza smoking on both the elevated and surface cars in the city of Chicago was prohibited by the health commissioner. Prior to that time smoking had been permitted on the front platform of all surface cars, and a special smoker was carried on all elevated trains. After the order was issued, the elevated smokers were converted into regular passenger cars by taking down the match scratchers, and painting out the word "smoker" on the cars. Both the elevated and surface cars immediately became notably cleaner.

One of the Aldermen in the City Council has now initiated a measure to have the anti-smoking order set aside. This has met immediate opposition from the city health commissioner, who has announced that he would muster up supporters to aid him in his fight against the new order.

The opposition to the anti-smoking order contends that the order was issued at the height of the influenza epidemic and that the necessity for it has now passed. They maintain that such an order "is only a step toward taking away more personal liberty, and no one can see how far a thing like this will go."

The newspapers editorially favor a continuance of the anti-smoking order.

Yonkers Case Argued

Thomas J. O'Neill, counsel for Henry Koster, a Yonkers taxpayer, who is suing in the Supreme Court for an injunction to compel the Yonkers Railroad to restore a 5-cent fare, contended that the company is perpetrating a fraud upon the city, in a brief filed with Justice Joseph Morschauser at Poughkeepsie on May 17.

Besides asking the restoration of the 5-cent fare, instead of a dime and 15 cents, Mr. O'Neill in his memorandum asks the court to force Corporation Counsel William A Walsh to sue the railroad "for the liquidated damages due the city because of the railroad's violation of its franchise." The company is under bond to live up to the 5-cent fare agreement in the ordinance of 1911 granting its franchise, which, plaintiff alleges, it illegally modified with only six instead of eight votes.

The whole legal fight over the carfare hinges on the construction of Section 37 of the second-class cities law. Under this section the company had to get eight votes to get its franchise in 1911, but could muster only six votes recently to amend the franchise to clear the way for a higher fare.

The company sets up the claim that its new contract is valid under Section 30. This, O'Neill claims, covers only legislative and governmental functions, which require but six votes of ten in the Board of Aldermen for enactment, but that all the laws on franchises are contained in Section 37.

In answer to the company's contention that it holds no franchises outside the city of Yonkers, and therefore can collect another fare beyond the city limits, Mr. O'Neill states that Yonkers would not have granted the company a franchise unless it agreed to carry passengers on its cars outside the city. The brief continues:

> It must be remembered that, indeed, this special ordinance passed by a vote of 6 to 4 on April 4, 1919, does this same thing. It authorizes a 5-cent fare from 242d Street subway terminal to McLean Avenue, one-half mile within Yonkers city limits.

The special ordinance referred to is the one increasing fares which is now under legal attack.

Jersey Railway Finishes Its Case

The hearing before the Board of Public Utility Commissioners of New Jersey in regard to the proposed establishment of a zone system on the lines of the Public Service Railway was resumed before the commission on May 7. Robert M. Feustel, of Sloan, Huddle, Feustel & Freeman, testifying for the commission, declared it was his opinion that the development cost of $16,000,000 cited by the railway for the period from 1903 to 1918 was too liberal. On May 8 both R. E. Danforth, general manager of the railway, and Mr. Feustel testified. Mr. Danforth was questioned more particularly about increased costs. On May 9 the railway completed the presentation of its case dealing with the valuation. Prof. Henry C. Anderson was re-examined with respect to appraisal figures.

On May 12 testimony had to do largely with the proposed methods of recording and collecting fares under the zone system. Types of various machines to be installed on the cars were exhibited and their work illustrated. On May 16 Dr. Thomas Conway, Jr., witness for the railway, testified that the conditions under which the company operated in New Jersey were more peculiar than those faced by any other company in the United States due to the diversity of the system, the extensive mileage, the fact that the northern part of the territory is served by a number of steam railroads, the wide diffusion of factories and the proximity of the northern section to New York City and of the southern section to Philadelphia. Dr. Conway explained that more than eight months were devoted to making the check on which the zone system was based and in working out the plan, but that if the requirements of Mr. Sommer, counsel for the municipalities opposed to the zone plan, had been put through it would have taken the same number of years to complete the work.

Not Even Mr. Storrs Knows

When asked recently for some sort of a statement as to what the Connecticut Company, New Haven, Conn., contemplated doing, now that practically all of the bills which were intended to relieve the company during its present financial difficulties had failed of passage in the Legislature, L. S. Storrs, the president of the company, said that he did not consider the time ripe for the company to make any statement as there had been no decision reached as to the future policy of the company, and that he "considered that the public was just about sick of reading indefinite, and many times incorrect, statements with regard to proposed action by the company."

He also stated that there is no chance whatever of the company operating jitneys or motor passenger vehicles over routes of abandoned lines, if such service is discontinued, for he said, "the jitneymen cannot make it pay and the company cannot do so."

Transportation News Notes

Eight-Cent Zones on Maine Interurban.—The Atlantic Shore Railway, Sanford, Me., will advance its fare from 7 cents to 8 cents beginning June 1. This new fare will be collected in every zone except that between Sanford and Springvale. Under the new fare arrangement, tickets in strips of seven will be sold for 50 cents, and the price of school children's tickets in books of fifty coupons will be increased from $2 to $2.50.

Court Upholds Fare Increase.—The Supreme Court of Louisiana on May 5 affirmed the validity of the ordinance permitting the New Orleans Railway & Light Company to increase fares and gas rates. A petition to enjoin the collection of 6-cent fares was denied. The case of the Board of Public Utilities of Louisiana, in which the board claimed jurisdiction over rate fixing in New Orleans was also dismissed, the Court holding that the act of the General Assembly of 1916, purporting to create the Board of Public Utilities, was unconstitutional.

Hearing on Rainier Valley Fares.—The State Public Service Commission of Washington has started a hearing in Seattle on the proposed increased fares on the Seattle & Rainier Valley lines. The rate proposed amounts to an increase of 2 cents, making virtually a 7-cent fare when transfers are issued. The company proposes a straight 6-cent fare, with an additional cent for transfers, and a charge of 2 cents for every transfer accepted from other lines. The company contends that for five years previous to 1918 its net returns averaged only 0.87 of 1 per cent.

Fare Compromise Likely.—It is believed that a compromise will be reached by the City Council of Martins Ferry and the Wheeling Traction Company in the controversy as to passenger fares to be charged in that community. At a recent meeting of the City Council with C. P. Billings, superintendent of the company, the Council indicated its willingness to agree to rates on the following basis: 7-cent fare from Martins Ferry to Fourteenth Street, Wheeling; 7-cent fare from Martins Ferry to Pinch Run, Bellaire; 7-cent fare from Martins Ferry to Brookside and sixteen tickets for $1.

Progress on Washington Case.—The hearing before the Public Service Commission of the District of Columbia on the application of the Washington Railway & Electric Company for an increase in fare was continued during the week ended May 17. The principal witness was William F. Ham, president of the company. It was regarded as quite certain on May 15 that the commission would act in the near future on the company's application for relief. In the event the public did not require much time for presenting its case, the finding of the commission was regarded as likely to be handed down before June 1.

Rates Must Be Fair.—Fair play seems at last to be in sight for the utilities at Lansing, Mich. The conciliatory attitude on the part of the city representatives, however, was brought about in part in a peculiar way. Lansing stood to lose heavily industrially. The Olds Motor Works saw possibilities in locating at Lansing. But it demanded first of all that Lansing play fair with the company's own employees by pledging itself to secure for them adequate electric light, gas and railway facilities. As a result Lansing's new Council has adopted the report of a committee of citizens appointed to work out a solution of the utility problem and the city stands committed to a policy of rates based on findings following an inquiry into public utility production and operating costs.

New Time-Table Folder at Reading.—The Reading Transit & Light Company, Reading, Pa., is distributing a neat vest-pocket time-table in folder form, containing schedules of cars on all of the suburban lines of the company, a map showing their connections with other railway lines reaching surrounding cities and a chart giving the route numbers of cars, which enables patrons to become familiar with the cars they most frequently use. The time-table is revised and published annually on May 1. That it is recognized as one of the fixed and most useful institutions of the company is evidenced from the large number of requests for it that are received even before any notice of the new time-table is published. Very effective distribution is obtained by placing copies with all leading hotels, municipal and county offices, department stores and other business places.

Newark Mayor Loses Fare Protest.—Judge Johnson of the Second District Court at Newark, N. J., has decided that the Public Service Railway has the right to charge a 7-cent fare and that a conductor, representing the company, was justified in demanding that rate from Mayor Gillen, when the latter, on May 5, laid the ground for a test case. Judge Johnson cites the Supreme Court decision in the case of O'Brien vs. the Public Utilities Commission, the opinion having been written by Justice Swayze, in support of his belief that the company is empowered by the public utility act to fix rates so long as they are not questioned as to their justice and reasonableness by the Public Utilities Commission or through the filing of a written complaint against them. City Attorney Kearns has declared that he will prepare papers for an appeal of the case to the Supreme Court.

Seven-Cent Rate Wanted. — The Monongahela Valley Traction Company, Fairmont, W. Va., has applied to the Public Service Commission for a passenger rate increase from 5 cents in the cities it serves and 6 cents in rural communities to a flat rate of 7 cents in each zone. This would mean a 7-cent rate for city cars and a 7-cent rate for suburban cars. Some time ago the company applied for a 6-cent rate on the interurban between Parkersburg and Marietta and for six zones instead of five as at the present time. The application as filed affects all the lines operated by the Monongahela Valley Traction Company, including those in Parkersburg, Clarksburg, Fairmont, Weston and other points. The commission has fixed May 27 as the date for the hearing on the company's application. A separate application has been filed by the railway asking for a 20 per cent increase in power rates.

Receiver's Fare Plea Granted.—The Public Service Commission for the Second District of New York at its regular session on May 8, vacated and set aside the part of its order of Feb. 4 directing George Bullock, receiver of the Buffalo & Lake Erie Traction Company, to resume the sale of strips of seven one-way tickets between South Park Avenue, Lackawanna, and the Lacakawanna steel plant for 25 cents. The original order contained the provision on the understanding that the sale of tickets was required by a franchise. Receiver Bullock applied to the commission for relief on the ground that the provision for the sale of the tickets was not contained in any franchise but was a condition in a contract made on June 23, 1903, between the Lackawanna Steel Company and the Hamburg Railway and was to continue in force for three years. Commissioner Barhite, who investigated Mr. Bullock's application, found that the receiver's claim was true.

Fare Rehearing Denied Chicago.—The State Public Utilities Commission of Illinois on May 20 denied the application of the Chicago Surface Lines for a rehearing in the rate case. The original refusal of a 7-cent fare was announced a few weeks ago. The commission took the position then that the war emergency no longer existed and that business was picking up to such an extent on the surface lines that a reasonable return was assured to security holders. To give justification for this finding the commission reduced the valuation of the companies for rate making purposes about 28 per cent. The companies then asked for a rehearing for the purpose of proving up a valuation to the extent of its outstanding capital. This was not done in the original application because the commissioners did not intimate that valuation would be considered in the emergency petition. It is hinted that the next move will be the filing of a new petition asking for the fixing of higher rates based on a complete valuation of the properties.

Personal Mention

New Seattle Manager

D. S. Barnes Transferred by Stone & Webster from Everett to Seattle—Other Organization Changes

Donald C. Barnes, Everett, Wash., manager of the traction and power properties of that city, has been appointed manager of the Seattle Division of the Puget Sound Traction, Light & Power Company, to succeed A. L. Kempster. He will remove from Everett to Seattle and will make his headquarters in the Electric Building at Seventh Avenue and Olive Street.

Mr. Barnes is well known in utility circles. He has been associated with the management of Stone & Webster companies since 1905. During recent years he has been manager at Everett of the Puget Sound International Railway & Power Company and the Pacific Northwest Traction Company in charge of city railway, light and power operations and of the Seattle-Everett interurban lines.

D. C. BARNES

He was born in Cambridge, Mass., in 1880 and was graduated from Harvard University in 1902 with the degree of A.B., and of B.S. in electrical engineering in 1904. Since his graduation he has served with the Boston (Mass.) Elevated Railway, the Little Rock Railway & Electric Company, Little Rock, Ark.; the Birmingham Railway, Light & Power Company, Birmingham, Ala.; the Electric Light & Power Company of Abington and Rockland, Mass.; the Brockton (Mass.) Edison Company; the Pawtucket (R. I.) Electric Company, and the Everett companies named previously.

Mr. Barnes is an associate member of the American Institute of Electrical Engineers and is a non-resident member of the University Club and of the Rainier Club of Seattle, he is chairman of the house committee of the Cascade Club of Everett, of the greens committee of the Everett Golf and Country Club and for the past two years has been chairman of the Civilian Relief Committee Everett Chapter of the Red Cross.

The executive offices of the company at Seattle announced other changes effective on May 12. Frank Dabney becomes assistant treasurer of the Renton Coal Company, the Diamond Ice Company and the Washington Auto Bus Company. John Harrisburger becomes general superintendent of power and Mr. Crawford superintendent of distribution.

The removal of Mr. Barnes from Everett makes changes in the offices there. George Newell has been appointed acting manager of that division and W. E. Delano has been appointed superintendent of railways.

Some members of the executive staff now in the Stuart Building, Seattle, will move over to the Electric Building on June 1 and take up the quarters vacated by the electric railway operating department when it goes into its new quarters at the County-City Building.

Mr. Belden in New Field

Head of New Hampshire Electric Railways Becomes Officer in Engineering Company

David A. Belden of Haverhill, Mass., will on June 1 become associated with the Harry M. Hope Engineering Company, Boston, Mass., in the capacity of vice-president.

For nearly fourteen years Mr. Belden has been president of New Hampshire Electric Railways and its subsidiary companies, operating railways and light and power plants in northeastern Massachusetts and southern New Hampshire, the principal offices of which are in Haverhill.

Mr. Belden was born in Aurora, Ill., about fifty years ago. He was educated at Racine College, Wis. From 1892 to 1901 he was general manager of various electric railways in northern Illinois, following which he became general manager of the Georgia Railway & Electric Company, Atlanta, Ga., where he remained until elected vice-president and general manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala., which position he held until called to New England as president of the group of railway, light and power companies controlled by the New Hampshire Electric Railways.

He was president of the Massachusetts Street Railway Association in 1916-1917 and is now the Massachusetts vice-president of the New England Street Railway Club.

Mr. Belden is to continue as executive head and president of the companies with which he is now connected, but he will be less active in matters of operating detail, all of which work will be delegated to the local officials in Haverhill and Portsmouth. He expects to leave Haverhill in the fall and resume his residence in Boston, where he lived until September, 1917.

J. R. Wilson, formerly traffic manager of the Sacramento Northern Railroad, Chico, Cal., is now actively connected with the Latourette-Fical Company, mechanical contractor, Sacramento, serving as vice-president and assistant manager.

J. O. Penisten on March 1 became superintendent of power distribution of the Union Traction Company of Indiana, Anderson, Ind., assuming the position made vacant by the resignation of G. H. Kelsay, who has become associated with the Cleveland, Southwestern & Columbus Railway. Mr. Penisten joined the Union Traction Company of Indiana in 1907, in the bonding department, and was later made foreman of this department. From this position he was promoted to substation operator, and in May, 1908, he joined the electric construction department in the work of repairing substation equipment and motors. Early in 1913 Mr. Penisten was made division electrician. He continued in that capacity until made superintendent of power distribution on March 1, last.

J. O. PENISTEN

William S. Murray, for many years chief electrical engineer of the New York, New Haven & Hartford Railroad and recently president of the Hoosatonic Power Company, which supplies power to part of the lines of the Connecticut Company, has opened an office as consulting engineer in New York. He will specialize on electrical generation and transmission, railroad electrification and conservation of natural resources. Mr. Murray's connection with the New York, New Haven & Hartford Railroad extended from April, 1905, to December, 1916, during which time the electrification of the railway with the single-phase system took place. For the first part of this time Mr. Murray was directly connected with the electrical engineering department and during the latter part of the time he acted as consulting engineer, as a member of the firm of McHenry & Murray, now dissolved.

J. C. Johnson, recently appointed general manager of the Iowa Southern Utilities Company with offices at Centerville, Ia., has been with David G. Fisher & Company, public utility engineers of Davenport, Ia., for the last two years. During the war with Germany, Mr. Johnson, as representative of the Fisher Company, had charge of the office of the Associated Manufacturers of Davenport at Washington, D. C. This office was the clearing house of Davenport manufacturers and the government on war contracts and was instrumental in having approximately $25,000,000 war contracts placed with concerns at Davenport. Mr. Johnson was graduated from Lewis Institute in 1909 and soon afterward accepted a position with the Commonwealth Edison Company, Chicago. He was engineer at the Fisk Street station in that city in 1912. Subsequently he went with the Westinghouse company, remaining there until 1917, when he accepted a position with the Fisher Company. At present Mr. Johnson is secretary-treasurer of the Fisher Company. When the Fisher interests bought out the D. C. Bradley and Frank S. Payne holdings in the Iowa Southern Utilities Company recently, Mr. Johnson was selected for the position of general manager to succeed Mr. Payne. His appointment was confirmed at the reorganization meeting of the new board of directors on May 15. He was also elected treasurer of the Iowa Southern Utilities Company, which furnishes thirty-two Iowa towns with electric power.

J. C. JOHNSON

Dr. William McClellan, who resigned recently as dean of the Wharton School of Finance and Commerce of the University of Pennsylvania, has been elected vice-president of the Cleveland (Ohio) Electric Illuminating Company. Dr. McClellan is a graduate of the University of Pennsylvania, and his technical experience includes that of engineer in charge of construction of the Philadelphia Rapid Transit Company, supervising engineer with Westinghouse, Church, Kerr & Company, a member of the firm of Campion & McClellan, and chief of the division of light, heat and power of the Public Service Commission for the Second District of New York.

Raymond H. Smith has resigned as vice-president and general manager of the Eastern Wisconsin Electric Company, with headquarters at Sheboygan, Wis., and as president of the Wisconsin Electrical Association and the Wisconsin Gas Association, to become connected with the Electric Bond & Share Company, New York. Mr. Smith entered the utility field in 1897 at Waterbury, Conn. He has been very successful, particularly in dealing with labor and in building up good public relations. A portrait and a biography of Mr. Smith were published in the ELECTRIC RAILWAY JOURNAL of April 5 at the time of his election as president of the Wisconsin Electrical Association.

Frank B. Walker has been appointed superintendent of way and structures of the Bay Street Railway, Boston, Mass., succeeding W. S. Hubbard. Mr. Walker was graduated from the University of Minnesota in 1897 in the civil engineering course. After post-gradu-at the Massachusetts Institute of Technology, he entered steam railroad service in the West. He was on the engineering staffs of the Minneapolis & St. Louis, Great Northern and Soo Line roads for various periods until 1914, when he went to Boston and entered the employ of the Bay State Street Railway. In the summer of 1918, Mr. Walker left the Bay State company and was employed by Fay, Spofford & Thorndike, consulting engineers, Boston, on the construction of the Boston Army Base. He recently returned to the Bay State engineering department to take up the duties relinquished by Mr. Hubbard, whose retirement from the electric railway field is noted in these columns.

Cyrus S. Ching has withdrawn from the electric railway industry and been placed in charge of industrial relations of the United States Rubber Company, with headquarters in New York. Mr. Ching is a native of Prince Edward Island. He came to the United States in 1899 and was employed as a surface car motorman on the Boston Elevated Railway, transferring to the rapid transit lines upon their opening in 1901. He soon became an inspector and after a term of service in the rolling stock department he organized a school of instruction for trainmen. Mr. Ching studied law in his spare time and was admitted to the Massachusetts bar in 1912. His work in the transportation department of the company brought him into close relations with M. C. Brush, at that time vice-president of the Boston system and later president. He became one of Mr. Brush's most valuable staff members and was assigned many important tasks in relation to the company's labor problems, and he became particularly useful in conferences between the management and the union organization. At the time of resigning to enter the industrial field he was in general charge of instruction work for trainmen.

Frederick L. Ray has been appointed superintendent of power plants of the Union Traction Company of Indiana, Anderson, Ind. Mr. Ray has spent the past thirty years in power station work, being last connected with the Merchants Heat & Light Company, Indianapolis, where he had charge of the power plants. For nine years previous to that he was superintendent of steam equipment of the Louisville (Ky.) Railway, during which time a new and modern power station was built. Other companies with which Mr. Ray has been associated are the Stanley Rule & Level Company, New Britain, Conn.; the Brooklyn, (N. Y.) Rapid Transit Company; Westinghouse, Church, Kerr & Company, New York City, and the Terre Haute (Ind.) Electric Railway. Mr. Ray has served as national president of the National Association of Stationary Engineers, an organization with members in every state in the Union.

F. L. RAY

Major W. W. Nielsen, Hartford, Conn., one of the commanders of the 349th Field Artillery, has been appointed assistant to E. C. Deal, general manager of the Springfield (Mo.) Traction Company and the Springfield Gas & Electric Company. Major Nielsen will assume the duties discharged by N. J. Cunningham, who resigned recently. The major is a graduate of Colgate University, Hamilton, Ohio. W. N. Colgate, whose ancestors founded Colgate University, is one of the directors of the Federal Light & Traction Company, which controls the companies at Springfield. Major Nielsen has been associated with the Federal company in the East.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES   BUSINESS ANNOUNCEMENTS

Car Wheel Market Shows Little Activity

Present Deliveries Are Good — Prices Remain Firm, but Tendency Is for Upward Revision

Regardless of the kind of wheel in use, whether it be the steel, steel tired or chilled iron, the market for car wheels for electric railways is rather quiet at the present time. Some producers are running up to capacity in order to fill back orders, but these are for the most part for steam railroad use. However, some traction lines are finding the wherewithal for purchases and orders are coming through.

There has been practically no price change lately. Due to the amount of labor involved and the very unstable condition of the labor market, there is a tendency toward an upward trend of prices rather than a downward trend. There is no assertion, however, that that condition will be brought about in the very near future.

Deliveries of steel products can be made in about thirty days whereas when the market comes back to normal the time will be nearer sixty to ninety days. The iron wheels can be turned out in a little better time.

In the meantime many railways, manufacturers say, are practicing every economy in regard to wheels, because they cannot afford to purchase new ones. Flats, if not of too large size, are allowed to remain in the tread, and the wheels are being ground or turned down to the limit before being scrapped. Where steel tires have worn down under heavy interurban service the wheels have been changed to cars doing lighter city service until the tires have been used to their limit.

Manufacturers are of the opinion that the present state of the market cannot last very long, and are hoping for some relief through Congressional action and the President's suggestion of federal investigation into electric railway conditions.

Electric Railways Plan Extensions in Argentina

The Buenos Aires Western has electrified a portion of its suburban system. In its recently completed freight tunnel, the original plan was to use only electric locomotives, and an order had been placed with a German firm to supply these, but this order was canceled and at present steam locomotives are being used. The company has also built a tunnel which affords direct connection between its own passenger terminal and a station of the Anglo subway and has plans for the construction of several branches and feeders.

The Great Southern, which serves suburban Buenos Aires, has not electrified any portion of its line yet, but had made plans to do so prior to the war. It has a large passenger terminal in Buenos Aires, and the largest freight station in South America. An extension is projected from Zepala, where connection will be afforded with a line to be built by the Chilean State railways, thus forming a transcontinental line with easy grades.

Few Orders Being Placed for Special Track Work

Repair and Transfer from One Part of Line to Another Keeps Track in Condition

The market for track specialties is probably no better than that for almost any kind of electric railway material. To be sure there are some bright spots where traction companies have had to purchase new crossings, frogs, switches, etc., to replace parts in such condition as to render their use entirely out of the question. But this is a last resort in the market of to-day.

RAILWAYS SHORT OF STOCKS

From available information the common practice seems to be to transfer from one part of the line to another the worn track parts. A part gone bad on a heavy duty section of track is pulled out and inserted in a section where traffic is light, and the piece in this section may be in such shape that it can be used for heavy duty work. Only in the last analysis is it scrapped and a new one ordered. The stocks kept by the railways are practically used up, and in the case of a bad break it is quite probable that some railways would have to wait for regular deliveries on their special part.

There is considerable repair work being done on the tracks. Building up of worn and broken parts is tiding over many faults until such time as the railways can see their way out of the financial difficulties besetting the paths of almost every one of them. It does not seem to be a question of the cost of the material but of the source from which to secure the investment. It is only too common to find traction companies with layouts already completed for many special pieces of track work. One case recently brought to notice is for 150 layouts planned by one line, to be turned into orders as soon as money for the work can be found.

Transformer Raw Materials Costs Double Those of 1914

Review of Increases with Respect to Selling Price Indicates There Will Be No Further Price Recessions

The approximate percentages of increase in the prices of materials entering into the manufacture of transformers in 1919 over the prices of the same materials for 1914 are set forth in the following table:

Material	Approximate Percentage of Increase
Sheet iron laminations	100
Copper wire	150
Copper sheets	100
Cases and covers	125
Cotton tape	300
Insulating compounds	60
Hardware (iron)	160
Hardware (copper)	120
Hardware (brass)	200
Hardware (porcelain)	60
Lumber for crating	80

It is apparent from this table that the cost of the principal raw materials involved in the manufacture of transformers will average over 100 per cent above the cost of the same materials in 1914. The effective increase in the price of transformers which has taken place during that time amounts to something like 40 per cent. It appears, therefore, that the ability to market transformers at an increase of only 40 per cent as against 100 per cent increase in the cost of material must have been due to some striking increase in efficiency. In most cases it was due to the application of principles of greater efficiency in the factory and to the application of methods involving a lower percentage of overhead in handling the business.

However, it is reasonable to expect that some of the materials listed in the table will go down to some extent in the future, but in the majority of cases the labor is not being reduced in price; moreover, the load factor on transformer orders has fallen off considerably. In view of all these circumstances and after having discussed the matter with some manufacturers of transformers, it does not appear probable that there can be a much further reduction of prices during 1919.

Production of Rails for Electric Roads Shows Decline

In the last six years the production of steel girder and high T-rails for electric and street railways has constantly declined from year to year as shown in the attached table:

1918	20,834	Tons
1917	91,674	Tons
1916	127,410	Tons
1915	133,965	Tons
1914	136,889	Tons
1913	195,659	Tons

Window Curtain Market Shows Improvement

Weavers Are Running on Short Time —The Prevailing Tendency of Prices Is Upward

Although there is a fair market for window curtains it is still far below the demand normally found at this season of the year. The number of new cars in process of construction or about to be ordered is well below the average, but there is still a demand from this quarter. In fact, there is a better demand for curtains for new cars than for repairs and replacements to existing rolling stock. Probably many more curtains which present a worn appearance will keep out sun and rain for one more season than would normally be permitted to remain in service.

The fabric manufacturers and weavers have plenty of raw materials but the demand for the finished product is light. Those plants which have not altogether shut down are running two or three days a week. However, deliveries can be taken care of in a satisfactory manner.

Since the first of the year there has been a price reduction of 7 or 8 per cent. With the present course of cotton it has been predicted that the future price tendencies will be upward rather than downward. Withal, there has been reported a curtain market which is on the increase.

Cedar Pole Market Satisfactory in Mid-West and South

In the Middle West and South the market for cedar poles is holding up well. In the Chicago district one of the larger holding companies has just purchased sufficient poles for a 95-mile line. The Indiana Traction Company has recently bought fourteen carloads, and other concerns are buying in similar quantities. Some pole producers state that they have already done more business this year than they did during the entire year of 1918, excluding the government business.

A satisfactory volume of trade is reported from the South. Drop shipments direct from Western stocks to consumers are prompt and prices are steady.

Rolling Stock

Selma (Ala.) Electric Railway, formerly the Selma Traction Company, expects to repaint and repair its old cars and secure some new rolling stock.

Gary & Interurban Railway, Gary, Ind., has received ten modern full-sized cars which have been placed on the Broadway runs. The cars represent a cost of $110,000.

Boston (Mass.) Elevated Railway, according to the trustees' report, contemplates the purchase of $10,500,000 worth of cars within the next five years, provided the Cambridge subway bill goes through. This bill would provide for the purchase of the subway by the State. The purchase of 600 surface cars would permit the retirement of 625 of the oldest type of box cars, it is said, in 1919, and the remainder in the next year. Besides, it is planned to purchase thirty snow sweepers and a number of auto trucks.

Track and Roadway

Municipal Railway of San Francisco, San Francisco, Cal.—The Board of Supervisors recently authorized the Board of Public Works to receive bids and enter into a contract for relocating the Union Street line of the Municipal Railway of San Francisco from Franklin and Union Streets to Van Ness Avenue and installing trolley poles and wires on Union Street from Franklin Street to Van Ness Avenue at an estimated cost of $22,000.

Charles City Western Railway, Charles City, Iowa.—A stock company, capitalized at $300,000, has been formed to construct an extension of the Charles City Western Railway from Colwell to New Haven, a distance of 10 miles. Articles of incorporation are now being drawn up. Surveys and estimates of the cost of different routes will be made at once. E. R. Ernsberger, general manager.

East St. Louis (Ill.) Railway.—The construction of a line to operate between the east approach of the free bridge and the plant of the Monsanto Chemical Company, 2 miles south of East St. Louis, is being planned by the East St. Louis Railway.

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—It is reported that work will soon be resumed on the proposed line of the Southern Illinois & St. Louis Railway to connect Harrisburg, Pittsburg, Marion, Johnston City, West Frankfort, Benton and Herrin, which was interrupted at the outbreak of the war. W. H. Schott, Chicago, president. [Jan. 27, '17.]

Boston (Mass.) Elevated Railway.—A budget system has been established by the Boston Elevated Railway, under which the company plans to expend $21,500,000 for improvements during the next five years. Among the improvements listed are the reconstruction of 23 miles of trackage every year, in addition to the ordinary repair work; the building of a modern car shop; the installation of new turbine, rotary and stokers at the Lincoln power station; completion of the Somerville substation; installation of two rotaries in the Charlestown station; the provision of necessary conduit and cable construction; additions to the signal system; strengthening of bridges, etc.

New York Municipal Railway, Brooklyn, N. Y.—An order authorizing the New York Municipal Railway Corporation to let a contract under bids recently received from the American Bridge Company and the McClintic-Marshall Company for the structural steel with which to build a connection between the Culver Line and the Coney Island terminal has been made by Public Service Commissioner Lewis Nixon of the First District of New York. The city's elevated line is completed and in operation to Avenue X, and beyond that point to Sheepshead Bay Road is under construction. It is expected that the portion just referred to will be completed about the end of 1919. The approval of the Commissioner to the letting of the contract for the 600-ft. section from Sheepshead Bay Road to Coney Island terminal is given with the proviso that the work shall be completed about Dec. 31, 1919, or practically simultaneously with the completion of the city work, so that the whole remaining uncompleted section from Avenue X to Coney Island can be placed in operation at one time.

New York State Railways, Syracuse, N. Y.—A report from the New York State Railways states that the company has completed the construction of 700 ft. of single track 7-in. T-rail on East Fayette Street and has under construction 3800 ft. of single track 7-in. T-rail on West Genesee Street.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—Work will be begun at once by the Trenton & Mercer County Traction Corporation on the construction of the Market Street extension from Bridge Street to the new Municipal Dock. Rankin Johnson, president of the company, recently asked the Public Utility Commission to rescind its order of last November providing for an expenditure of $3,300 for improvements to the property of the corporation and issue an order permitting the company to expend $55,000 for work contemplated to the trackage, etc., on its various lines. The matter was taken under consideration by the commission.

Brantford (Ont.) Municipal Railway.—Work will be begun at once by the city on the construction of an extension of the Brantford Municipal Railway to connect Terrace Hill and the northeastern industrial section of the city.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—It is reported that the Niagara, St. Catharines & Toronto Railway plans the reconstruction of several miles of track within the city of St. Catharines, the erection of new overhead work on the line between St. Catharines and Thorold, the enlarging and transforming of the park at Port Dalhousie into a pleasure ground and the provision of a bathing house there.

Allentown & Reading Traction Company, Allentown, Pa.—An extension is being built by the Allentown & Reading Traction Company on Walnut Street.

North Branch Transit Company, Bloomsburg, Pa.—This company reports that it will reconstruct about 2 miles of track, using Dayton steel ties and a 75-lb. girder rail.

Scranton (Pa.) Railway.—The city of Scranton and the Scranton Railway plan to improve and repair the Lackawanna Avenue bridge at a cost of about $20,000.

Canadian Pacific Railroad, Montreal, Que.—It is understood that the Canadian Pacific Railroad will soon ask for bids for equipping the branch line from Three Rivers to Shawinigan Falls and Grand Mère for electrical operation. J. M. Fairburn, chief engineer.

Montreal (Que.) Tramways.—Work has been begun by the Montreal Tramways on the reconstruction of its track on the west side of St. Denis Street and the east side of St. Lawrence Street

Power Houses, Shops and Buildings

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—Work will soon be begun by the Chicago, North Shore & Milwaukee Railroad on the construction of a station at Sixth Street between Sycamore and Clybourn Streets, Milwaukee, Wis.

Interstate Public Service Company, Indianapolis, Ind.—Plans have been completed by the Interstate Public Service Company for the construction of an interurban freight station at Brook, First, Walnut and Liberty Streets, to be completed by Aug. 1.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—The St. Joseph Railway, Light, Heat & Power Company has purchased a tract of land running the entire length north and south of its power house and extending from the power house west to the Missouri River. The additional tract will provide for any extension of the plant in the future. The purchase also assures the completion of the company's extensive alterations in its power plant before Sept. 15.

Northwestern Ohio Railway & Power Company, Toledo, Ohio.—A report from the Northwestern Ohio Railway & Power Company states that it will place contracts at once for the construction of a carhouse and repair shops at Oak Harbor, Ohio.

Philadelphia, Pa. — Sealed proposals will be received by William S. Twining, director Department of City Transit, for the following work appurtenant to the Frankford Elevated Railway: Contract No. 564—Erection of brick, steel and reinforced concrete station buildings at the northeast and southwest corners of Kensington and Allegheny Avenues, including the removal of existing buildings on these sites. Contract No. 565—Erection of brick, steel and reinforced concrete station buildings at the southwest and southeast corners of Kensington Avenue and Somerset Street, including the removal of existing buildings from these sites. The plans are modifications of those issued for bids opened April 29 and rejected. Copies of plans and specifications may be obtained upon deposit of $10, to be refunded upon return of plans.

Trade Notes

Westinghouse Changes

The following changes in the executive sales personnel of the Westinghouse Electric & Manufacturing Company are announced:

E. A. Thornwell, manager of the railway and power division, Atlanta office, returned from government service, has resumed his former duties.

C. E. Smith, of the engineering department, who spent several years in the Pittsburgh office and later was connected with the Robbins & Myers Company of Pittsburgh, has resumed work with the export department of the Westinghouse company.

A. D. Stephanus, after eight years in the export department, East Pittsburgh, Pa., has been transferred to the Westinghouse Norsk Elektrisk Aktieselskap, Christiania, Norway.

Portable Electric Tool Association held its annual meeting in Cincinnati on April 24-25. In the discussions that ensued it was brought out that American manufacturers of portable electric tools would have to cooperate more closely to obtain a fair share of foreign business. Many requests for agency representations were reported, as were visits of European machinery importers with a view to making selling arrangements. That the outlook is good was the consensus of opinion.

Frank B. Cook Company, Chicago, has obtained a license from A. F. Daum to manufacture refillable fuses under Daum patents. Negotiations are under way with other firms for a similar license.

Standard Electric Tool Company of Cincinnati, Ohio, is reported to have completed the removal of its machinery to the new plant at York Street and Western Avenue.

Joseph Myerson, dealer in steam, electrical and power transmission machinery, announces that he has moved to large and more centrally located quarters at 411-413 Atlantic Avenue and 74 Purchase Street, Boston.

H. B. Bush, of the Bush Electric Tool & Manufacturing Works, Redlands, Cal., writes that he is shipping his entire equipment to Cleveland, Ohio, where he is forming a new company to be known as the Bush Electric Manufacturing Company. A rapidly growing volume of sales made it necessary to have large factory space in the East. The company's temporary address is 6616 Morgan Avenue, Cleveland, Ohio.

M. H. Jones, who has been connected with the Westinghouse Electric & Manufacturing Company for the past fifteen years as assistant to manager of Philadelphia district, has resigned to become sales manager of the Standard Electric & Elevator Company of Baltimore.

Black & Decker Manufacturing Company, Baltimore, Md., has just established a New York office in Room 2920, Equitable Building, which will be in charge of G. R. Lundane, who will supervise the distribution of Black & Decker products in New York City and surrounding territory, including the State of Connecticut.

R. Sanford Riley, president of the Sanford Riley Stoker Company, Worcester, Mass., and the Murphy Iron Works, has returned to his private interests after having completed the organization of a performance section of the Emergency Fleet Corporation. The performance section has charge of all trial trips and follows up the defects developed in service.

Chicago Pneumatic Tool Company announces the election of Allan E. Goodhue as managing director of its English subsidiary, the Consolidated Pneumatic Tool Company, Ltd., with offices at 170 Piccadilly, London. Mr. Goodhue will also be in charge of European sales for the Chicago Pneumatic Tool Company. Mr. Goodhue is to sail for England May 13.

A firm in Spain (No. 29,179) desires to purchase high-pressure turbines and electrical machinery of all sorts for developing a waterfall power in that country. Quotations should be given f.o.b. New York. Payment, cash against documents. Correspondence may be in English. Further information on request to Bureau of Foreign and Domestic Commerce, Washington, D. C., mentioning number.

Lewis Jalovec has been appointed assistant to the United States Foreign Trade Commissioner to Czecho-Slovakia. He will be stationed at Prague, Bohemia. Information in regard to markets and information of any kind concerning the country where he will be stationed will be gladly furnished upon application. It is interesting that Mr. Jalovec is an engineer—one of the first to be appointed to such a governmental position.

Van Dorn Electric Tool Company, Cleveland, Ohio, announces that the new Chicago office is at 527 South Dearborn Street. William Cottrell, sales manager at the Chicago branch, says that the phenomenal increase in business enjoyed by the company is the result of the insistent demand to-day for mechanical devices of proved efficiency and economy. He emphasized the imperative need of the increased accommodations.

New Advertising Literature

Central Scientific Company, 460 East Ohio Street, Chicago: Bulletin No. 8 explaining the Van Sicklen-Elgin chronometric precision tachometer.

Metal & Thermit Corporation, New York: Folder entitled "How Thermit Healed My Broken Jaw." It describes the way in which a 13½-ton upper jaw of an alligator shear in the works of Joseph Joseph & Brothers Company at Modena, Pa., was mended.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, May 31, 1919 *Number* 22

Utilize the Skip Stop to Increase Schedule Speed

DURING the war period the United States Fuel Administration furnished the backing needed to get the skip-stop idea "over" in many quarters. Fuel saving was the immediate goal, with general operating economies on beyond. The operating economies were predicated upon the increasing of schedule speeds to absorb the time saving, in other words on the taking up of slack in the schedules. The result with respect to fuel saving was gratifying; that with respect to time saving, disappointing. It is not too late to speed up the cars. The public is entitled to an increment of speed for each eliminated stop. The railway profits by furnishing it.

What the Federal Commission Could Do

IT IS INDEED a hopeful augury for the future that President Wilson has decided to appoint a federal commission to study the electric railway situation. If this action should help to secure a higher net return for the electric railways, it will be some reparation for the heavy wage burdens which were imposed on them by the War Labor Board. This cheerful prospect must have occurred to thousands of investors when they read a few days ago that President Wilson had cabled his sanction for the plan mentioned.

Ever since the War Labor Board made public its first findings last August the distressed utilities have continued to look to Washington for relief, their experience with city and state authorities having convinced them that the recommendations of Messrs.Taft and Walsh for sympathetic consideration from regulatory bodies would bear little fruit. Now it appears that the nation's leaders have been impressed with the necessity for action, and millions of investors will wait anxiously for results which may turn the tide away from the abyss of disaster. We can only express the hope that they will not be disappointed and that the history of the new commission will be more cheering than that of the War Finance Corporation, several of whose utility patients did not survive the delayed treatment.

It is announced that the proposed commission will have in its membership representatives of various organizations most concerned with the fate of the electric railways. This statement holds the promise of an intelligent handling of the problem, and if effective relief should call for new legislation there is hope that such measures will be put into force by the present Congress which now must be convinced that national prosperity is closely connected with the well-being of the railway industry.

Electric railway interests might well submit to the consideration of the new commission the suggestion outlined at the recent meeting of the Chamber of Commerce of the United States by Samuel W. Fordyce, Jr., which was mentioned in our issue of May 3. This plan called for a congressional act by which utility bonds would be put on the same basis of tax exemption as municipal bonds. That the corporation tax burden is also a heavy one for electric railways is shown by the 1912 census wherein it is indicated that taxes consumed 13.8 per cent of gross income remaining after payment of operating expenses. While it is not expected that the lifting of all these taxes would be contemplated in a federal law, a considerable part of the burden undoubtedly could be removed.

The advantage of tax-exemption securities was argued in a plan recently offered for a new franchise in Chicago. It was shown there that about $1,000,000 would be saved in fixed charges annually by the tax exemption feature and there would be less likelihood that increased rates of fare would be necessary. There may be obstacles in the way of the plan suggested by Mr. Fordyce, but this and the many other suggestions for the elimination of non-transportation charges should be weighed carefully by the new federal commission when it is organized and gets down to work.

Putting "Pep" Into Every-day Work

MANUFACTURERS tell us that there has been a "letting down" during the last two years in the sense of personal responsibility of workmen, in spite of the great increases in wages that have accompanied the war activity. Attention has been called editorially in this paper to the same fact in connection with construction and maintenance work on electric railways. The same condition undoubtedly exists in other lines of work in this field. The period of reconstruction which now confronts us will require a quickening of effort all along the line. There is bound to be a labor shortage soon, and the output of the individual must be increased, whether he is molding from patterns in a foundry or retailing transportation with the aid of a trolley car.

In a talk before the Public Service Railway company section last week, Alexander Jackson stated some plain truths very forcefully, with particular reference to the transportation department. The talk is abstracted elsewhere in this issue. The speaker's thought was that each man holding a position of any responsibility in the department has a wonderful opportunity to improve the character of the service with the end in view of pleasing and serving the public. The secret of success, if secret it be, is in the attitude of the individual toward his job. If the attitude is that of a "time server" the work is going to be slipshod and constantly on the down grade. If the attitude is that of one whose constant desire is to make the local service the "best ever," then the carhouses will be neat, the headways will be maintained, the car windows will be clean, reports will be accurate and complete, etc. If all of his men held the latter attitude the day of the superintendent's millennium would be in sight.

There Is a Better Outlook in Railway Power

IT IS encouraging to observe lighter skies in the railway power supply field. Here at least seems to be a department in which costs can be somewhat reduced as time goes on, and as the handicaps of the war period diminish. The difficulties of the past two or three years need not be detailed. Every chief engineer and manager knows how hard it has been either to generate or to buy electrical energy on entirely satisfactory terms, in view of the increased cost of coal, labor and supplies, the burdens of a poor load factor, and the uneven character of the fuel available in so many cases. The last factor in station inefficiency attained a climax in the severe winter of 1917-1918.

Fuel costs are still very high and central station rates still generally embody coal clauses. Wages are high too, yet there is reason for optimism. Electric railways which generate and distribute their own energy supply are now in a position to look outside and in many cases will find it to their advantage to investigate the possibility of combining their generating and purchasing abilities. The central stations are generally somewhat underloaded at present, owing to a falling off in power output since the armistice was signed and to plant expansion carried forward during the latter part of the period of hostilities. Great strides toward economical power production and distribution over considerable areas are being made through the interconnection of plants. While it is true that in many cases the interconnection of central stations and railway plants is handicapped by differences in frequency or in current type, other instances occur in which interchange can be handled with economy to all interests involved. The time is ripe to analyze the possibilities of purchasing part of the energy requirements by utilizing surplus central station power, and in some cases, certainly, non-overlapping railway and central station loads will permit a reasonable degree of interchange through appropriate equipment.

Electric railways operating in adjacent territory may well consider the possibilities of plant interconnection and load subdivision. The "electrical island" policy is out of date. Then, inside the company organization, the analysis of schedules in relation to power requirements is worth while. Of course, fundamentally, traffic needs determine schedules, but there are many cases where minor adjustments one way or the other with respect to the clock and plant load curve would not affect the patronage materially, and might help to raise the load factor of the station, that *bête noir* of the operating engineer. If fuel costs stay high and little chance of reductions of magnitude yet appears, a good deal of valuable work can be done in the way of analyzing the coal available, studying the combustion problems of local installations and looking into bonus systems for operating personnel. The present price of copper is more favorable to the revamping of feeder and return system layouts than for some months, and the growing use of the safety, light-weight car should be accompanied by thorough studies of its relation to power plant costs. As contracts for electrical service extended under war conditions expire, there may also be an opportunity for railways to put a better foot forward and make a more advantageous bargain for the next period of supply. Where rotary converters or synchronous motors are utilized in supplying the direct-current railway service from an alternating-current system, the effect on the central station power factor is helpful, and should have a positive money value in contract negotiations. The automatic substation also presents opportunity for cost reduction in the distribution system.

In brief, the war brought about tremendous changes in the work of power production which were reflected in increased costs all along the line, but since loads, traffic, rolling stock units, coal quality and electrical interchange possibilities are now changing from mid-war values, it is time to renew the ever-important investigations on behalf of minimum energy cost delivered at the trolley. Difficult as is the path of the electric railway to-day, every advantage should be taken of those phases of the electric railway power demand which are assets to the power generator and distributer, and no manager should hesitate to "stand up in his boots" and defend those assets on behalf of making a good trade in buying power. New opportunities for team play within the railway organization are at hand, and from the watt-hour meter on the car to the calorimeter in the consulting fuel expert's laboratory, forces should be combined to cut the cost of electrical service utilized in traction operations.

The International Association, Reconstructed, Begins Again

ALL electric railway men in this country who are acquainted with the splendid results achieved by the International Tramway & Light Railway Association during the thirty years of its life up to 1914 will be much pleased to hear that plans have been completed by which it will take up its work again. Brussels, its headquarters, was for many years the city from which capital flowed all over the world to build and operate tramways. It was in Brussels that most of the large international syndicates, including the tramway syndicates, had their domicile, presumably because the neutrality of Belgium was guaranteed by its larger neighbors and it was thought that a Belgian company would be less apt to be affected by wars and international jealousies than would a company in one of the larger countries. But 1914 showed the error of all this. The International Association has now been reincorporated to include only tramway companies and individuals in the Allied countries or in neutral nations, and it hopes to renew its activity, broken off when the war began. It is pleasing to note that its announcement to this effect is signed by President de Burlet, who occupied that office in 1914 and was for many years general manager of the national light railway system of Belgium and later was government inspector general of bridges and highways. Mr. Camp, the association's efficient secretary, also survived the war and occupies his old office. We welcome the re-created association and wish it all success in its future work of service.

If Milk Prices Can Be Raised, Why Not Fares?

THE people of Chicago had an effective illustration recently of the difference between a public utility and another line of business which dealt with as great a necessity for the public, possibly, as urban transportation. The milkmen of the Chicago district had been on strike several days and there was much inconvenience and some suffering from the sudden shutting off of deliveries of this essential lacteal food. The drivers insisted on an advance of $9 a week in their wages and the employers said they would stand firm against an increase in costs of operation which they could not afford. A federal mediator came along, got the leaders of both sides together, and the next morning milk was being delivered as usual—but the people found the price of milk had gone up 1 cent a quart. There was the usual stir of indignation but the consumers had to have their milk and the new rate was established as another item in the increased cost of living.

Only a few weeks before, the Chicago car-riding public was made happy by a decision of the State Utilities Commission refusing to allow an advance in rates of fare. The commission said that the proposed rate would impose a burden on the people greatly in excess of any apparent deficit in the year's net income. Evidently there were no such considerations in the discussions which led to the increase in the price of milk, although it was reported later that the 1 cent advance would produce revenue much in excess of the requirements to pay the drivers the extra wage demanded.

The contrast in these two cases was commented on freely in Chicago. It is the same old story of people submitting to increases in the cost of living over which they have no direct control and fighting hard against extension of any clemency toward utility companies which happen to be bound by contract to a fixed rate of fare. Undoubtedly, many persons will be impressed with a sense of the unfairness indicated by comparison of the two situations, but will it lead to any different treatment for the transportation companies? We doubt it. Instead, the people are likely to take all the more pride in the feeling that there is at least one situation which they can control and they will insist that the ordinance contract be adhered to.

Perhaps this is human nature, to glory in the feeling of authority. It is apparent, however, that the public still needs to be educated to the fact that in insisting on their pound of flesh they may be doing their community irreparable harm. There are few, if any, instances where city officials have shown that they were impressed with this fact and have urged the public to extend a helping hand to the utilities which happened to have the bad end of a bargain. Probably it is not good politics in the present state of the public mind to urge such clemency.

The suggestion has been made that the electric railways which have been caught by rising prices with an unprofitable contract are no worse off than breweries which are being put out of business just now. The breweries do not ask the public for recompense for losses suffered, it is said, so why should the railways? No one, we believe, will really insist on this as a fair comparison. Neither the law nor the public is asking the breweries to continue business at a loss, as they are the railways, and capital and labor engaged in making beer can find other fields for their employment.

The great necessity of the utility situation, as we see it, is to impress the public—including the politicians—with the fact that their prosperity and the good name of their communities are bound up in the prosperity of the railway companies, and that such prosperity is not possible under terms agreed to years ago when world conditions were so different. Publicity, and more publicity is the crying need of the hour. Fair treatment to the electric railways must follow as the day the night.

Traffic Grows Faster in East than in West

ANALYSIS of the comparative census data for electric railways, printed in our issue of May 3, presents a striking illustration of the lack of development of the industry in certain sections of the country. Taking, for instance, the item of "revenue passengers carried" in the year 1917 as compared with 1912, we see that the Pacific states showed a decrease of 2 per cent and the Mountain states an increase of only 5 per cent, while the average increase for the country was 15.5 per cent—the East-North Central states leading with a gain of 25.6 per cent. The Pacific and the Mountain states showed a small increase in gross revenue and the former group were the only states in the country which showed a deficit in net income. One need not look further for evidence of the hurtful effect of jitney competition and the high labor and material costs which prevail in the Far West.

While the preliminary figures issued by the Census Bureau do not include a showing as to investment in the industry for the recent period, no one expects that it will indicate any such increase in capitalization as the 24 per cent from 1907 to 1912 or the 63 per cent gain in 1902 to 1907. While one explanation of this probably is the fact that there has been no great development of the industry as in former periods, another undoubtedly may be found in the lack of encouragement to capital since regulatory bodies began to bear down on the transportation companies.

The census figures have been made public at a time when one who can read history and make prophesies from statistics may find in them a basis for serious thought. In the present period of nation-wide development one would not think the majority of people have to be convinced that it is worth while to safeguard a business which handles the entire population of the United States 100 times over in a year—a business which in 1917 paid out more than $267,000,000 in salaries and wages to its employees—a business which now represents perhaps more than $6,000,000,000 of invested capital.

And yet if the census study had covered also the year 1918 we believe that the showing of declining net income would be the most effective propaganda to persuade the thoughtful average citizen that the critical situation of these public utilities bodes no good for the prosperity of the nation particularly of the communities which they serve. Study of the completed census report when it is issued should be recommended to those who are most concerned with the future of the electric railway companies.

BANK OF IRELAND AND TRINITY COLLEGE, COLLEGE GREEN

The Zone Fare in Practice

BY WALTER JACKSON

DUBLIN—PART I

Dublin's Housing Problem Arose From Activities of House Jobbers in Old Wealthy Sections and From Immigration of Laborers to City From Country Because of High Wages — Tramway Company Has Built 220 Houses for Employees

In large manufacturing centers it is the rule, rather than the exception, for five or six men to be found sleeping in a room which will not properly hold more than two, and it is a common thing for the same beds to be occupied day and night by different shifts of workers. The sanitation is often deplorable. There are many large houses now occupied by several families in which there is only one toilet for general use. Many of the poorer tenements have no water supply, and the tenants have to fetch their water from a pump or faucet in the yard. The bath tub is an unknown luxury. In many cities only a very small proportion of the houses of the working classes are connected with the sewers, while the privy and cesspool are everywhere.

NO, THIS IS NOT a description of conditions in some thousand-year old city of Europe, but in our own United States! The quotation is from an article on "The Problem of Industrial Housing," written by Leslie H. Allen for the December, 1917, issue of *Industrial Management*. To continue the quotation:

> Localities as far apart as California, Texas, Pittsburgh, Boston, Fall River and Bridgeport have a like state of affairs. . . . In most American cities few houses have been built for the unskilled workmen, and, as a result, they are very badly housed and overcrowded.

Evidently, the universal fare hitherto prevalent in the American communities named is not of itself a cure-all for congestion.

THE HOUSING PROBLEM IN DUBLIN

Dublin, as regards the origin of its housing problem, is unlike many other cities because its tenement houses are not a deliberate creation. The congestion in Dublin, according to the 1918 report of the municipality's housing committee, arose from the fact that the large old mansions and residential quarters built by the nobility and gentry during the earlier periods gradually drifted from their private residential character and ownership into the hands of the house jobber, whose only concern was to extract the best return for his investment by letting out the rooms in tenements. Numbers of the successors of the original occupants have ceased to retain their town houses in the city, the rapid means of transit gradually transferring the residential life of the wealthy classes from the city to the suburbs. On the other hand, large numbers of the laboring classes have migrated from the provinces to the city, attracted, no doubt, by the large works in progress from time to time and the comparatively high wages prevailing under city conditions.

The report contains a survey, street by street, of the north side of Dublin, showing that the degeneration of many thoroughfares from wealthy to workmen's sections began to be perceptible as long ago as 1850 (a generation before the tramway period). The conclusion of the committee is that "had the municipal area been extended from time to time in accordance with the city's natural expansion, the question of housing the working classes would not be so acute, and the expenditure now required in that direction would be more equitably distributed."

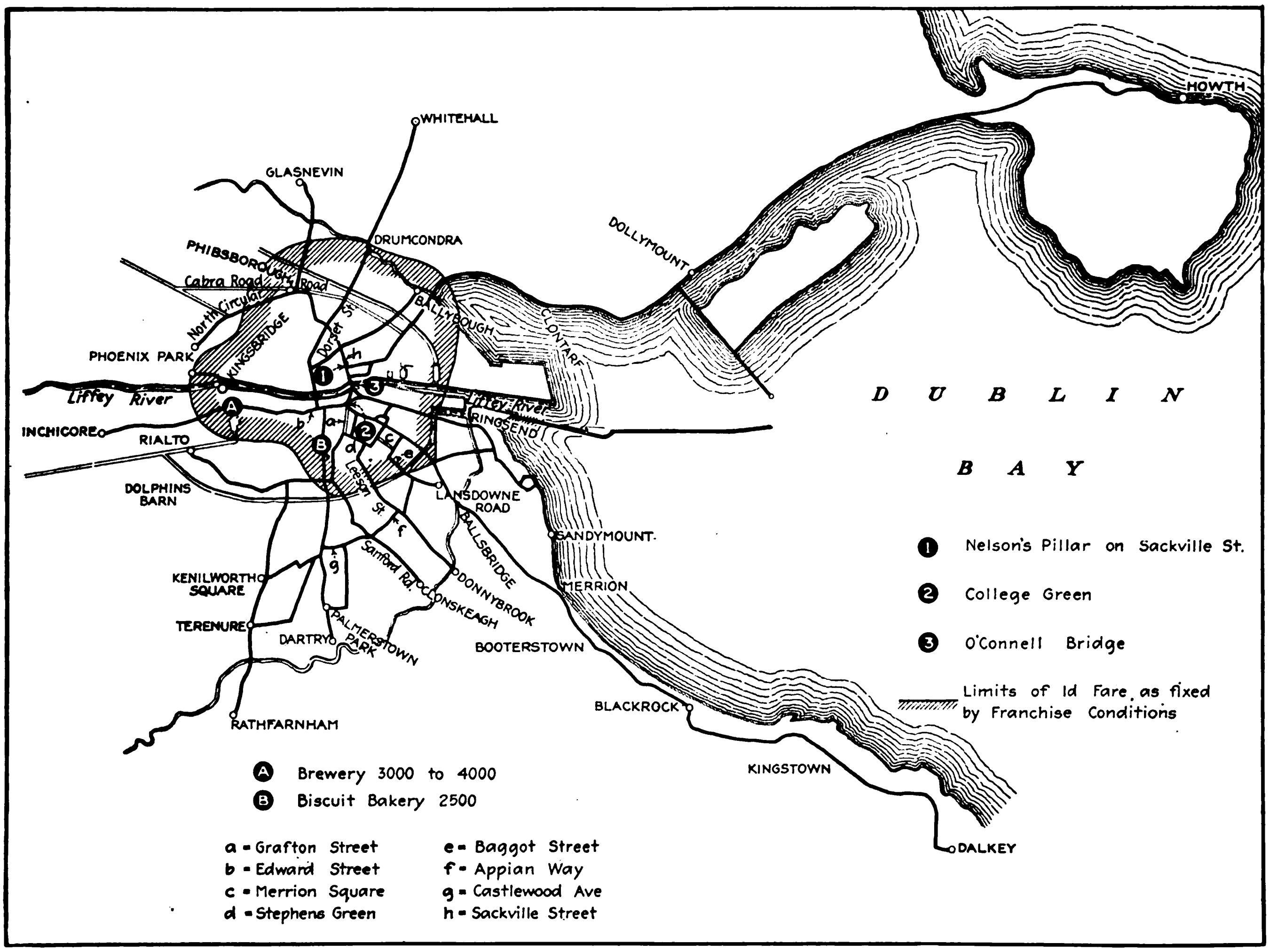
The earlier way of attacking the slum question in Dublin was by the acquisition, destruction and reconstruction of the original property. This proved prohibitory in cost inasmuch as the locations were close to the business district and highly profitable to their landlords. More recently, the plan of purchasing the cheaper, open land near or beyond the city boundaries has been followed in the hope that ultimately the tenants of the slums would move out of their own accord. Curiously enough, the same war that has slowed up the fulfillment of the housing plans, through the enormous increase in building costs, has also demonstrated that, once the workman has learned to love the country because of his work in the war garden allotments, he no longer accepts the stuffy tenement as a matter of course.

In a "Report on Dublin Housing" made in 1918, P. C. Cowan, chief engineering inspector Local Government Board, shows the difference in cost between slum and suburban areas in Dublin. Mr. Cowan states that the average cost per acre for acquiring eleven slum sections with a total area of 18 acres, between 1886 and 1912, was about £6,160, which with the cost of clearing the streets, etc., gave a total of £8,798 per acre apart from the cost of building. On the other hand, 12½ acres purchased at Inchicore within the city boundary in 1903 cost £320 per acre, and 22 acres of the Fairbrother's Fields, purchased in 1914, cost £717 per acre. According to the city by-laws, all new streets must have footpaths (sidewalks) with a concreted surface, chisel-dressed granite curbing and a paved channel 3 ft. wide on each side. These items alone, with footpaths 6 ft. wide, would cost £4 per lineal yard. But even this construction, which Mr. Cowan regards as unnecessarily elaborate, would not have cost in 1918 more than £1,046 per acre, including sewer, gas and water mains.

The pressing nature of the housing problem is well indicated by the following: From 1914 to 1917, inclusive, 956 tenements housing 3989 families were closed as unfit for habitation, but during the same period the city built only 327 new houses and other agencies a much smaller number. Moreover, the houses remaining open deteriorated at a more rapid rate than in peace times because of the difficulty and the expense of maintenance. Mr. Cowan's estimate as of January, 1918, is that at least 16,500 new houses and 13,000 reconstructed dwellings are imperatively needed. The corporation of Dublin has already built and is the landlord of 1880 houses. The new houses contemplated would be similar at least in size to the one-family houses constructed in recent years. A few flats might be built for two to four families, but they would be a small percentage of the total construction.

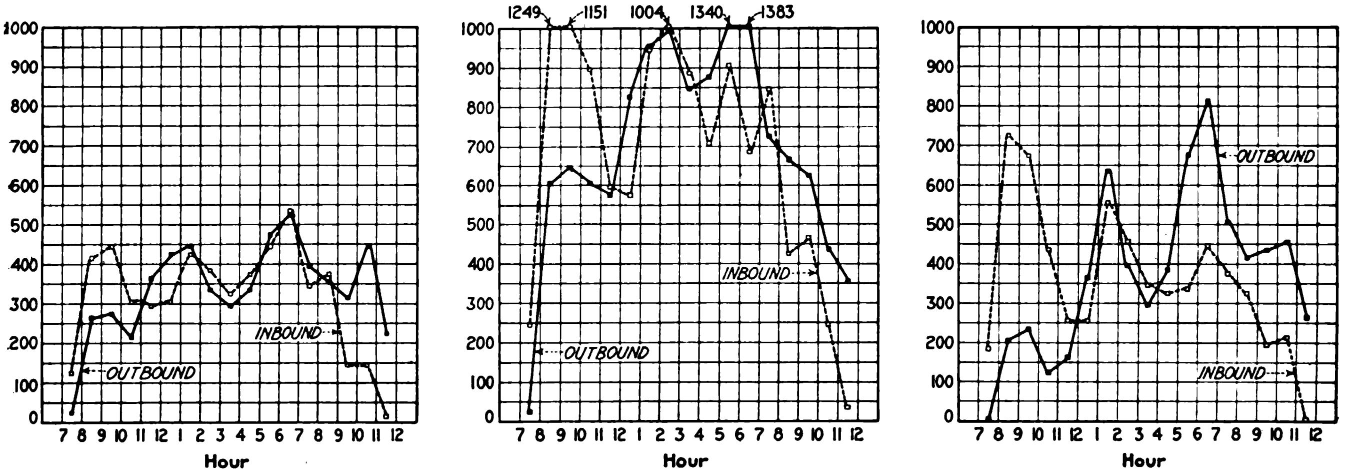
Some of the existing three and four-room houses built by the city are shown in the illustrations on page 1043. It should be noted that they are built along the sides of a plaza, although there is no garden space as contemplated for the suburban area. To an American familiar with the possibilities of the modern apartment house with its private courtyard, roof playgrounds, etc., these one-family houses appear to be a wasteful use of extremely costly space. American apartments are not to be compared, of course, with the old-fashioned tenement, such as the Dublin municipality built a generation ago.

At the present time, 1919, approximately 40 to 45 per cent of the population of 390,000 in Dublin are in need of better housing. It would not be practicable to build all the new houses within the present limits of Dublin,


WHITEHALL
GLASNEVIN
DRUMCONDRA
PHIBSBOROUGH Road
Cabra Road
North Circular
KINGSBRIDGE
PHOENIX PARK
Dorset St.
h
BALLYBOUGH
CLONTARF
DOLLYMOUNT
HOWTH
1
3
2
A
B
Liffey River
INCHICORE
RIALTO
DOLPHINS BARN
a
b
c
d
e
f
g
Leeson St.
RINGSEND
LANSDOWNE ROAD
SANDYMOUNT.
MERRION
BALLSBRIDGE
DONNYBROOK
CLONSKEAGH
Sanford Rd.
KENILWORTH SQUARE
TERENURE
DARTRY
PALMERSTOWN PARK
BOOTERSTOWN
BLACKROCK
KINGSTOWN
DALKEY
RATHFARNHAM
D U B L I N
B A Y
❶ Nelson's Pillar on Sackville St.
❷ College Green
❸ O'Connell Bridge
Limits of 1d Fare as fixed by Franchise Conditions
Ⓐ Brewery 3000 to 4000
Ⓑ Biscuit Bakery 2500
a = Grafton Street
b = Edward Street
c = Merrion Square
d = Stephens Green
e = Baggot Street
f = Appian Way
g = Castlewood Ave
h = Sackville Street

ROUTE MAP OF DUBLIN UNITED TRAMWAYS

nor would it be desirable, in Mr. Cowan's opinion, to intrust the spending of millions of dollars a year to a council too responsive to local selfish influences. He has therefore recommended that the houses be built under the auspices of a board representing the national government (which is expected to loan the money at low rates of interest), the city of Dublin, the urban districts of Rathmines and Pembroke, and Dublin County. It cannot be said that this proposal meets the unqualified approval of the Dublin Council, and the resulting differences of opinion, plus the war aftermath and local politics, are seriously retarding the advancement of the several housing projects.



Inchicore Line Dalkey Line Howth Line to Dollymount

DUBLIN LINES HAVE GOOD TRAFFIC PEAKS IN THE MIDDLE OF THE DAY, TOO

Housing as Related to Transit Facilities

The foregoing facts regarding the housing situation in Dublin have been recited at some length to show how little the electric railway conditions have had to do with congestion. It is surely no advantage to a tramway to have a large proportion of the population within ten to fifteen minutes walk of the working and shopping centers. For revenue purposes, such a population is non-existent. This is obvious enough from a comparison of the Dublin passenger-per-car-mile statistics with those of other cities in the United Kingdom where the population is distributed more evenly, and from a study of the Dublin routes and their characteristics. Mr. Cowan evidently does not hold the tramways to blame, for he refers to them as "excellent," and notes with interest the following: "The longest extensions are for the service of places which have long had a railway service (steam), such as Clontarf, Sutton, Howth, Merrion, Blackrock, Kingstown and Dalkey. The tramways naturally enough followed development. The time has now arrived when they should take a leading part in the development of such areas as Cabra and Crumlin."

Although it can hardly be said that the Dublin fare system has acted as a deterrent to development, Mr. Cowan takes the extreme view recently put forth also by Ralph S. Bauer, Lynn, Mass., namely, that the provision of cheap or absolutely free transit is but a logical step from the free use of the public highways, and that this would be an immense help in securing healthful houses "on an economic basis." As the Dublin tramways are not owned by the city, this proposal is not likely to do more than create some embarrassment for the company in trying to run its *own* affairs on an economic basis.

In view of the fact that the wages of all classes of labor have risen in greater proportion than tramway fares, it might be well to see if new suburban houses do not fill up without the stimulus of free transit. It is a safe prophecy that whenever the city erects the 600 houses at Marino in the Clontarf section and the 370 dwellings laid out for Fairbrother's Field on the south side, it will not have to cry for tenants! If the tramways were owned by the city and if tramway operation were free from its opportunities for appalling wastage of labor and material, the subject of "free transit" would be riper for discussion.

In concluding these references to the matter of housing and transit, the writer extends his thanks to Edmund W. Eyre, treasurer of the city of Dublin, for his courtesy in permitting the inspection of official documents, and of the several classes of houses built by the city.

Aside from its port activities, Dublin is not an industrial city. Its largest establishments are a brewery with 3000 to 4000 employees and a biscuit bakery with 2500

No article on the Dublin United Tramways could be complete without some reference to **William Martin Murphy**, chairman of the company for a generation. Mr. Murphy is one of the great pioneers of the electric railway industry. He electrified the Dublin system, the first work of the kind on a large scale in the United Kingdom. He financed and built the Belfast horse lines as far back as 1879, and he promoted, financed or built—and sometimes all three—the Isle of Thanet, Hastings, Poole & Bournemouth, London Southern, Cork and Paisley (Scotland) tramways. He also constructed railways in the Gold Coast Colony, West Africa, and partook actively in general railway and lighting projects in the United Kingdom. Mr. Murphy's activities, however, have not been limited to his public utility labors. Parliament saw him as representative of St. Patrick's Division, Dublin, from 1885 to 1892. In 1905 he founded the *Irish Independent*, the first half-penny (now penny) morning daily newspaper in Ireland. In 1907 he was the principal promoter and committee chairman of the Irish International Exhibition in Dublin, and during 1912 and 1913 he was president of the Dublin Chamber of Commerce. Since February, 1915, Mr. Murphy has shown his public spirit in a most timely way by serving as chairman of the general finance and general purposes committee, Dublin Castle Red Cross Hospital. That the Dublin United Tramways has so good a record to show under the most trying conditions of recent years is due in large measure to the continued personal attention that Mr. Murphy has been able to give this undertaking because of his residence at Dublin.

employees. In both cases, the mass of the workers live in the immediate vicinity. The reputation of Dublin as a capital and its salubrious climate have, as Mr. Cowan says, made it the rest house or alms house to which people broken in health, character or fortune come from all over Ireland to shelter or hide themselves or to take advantage of its numerous hospitals and almost innumerable overlapping charities. These factors are not particularly favorable to the highest degree of tramway development, but the Dublin system was the first tramway in the United Kingdom to be electrified and it has been progressing ever since. Therefore, an insight into the operating standards will be worth while.

WHAT THE TRAMWAY SYSTEM IS

The system as a whole, shown in the map on page 1039, comprises 101 miles of single track. Practically all routes are double-tracked except 1½ miles of gauntlet or interlaced track on certain narrow streets where inbound cars have the right of way up to 2.30 p.m. and outbound cars for the remainder of the day. The main streams of travel are north and south, with Nelson's Pillar in the center of the city as the converging point. Of the eight routes that reach the pillar, five are turnbacks and the others are through lines. The inequality of population per acre in Dublin is reflected in this arrangement of routes.

J. McDOWELL JEWELLER
JEYES' FLUID
SUNLIGHT

DUBLIN'S CARS AT A MAIN TRAFFIC POINT

With a war-time service of 170 cars, compared with 212 in pre-war days, the company carried 71,008,655 passengers for the year ended Dec. 31, 1918, as compared with 66,624,326 passengers the preceding year. On the basis of 390,000 inhabitants, the journeys per head of population per annum were thereby increased from 171 to 182 and the passengers per car-mile from 8.7 to 10.6. The car-miles run per inhabitant per annum, however, were reduced from 19.7 to 17.2.

Except for the workmen's cars run out of the depots at 5.30 a.m., the operating hours are from 7.30 a.m. to shortly before midnight, the last cars outbound leaving Nelson's Pillar at 11.15 p.m. In peace days, the last car left at 11.30 p.m. To-day the coal shortage is the determining factor in the hours and the amount of service. At the time of the writer's visit, G. Marshall Harriss, general manager, was absent on a prospecting tour among Irish coal mines.

As indicated on page 1040 there are three peaks on week-days—8.30 to 9.30 a.m., 1 to 2 p.m. and 5.15 to 6 p.m., the last being the heaviest. During these hours the customary headway is two and one-half minutes. A five-minute headway is the normal service, lengthening out to seven and one-half and ten-minute headways at night. The peak hours indicate that life in Dublin is not too strenuous. The shops open at 9 a.m. and close at 6 p.m., and many are closed also during the luncheon period for one to one and one-half hours. Half holidays prevail on Wednesdays and Saturdays, the smaller shops generally observing Wednesday and the larger ones Saturday. During the lively summer travel to the parks and beaches, the pleasure lines are operated on headways down to one minute. Recent betterment of afternoon riding is credited in part to the moving-picture theaters.

While motor cars are permitted a speed of 25 m.p.h., the rather obsolete local regulations specify tramcar speeds of 3 m.p.h. on curves and 7, 12 to 16 m.p.h. from city to open sections. The actual schedule speed is approximately 9 m.p.h., with a maximum speed of 16 m.p.h. on the longer lines. The same schedule speeds are maintained throughout the day. The comparative scarcity of automobiles and the width of Sackville Street, on which the lines converge, serve to prevent congestion troubles. During rush hours as many as 120 cars—all double-deck—are handled per hour at Nelson's Pillar without any difficulty under the control of timekeepers who pass the cars in and out by whistle signals.

In addition to the stops made at the boundaries of fare stages, there are a number of safety stops prescribed partly by the Board of Trade and partly by the company. Otherwise, the spacing between stops is five poles, equivalent to 600 ft. This is the revised distance, about one-third of the original stops having been eliminated as a coal-saving measure. Stops are usually on the near side, but they are governed by traffic conditions rather than by an inflexible rule. Ordinary stops are marked by a pole with a white band; fare stages, by a red plate in addition to the banding.

The Dublin United Tramways handles practically all the traffic of the city. At one time, the little back-to-back carriages known as "jaunting cars" were quite popular, but the high and uncertain fares said to have been charged by the drivers diminished their use. For a short time a bus line was in operation to the steamship piers, largely because it did not pay to put down a 1½-mile railway for one-hour-a-day traffic. After the suspension of this service, four buses were licensed to run between Kingsbridge and North Wall, but as there was a two and one-half minute car service between Kingsbridge and O'Connell Bridge, the buses ran only from the latter point to the North Wall. One of these buses has already been withdrawn. Aside from the traffic conditions, the paving of Dublin is not encouraging to bus operation.

DETAIL OF ROUTES—NON-STOP SUBURBAN CARS

The 55.3 miles of route of the Dublin system include the following lines, all shown on the map on page 1039:

Dalkey Line (9.1 miles) is a suburban line of residential character but also carries harbor business at Kingstown, the port of Dublin, and in summer transports the working class of people to Merrion Beach. In addition to the usual four-minute headway on this line, the company for about ten years has been running a through or non-stop car service during the rush hours as part of its competition against the Dublin South Eastern Railway. In the morning, three cars leave Dalkey at 8.30, 9 and 9.25 o'clock; in the evening, the times of departure from Nelson's Pillar are 4.16, 5.04, 5.36 and 6.08, the first car out returning in time to make a second trip. These cars make the run in about forty-five minutes, as compared with sixty minutes by the locals. To do this, the local cars must begin to take sidings as near in as Ballsbridge (1½ miles from the city), according to time points and the instructions of the traffic inspectors. At Booterstown it is necessary for the local to switch over to the opposing track. As the result of this competition, the steam road cut its service to a thirty-minute headway, a reduction of 50 per cent. The steam run takes but thirty minutes, but as the electric terminals are more conveniently situated and the headway of the tramway is so short, the advantage of time is usually with the electric service. A diagram on page 1040 shows the afternoon travel on this route.

Howth Line via Dollymount (9.5 miles) is Dublin's other suburban line along Dublin Bay. To Dollymount (4.09 miles) there is good traffic, beginning with the business section and extending out into a good residential district. The territory between Howth is largely a campers' district and seaside playground. Through cars to Howth did not pay because they did not start well filled, as the Dalkey ones do. The load curve on page 1040 shows that there is good mid-day travel 4.09 miles out to Dollymount.

Terenure Line (3.4 miles) serves a good residential district.

Dartry Line (3.15 miles) is similar to the Terenure line, which it overlaps for almost the first 2 miles from the center, making for the encouragement of short riders.

Palmerston Park Line (3.23 miles) has good business traffic at one end and residences of good class at the outer end.

Sandymount Line via Ringsend (3.25 miles) has a working-class district with a beach at the end.

Inchicore Line (3.14 miles) serves a working-class district. The aforementioned brewery and a railway locomotive plant are located along and at the outer end of this line respectively. The load curve between Inchicore and College Green is given on page 1040.

Ballybough Line (2.86 miles) serves a working-class district.

Donnybrook Line to Phoenix Park (5.06 miles) is a through route on which a four-minute service is given between Nelson's Pillar and Phoenix Park over a single route. On the other side of the city, close to the center, part of the cars are routed via Merrion Square and Baggot Street, and part via Stephens' Green and Leeson Street. Formerly, the cars on both arms went to Donnybrook. Coal shortage, however, made it necessary to cancel the near-by Nelson's Pillar-Clonskeagh line. Consequently, since April, 1918, the Leeson Street arm carries its half of the service via Appian Way and Sandford Road to Clonskeagh. In this way Clonskeagh receives an eight-minute service in place of the former six-minute independent service, and Donnybrook receives an eight-minute service in place of a four-minute service. This reduction produced a big saving in mileage without affecting the Nelson's Pillar-Phoenix Park section, which is a far better traffic producer. The Donnybrook district bears no signs of the famous fair of old, but is a district of substantial residences. Close by in the direction of Clonskeagh there are some poor, dilapidated cottages, most of them being so ancient that they are below the level of the more modern roadways.

Drumcondra-Rathfarnham Line (6.2 miles) is a busy through route.

Dolphin's Barn-Glasnevin Line (5.12 miles) is a through route. The Dolphin's Barn terminus is in suburban territory, while Glasnevin is a gathering point for farmers on their way to Dublin.

Fairview-Westland Line (2 miles) has been canceled because of coal shortage.

Lansdowne Road Line (2.5 miles) is a crosstown line to Kenilworth Square. It is now cut off at Castlewood, 1.7 miles being operated at the Landsdowne Road end to keep the suburbanites in proximity to the beach as before.

Drumcondra-College Green Line is a circular route which is otherwise served and is now out of use because of the coal shortage.

In addition to the foregoing reductions several other services were canceled during the spring of 1918, but the total amount of single track made idle did not exceed 10 miles. The car-miles for 1918 were 6,787,654 as compared with 7,732,897 for 1917, and although the average number of cars per diem was reduced from 208.6 to 177.6, the daily mileage per car was increased from 100.6 to 103.69 miles. As compared with 1914, the increase in passengers carried was 21.8 per cent besides a reduction in mileage of 12 per cent.

SINGLE-TRUCK CARS PREVAIL IN DUBLIN

The total rolling stock for passenger use in Dublin amounts to 328 cars, but the number in operation has been much below this figure because of coal restrictions. Except on the suburban lines to Dalky and Howth, the single-truck car prevails. The lower deck of these cars seats twenty-five, and the upper deck, thirty-three. An unusual feature is the plush seating on the lower deck. This seating is kept in excellent condition through the use of a vacuum-cleaner car, which visits each carhouse in order. Curtains are also used.

Only fifty of the single-truck cars have top covers, the rest being open because of clearance limitations under bridges, etc. The body doors of all cars are of sliding type, 2 ft. wide in the clear. On the through lines, passengers are permitted to use both front and rear doors at certain places to facilitate traffic. Conductors are ordered to keep the platform clear at all times, and passengers are not allowed to stand inside the cars except when the weather becomes suddenly inclement. "Car Full" signs are hung from the hood directly over the step.

In addition to the roller-type destination sign, every car carries a route-number designation below. A novelty of the painted-board side signs is the use of opposing index fingers at each end to show toward which terminal the car is going—a little thing, perhaps, but one which the stranger appreciates.

The company's double-truck cars are somewhat larger than the single-truck cars, seating thirty-three below and forty-seven above, or eighty as compared to fifty-eight. The principal motor on the double-truck cars is the GE-80, 40-hp. type for a speed of 16 m.p.h., with B-18 and B-49 controllers. Some of these cars are fitted with Westinghouse 220, 40-hp. motors and the same maker's T-IC controllers. All double-truck cars are fitted with the Westinghouse magnetic track brake.

Most of the single-truck cars have GE-52 motors of 27-hp. rating, with B-13 and B-18 controllers. Lately the company has been replacing these equipments with the new GE-200 self-ventilated interpole 40-hp. motor and the same maker's B-49 controller. The work cars have GE-58, 27-hp. motors with B-13 controllers.

WORKING CONDITIONS—COMPANY-BUILT HOMES

As elsewhere, the war brought large increases in pay to the 700 motormen and conductors of the Dublin United Tramways. New motormen now receive weekly 48s. 6d. ($11.64), of which 23s. is a war bonus. For three-year motormen the corresponding amount is 53s. 6d. ($12.84), of which 22s. 6d. is a war bonus. New conductors now get 45s. ($10.80), and three-year conductors the maximum of 51s. 6d. ($12.36). These rates have probably been increased under the new general agreement of 48 hours' work for 54 hours' pay.

The average workday is nine and one-half hours on week days and eight hours on Sunday, with every twelfth day off with pay. The week averages sixty hours. Uniforms, caps and other operating necessities are supplied free, but 1s. a week is set aside from a man's pay up to £2 as a guarantee against carelessness and loss of uniform. This money is returned to the man whenever he leaves the service.

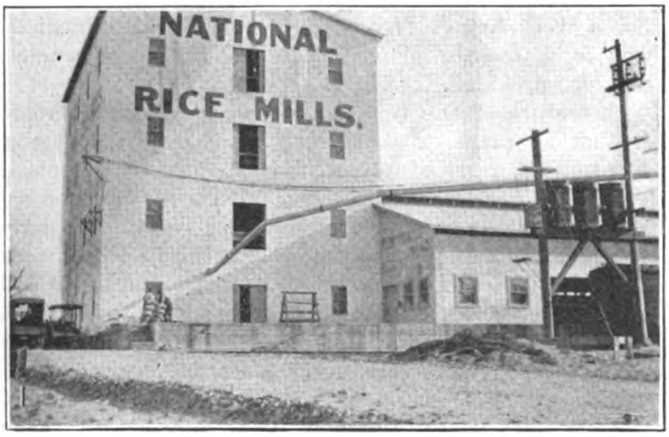
The employees of the Dublin United Tramways had a mutual welfare society long before the passage of the government acts relating to compulsory insurance. The functions of this society have since been reorganized to meet government requirements where voluntary insurance is maintained. A contribution of 3d. a week brings free medical service, free medicine and 7s. a week to members who fall ill. Free pensions are also provided.

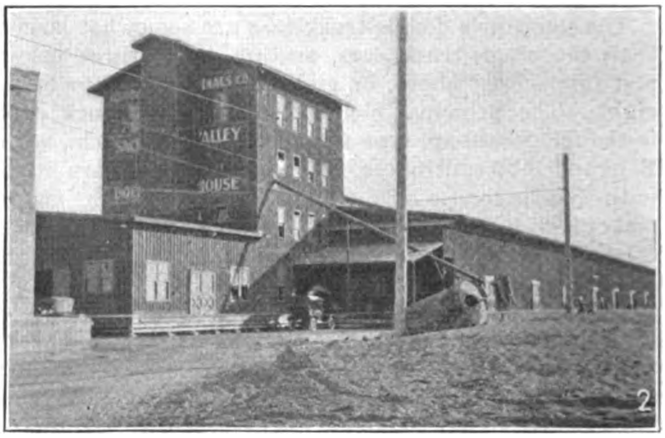
A feature of the time-table practice of the company is that an extra or spare man takes over the regular rotation of runs of the man he temporarily replaces instead of a regular man being advanced from one run to another. Regular men may have a rotation of early, late and split runs, something like this: First week, start 7 a.m., off 12.43 p.m. to 1.43 p.m., and on to 5.30 p.m.; second week, start 12.51 p.m., off at 5.39 p.m., return at 6.50 p.m. and finish at 11.12 p.m.; third week, early morning and late night split or return to first week.

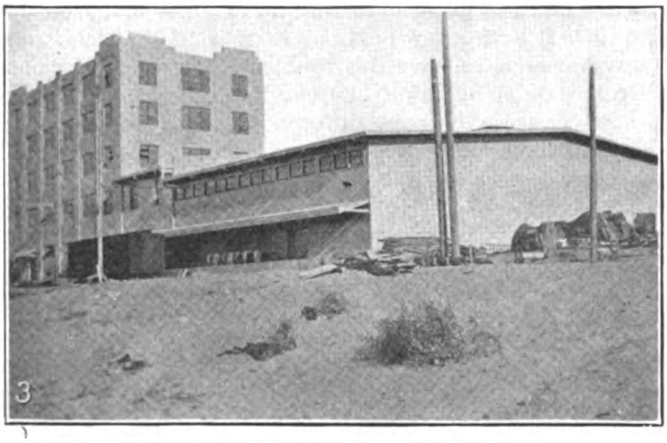
As the first part of this article began with a discussion of the housing problem in Dublin, it is not inappropriate to close it with a few particulars of what the local tramway has done to solve this problem for its own car men. Up to date it has built 220 one-family cottages at locations convenient to the different depots. These houses cost £42,000, and are let at rents of 3s., 4s. and 4s. 6d. weekly. There are 190 one-story houses comprising two rooms, with kitchen and scullery; ten two-story houses comprising three rooms, with kitchen and scullery, and twenty two-story houses comprising four rooms each.

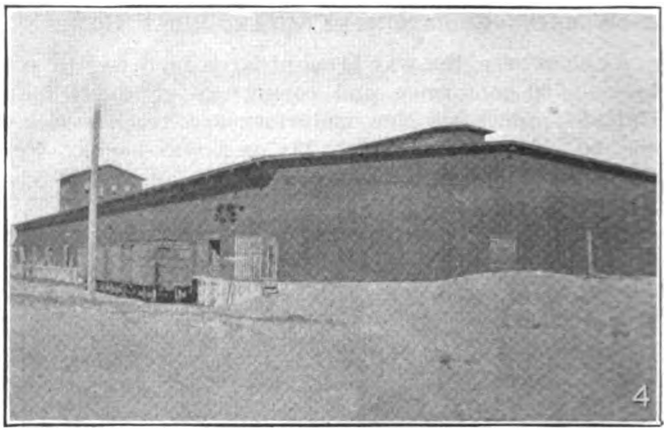
CITY-BUILT HOUSES, BRIDE'S ALLEY, AT LEFT; TRAMWAY BUILT HOUSES, CABRA, AT RIGHT, AND CITY HOUSES OPPOSITE FATHER MATTHEW'S CHURCH, BELOW

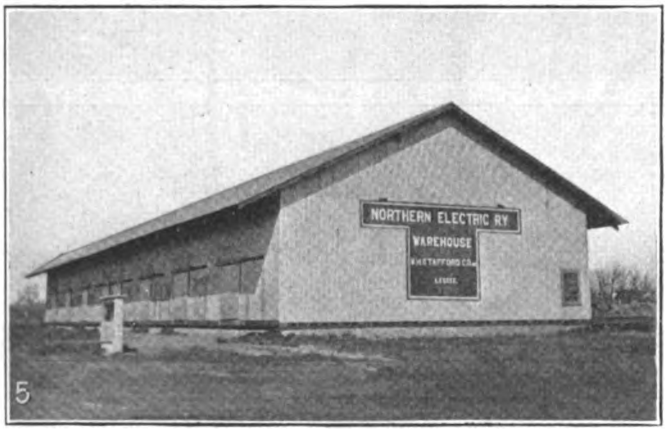
The houses are assigned to the men in the order of seniority and good behavior. They are welcomed by the men not only for their convenience but also for their accessibility. For example, the Cabra carhouse near Phibsborough is located in a good residential section where houses of suitable size and low rental were unobtainable. Here the company erected a complete block of neat brick houses which inclose the street from three sides to make a safe playground for the children. At Donnybrook, where there is plenty of open ground, each tenant has an allotment or war garden opposite his house. From these few notes and the accompanying illustration it will be evident that the company has grappled wisely with its own housing problem. Part II of this article will show the good results of fare increases in 1918 despite enforced reductions in service.

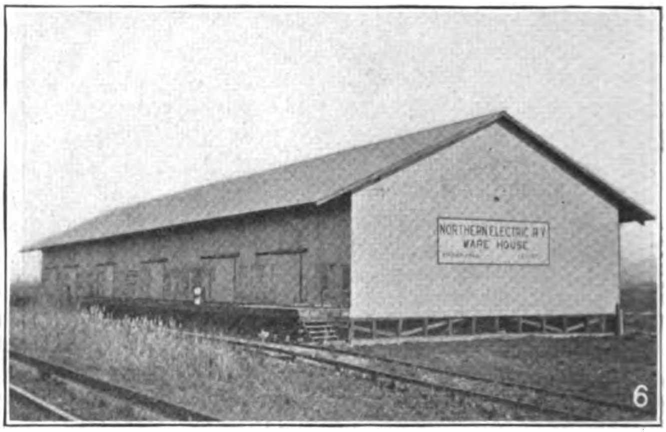

NATIONAL
RICE MILLS.
1

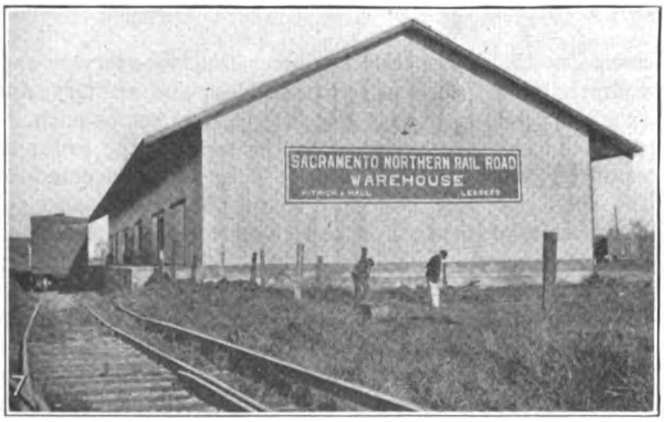

ALLEY
HOUSE
2

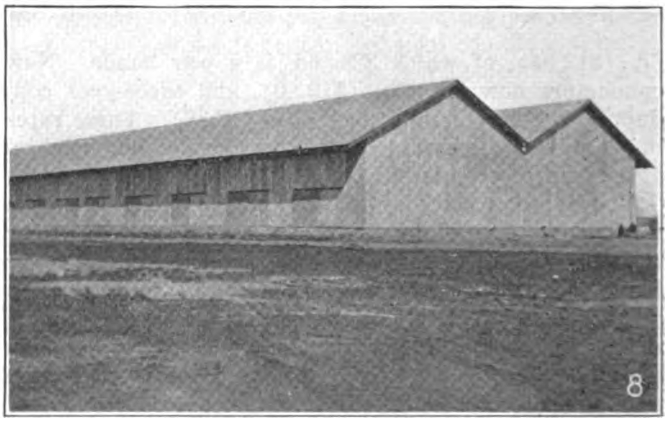





NORTHERN ELECTRIC RY
WAREHOUSE
5

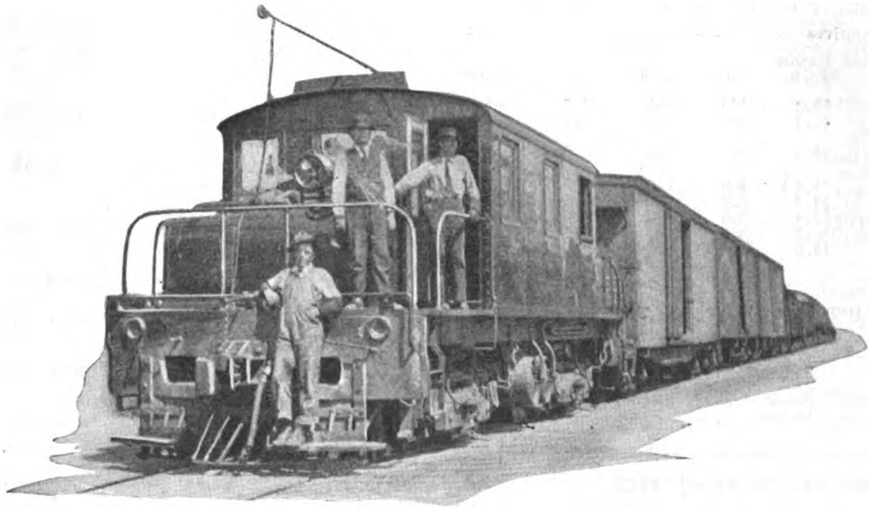

NORTHERN ELECTRIC RY
WARE HOUSE
6


SACRAMENTO NORTHERN RAIL ROAD
WAREHOUSE
7



These Houses Have Been a Big Factor in Developing the Sacramento-Northern's Freight Traffic

1. National Rice Mills at Sacramento. 2. West Sacramento Bean Warehouse. 3. California State Rice Mill at West Sacramento. 4. West Sacramento Bean Warehouse. 5. Live Oak Warehouse. 6. Esquon Warehouse. 7. Durham Warehouse. 8. Blave Warehouse.



TYPICAL SACRAMENTO BELT LINE FREIGHT TRAIN

Developing Feeders for Freight Traffic

Sacramento Northern Railroad Demonstrates from Operating Data the Value of Storage and Industrial Plants in Upbuilding Freight Traffic — Warehouses Have Increased Business Tenfold

THE development of freight traffic on the Sacramento Northern Railroad, particularly with respect to the part played by the warehouse facilities, shows what can be done by intensive effort. This system lies generally north and south in the Sacramento Valley of California and reaches the cities of Sacramento, Woodland, Marysville, Colusa, Oroville, Chico, Suisun and Vacaville, constituting in all approximately 170 miles of main-track line.

TABLE I—GROWTH IN FREIGHT REVENUE

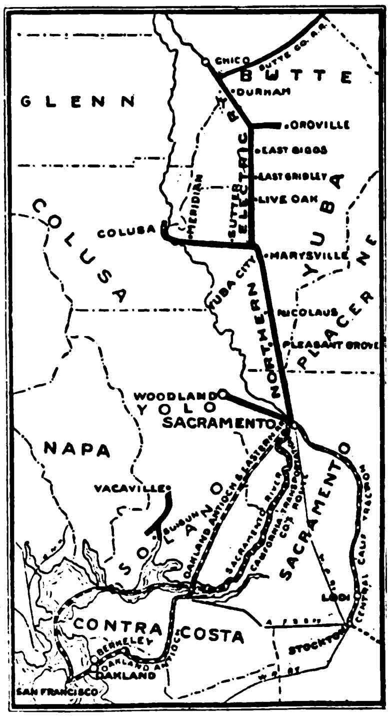
Year	Freight Revenue, Per Year	Revenue Compared with that for 1914, Per Cent	Ratio of Freight Revenue to Total Passenger and Freight Revenue, Per Cent
1914	$260,000	100	34.8
1915	290,000	112	39.6
1916	360,000	139	44
1917	400,000	154	45.1
1918	556,000	214	52.2

During the past four years more attention has been paid to the development of freight business than previously, with the results listed in Table I. The table shows that during the past calendar year the revenue from freight exceeded that from passenger business for the first time, having increased 114 per cent during the four-year period.

A fair idea of the extent of the freight traffic handled may be gained from the following figures for year 1918:

Gross ton-miles..	41,000,000
Foreign freight car-miles..................................	512,000
System freight car-miles...................................	920,000

From the mileage of foreign cars on these lines, it will be noted that a large amount of the business is interline traffic with the connecting steam and electric lines. This foreign equipment is handled under the M. C. B. interchange rules. Interchange connections are maintained with other carriers as follows:


CHICO
BUTTE CO. R.R.
BUTTE
DURHAM
GLENN
OROVILLE
EAST BIGGS
EAST GRIDLEY
LIVE OAK
SUTTER ELECTRIC
MERIDIAN
SUTTER
COLUSA
YUBA
MARYSVILLE
YUBA CITY
NORTHERN
NICOLAUS
PLACER
PLEASANT GROVE
WOODLAND
YOLO
SACRAMENTO
NAPA
VACAVILLE
SUISUN
SOLANO
OAKLAND ANTIOCH & EASTERN
SACRAMENTO RIVER
CALIFORNIA TRANSPORTATION CO'S ROUTE
SACRAMENTO
CENTRAL CALIF. TRACTION
LODI
STOCKTON
CONTRA COSTA
BERKELEY
OAKLAND ANTIOCH
OAKLAND
SAN FRANCISCO

SACRAMENTO-NORTHERN SYSTEM AND CONNECTIONS

1. At Sacramento with the Southern Pacific Company, the Western Pacific Railway, the Central California Traction Company and the Oakland, Antioch & Eastern Railroad. Of these the first two are steam lines and the others electric lines. Interchange is made also with the California Transportation Company, the Sacramento Transportation Company, and the Producers' Transportation Company, the latter two being river carriers.
2. At Marysville with the Southern Pacific Company, and the Western Pacific Railway.
3. At Oroville with the Western Pacific Railway.
4. At Chico with the Southern Pacific Company.
5. At Fairfield with the Southern Pacific Company.

LOW-SPEED TYPE LOCOMOTIVES ARE PREFERRED

Table II shows the freight locomotive, power and freight car equipment operated by the company. The smaller locomotives, such as the 1000 to 1005 class, are wooden frame units, equipped with the same type of motors as are used on the interurban passenger equip-

TABLEJII—EQUIPMENT OF FREIGHT MOTIVE POWER

Identification Number	Locomotives			One-Hour Rating			
	Tons on Driver	Continuous T.E. Lb.	Rating M.p.h.	Amp.	R.p.m.	T.E. Per Amp.	Horsepowe
701	21	1,880	15.2	140	515	19.2	160
1000	35	2,800	25.5	300	720	12.5	360
1002 1003 1004	41	2,800	25.5	300	720	12.5	360
1005*	41	4,400	21.0	400	720	12.5	360
1010*	77	6400	24.3	620	70	13.8	700
1020*	61	13,000	15.4	760	470	19.6	800
1030*	60	12,000	18.0	800	547	17.1	800
1040*	50	9,000	13.0	460	380	21.9	400

* Forced ventilation.

FREIGHT CAR EQUIPMENT

Number of Cars	Type	Capacity, Lb.
109	Box	80,000
141	Flat	80,000
6	Stock	80,000
40	Ballast	80,000

TABLE III—WAREHOUSES OWNED AND LEASED

Location	Year Built	Size, Ft.	Type of Construction
Sankey, Live Oak, Esquon	1916	50x200	Concrete foundation, wooden floor, corrugated iron building.
Woodland, Colusa, Shippee	1918*	50x200	Concrete foundation, concrete floor, wooden building.
Blava	1918*	100x250	Concrete foundation, concrete floor, corrugated iron building.
West Sacramento Warehouse No. 1 and Bean Cleaner	1917	100x400	Concrete foundation, concrete floor, wooden building.
West Sacramento Warehouse No. 2	1918	100x200	Concrete foundation, concrete floor, corrugated ironbuilding.
Tarke*	1914	50x400	Concrete foundation, wooden floor, corrugated iron building.
Durham	1918	50x200	Concrete foundation. concrete floor, corrugated iron building.

* Community concerns promoted by railroad and in which it is part owner only.

ment, except that they are provided with freight gearing. Motors of this particular equipment, however, are of the high-speed type suitable for passenger service, and not suitable for freight service, and the tractive effort necessary for handling the heavy freight trains with these locomotives is obtained only with excessive current, resulting in severe motor maintenance costs and heavy drag on the substations. On account of this fact, more recently locomotives of the low-speed type have been selected, of which locomotives 1020, 1030 and 1040 are typical.

The freight traffic movement consists of two heavy freight trains each day northbound from Sacramento to Chico and Oroville, and two heavy freight trains southbound to Sacramento. These trains approximate 1000 to 1200 trailing tons, and require the services of the larger locomotives. In addition one freight locomotive is kept in regular service on the branch line between Marysville and Colusa, and another on the branch line from Sacramento to Woodland. The small locomotive 701 is employed on the line from Suisun to Vacaville, where freight business exists only a few months of the year when orchard products are being moved.

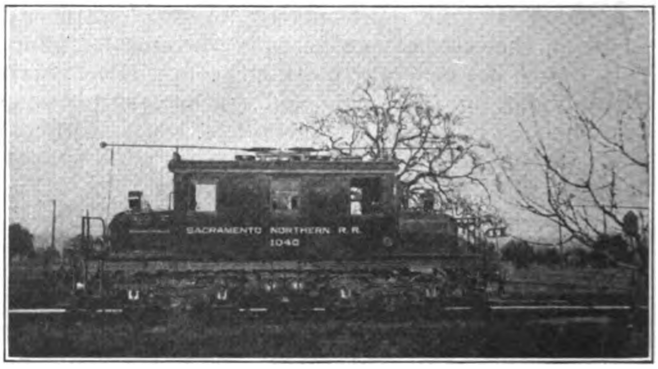
Two locomotives regularly, and sometimes a third, are required in the Sacramento yards and on the belt line, distributing cars to the various industries. This belt line surrounds the business district of Sacramento on three sides and serves various industries, including the river carriers along the Sacramento River waterfront. The Sacramento yards include about 10 miles of tracks, and from 150 to 200 cars per day are switched in them.

With the California Transportation Company, at the Sacramento River wharfs, are interchanged each day approximately ten full carloads and from one to two cars of l.c.l. business transferred to the boats, and from them approximately 125,000 lb. of l.c.l. merchandise is received for points on this line. A large amount of rice is transferred to the boat company for export. For such switching service locomotive 1040 is particularly well fitted on account of its high tractive effort and low speed.

For the main-line service, however, locomotives of a somewhat higher speed are preferable, suitable locomotives for this service being similar in characteristics to 1020 and 1030. An examination of Table II, and particularly the columns headed "Tractive Effort Per Ampere" and "R. P. M." shows the vital characteristics which are necessary in electric locomotives for handling freight trains; *i.e.*, the most suitable locomotives are those of low-speed design, giving a high tractive effort per ampere, so that the moderate substation capacity of the average electric line can handle the large demands of power made by freight service and still not exceed the capacity of the substation or of the distributing system.

Freight is handled at night after most of the passenger trains are off the line, and one of the operating rules is that all freight trains meeting a passenger train must not start within five minutes after the passenger trains have passed, this rule permitting the line voltage to be held up until the passenger train is accelerated and fairly on its way.

The substations are equipped each with one 400-kw., 600-volt motor-generator set. They are spaced approximately 10 miles apart, and the positive conductor between substations is a 60-lb. third-rail approximately equivalent to 600,000 circ.mil. copper.



A 50-TON SACRAMENTO NORTHERN FREIGHT LOCOMOTIVE

WHY WAREHOUSES WERE NECESSARY

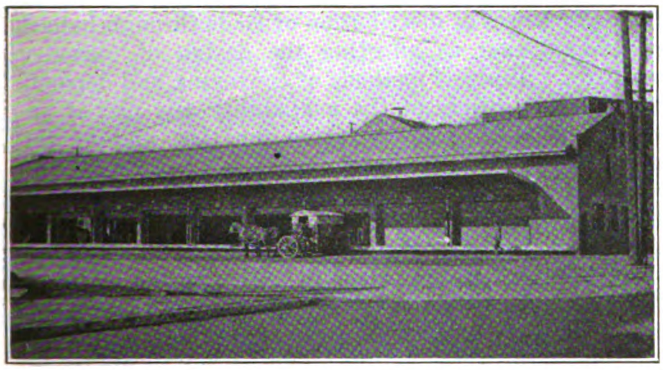
A large extent of the country tributary to the line is planted to rice, beans and grain, which products must be held in warehouses until sold. The competitive steam lines were well equipped with warehouse facilities, and thus were intrenched in the business of hauling these particular products through the switching facilities on their own tracks. In this competitive territory local capital could not be interested in the construction of additional warehouses on the Sacramento Northern, and in order to obtain a fair share of this traffic it was decided several years ago to construct warehouses at different points on the system. Most of these warehouses were built by the railroad company and are leased to outside warehouse concerns. In some cases the warehouses were community affairs promoted by the railroad, which became a stockholder for a certain amount of the cost. In other cases the ownership is entirely with the railroad. Where the railroad is the sole owner in the warehouse the rental charged to the warehouse concern is sufficient in amount to cover fixed charges and upkeep of the property, the benefit to the company arising from the additional freight business received through new storage facilities and not from any profit in the operation of the warehouse itself.

Table III shows the warehouses recently constructed, together with sizes and type of construction.

Table IV has been made up to indicate the growth of freight traffic in the items of rice, beans, grains and raisins moved in carload lots at various warehouse points. It permits comparison of the growth in tonnage and revenue in the year 1918, when warehouse facilities were available, with these items in 1915, when there were no warehouse facilities. At the nine points where warehouses have been constructed the increase in tonnage is, on the average, 1120 per cent.

1000 PER CENT INCREASE IN BUSINESS DONE BY WAREHOUSES

Naturally some of the growth indicated in the upper portion of Table IV was due to increased acreage. To give some idea of what this normal growth has been, the figures for Tarke Station are given. At this point a warehouse existed both in 1915 and 1918, so that an increase in business at this point would indicate the normal growth of the traffic uninfluenced by any additional warehouse facilities. In this way the normal growth of tonnage is seen to be approximately 108 per cent, which checks with the increase of 114 per cent in freight business over the entire system, as shown in Table I. In other words, at normal points, the growth of traffic in four years has been roughly 100 per cent, while the introduction of warehouse facilities has increased this traffic by more than 1100 per cent.


WAREHOUSE AT SACRAMENTO

PASSENGER STATION AT LIVE OAK

All of these warehouses were provided with portable grain stackers, operated by 220-volt, three-phase motors when this source of power was available, otherwise by 600-volt direct-current motors drawing power from the third-rail.

Obviously the warehouse must be of capacity sufficient to take care of the tributary acreage. In one instance recently a warehouse at one point was not large enough, and business to the extent of upwards of 12,000 sacks of beans, 20,000 sacks of barley and 10,000 sacks of rice was lost. This was approximately 80 carloads.

A salient fact in connection with the warehousing of grain products is that provision is made in the tariff to take care of the storage in transit, with the same rate applying from the point of origin to the destination as would be in effect with a through haul. In other words, warehouses in the territory where barley is grown may be empty in October and November. During these months rice can be stored, and if the warehouse facilities in the rice territory are not sufficient during these months the rice may be carried to a warehouse in the barley district and there stored until such time as its movement may be completed to the final destination.

TABLE IV—GROWTH OF FREIGHT TRAFFIC IN RICE, BEANS, GRAINS AND RAISINS AT POINTS WHERE RAILROAD HAS WAREHOUSES

Location	Freight Traffic, Tons 1915	Freight Traffic, Tons 1918
Blava	....	956
Colusa	1,227	5,023
Durham	409	8,351
Esquon	682	3,961
Live Oak	22	2,946
Sankey	675	5,540
Shippee	45	2,121
West Sacramento	....	8,397
Woodland	38	1,582
	3,098	38,877
Increase in per cent		1,120

GROWTH AT NON-WAREHOUSE POINTS

Location	Freight Traffic, Tons 1915	Freight Traffic, Tons 1918
East Nicolaus	365	278
Increase in per cent	....	24

GROWTH AT POINTS WHERE WAREHOUSE EXISTED BOTH PERIODS

Location	Freight Traffic, Tons 1915	Freight Traffic, Tons 1918
Tarke	2,568	5,334
Increase in per cent		108

The large bean warehouse shown in an illustration is located on the Sacramento River, opposite the City of Sacramento and on the Woodland branch of the railroad. This warehouse was built to attract raw materials from non-competitive points on the Sacramento River and non-competitive rail points to this warehouse. As the warehouse is served exclusively by this road the railroad gets a haul on all outbound business in the finished products, the Sacramento Northern line having both local and joint transcontinental rates with all of connecting steam lines. Thus, the bean-cleaning plant and warehouse creates a market for products from non-competitive territory and brings this material to this company's rails so that outbound it may move over its line.

Adjacent to this bean-cleaning plant and warehouse there have recently been constructed two large rice mills, one by the National Rice Mills, in which local capital is interested, and the other by the California State Rice Milling Company, the parent company of which is the Louisiana State Rice Milling Company. This latter rice mill is now the largest west of New Orleans and this year will become the largest rice mill in the United States. These plants at West Sacramento have had the effect of stopping at Sacramento a large amount of tonnage which would have gone to San Francisco, thus giving an opportunity to profit by the growth of acreage in territory not naturally tributary to this system, and in addition to the outbound haul which is obtained on the finished produce the City of Sacramento obtains the benefit of the large payrolls of these plants.

By way of summary it may be said that the experience of the Sacramento Northern Railroad in building up a substantial freight service and revenue has shown the following results:

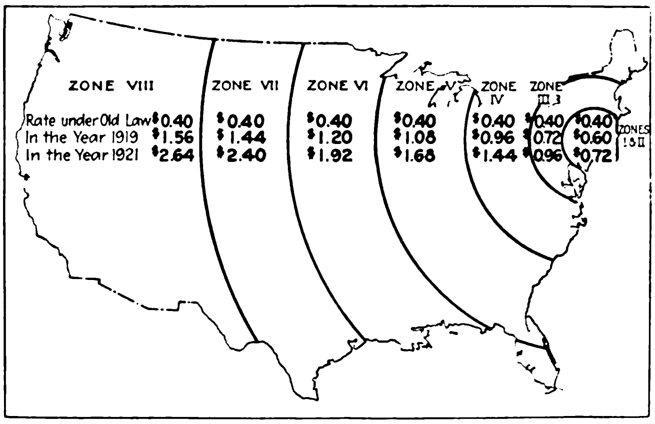
1. Added service was given to the community served by the provision of warehouses, terminals, etc., and co-operation with desirable industries.
2. Steam-road competition was met by the quality and frequency of freight service.
3. Motor-truck competitive haulage was reduced to a minimum by superior and cheaper service.
4. Gross revenue was greatly increased through the upbuilding of a profitable freight account.
5. Existing investment in track and power houses was used for freight business.

Where Do You Live?

Zone Postal Law Compels a Higher Subscription Rate West of the Mississippi River

AT THE TIME that the zone system for second-class postage was under consideration by Congress two years ago, this paper protested against the unscientific nature of the proposed rates which exaggerated the effect of length of haul on postal charges and ignored the terminal expense. The evils from a national standpoint of basing a charge for postage on distance and thus sectionalizing the country in the distribution of intelligence were also pointed out. At that time a number of readers of this paper who would be most affected by the measure wrote to their representatives in Congress protesting against the change. Other opposition developed, but the bill was finally made part of the war revenue bill and was passed.

As publishers generally did not believe that the retention of this tax would be seriously considered after the war, most of them, including those who issue this paper, paid it, partly because of the complication in accounts involved when a difference is made in subscription rates according to residence, and partly because of the discrimination between subscribers which the plan requires. As the rate is progressive, however, and as there is no evidence that the law is to be repealed the publishers of this paper feel forced to recognize the facts in their subscription rate. They do not plan at present to go farther than to establish two zones, the dividing line being the Mississippi River. Hence, beginning July 1, subscribers to the ELECTRIC RAILWAY JOURNAL who live west of the Mississippi River must add 50 cents a year when they send their subscriptions, and if the zone law is not repealed, it may be necessary later to readjust these differential rates. The accompanying map shows the postal zones into which the country is divided by the law, the postage annually per subscription under the old rate, that in 1919 and that in 1921.



POSTAL ZONES IN THE UNITED STATES

The United States is now divided into sections for second-class postal rates. The map shows the old rate, present rate and rate in 1921 if the law is not repealed.

It will readily be seen, from the rapidly progressive charge per zone, that the result of such a system of postal charges will seriously penalize the spread of intelligence in this country, particularly to those farthest from the large industrial centers. It will be surprising if those who are thus obliged to pay these higher rates do not complain to their congressmen about the continuance of any postal system which disregards the cost of transportation as absolutely as does the present zone postal law for second-class matter.

Engineering Association Assigns Subjects

THE American Railway Engineering Association has assigned a number of new subjects for committee work. Among those of interest to electric railway men are the following: Use of reinforced-concrete slabs, etc., to assist the ballast in distributing the load on soft roadbeds. Effect of usage on the physical properties of rail steel. Effect of distribution of loads through ballast and embankment as affecting the design of masonry structures. Study of methods of conveying and depositing concrete. Study of the availability and use of sodium chloride as a preservative for ties, and of the comparative value of several grades of creosote oil and creosote coal tar solutions as preservative agencies. Further collection of data relative to clearances of third-rail and overhead working conditions. Co-operation with the Bureau of Standards in regard to the National Electrical Safety Code and other safety codes, and preparation of specifications for insulated wire and cables. Study of methods for training and educating engineering and maintenance department employees.

Franchise Calls for Value, Not Coin

L. A. HERDT, D.S.C., vice-chairman Montreal Tramways Commission, gave a very clear presentation of the electric railway situation in an address before the Montreal Publicity Association on May 9. He brought out very clearly the present situation on fares when he said:

"The fares should be restored to the level which prevailed in past years. In Montreal the ticket dropped in our fare boxes to-day bears the impress '5 cents' but as compared with the 5 cents of a few years ago, it is 2½ cents and no more. The street railway franchise, or the statute of agreement calling for the 5-cent unit, calls not for an impress or a coin but for a certain value of purchasing power. The equivalent of the 5-cent coin in the decade 1890 to 1900 in purchasing power is the 10-cent fare. The purchasing power of the dollar has declined at least 50 per cent since the early nineties."

Plain Words on Transportation Service*

Concrete Suggestions Are Made on Ways in Which the Service Can Be Improved in Schedule Making, Lay-Overs, Traffic Supervision, Assignment of Runs and Other Ways

By ALEXANDER JACKSON
Superintendent of Time-tables, Public Service Railway,
Newark, N. J.

THE time-tables of an electric railway property are the cornerstone upon which the financial structure is built, and a great loss can be incurred by carelessness in their construction and operation. A time-table to meet traffic conditions should be developed with great care after a comprehensive study has been made of the district to be served, and sufficient cars should be placed in service to accommodate all persons presenting themselves for transportation. After the schedule has been inaugurated it should be carefully checked at frequent intervals to see that it is giving the results desired.

THREE FACTORS TO BE CONSIDERED IN DEVISING SCHEDULES

In providing the public with safe, convenient and adequate service, and in the development of time-tables to that end, there are three governing factors which must be taken into consideration if satisfactory results are to be obtained.

First, the public should be furnished with dependable service, given by means of clean, well-lighted and well-ventilated cars suitably heated during the winter months. These cars should be in charge of courteous, careful trainmen, including conductors who among their other duties will call out the streets and transfer points distinctly so that strangers will not be carried past their destinations.

The trainmen, through proper division of the car-hours comprising the proposed schedule, should be given a day's work to be completed within a reasonable time and with an over-all spread as short as possible.

The company, comprising the many holders of securities, should receive a reasonable return upon the investment made in the property. The extent to which this can be accomplished depends upon the furnishing of such service as will attract business and as can be furnished at a minimum of expense.

Satisfactory service to the public involves regular operation in accordance with the time-table, the cars leaving the terminals on schedule time and being kept on time so that headways will be equalized. The service must be adjusted to the needs of the line but it should be remembered that constant changing of schedules does not always improve conditions. It tends to keep the men in an upset condition, always anxious to know when a change is to be made and how it is going to affect them personally. This is perfectly natural as it may happen that a man holding a day run on one schedule may draw a half night run when a change is made, thus necessitating a change in his entire mode of living.

A division superintendent, before making recommendations to the general superintendent as to changes in time-tables, should be thoroughly familiar with conditions existing on the several lines of his division so that when a supervisor makes a request for additional service the superintendent can decide wisely in justifying or refusing the change. He should pass on no alterations in the time-table without having made personal observations of the service. The same principle applies in connection with applications for additional running time or lay-over time.

The division superintendent needs first-hand information to enable him to check the laying out of time points. He should not deal in generalities, but should depend upon facts which he can personally verify. He should know if apparent trouble is caused by one or two trainmen on a line who continually run late, or whether most of the cars run late. It may be that the trouble is caused by vehicular interference or by delays in interchange of passengers at heavy loading points. When time cannot be made, specific reasons should be assigned for the trouble.

The superintendent should try to avoid making a request for one or more additional cars to be used to increase lay-over or running time. If he owned the road himself he certainly would use every effort to save a car. He would not spend $12,000, a year for an extra car if the money came out of his own pocket. In the last analysis the company's interests are his own.

There is no other industry in which, after a man has worked a period of time equivalent to a trip on a trolley car, he is allowed 5 or 10 per cent of the working time to rest. How often is a trainman overheard to say: "The time on this line is too fast, and only two minutes are allowed in lay-over; we have to work every minute and it is a case of getting to the end of the line and right back again"? This is as it should be.

Some of the time allowed in lay-over is for slack in the time-table, so that in case of delay on any trip the car can leave for the next trip on time. Most of the lay-over time is due to the fact that the running time for the round trip is not evenly divisible by the headway, the remainder in many cases being the only time allowed for standing. If cars could be operated without delays and if the running time were divisible into even minutes in all cases lay-over time would not be necessary.

The time has arrived when electric railways cannot afford to pay for lost time. If on the 14,274 trips operated per day on the Public Service Railway we allow an average of only two minutes lay-over on each trip, there results a total of 476 car-hours per day. The corresponding annual cost in platform wages approaches $150,000.

The division superintendent should be on the lookout for signs of congestion at any point and be ready to work out plans of relief. Congestion spreads very rapidly, and soon leads to saturation and stagnation. Motionless cars cannot increase a company's income.

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*Abstract of paper read at meeting of Public Service Railway Company section, American Electric Railway Association, Newark, N. J., May 23, 1919.

Again, he can be prompt in making thorough investigations of complaints from the public regarding service. A prompt removal of the cause of criticism will be to the advantage of all concerned. Furthermore, on the occurrence of accidents, derailments or serious delays on any line the division superintendent should inaugurate investigation immediately. He should make it his business to visit the carhouses on his division frequently and to keep in close touch with the station force and trainmen. Cordial greetings to the men will do much to show them that the superintendent and the company have their welfare at heart.

Superintendents should also ride much in the cars on their lines, and not travel too exclusively by automobile when they have the opportunity to do so. The automobile is to be used when such use will conduce most to the benefit of the company, but the best place to secure first-hand information regarding equipment, tracks, paving, overhead and service in general is on the cars.

EFFICIENT SUPERVISION IS A PRIME NECESSITY IN TRANSPORTATION

The supervisor who is on the job knows that equalized headways mean good business. The earning capacity of a line depends to a considerable extent upon the regularity with which headway between cars is maintained. Broken headways, with cars running in bunches, drive business away and irritate the passengers who are forced to patronize the service. Irritation on the part of passengers makes the work of the trainmen more difficult and strains relations with the public.

When bunching of cars occurs the supervisor must find out the cause of the irregularity and determine why proper headway cannot be maintained. As his title indicates he is supposed to oversee the operation of the cars assigned to his lines.

It is the supervisor's duty also to see that the cars are kept clean, because he is furnished with the necessary help for this purpose. Conditions of uncleanliness would not exist if the supervisors conducted periodical campaigns on car cleaning.

The supervisor also should be very careful in picking men for advancement in his department. Men should be picked on the basis of their efficiency; for character, ability and personality. In this department a man who can mix well with his fellow-workers and can smooth out troubles is greatly to be desired. Men who keep things "riled up" should never be selected for work in this department. It is a poor philosophy also for the supervisor to be afraid to pick a good man for fear that the latter may eventually oust the supervisor from his job. If a man, in this as well as in any other department, expects advancement himself, he should always have someone prepared to "step into his shoes."

WHERE THE STATION MASTER COMES IN

The first duty of the station master is to see that cars pull out of the carhouse on schedule time in starting the day's work. When crews leave a minute or two late they are making a bad start for the day's run. Furthermore, this induces a tendency on the part of motormen to run their cars recklessly trying to make up for the lost time. It is impossible for a company to have careful trainmen and careless station masters.

The station master also should assure himself that his cars are clean and in proper condition to be placed in service. Very often public opinion is greatly influenced in regard to service by the appearance of equipment.

It is a good practice for the station master to glance out through his office window now and then to see how headway is being maintained on his lines. This will give him first-hand information.

Among the many little duties to which the station master should give attention are such as these: He should make an inspection of the carhouse and yard after the car cleaners are through to see in what condition they have left the premises. He should see that all trolley poles have been removed from the overhead wire and are securely fastened down. He should insist on the cutting out of all unnecessary lights around the carhouses and yards. He should insist on care in seeing that bolts, nuts, washers, and trolley wheels are not scattered around the yard but are collected and deposited in their proper places. He should keep a sharp lookout for stray oily waste, journal box packing and litter generally, with his mind fixed on the possibility of fire. He should assist in conserving stationery and other materials.

Finally, the relations of the station master with his men are very important. He should give them a square deal, especially in assigning extra men from the list to the board. A favor done a man one day may be returned later when, for example, the station master wishes to have a man take out an extra trip after completing his day's work.

REPORTS NEED PROPER INSPECTION

Regarding clerks and receivers, it is well known that the carhouse employees of these classes are continually busy attending to their regular duties. It is, however, just as easy for them to do their work well as to turn in illegible, "sloppy" and inadequate records. Clerks should not accept conductors' day cards unless these are properly and completely made out, and the same is true with regard to accident reports.

These remarks apply on the Public Service Railway particularly to form No. 418, a very important one, as it is the basis for all car-mileage and carhouse data. This form calls for the schedule number, the number of cars run, the number of trips, the car-hours and the car-miles. The necessity for care in the filling in of this form is an obvious one.

When the cars are all out on the line it falls to the inspector to be responsible for their movement. He is the man who must actually check the headway and turn in reports as to bunching and the reasons for this difficulty.

The inspector has an excellent opportunity to explain to motormen who are running ahead of time how serious is the effect of this practice in producing unequal distribution of passenger transportation. He can explain how the motorman is not doing his share of the work in passing up some of his business to his follower, who is running on time and having his car overcrowded because the leader is running away.

The inspector should frequently compare watches with the trainmen to insure their knowing that they are keeping to schedules. He can also study the manner in which the motormen are operating their cars, with reference to feeding the controller, applying the brakes, reducing speed over special work and curves, etc. And in regard to coasting, the supervisor has an opportunity to assist in the saving of energy. Some motormen have the very bad habit of running by passengers. The inspector should detect this practice and secure the dismissal of men who cannot overcome the habit, which is not fair to the passengers or the company. It is not fair, either, to run away from an approaching car at a transfer point, especially when the lines are on a long headway. The company is selling transportation and it is the inspector's duty to help develop trade and not discourage it.

The inspector should see also that all crews are familiar with the running time points on the line and that they are striving to adhere strictly to them. After a delay on the line he can do much to straighten out the cars rather than leave it to the trainmen to get back on schedule time the best they can. In all of this work great tact is necessary, for it is humiliating to a man to be corrected before his associates.

The inspector should also keep his eye on the equipment on the line and see that it is up to standard. Cars should not be allowed to be operated with dilapidated or missing signs, broken windows, etc. He should also keep in close touch with traffic conditions on the line and make it his business to learn when churches, lodges and other organizations in his district are to have special gatherings that will overtax the cars. A notification to the supervisor will insure proper service, and it is such emergency service that wins friends for the company. During the summer he can canvass his district to learn when there is to be extra riding due to excursions or picnics.

In the foregoing attention has been called to some points regarding which strict observance will make the employee's work easier and more effective to himself and his superiors. "If a job is worth doing at all it is worth doing well." The electric railway industry is working at present under most trying conditions and must expect the utmost from every employee regardless of his rank. If the business is to continue each individual must work with his maximum effectiveness.

Utilizing the Transformer Pumps for Emergency Duty

IN THE Canal Substation of the Columbus Railway, Power & Light Company, Columbus, Ohio, recently completed by the E. W. Clark Engineering Corporation, the circulating pumps used for the transformer cooling water also perform other functions. In addition to circulating this water through the cooling tower, the piping is so arranged that either pump can be used to pump out the transformer pit or the substation basement in time of flood when the ordinary sewer connections have to be closed. The basement is rather deep, due to provision being made for installing feeder regulators on the outgoing circuits at a later date if necessary. The substation site is well above extreme high-water level but both the basement and the transformer pit are below this level, so that the sewer connections from them are provided with valves and the above provisions are made for pumping them out in case of flood.

1918 Steam Line Statistics

Under Government Control Net Operating Income of Class I Carriers Fell Off $214,000,000 or 23 Per Cent

THE operating revenues in 1918 of 195 steam railroads of Class I (having annual revenues of more than $1,000,000) amounted to $4,913,319,604, an increase of $862,856,025 or 21.3 per cent over 1917. Freight revenue rose 21.7 per cent and passenger revenue 24.7 per cent. These figures are contained in the latest report of the Bureau of Railway Economics, based on returns to the Interstate Commerce Commission.

The operating expenses of these carriers aggregated $4,006,894,762, an increase of $1,148,682,552 or 40.2 per cent. Maintenance of way expenditures increased 46.7 per cent, maintenance of equipment 60.4 per cent and transportation 33.7 per cent. The operating ratio was 81.55 per cent in 1918 as compared to 70.57 per cent in 1917. Taxes at $186,652,095 represented an advance of 2.1 per cent, and the net operating income at $690,418,778, a decrease of $284,360,159 or 29.2 per cent.

The net operating income for 1917 was greater by about $70,000,000 than the annual average of the three years ended June 30, 1917, the test period which formed the basis of the standard return guaranteed by the railroad control act of March 21, 1917. Accordingly, the point of greatest interest in connection with the net income earned in 1918 is not the $284,000,000 by which it fell below that for 1917, but the approximate difference of $214,000,000 between the $690,000,000 actually earned by railroads of Class I under government operation during 1918 and the $904,000,000 which they earned annually during the test period.

The following table compares the returns of 1918 with the average annual results of the three-year test period:

Item	1918	Test Period, Average 1915–1917	Change in Per Cent
Operating revenues	$4,913,000,000	$3,391,000,000	Inc. 44.9
Operating expenses	4,007,000,000	2,293,000,000	Inc. 74.7
Net operating revenue	906,000,000	1,098,000,000	Dec. 17.4
Taxes	187,000,000	152,000,000	Inc. 22.6
Net operating income	690,000,000	904,000,000	Dec. 23.7
Operating ratio—per cent	81.6	67 6	Inc. 20.7

It should be noted in connection with the operating expenses of 1918 that the aggregate shown in the next table ($4,007,000,000) does not include the cost of maintaining the corporate organizations of the railroads. This cost represents a substantial sum, the exact amount of which is not yet available. Corporate expenses were a part of the operating expenses of 1917 and of the test period. For an exact comparison, the corporate expenses should be added to the operating expenses of 1918, which would correspondingly swell the increase over 1917 and over the test period.

According to a note in the *Electrical Review*, London, the president of the Hungarian State Railways has submitted a proposal to the Minister of Commerce urging that immediate steps be taken for the electrification of the Budapest Railways. It is estimated that by the electrification of about 1350 miles of line 1,500,000 tons of coal would be saved annually.

Side Lights on the Zone Fare—The Bane of Comparative Statistics

The Greater Track-Miles in the United States Cannot Explain Away the Fact That British People Are Better Riders of "Walking" Distances

By Walter Jackson

THE many misconceptions that have prevailed in this country concerning the British system of graduated fares seem to be due to two causes: Hearsay and the thoughtless repetition of hearsay; comparisons of street railway statistics made by those who were unfamiliar with conditions in detail in both the British and the American cities compared. It is a pity that so many should have decried for so long the principle of charging by distance because some of these folk will now have to reverse themselves. For example: After all the gratuitous assertions that zone fares are responsible for British congestion we are now gravely assured by a former universalist that "the typical American city has a highly congested center, etc.," and not the zone-fare British city. Precisely! But why didn't we make this discovery sooner?

Hearsay has many sins to answer for, but the "comparative statistics" fellow is worse. He takes a peculiar delight in comparing such figures as track-miles, passengers per track-mile and passengers per car-mile, and has no difficulty in proving what is true: That the American rider is offered too much for his money. It does not occur to him to go to the sources, namely, the cities themselves, to see what the pretty figures really mean. "Fine words butter no parsnips" and duplicate track pays no dividends.

To avoid burdening the reader with figures, let the dread truth be admitted without parley: British cities do have less miles of track per population than American cities. In fact, one may say that we generally have too much and the other chap too little track. Why is this? Primarily, the lesser amount of trackage of British tramways is not due to any unwillingness by the operators to develop facilities or by the public to move out into the country. In part it is the result of legislation since 1870 which makes it necessary for a municipal or private operator to go through cumbersome Parliamentary procedure for the right to extend trackage; in part, it is the result of a more unified development in which every piece of track is made to count.

Whereas British tramway development was greatly hampered, especially in planning suburban extensions into other political subdivisions, American builders were free to risk as much as they liked. In their optimism, they built too far out into the country, often transforming the 2-mile rider into a 4- or 5-miler, but without getting any more money for the doubled service. But even in the older parts of the cities the old competitive lines built more track than was really needed. Unfortunately the investment involved blinded the owners to the desirability of wiping out needless lines after consolidation.

Instead of bewailing the taking up of unprofitable track we ought to be thankful that the true commercial spirit is entering the industry. It is cheaper to pay fixed charges on the bonds of an obliterated road than to pay operating deficits, too. At least that has been the standpoint of British municipal tramway managers for years. Is it not worth a thought that even these compact properties will not tolerate the retention of useless trackage?

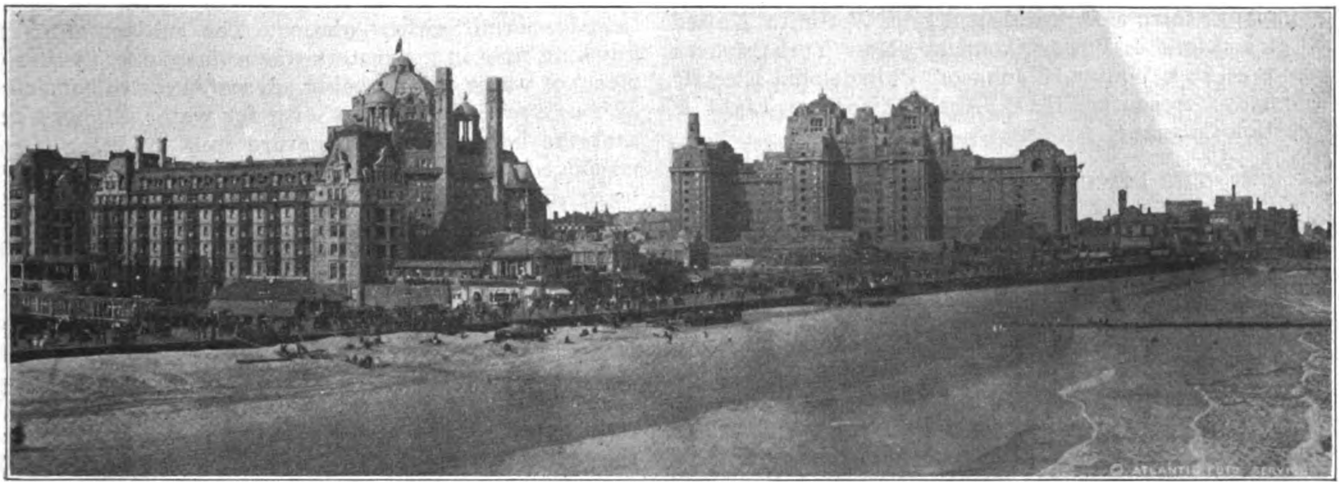
The true test with regard to track mileage is whether there is enough of it to serve the needs of the community. If there is, nothing will be gained by comparing it with another city of like size, because no two towns are similar in topography, distribution of industries, etc. While most of the British tramways lately visited by the writer were contemplating either track or omnibus extensions, none except the Edinburgh electrification from cable traction felt that they would need to build any important extensions at the termination of the war period. Of the other roads, the Glasgow Corporation Tramways apparently has the most ambitious plans, in figuring to go from 196 to 238 miles of single track.

Rides per inhabitant per annum offer a second dangerous means of comparison unless used with care. This per capita figure is not merely a function of trackage, cars, fares and other street railway indices. The degree of concentration of the inhabitants with regard to places of work and pleasure is extremely important—yet the effect of this cannot be estimated except by a population survey. To illustrate: In Edinburgh a great part of the population lives in tall tenements. The older folk and children on the upper floors of such houses are virtually prisoners, while many of the active workers are within walking distance of their jobs. Contrariwise, a city in a river valley, like Glasgow, has the right foundation for high per capita riding.

Nor should we forget in connection with these studies that hitherto many British workmen have had such long hours that they have tried to live close to their work. With shortened working hours they will be more willing to move out into more distant sections and so become car riders.

In a recent quasi-technical paper passengers per car-mile were used as an index of service. The reader was allowed to infer that the more customers a street railway car gets the more censure the company deserves! That there are but six passengers per car-mile in the American city praised and eighteen in Glasgow is no severe reflection on Glasgow, when a person familiar with both cities knows that most of the difference is due to the better load factor built up in Glasgow by short-ride traffic. Overcrowding during the rush hours is not inconsistent with a low passenger per car-mile index, for the American passenger averages a longer occupancy of the seat. For example: Sixteen passengers per car-mile where each passenger averages 2 miles means no more seats used than eight passengers averaging 4 miles each. In each case the passenger-miles, a unit unknown to the universal fare, are the same, 32. The higher figures of Britain do not mean that the cars are overcrowded. Riders going 1½ miles or less are not likely to board a car that is uncomfortably full. As these riders constitute one-half the traffic and are the patrons who can walk, the answer as to service standards is obvious.

After all, what have we to gain by comparisons that do not put customers in empty seats? It is up to each operator to find whether he can create on his own system by either the zone system or frequent service or both that great percentage of short-ride traffic which is an inevitable characteristic of British travel, whether the cities are large or small, congested or diffused, industrial or residential.



A FAMILIAR PIECE OF SKY LINE ON THE JERSEY COAST

N. E. L. A. Meets at Atlantic City

The Subjects Discussed at the General Sessions Included Municipal Ownership, Conservation of Power Resources and Lamp Production—The Technical Sessions Took Up the Questions of Prime Movers, Oil Switches, Underground Construction and Overhead Lines

AN "OLD TIME" convention was held by the National Electric Light Association at Atlantic City last week. In 1918, only about 300 were present and they met in a hall of one of the hotels. This year "The Million Dollar Pier" was engaged, meetings were resumed by all of the different sections, the attendance was large and there were about 200 exhibits. It was called a "victory" convention, and all in attendance seemed pleased to be back on a peace footing again.

FOUR GENERAL SESSIONS WERE HELD

Four general or executive sessions were held on the three days of the meeting. In addition meetings were held of the technical, commercial, vehicle and accounting sections.

In his presidential address at the first general session, Mr. Wells referred to the sweeping change between the conditions of last year and those of this year. He then discussed the rising costs of operation and of raising capital and expressed the opinion that the uncertainty of the future makes a short-term note at high interest rates probably the most favorable competitor at present of tax-free investments.

In the report of the rate research committee, Alexander Dow referred to the general practice of commissions of allowing surcharges rather than increases in the basic rate, evidently with the belief that the present price conditions were only temporary; but he pointed out that these conditions remain and that the period of readjustment which the country is now undergoing is not likely to be a period of retrogression in costs.

The report of the public policy committee was presented at the second general session on Tuesday evening. W. W. Freeman, chairman of the committee, in speaking of municipal ownership, called attention to the difference between the man who advocates municipal ownership as a question of economics and one who advocates it because he believes in socialization of the country. The former can be reached by arguments and a showing of facts. The latter will continue to advocate socialization irrespective of any financial considerations. The spread of socialism and municipal ownership is being urged by an active propaganda, said Mr. Freeman. The problem of a counter propaganda has been considered by the committee, but it was not prepared to outline any specific plan of action.

At the third general session George Otis Smith, director of the United States Geological Survey, described the ideas underlying the proposal of Secretary of the Interior Lane for an investigation of the power resources in the entire country and in the Atlantic Seaboard District. He also called attention to the difference in manpower required by a steam plant and a hydroelectric plant and cited the case of the Alabama Power Company where the ratio was 84 : 1. It is time, he thought, to count the rising costs of labor in the steam plant, where the coal miner as well as the fireman is an employee in fact. From the proposed power system of the so-called Boston-Washington District would flow the energy to serve a score of railroads, hundreds of public service companies, thousands of manufacturing plants and millions of homes.

The report of the lamp committee, presented at the fourth general session, showed the total sales of incandescent lamps for domestic purposes, excluding miniatures, during 1918, to be 186,000,000; of this number nearly 90 per cent were tungsten filament lamps and the rest were carbon and "gem." The production of gem lamps has now been discontinued. The use of carbon lamps seems still to be confined to places where service is severe, where the use is temporary or where protection from theft cannot be afforded.

At the conclusion of the meeting the following officers were elected for the ensuing year: President, R. H. Ballard, Southern California Edison Company; first vice-president, Martin J. Insull, Middle West Utilities Com-

pany; second vice-president, M. R. Bump, H. L. Doherty Company; third vice-president, Frank W. Smith, United Electric Light & Power Company, New York; fourth vice-president, Walter H. Johnson, Philadelphia Electric Company; treasurer, H. C. Abell, American Light & Traction Company.

THE DISCUSSION ON PRIME MOVERS

The principal feature of the technical meetings of electric railway interest was the report of the committee on prime movers, of which an abstract was published in the last issue of this paper.

In the discussion, W. L. Abbott, Chicago, pointed out that although there had been considerable concern regarding the operation of large turbines, there is nothing in the situation that warrants distrust in large turbine units or in the present design of these machines. W. S. Finlay, Jr., Interborough Rapid Transit Company, New York, commented on the operation of the large turbines of that company. He said that the generating system of the company is now laid out on the basis of a 30,000-kw. unit, and operating conditions and connections are such that a 15,000-kw. unit is floated on the lines and available at all times, so that a 30,000-kw. unit can be taken out at any time without a disturbance in plant operation.

On the subject of boiler operation a number of speakers seemed to agree that higher pressures must come at an early date, 500 to 600 lb. being mentioned by several. One speaker, in commenting on the subject of superheaters, said that the superheater is a good indicator of the condition of the boiler. In case the boiler throws over solid material, the trouble should be corrected at its source.

In connection with the section on stokers and grates, one speaker mentioned interesting results secured by means of water backs which had been installed to help out in troubles with clinker grinders and to utilize heat for raising the temperature of feed water. He said that with long water backs, from 4 to 5 per cent of the heat generated in the furnace was absorbed by the water passing through the water backs, while with short water backs this rate of heat transmission was reduced approximately 60 per cent. Progress was mentioned by several speakers in the burning of powdered fuel.

ELECTRICAL APPARATUS REPORT

The discussion on this report, of which an abstract was published on page 1003 of last week's issue, centered around standardization of transformer polarity, construction of substations which can be easily enlarged, automatic substations, difficulties with oil and airbreak switches, basis for oil-switch guarantees, and protection of generators against internal troubles. Owing to the difference of opinion which developed at the meeting regarding the advisability of standardizing transformer polarity, the subject was referred back to the sub-committee for further consideration. According to several speakers, too many outdoor substations are constructed so that they cannot be easily extended. Another referred to the use of automatic substations for serving three-wire loads as a means of saving investment in large feeders. One central station operator suggested that oil switch explosions were sometimes due to explosion of oil fumes, in which case they may be prevented by proper scavenging of the air, one method being described. This involved the use of two large check valves, one at oil level and one at the top of the case to permit air circulation. The subject of extinguishing fires in generators was a lively one, the use of steam or water or both being advocated for this purpose, although preference was shown for water. It was said that the immersion of armature coils in water if not prolonged is not permanently injurious, but they should be dried as soon as possible.

CONDUITS AND CONSTRUCTION OF UNDERGROUND FEEDERS

Underground construction was discussed under fourteen headings in the report of the committee of which B. D. Meyer is chairman. Three topics which were treated most extensively were, carrying capacity of cables, dielectric losses and cable failure. According to the committee, the rating of a cable should depend on the temperature actually obtained during operation. To facilitate determining this rating, operating companies are urged to keep accurate records on the loads on their transmission cables as well as measurements of temperature and data on characteristics of the duct line. The Public Service Electric Company has developed a plan by which the cable is given a seasonal rating based on the average temperature of an idle duct. Another company reports that the temperature of a bad local hot spot in the duct line was reduced from about 160 deg. Fahr. to about 75 deg. by uncovering the conduit line for a distance of about 20 ft. and back filling the excavation with heavy clay to replace the sandy fill which had been causing the trouble. Where local conditions do not permit the use of this method, a specially ventilated manhole may be installed at the point where the temperature is excessive.

Considerable space was given in the report to a discussion of the relative values of rosin and mineral-oil compounds for feeder insulation. The mineral-oil compounds seem superior to the rosin oil base as far as dielectric losses are concerned, but the committee suggests that some mineral-oil compounds might become too fluid at high temperatures, leaving the insulating material dry at certain sections and thereby liable to breakdown. Additional investigations will be undertaken by the committee.

The committee reports cement as being superior to the various types of asbestos covering used for fireproofing cables in manholes. However, there is a considerable difference of opinion regarding the comparative merits of rope and metal lath for reinforcing the cement covering. It is generally agreed that the covered cable in the manhole has a better chance to radiate its heat than the covered cable in a conduit line.

The opinion was expressed that it is not desirable to concentrate more than 7000 kva. to 8000 kva. in a single underground circuit, and that 3-in. (outside diameter) cable is about the largest now in use. The committee recommended that the size of a single conduit be limited to from sixteen to twenty ducts and repeated a previous recommendation that not more than 35,000 kva. be carried in a single duct line.

In discussing the committee report, the members agreed that great advantages would result from further standardization of manhole and duct line construction. Several members felt that the standard duct size might well be 4 in. or 4½ in. instead of 3½ in. This would facilitate changes and repairs. Considerable difference of opinion was expressed regarding the relative methods of protecting cables in manholes with cement (over metal lath or rope) and disposing them on shelves. One speaker advocated more uniform spacing of manholes in the interest of reducing the number of cable lengths which must be kept on hand.

REPORT ON OVERHEAD LINES

The committee on this subject referred to the studies conducted by the California joint committee. Reference was made also to the joint use of poles by power and telephone companies as of much concern to the industry and public. Thus far, it was said, prevailing telephone practice had definitely discouraged extensive joint pole use, it being limited to circuits not exceeding 5000 volts, no suitable provision being made for the higher voltages which are required in the development of power company business.

One war-time suggestion made by manufacturers was a new standard for cable stranding, based upon utilizing a minimum number of strand sizes and designating each cable in terms of the number and diameter of strands composing it, rather than in terms of circular mils, as at present. This would reduce stocks and make for more prompt deliveries.

Further study of the causes for insulator depreciation was urged.

California Electric Railway Association Holds Annual Meeting

AT THE annual meeting of the California Electric Railway Association in San Francisco on May 19 there was a detailed discussion of the problems confronting the California companies at the present time. The increased cost of operation, increased labor and material costs and automobile competition were some of the foremost topics. It was decided to continue the association for a term of three years and plans were arranged accordingly.

W. V. Hill, who managed the affairs of the association in San Francisco previous to taking up his duties at Washington for the American Association, is to return to San Francisco to take care of the interests of the California Association immediately after the conclusion of the present special session of Congress. Mr. Hill was present at the May 19 meeting, but left for Washington immediately afterward.

The election of officers resulted as follows: W. R. Alberger, vice-president and general manager San Francisco-Oakland Terminal Railways, was elected president; W. E. Dunn, vice-president Los Angeles Railway Corporation, vice-president; W. V. Hill, manager. Jesse W. Lilienthal, president United Railroads of San Francisco; W. Clayton, vice-president San Diego Electric Railway; Paul Shoup, president Pacific Electric Railway; W. R. Alberger and W. E. Dunn were reelected members of the executive board.

The proposed increase of fares by the London General Omnibus Company is objected to by the Westminster City Council on the ground that it would create a traffic monopoly against the interest of omnibus users and ratepayers. It was also decided to investigate the working and management of the company with a view to providing out of its revenue a direct contribution to the upkeep of the highways of the city and elsewhere.

International Association Begins Again

Executive Committee Issues Call — Subjects of Enemy Nations to Be Excluded from Body

UNDER date of May 3, the president of the Union Internationale de Tramways et de Chemins de Fer d'Interêt local, C. de Burlet, has announced the reestablishment of the association. The notice was issued from the office of the secretary at Rue d'Arlon 23, Brussels, and is signed by President de Burlet. It reads as follows:

> It is with a feeling of great satisfaction that the executive committee, after a long and sad separation, is able at last to renew its communications with the members of the association. The events of the terrible war have had their effect on the association, and radical changes are necessary to maintain its existence and prevent its work of years from being irredeemably lost.
>
> In view of the new international situation the executive committee, at a meeting on March 22, decided that the only solution possible was the dissolution of the organization as it had existed and then its immediate reorganization with members only from countries of the allies and the neutral countries. An association embracing all countries being considered morally impossible at the time, the executive committee assumed the responsibility of the measure mentioned and now asks ratification of its acts as soon as the circumstances permit. The act is legal because under a decree of the Belgian Government the property and rights of the citizens of an enemy country are subject to confiscation, and similar laws have been passed in all of the countries of the allies. The association has already given notice of this action to those who will be affected by it.
>
> Through a surplus balance left from previous years, the executive committee has been able to administer the affairs of the association during the period when mail communication was interrupted between its office and the greater number of its members. This is in spite of the fact that no dues have been received since 1914. It is the intention of the executive committee not to collect any dues for the years 1915, 1916 and 1917, but to enable the association actively to begin its work again, issue reports, etc., members are invited to forward to the secretary their dues for the years 1918 and 1919.
>
> Article 13 of the bylaws fixes the dues for active members (tramway companies) as follows:
>
> For annual receipts of:

(a)	Less than 1,000,000 francs	50 francs a year
(b)	Between 1,000,000 and 2,000,000 francs	100 francs a year
(c)	Between 2,000,000 and 3,000,000 francs	150 francs a year
(d)	Between 3,000,000 and 4,000,000 francs	200 francs a year
(e)	Between 4,000,000 and 5,000,000 francs	250 francs a year
(f)	More than 5,000,000 francs	300 francs a year

> The annual dues of individual members are 20 francs, those of associate member companies (firms, etc., interested in the tramway industry) are 100 francs.
>
> Members will shortly receive a volume containing the questionnaire of the Christiania Congress and a certain number of reports which were issued in expectation of the Budapest Congress. The sending out of these reports, whose printing had not been finished in 1914, will follow immediately on the receipt by the association of the dues mentioned above.
>
> Important changes have occurred or are inevitable in the tramway and light railway business as in all branches of industry, and it is of the greatest importance at this time that all companies and individuals engaged or interested in tramways should give their experience.
>
> The committee counts on the active co-operation of all its members. It is happy to say that from all sides expressions of sympathy and hopes of seeing the association revived have been received at its headquarters. It hopes to inspire the same sentiments among all for a work commenced thirty-four years ago so that the association may carry out its purposes for the good not only of the companies but also of the public and all directly and indirectly interested in the development of intercommunity transportation.
>
> All communications should be addressed to the secretary, H. Camp, 23 Rue d'Arlon, Brussels, Belgium.

Some Principles in the Training of Car Men

It Is Not Necessary for a Motorman to Cause an Accident to Train Him in Safe Car Operation

BY E. C. CLARKE

A MAN may be told a thousand times to be careful but he does not understand unless he has been properly instructed. Not knowing of danger he cannot avoid it.

A car may be equipped with every known safety and economy device and every part of the car may be in excellent condition, but all appliances become useless unless the trainman has been properly instructed. An improperly instructed motorman will send the best car that was ever manufactured to the scrap heap. And the money paid out for accident claims amount to more than the cost of the car in some cases.

It is quite a different story if the motorman has been fully instructed. For instance, take an old-style hand-brake car that is not equipped with a single safety device. The controller may be stiff and the pawl spring broken, and there may be too much slack in the brake chain making it exceedingly hard to stop the car—in fact, the general condition of the car may be very bad. Place in charge of such a car a competent motorman, who has been properly instructed regarding the car equipment and the careful operation of a car through the streets, and he will operate the car safely. In all probability he will not keep the car on time, for having been properly instructed he will realize that the safety of passengers and the car equipment is the first consideration. He will operate the car to the depot safely but he will be tired and worried and will, of course, want to change the defective car for one that is in good condition.

It has not been a great while since raw recruits were assigned for instruction to a motorman who did not fully understand the operation of a car. In fact, there are cases of this kind now. After a few trips with such an instructor the recruit was pronounced competent, but what happened when he started to work for himself? It was necessary for him to learn how to operate a car in a manner of his own creation. If anything happened to be on the tracks in front of his car while he was learning it was a case for the wrecker, the ambulance or the coroner, and not infrequently all three were needed.

It has been said that a man is not a good motorman until he has had an accident, the cause assigned to this fallacy being that in having the accident the motorman saw how it occurred and can avoid a repetition. If there is anything in such a statement it is simply that the accident frightened the man into being more careful. The chances are that he is so occupied in stopping the car that he is prevented from seeing just how the accident occurred. Obviously the paying of accident claims is a very expensive method of instruction.

The past few years have brought a crying need for the systematic instruction and following up of operating department employees. Cars and trains have become greatly overcrowded and the streets are congested with pedestrians and vehicular traffic. There is a demand for speeding up of schedules and the prevention of accidents.

While the multiple-unit system of control, with the automatic air brake, has been used for some time on elevated, subway and interurban trains, such equipment has only recently been installed on surface cars. Such cars are now being equipped with devices to insure the proper operation of the controller, to save power and reduce brakeshoe wear, but the desired results are not to be obtained without a proper system of instruction.

The most recent improvement in cars and car equipment is the one-man safety car. While the safety car is simple it is just enough different from other cars to require special instruction in order to secure the best possible results in operating the equipment and handling the passengers.

VISUAL MEANS SHOULD BE UTILIZED FULLY IN INSTRUCTION WORK

A recruit to-day must be carefully selected; then sent to a school where he can be thoroughly instructed with regard to the different parts of the car equipment and the functions they perform. The student should not only be instructed as to the proper operation of the equipment, but also should be shown the damage resulting from improper operation. This is not only necessary for the comfort of the passengers but for the prevention of abuse of the equipment. The different pieces of apparatus should be arranged so that the student can be shown as fully as possible the functions performed by each part. There should be no mysteries about any piece of apparatus or the duties it performs.

When the student passes through the school successfully he should receive instructions from a corps of instructors selected from each line and properly qualified at the school. The instructor and the student should be advised and coached by a force of instructors who act in a supervisory capacity.

While the student is receiving actual instruction on the line under the guidance of competent instructors it is possible for the latter to explain conditions and situations in the street that produce accidents. The supervisory instructors should ride with the new man just as soon as he starts to work for himself, advising and coaching him in his duties. The thoroughness of such a system will make it no more necessary for a new man to have an accident just to see how it occurs than it is to look down the barrel of a gun to see what happens when the trigger is pulled.

To supplement verbal instructions, drawings, stereopticon slides and motion pictures are of great value in showing how accidents occur and how they can be avoided. The most natural method of instruction is through the eye. An additional value of the pictures is that they are presented when the student is at ease in a comfortable seat, thereby making it possible to secure his undivided attention. Stereopticon slides and motion pictures cannot be surpassed in illustrating the car equipment and the functions performed, particularly those operations that cannot be seen otherwise. Animated drawings visualize such work and relieve the effort to understand the operations.

The Canadian Engineering Standards Association has been incorporated for the same general purposes as those of the similar organization in Great Britain and the proposed American Engineering Standards Association in this country.

Inaugurating Safety-Car Service in Ogden

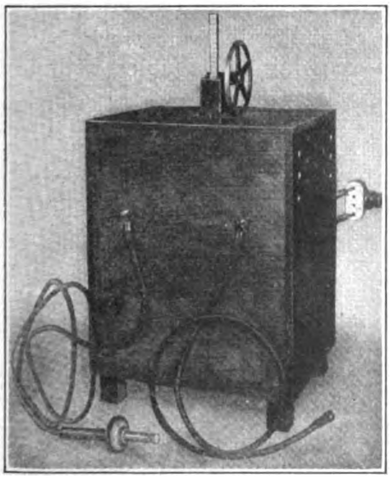
AFTER the Utah-Idaho Central Railroad had decided to make a trial installation of seven one-man safety cars on its lines in Ogden, Utah, the management made a special study of introducing them with the greatest possible satisfaction to the public and the employees.

A special effort was made to inform the public as to what safety cars were accomplishing in other cities, and the co-operation of several "boosters" on each line was secured to assist in this phase of the work. As soon as the first car arrived it was well limbered up and its operation was demonstrated to a party comprising the Mayor, the city commissioners, newspaper men and the company officials. The result was reflected in an editorial in the *Ogden Standard* where, after listing some of the good features of the cars, the editors said: "All of these and other accomplishments of the one-man safety cars show that the street railway company in Ogden is making an advance step which will be appreciated."

To secure intelligent co-operation on the part of employees the men were given thorough training on two lines on which, fortunately for the purpose, there was very little passenger traffic. Furthermore, without any reference to the further use of the one-man cars in Ogden, the following clause was put into the wage agreement with the carmen: "Conductors or motormen required to work safety cars will receive 5 cents per hour in addition to their regular pay." In consequence there was no discussion necessary with the men at the time the cars went into operation and the publication of the unfavorable newspaper comment usually accompanying such discussion was avoided.

Welding Transformer with Adjustable Secondary Winding

A NEW type of alternating-current arc-welding transformer has been developed and has been given the trade name of "Zeus" by the maker, the Gibb Instrument Company, Detroit, Mich. The transformer is mounted in a box provided with line and welding circuit terminals. One of the particular features in this equipment is its arrangement for regulation of welding current through the raising and lowering of the secondary winding of the transformer. This is accomplished by means of a rack-and-pinion connection operated by a hand wheel installed on the top of the transformer box.



A. C. WELDING OUTFIT FOR CONVENIENT ADJUSTMENT OF SECONDARY CURRENT

The "Zeus" is arranged for unit installation and it is recommended that a 150-amp. outfit be installed and as the work increases a duplicate may be connected in parallel with the original machine.

More Light on the Situation

National Chamber of Commerce Continues Its Study of the Vital Needs of Electric Railways

IN THE furtherance of its plan to make a thorough examination of the critical condition of the electric railway industry, the public utilities committee of the Chamber of Commerce of the United States held its second hearing in Washington, D. C., on May 28 and 29. The sessions are still going on as this issue goes to press, and for this reason a detailed report of the proceedings will not be published until the following issue.

It may be said now, however, that the various speakers gave a clear-cut picture of the essentiality of the electric railway industry to the nation's welfare and of the inevitable disaster that will follow a continuance of the existing situation. The efforts made to secure relief through more elastic franchises, through fare increases and through the curtailment of tax burdens were all described in detail.

For example, L. R. Nash, of Stone & Webster, Boston, Mass., discussed the various efforts that have been made in recent years to perfect the service-at-cost franchise, and other speakers took up this and other points in connection with individual communities. John W. Van Allen described the complex difficulties of the Buffalo fare situation and the still unsuccessful efforts to find a means of settlement. The conditions of the lines in their respective cities and salient points regarding the franchises were mentioned by Walter A. Draper, vice-president Cincinnati (Ohio) Traction Company; W. C. Culkins, director of street railways in Cincinnati; Britton I. Budd, president Chicago (Ill.) Elevated Railways, and Lucius S. Storrs, president the Connecticut Company. The points most emphasized by all were the need of flexible service-at-cost franchises and of a better understanding on the part of the public of its responsibility for and interest in successful railway operation.

Another highly significant point was that made by T. S. Holden, economics investigator of the Division of Public Works and Construction Development, Department of Labor, in regard to the 1919 price situation. Mr. Holden averred that no recession in the general price level should be expected for several years. He added that there was no reason to assume that a 5-cent carfare was to-day "normal," for a normal rate now is one based upon the cost of production under present high price conditions.

The members of the public utilities committee present at the hearing were Lewis E. Pierson, New York, N. Y., chairman; P. H. Gadsden, Philadelphia, Pa.; Arthur W. Brady, Anderson, Ind., F. B. De Berard, New York, N. Y.; E. K. Hall, New York, N. Y.; Charles L. Harrison, Cincinnati, Ohio, and P. N. Myers, St. Paul, Minn.

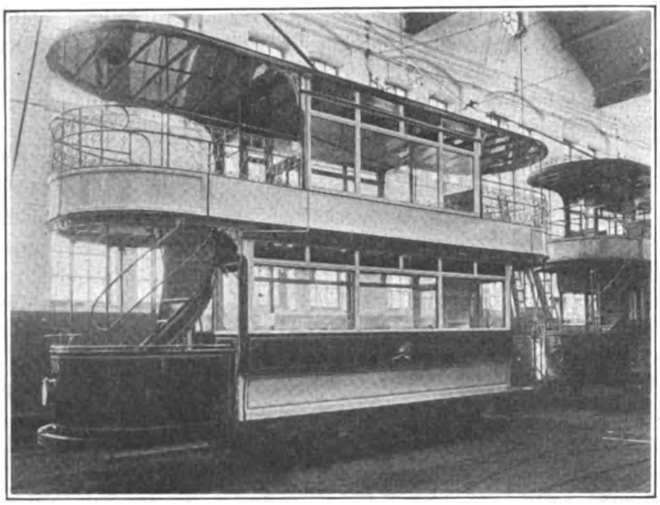
In its second quarterly report to Congress the Rehabilitation Division of the Federal Board for Vocational Education gives the number of registrations of disabled men up to March 15 as 49,161. At the time of their registration all of these men were prospective cases for vocational re-education or for placement without training in suitable employments.

Car Body Maintenance in Belfast

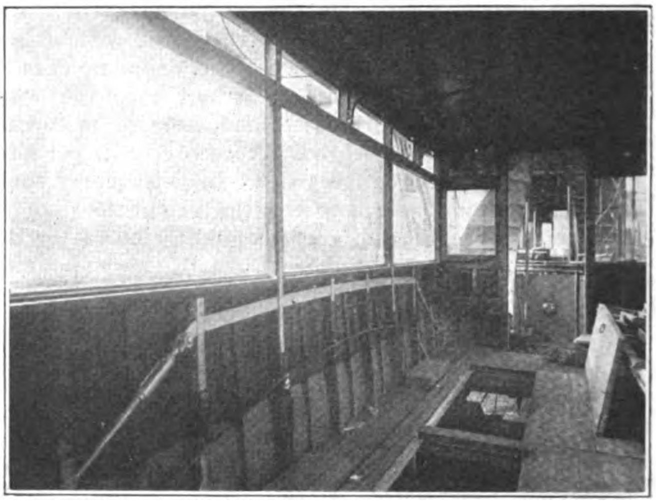
Original Improvements Which Have Been Made to Prolong the Life and Strengthen the Structure of Double-Deck Cars

By P. Williamson
Car Works Superintendent Belfast City Tramways

FOR a number of years tramways throughout the United Kingdom have been experimenting in a variety of ways, so as to improve their rolling stock and lengthen its life. In this direction it has become established that, since the introduction of top covers to the old, standard, wooden underframe type of car, many difficulties have arisen that are mainly due to heavy loading and higher speeds. These conditions have now become responsible for much distortion and hogging at the ends of the bodies, which not only detract from the general appearance, but shorten the life of the main structure and increase the cost of maintenance very materially.



DOUBLE DECK CAR WITH TOP COVER



INTERIOR VIEW OF BELFAST CAR

The builders of this class of rolling stock have for a number of years followed the practice of bracing the framework together with a light iron rod (the lower one in the interior illustration) to the inside of the side members, and securing it in position to the ends of the sole bar (side sill) with a strong adjustable nut. To a great extent this method has proved in itself deficient for the purpose for which it was intended, and it has now become necessary to improve upon it so as to restore the cars to their original shape.

After many years' experience in the building and maintenance of this class of rolling stock, the writer has developed several improvements that have been found to overcome some of the difficulties in Belfast. These methods are applied when the cars are passing through the workshops for a general overhaul. In order to inspect, repair and repaint them thoroughly it was found necessary completely to remove the internal structure so as to simplify the labor in fixing new floor boards, wheel covers, and heelboard rails. The advantage of this is the obtaining of a clear opening for the inspection of the head stock, bolster and center bearer, and it simplifies the removal of defective bolts that are likely otherwise to be overlooked. At this stage of the work, we take the opportunity of fitting a new trussing device (shown in the interior view) by fixing a spring-steel bar 9 ft. x 2¼ in. x ⅜ in. to the intermediate and stump pillars (short posts), which are checked out ⅜ in. to form a level at all bearing surfaces, and 4 in. from the top edge of the bottom glass rail (window sill). We have found it an advantage to shape the steel bar to a 2¼ camber, as that has the effect of regulating the strain to a greater degree. The ends of the steel bar are set in the direction of the corner posts shoulder and side sill, and drilled to accommodate a ⅝-in. cast-steel connecting pin. At the junction of the corner post and side sill, there is attached and bolted a malleable-steel knee 2¼ in. x ¾ in. with a lip directly in the center, and drilled to take a ⅝-in. steel cotter pin. To these two steel pins at each corner of the cars are fixed ⅞-in. connecting rods with 5-in. turnbuckles, and so arranged that when necessary they can be used for adjustment by removing the back portion of the seat only, which in no way incurs any further labor. In combination with this arrangement the intermediate glass pillars (window posts) have been reinforced with T-section steel 1 in. x 1 in. x ¼ in. set in flush, which extends from the cant rail (to the existing portion of the builder's truss rod) and is screwed firmly along the outer edges. This device not only has the effect of strengthening the posts and other parts of the main framework, but has been the means of overcoming all troubles with leaky windows.

It has been found by cutting away 2¼ in. of the above-mentioned 1-in. x 1-in. x ¼-in. web that this serves as a keeper plate for retaining the truss bar in the required position. At the extreme ends of the 2¼-in. truss bar, it has been found to be a much better plan to use angle iron 1¼ in. x 1¼ in. x ⅛ in. as retaining plates to protect the timber of the short posts, where the portion is notched out, in place of the flat iron so commonly used for similar purposes.

Continuing along these lines, another improvement has been added by lining up the window sills with lengths of hardwood and screwing steel plates 1¼ in. x ¼ in. to the underside of the timber before finally securing these to the window sills. By this method we have been able to restore the window sills to their original shape and to improve greatly the appearance of the cars.

The floor bearers (sills) have also required attention as the earlier construction of these members of the car was altogether unsuitable and unreliable to sustain the requirements of heavy traffic conditions. The original method of fixing the center sill in position was by means of an iron bracket bolted to the inside of the side sill, the sills being secured by bolts to the brackets. This form of fixing, however, proved to be very unreliable as the whole weight entirely depended upon two ½-in. diameter bolts, which were so arranged that inspection was most difficult. It has been overcome and all further danger of breakage of bolts, etc., removed by redesigning the malleable-iron bracket and extending the side flanges so as to utilize the top of the side sill for bolting-down purposes, instead of relying solely on the side bolts. Along the bottom sides of the sills we have fixed angle steel 1¾ in. x 1¾ in. x ¼ in. made flush on each surface, the object of this arrangement being to retain the bar in shape and maintain an even appearance of the floor generally.

BOLTS CUT OFF AND HOLES ELONGATED BY HEAVY LOADS CARRIED

The constant use of the mechanical brakes, and the excess load of passengers occupying the platforms are responsible for the displacement of the wooden sills and the bolster. In many instances we found on inspection that the ends of the bolts (that pass through the side sill and angle steel) were completely cut away, and the holes quite elongated. To overcome the wear and to prevent excessive strains having a detrimental effect, we have attached to the side sill bolt a malleable-iron stay, angular in form, with a broad, flat surface shouldered to rest upon the top edge of the steel angle bar, and finally held in position to the side of the short posts by two hexagon bolts and nuts. Many advantages have been obtained by this arrangement, more particularly where the tenons of the wood bar enter the mortices in the side sill, as previous to this alteration we were compelled in some cases to renew the side sill owing to breakage having been found at the mortice holes. Frequent removal of the trapdoors of the main flooring for inspection of the motors, etc., resulted in a very noticeable amount of wear taking place on the outer edges of the boards, and, in view of the scarcity of this class of timber, which is difficult to obtain, and the necessity for the practice of the utmost economy, it has been found to be a great benefit to fix light angle iron 1¼ in. x 1¼ x ⅛ in. to the worn edges of the boards. This lengthens the life and does not interfere in any way with the removal of the trapdoors. Together with this alteration we have added angle irons 1½ in. x 1¼ in. x 3/16 in. to the floor runner bars (that are set in below the heel boards) the advantages of which are the supporting of the heavy weight of passengers standing and also the regulating of shrinkage that occurs during the summer season.

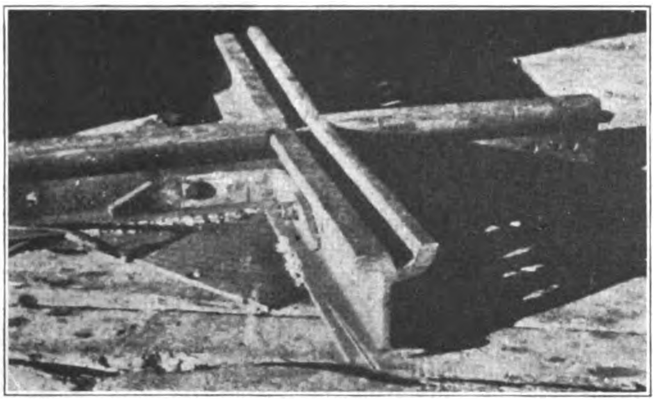
Since the addition of top covers to the Belfast double-deck cars a greater tendency in the direction of heavier loading has brought about many defects in certain forms of car construction. In view of the fact that many difficulties present themselves in the way of combining both body and top cover in a more solid form, it has become essential in Belfast to provide other methods to secure these two parts more firmly together. In this direction we have been able to devise means whereby we brace both structures together, which relieves the strain thrown upon the joints. Our method has been to fix two braces of iron 2 in. x ¼ in. along the inside of the bottom window sill, thickened out to ½ in., made in the form of a knee at each end, to accommodate a ⅝-in. hexagonal nut, provision having been made for screwing up by extending the iron brace 2 in. beyond the outer edge of the corner posts. To the center of the window sill an iron plate 7 in. x 2 in. x ¼ in. is set in level, screwed with countersunk iron screws. The other two holes adjoining are drilled ⅜ in. and tapped to receive countersunk metal-threaded screws. The surfaces of the iron braces are drilled for countersunk wood screws spaced at short intervals and firmly fixed to the window sill. On each side of the body canopy rim a cast-brass sleeve (formed on an angular surface plate) is fixed about 2 ft. 6 in. from the end of the corner post. To the ends of the iron brace we have fixed a mild steel rod ⅝ in. in diameter with screwed ends, and at the brass sleeve an easy form of adjustment is arranged, which provides an even support and hold to this essential part. In many other forms we have found angle iron ¾ in. x ¾ in. x ⅛ in. to be of great service, and by fixing it to the top edges of the decency boards (dress covering at the staircase landing) it has been the means of improving the appearance and overcoming all wear which is brought about by thoughtless passengers using these as foot rests.

Where inside portable wood seats are in use it is frequently found that the front rail warps, thereby causing the ends to curl upward (more especially where the body framework is out of line) and much annoyance and danger have resulted from this source. To avoid renewing the timber it has been found that by reinforcing the wood rails on the lower side with ¾-in. x ¾-in. x 3/16-in. angle steel, much trouble and expense are avoided, and the danger of passengers' clothing becoming entangled and damaged is considerably reduced.

GUTTERS INSTALLED AT ENDS OF CANOPIES PROTECT PASSENGERS

Included with the above, the labor involved in washing and cleaning the cars has been brought under similar consideration, in the way of arranging a device to preserve the paint and protect passengers from objectionable drenchings when entering or leaving the car.

This provision is made in the form of a wooden gutter, screwed to the front cant rail and canopy rim, directly below the nosing of the roof boards, in continuous form with the outline of the roof. At the staircase sides only, a portion has been slotted out of the bottom of the wood gutter, to form an outlet for rain or snow. Directly below this aperture a brass casting has been fixed, made in the form of a trunk head, and so arranged on the corner post to provide for the intake of rain. To this attachment is fixed a ¾-in. copper tube, that extends to the bottom of the side decency board (which is cut away to make provision for the tube in direct form), and to this junction a double elbow is attached in sleeve form, which provides for an additional length that passes down the end of the body corner post and terminates 6 in. below the platform boards. By this contrivance we claim to have not only reduced the labor in washing and repainting, but also to have protected passengers from much annoyance during wet and stormy weather, and in addition we find that a better appearance of the car is very simply maintained.

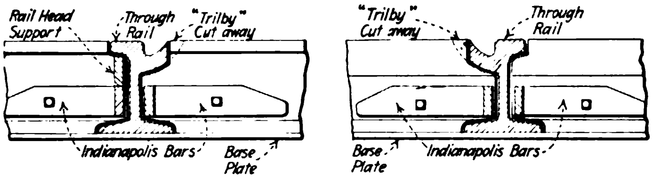


CROSSING RAILS BEING WELDED TO BASE PLATE IN THE SHOP

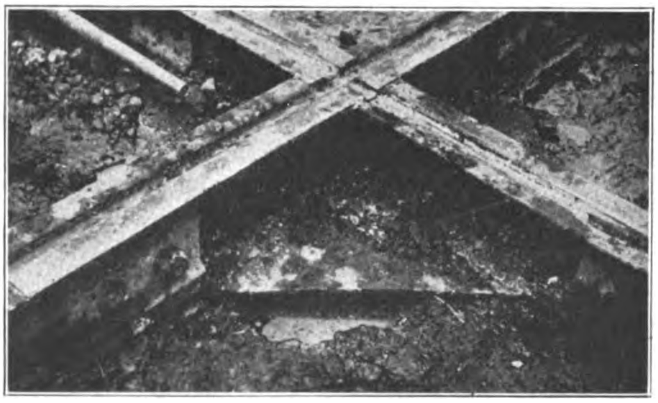
Emergency Special Work Made With Arc Welder

Kansas City Railways Use Arc Welding Equipment to Build Right Angle Crossings for Emergency Use

DURING the latter part of December, 1918, Kansas City was visited by a very heavy fall of wet snow which on account of existing labor conditions was not promptly removed from the streets and was speedily packed into a sheet of ice over all the tracks. The traffic over the rails and special work constantly packed this ice into the crevices and breaks in the special work, and many pieces which ordinarily would have lasted for some months were destroyed by spreading, lifting of the hard centers and breaking of the bolts and fastenings. The result was that when the snow was finally cleared several crossing frogs were almost impassable and were in danger of breaking equipment every time they were used. A period of at least sixty days would have been necessary to secure repair pieces and a very considerable time would have been required to make up bolted work in the shops. The latter plan was impracticable on account of the crowded condition of the shops at that time.



DIAGRAMS SHOWING SHAPES TO WHICH RAILS WERE CUT BEFORE JOINING



SECTION OF KANSAS CITY EMERGENCY CROSSING INSTALLED

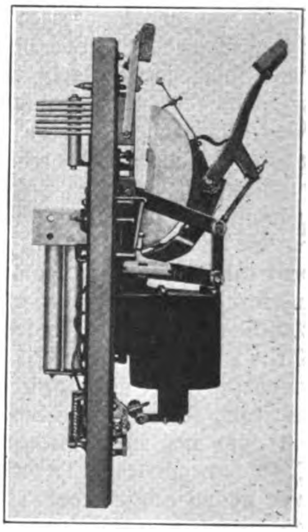
Under these circumstances the Indianapolis welder was utilized in such a way that five crossing frogs were turned out at the rate of one per day by four men. These crossings were constructed of a section of 7-in. grooved rail, one length serving as through rail, with a section of the "Trilby" cut away and a flangeway cut through the ball. The other rails were shaped and cut by means of hacksaws to fit against the through rail and all were welded to a base plate. Then knee braces made of standard Indianapolis bars bent to the proper angle were welded to the webs of the rails.

The crossing made up as above had the weakness that the ball of the rail was unsupported at the flangeways. This was remedied by fitting a block of steel between the under side of the rail head and the top of the knee braces and welding it in place. In addition the bottom flangeways were built up to form flange-bearing crossings.

These crossings were made to meet an emergency, but they are holding up well, and it is possible that crossings of this type may be used in more permanent construction.

New Construction Used for Automatic Reclosing Circuit Breaker

THE accompanying illustration shows a new circuit breaker, type "LRL" of 3000 and 4000-amp. capacity, recently put on the market by the Automatic Reclosing Circuit Breaker Company. This breaker is an electro-magnetically operated circuit breaker, having the following characteristics: (1) Breaker is closed and held closed by means of an electromagnet. (2) Opens automatically in case of overload, short-circuit or voltage failure. (3) Remains open a definite time interval regardless of cause of opening. (4) In case breaker is opened by a short-circuit, the breaker makes no attempt to reclose while the short-circuit exists, but closes instantly upon the removal of short-circuit or overload. The main contact brush is of a laminated butt contact type. The studs are of laminated construction, the lower stud being slotted vertically and the upper stud being slotted horizontally. The main contact brush is protected from arcing by an auxiliary copper contact shunt and the final arc is formed on upper "graph-alloy" contact tips. The upper arcing tip is supported on a pivoted support actuated by a strong compression spring so that the upper rear tip follows out a considerable distance in opening, thereby insuring good contact of the arcing tips until brush and auxiliary contact are separated from their respective contacts. The upper rear arcing tip is also pivoted directly on a bracket so that it is free to align itself with the front contact in all positions. Provision is made for adjusting the tension of the main brush by means of an eccentric bushing in the brush support.



AUTOMATIC RECLOSING CIRCUIT BREAKER FOR LARGE CURRENTS

American Association News

COMMITTEE ON POWER GENERATION AND ONE-MAN CAR COMMITTEE HOLD MEETINGS—ACTIVITY IN THE NEWARK AND CHICAGO COMPANY SECTIONS

Power Generation Committee Holds Two-Day Session

THE committee on power generation of the Engineering Association held a meeting at association headquarters in New York on May 26 and 27 to discuss the subjects which had been assigned to it for consideration. Those present were A. B. Stitzer, New York, chairman; R. W. Eaton, Providence, R. I.; C. R. Greenidge, New York City; Charles S. Lloyd, East Pittsburgh, Pa.; W. C. Slade, Providence, R. I. and Howell Van Blarcom, East Pittsburgh, Pa.

Considerable time was spent in a discussion of the points which are considered necessary for inclusion in the report on the development of the automatic substation. The replies received to the questionnaire sent out to secure information on the operating performances of railway power stations were reported to have been tabulated. The data were considered in detail and recommendations were made regarding additional data which it seemed advisable to secure. The considerations necessary to be included in a form of power contract for the purchase of railway power were also discussed. From replies to a questionnaire sent out on railway operating conditions it appears that the majority of the member companies are buying their power. It was decided that these companies be asked to furnish copies of forms of contract under which they are purchasing power, and that the different items entering into these contracts be tabulated by the committee for convenience in determining the parts that can be recommended for further consideration. A digest is to be made for the guidance of companies who are desirous of making new contracts.

One-Man Car Committee Interested in "Movie" Film

THE joint committee of the Transportation & Traffic and Engineering Associations on one-man car operation met at the association headquarters, New York City, on May 23. The members of the committee present were C. W. Kellogg, Boston, Mass., chairman; C. H. Beck, St. Louis, Mo.; J. M. Bosenbury, Peoria, Ill.; S. W. Greenland, Fort Wayne, Ind.; J. K. Punderford, New Haven, Conn., and Clarence Renshaw, East Pittsburgh, Pa.

A tabulation, prepared by J. W. Welsh, of the results and experiences with one-man car operation as shown by replies to the questionnaire sent out was reviewed by the committee and recommendations were made for important items to be included in the final report.

Mr. Beck reported on a meeting held in St. Louis to devise a plan for taking moving pictures of one-man car operation and construction. The plan proposed was discussed by the committee at considerable length and the general opinion was that this is a very advisable undertaking and should prove of great benefit to the industry.

Transportation Department Work Analyzed at Newark Meeting

THE Public Service Railway Company section met on May 23 at Newark. A paper on the work of the transportation department, abstracted on page 1049 of this issue, was read by Alexander Jackson, superintendent of time-tables of the company. R. E. Danforth, general manager, Public Service Railway, discussed the paper, approving the practical suggestions made by Mr. Jackson.

William Arthur, New Haven, Conn., spoke informally on power saving and discussed means which are available to this end. He gave data as to results which had been secured in several parts of the country. Mr. Arthur put his thoughts into everyday language, avoiding technical terms, so that others than engineers would see the force of his arguments.

The membership committee reported a substantial number of new members for the month and stated that its campaign will be carried on throughout the summer.

Mr. Budd Addresses Chicago Section

AT THE meeting of the Elevated Railways company section, held in Chicago on May 20, President B. I. Budd of the Elevated Railways briefly outlined the present serious condition of the electric railway industry, with special reference to the local properties. He pointed out why it is to the interest of the individual employees as well as to the company to do all that can be done to acquaint the public with the facts in the case. He especially urged the necessity for full co-operation between men occupying supervisory positions and those with whom they worked. Maj. D. L. Smith gave a recital of his work with the 149th Field Artillery in the war zone.

By way of entertainment J. H. Mallon spoke humorously on the Irish question and there were also some vocal selections.

Big Questions to Come Up

ON MAY 28 a joint meeting of the committee on national relations and the committee on readjustment of the American Electric Railway Association was held at the Washington office. Those present were P. H. Gadsden, Philadelphia, Pa., chairman; Arthur W. Brady, Anderson, Ind.; Britton I. Budd, Chicago, Ill.; L. S. Storrs, New Haven, Conn.; W. A. Draper, Cincinnati, Ohio; Myles B. Lambert, East Pittsburgh, Pa.; and C. C. Peirce, Boston, Mass.

At the outset Mr. Gadsden reported on the recent events culminating in the recommendation of Secretaries Redfield and Wilson as noted in last week's issue, that President Wilson appoint a special commission to investigate the general electric railway situation. A general discussion then ensued as to the course of procedure this commission, when appointed, could with advantage follow. It was felt that a national report on the general plight of the industry would be beneficial in helping to make the public realize the needs of the electric carriers.

It was pointed out also that besides the work of this investigating committee other matters of general importance are pending or will soon be coming up. These include the hearings on compensation for mail haulage, the hearings on short-line rates and connections, legislation regarding the return of the steam railroads to their owners, new valuation instructions and labor legislation. With all of these, it was believed, the industry must keep closely in touch.

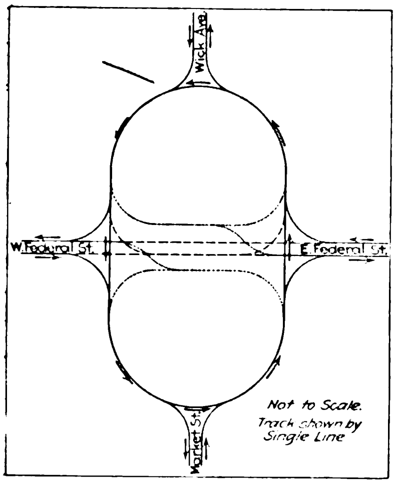
LETTER TO THE EDITORS

Relieving Downtown Congestion at Youngstown, Ohio

120 BROADWAY,
NEW YORK CITY, May 23, 1919.

To the Editors:

The article on "Relieving Congestion at the Diamond in Youngstown," appearing on page 969 of the issue of the ELECTRIC RAILWAY JOURNAL for May 17, presents an interesting problem in whose general solution many communities are interested, but comparatively few of these are so happily circumstanced as is Youngstown to effect a solution.



SUGGESTED TRACK LAYOUT AT CIVIC CENTER IN YOUNGSTOWN. OHIO

While it is some years now since I was called upon to examine the operation of the Youngstown property I was impressed at that time with the desirability to both the public and the railway, of through-routing practically all lines, turning none at the "Diamond." If for any reason that is not done, the present layout is admirably adapted, with probably a minimum of expense entailed, to permit safe, prompt and adequate operation through the business center, for either through routed or radial plans of operation; in either case provision being made for the through interurban service on Federal Street.

The conditions to be met, in the order of their importance, are: (1) Safety or greater safety of passengers and public, (2) improved convenience to both passengers and general traffic, (3) increased speed of all traffic through this center. To secure these results in the best and quickest way the city and the company must co-operate. The present operation as reported is obviously unsatisfactory and unsafe; the ultimate solution proposed has several objectionable features from both the public and the company's standpoints.

As a suggested solution the accompanying sketch is presented in which two distinct, non-interfering, minimum loops are proposed, yet through routing in any direction is left possible. In the diagram the dash lines show the present track within the loop, and the dotted lines the track which I suggest adding.

In the proposed plan it is assumed that the general traffic will be diverted (if it is not diverted already) from Federal Street at the center of the "Diamond" and required to follow the course designated by the arrows. This would leave the relieved space free for boarding, alighting and transfer passengers, and would involve for the last-named a minimum of street traverse, an important consideration in inclement weather. Track crossovers, or "Y's," should now be located within reasonable distance of the loop on all four approaching trunk lines as an insurance of continuity of service in case of blockade (from fires, etc.), occurring adjacent to the "Diamond."

Of course, if it be that the Federal Street track at the center of the "Diamond" either now needs or shortly will need replacement, the net cost of the work outlined will be much reduced; but in any event it looks as though the improvement were not only well worth while but readily possible through the joint efforts of the city and the company, and both have much to gain. The diagram should be sufficiently clear to need no further explanation. W. B. YEREANCE.

New England Club in Prime Condition

AT THE dinner meeting of the New England Street Railway Club held on May 22, 1919, new members to the number of thirty-one were elected. J. E. Dozier, who presided, expressed appreciation of the manner in which the members had co-operated with the membership committee in enlarging the membership. He announced that the executive committee had decided that the next meeting, to be held about the middle of June, shall take the form of an outing.

The principal speaker at the meeting was Harlow C. Clark, of the American Electric Railway Association staff. His address was abstracted at length in the issue of this paper for May 24, page 1011. E. B. Burritt, secretary of the American Association, was also present. He explained some of the recent activities of that association, particularly the work of the committee on readjustment, and of the information bureau. He outlined the plans for the Atlantic City convention and referred to the approval by President Wilson of the appointment of a federal commission to deal with the electric railway situation. (See ELECTRIC RAILWAY JOURNAL, May 24, page 1015.)

The club passed a resolution of thanks to Messrs. Clark and Burritt for their assistance and of appreciation of the work of the association.

An agreement is being reached between the employers and the vehicle workers in London looking toward improved working conditions for the London omnibus drivers and conductors. The proposed agreement provides for a guaranteed week of forty-eight hours, based on six eight-hour days; six days holiday with pay, and bonuses annually to all men who had served for six months on Jan. 1; payment of overtime based on an agreed basis, and arrangement in regard to spread overtime.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Buffalo Work Negatived

Disapproval of Enabling Legislation by Governor Regarded as Reopening Whole Railway Case

The failure of the enabling legislation planned for the city of Buffalo, N. Y., referred to in the ELECTRIC RAILWAY JOURNAL for May 24, means that the work of the board of arbitration which has been trying to determine the physical valuation of the properties of the International Railway within the city will probably go for naught. The situation now reverts back to where it was more than a year ago when the municipal authorities were trying to solve the railway problem without granting an increase from the 5-cent fare.

The only chance for the International to get higher fares now rests with the appeal taken by the city from the decision of the Appellate Division granting the Public Service Commission for the Second District authority to hear the case brought by the municipality to determine what is a reasonable rate of fare in Buffalo.

PRESIDENT CONNETTE STILL HOPEFUL

E. G. Connette, president of the railway, is unable to see why Governor Smith vetoed the so-called Brady-Graves bill. In an interview he is quoted as saying:

> I cannot see any immediate danger of suspension of railway service in Buffalo as the result of the Governor's veto. It looks to me as if the whole matter will ultimately revert to the Public Service Commission, which will determine and fix a fair rate of fare in Buffalo. This is the new view held by our attorneys after brief consideration of the meaning of the Governor's action. The one thing that I cannot understand is the Governor's sudden change of views on home rule and municipal ownership. He has preached the doctrines of home rule in his election speeches and now goes directly against his avowed policy. The Brady-Graves bill, while perhaps far from perfect, seemed to be the best plan put forward for the solution of Buffalo's traction problems. It was a decided step toward municipal ownership, which Governor Smith had said he favored, yet he disapproves of the bill despite these features.

In a letter to Governor Smith in which he expressed disapproval of the measure, Charles B. Hill, chairman of the Public Service Commission for the Second District, said:

> If the bill should be found to be constitutional, its effect, so far as concerns the territory occupied by the International Railway, will be to abrogate completely the general legislative policy of the State as expressed in the public service commission law and the railroad law, and to surrender the police powers of the State as expressed in these laws in their entirety, so far as affects the large and important section of the State occupied by the International system, both within and without the boundaries of the city of Buffalo.

For three weeks the board of arbitration has been taking testimony as to the physical valuation of the International properties within the city of Buffalo. This figure would be used as the basis of a service-at-cost agreement with the city. The three arbiters will be paid jointly by the city and company. No additional sessions of the board will be held pending the decision of the City Council to discontinue all further proceedings of this character.

To Electrify Suburban Lines

Officials of the Illinois Central Railroad have agreed with the Chicago Commission on Railway Terminals and a sub-committee of the City Council committee to a fifteen-year electrification provision being written into the proposed ordinance for the improvement of the south shore.

The provision is that within five years after the passage of the ordinance the railroad agrees to have its suburban service electrified. The next five years will bring electrification of the freight service north of Twelfth Street, and the next five years the balance of the freight service south of Twelfth Street.

With this agreement the remainder of the ordinance can be drawn up, and it is expected that the measure will be submitted to the Council within a short time.

Another Service-at-Cost Proposal

A service-at-cost franchise has been submitted to the Council by the St. Paul Street Railway, included in the system of the Twin City Rapid Transit Company. The question of valuation is likely to be much debated as a basis for the franchise and it is probable the city will hire an expert to make a valuation.

The proposed franchise provides for a board of arbitration to decide moot questions between the city and company; submission to voters ninety days after approval by the two parties; one year notice if city wishes to buy the property; agreement to be reached on capital valuation plus reserve fund of $250,000; rates of fare to be based on cost of service, with the possibility of a change of rates every two months; reserve fund to stabilize fares; St. Paul to be credited with eastbound fares collected east of the city limits of Minneapolis and Minneapolis with revenue west of Snelling Avenue in the city of St. Paul.

When earnings have decreased so the reserve fund is less than $250,000 fares may be increased, and vice versa. This reserve fund is to come from surplus after fixed charges have been taken out.

Homes for Its Employees

$50,000 All Absorbed That Was Set Aside by British Columbia Electric Railway for Homes

Considerable progress is reported on the plan of the British Columbia Electric Railway, Vancouver, B. C., to assist its office employees to acquire homes. As explained in the ELECTRIC RAILWAY JOURNAL for April 26, page 835, the plan had its inception in the fact being brought to the attention of the general manager of the railway that a number of the office employees had had the houses in which they lived sold over their heads by owners and had experienced great difficulty in finding other houses at reasonable rents.

The company decided to set aside $50,000 to be loaned at 6 per cent interest for the purpose of assisting its office employees to acquire their own homes. The details of the scheme were left in the hands of the Office Employees' Association through a committee elected by the members of that associations. A scale of repayments was arranged which provided for the loan, with interest, being repayable over a term of twelve years, the maximum amount to be loaned to any one employee being $2,500.

APPLICATIONS TOTAL $160,000

Out of approximately 250 office employees on the company's staff, there have been applications from eighty employees for amounts totaling $160,000. A selection has been made of twenty-five cases which are considered to be most equitable. These will absorb the $50,000 that has been set aside.

The first cases which have been handled are purchases of houses already built and the scheme promises to work quite satisfactorily. The committee of employees goes very thoroughly into the details of each case before putting it forward to the company for a loan to be made. The company has the property valued before finally passing upon the loan. The applicant is required to produce cash or other security equal to 10 per cent of the amount of the loan. The services of the company's legal and other departments are free.

In allotting the loan, the length of service of the applicant with the company, the number of members in his family and all other circumstances are taken into consideration, as well as his ability to furnish a proportion of the cost of the house.

All questions arising under the rules or in connection with the scheme are subject to the final decision of the general manager.

Public Relations Greatly Improved

Quick Results Follow Full Publicity Regarding Affairs of the Birmingham Railway, Light & Power Company

After five months of publicity work relations between the Birmingham Railway, Light & Power Company, Birmingham, Ala., and its patrons are cordial and the company is improving its service with the public co-operating and receiving the benefit. In fact, the results obtained are almost startling in the rapidity with which an extremely hostile public sentiment, countenancing even open violence and destruction of property, was overcome and converted to a spirit of co-peration.

DEMONSTRATION AGAINST COMPANY

An effective method of dealing with a public which had stoned several cars, attacked at least one car in mob formation, and through a civic organization was demanding of the City Commission the revocation of the company's franchises was the problem the company had to meet when its publicity campaign was decided upon and put into execution.

J. S. Pevear, as president of the company, decided upon and instituted the publicity campaign. When the company went into the hands of Lee C. Bradley as receiver, in January, Mr. Bradley, as was explained in the ELECTRIC RAILWAY JOURNAL at the time, not only continued the publicity work started by Mr. Pevear, but widened its scope. In charge of the campaign as director of publicity has been John Sparrow, for years a newspaper man and later an advertising man of Birmingham.

WAR TOLL LARGE

The Birmingham Railway, Light & Power Company was seriously affected by the war. It suffered a loss of 137 men in its operating department. In addition to the fact that it could not get the men because of the great amount of war work, there was a further and equally serious reduction in the effective operating force due to the epidemic of influenza. The war-time demands for material and machinery had prevented proper repairs and maintenance of cars and a considerable amount of rolling stock was out of repair.

All of the foregoing causes resulted in poor schedules. Cars broke down. The crowds waited for a car to get home. The car finally came and then in many instances it broke down. In spite of the fact that other cities were having similar troubles there was a growing hostility to the company.

SERVICE BREAKDOWN ON HOLIDAY

What has since been termed as the reign of terror came on with the Christmas season. An average schedule and average service was being maintained, but the system could not meet the heavy addition to traffic caused by the holidays.

Then it was that several cars were stoned. Windows were broken and the cars were otherwise damaged. One suburban car was attacked by a mob, which forced passengers to alight and then attempted to throw the car from the rails and overturn it. All cars were crowded above capacity and frequently all passengers who were standing would refuse to pay fares and rode free. In these cases conductors rarely made any effort to collect fares from those standing. The public utilities committee of the Civic Association took a hand, calling on the City Commission to act. President Pevear and other officials of the company were repeatedly arrested and fined in Recorder's Court for alleged failure to furnish proper service.

PUBLICITY CAMPAIGN STARTED IN JANUARY

At this juncture early in January the publicity work was started. The company did not take a defensive attitude, but began a campaign of informative advertising. The first advertisements and reading matter appeared in the local papers on Jan. 15. They set out the conditions which the company faced and the steps that were being taken to remedy matters. As more men were secured reports were published showing the additions to the operating force. At frequent intervals statistical reports were published showing the number of cars operated and the gain over the period just passed. News was immediately made public by the company as it developed and the advertising all tended to show a sincere effort on the part of the company to establish again and maintain good service.

This publicity, which included both advertisements and news matter, bore speedy results. Threats of violence against the company and its property and against President Pevear, which had been very common, subsided. There was an improvement in the attitude of passengers. They waited for their cars, and if they stood, owing to crowded conditions, most of them stood cheerfully.

BACK TO NORMAL AGAIN

Now, five months after the campaign was started, a very good schedule is being maintained. The operating force has been recruited to the strength necessary to furnish adequate service. Cars are being repaired and renovated, repainted and put into good operating condition. The tracks are being rehabilitated and a large amount of new rail, heavier than the old, is being laid. The public has been acquainted with all of the facts in the case and with all details of the work as rehabilitation of the system has progressed.

In discussing the matter with the representative of the ELECTRIC RAILWAY JOURNAL at Birmingham, Mr. Sparrow, the director of publicity in the campaign, said:

> The company adopted an open and aboveboard policy. The officers took the people into their confidence and placed all their cards on the table. All of the advertising was of a strictly informative nature. Any citizen could secure any information he wanted from me. The public was shown that the company was doing its best under adverse circumstances. Public sentiment showed an almost immediate improvement. The campaign appealed to the spirit of fair play and sportsmanship of the public and wonderful results were secured.

Union Contract Unenforcible

Strike on Pennsylvania Property Demonstrates Inability of Amalgamated to Force Compliance

The strike of the employees of the Schuykill Railway, Girardville, Pa., to which a very brief reference has been made previously in the ELECTRIC RAILWAY JOURNAL, was brought to a close on May 6, the men returning to work after the general manager had met them in a body and talked to them at length. The situation in Girardville had assumed a very serious aspect in that the Amalgamated Association publicly confessed that it was unable to enforce the provisions of its contract and had to abandon the situation without any hope of finding a solution. The company and its employees left to themselves arrived at a solution in an entirely amicable manner.

CONTRACT PROVES SCRAP OF PAPER

The strike situation revolved around the contract made by the Schulykill Railway with its men and the Amalgamated Association in July, 1918. This contract was to continue until Aug. 1, 1919. Under the terms of the agreement the company was to pay its men 33 and 35 cents an hour. The contract provided that either party desiring a change or modification should notify the other in writing thirty days before the expiration of the agreement. During the life of the agreement or any extension of it the company was not to suspend operations arbitrarily, except for causes beyond its control, and the men were not to strike, cease work or attempt directly or indirectly to hinder or prevent the company from operating. Both sides bound themselves to live up to the "letter and spirit of the contract as a matter of principle, honor and squareness."

Under this contract the wages of the men had been increased 60 per cent over those in force in 1915. The company in the meantime under an order from the Public Service Commission had been forced to return from an 8-cent fare to a 6-cent fare. About Sept. 1, scarcely two months after the contract had been signed, the men demanded a flat increase of 10 cents an hour. The company with its revenues thus decreased refused the demand. The men thereupon appealed to the National War Labor Board. This board on April 17 last dismissed the appeal, holding that it had no jurisdiction in view of the contract between the men and the company. The men then delivered an ultimatum to the company renewing their demand and further insisting upon the payment of the new scale being made retroactive to the date set by them originally. This demand the company refused. The men thereupon went on strike.

The company promptly notified President Mahon of the Amalgamated and called upon him to replace the men and live up to the terms of the contract. Mr. Shea of the Amalgamated was sent to Girardville and with the committee waited upon the general manager of the railway, at which time the demand was repeated. The company took the position at this meeting that it could not deal with either the men or the association while the men were in open defiance of the obligations of their contract. Mr. Shea thereupon issued a public statement declaring that the men had violated their contract and the laws of the association and that he had suspended them from membership therein. Having issued this statement, he left the community.

After the strike became effective but before the return of the men, the Public Service Commission handed down a decision permitting the company to charge an 8-cent fare, but requiring it to sell seven tickets for 50 cents. With this opportunity for increasing its revenue, the company promptly offered its men a new wage rate of 35 cents, 38 cents and 40 cents, all of the old men to be permitted to return at the highest rate. The men thereupon agreed to return and individually entered into a contract with the company at the new rates. This contract is to run for a period of six months under substantially the same terms as the former contract, with the exceptions as stated previously.

New York Mayors to Consider Traction Problems

One entire session of the tenth annual conference of the city officials of New York State at Schenectady on June 10, 11 and 12, will be set aside for consideration of the electric railway problem. Mayor Walter R. Stone, president of the cities' organization, who announced on May 28 that arrangements for this feature of the conference have been completed, is reported to have said:

> This is one of the most important problems confronting the cities of the State. Adequate traction service is of vital importance to every municipality. In many of the cities the situation is serious.
>
> Every city administration must prepare itself to solve the problem when presented. We have therefore arranged to have presented and discussed all of the plans that have thus far been suggested to insure adequate service at reasonable cost.

Dr. Thomas Conway, Jr., professor of finance of the University of Pennsylvania; Harlow C. Clark, of the American Electric Railway Association; T. E. Mitten. chairman of the executive committee of the Philadelphia Rapid Transit Company, and Delos F. Wilcox, New York, will advise the city officials how they think the problem can be solved.

Among the plans that will be discussed will be increasing the revenues of the electric railways by increasing the fare, service-at-cost plans, private ownership and municipal operation and municipal ownership and operation.

Wage Increase in Fort Smith

The Fort Smith Light & Traction Company, Fort Smith, Ark., has signed a two-year contract with the men, whereby a 32 per cent increase in wages is granted. The employees had asked a 52 per cent increase.

The company will ask the Corporation Commission of the State and the City Commission for a 6-cent fare, effective as soon as possible.

One-man cars will be used as soon as they can be had.

On some of the lines a fifteen minute service will be provided as soon as the necessary switches can be installed.

The new scale of wages follows: First six months, 33 cents; second six months, 34 cents; second year, 35 cents; third year, 36 cents; fourth year, 37 cents; fifth year and thereafter, 39 cents.

This scale is effective immediately and is without reservation, the company having every confidence in the fairness of the public and its willingness, in view of increased wages and cost of operation, to pay the additional cent fare asked for.

Municipal Ownership the Alternative

Louis H. Bean, president of the Tacoma Railway & Power Company, Tacoma, Wash., has started what is believed to be propaganda for the sale of the company's railway system to the city, to be operated as a municipal line. Each Councilman has received a letter through the mails, inclosing a pamphlet, "The Street Railway Situation," in which arguments favoring municipal ownership are set forth. The booklet suggests that under present conditions the burden of supporting the system must be borne by patrons of the line, and that this burden can be made less irksome under municipal than private ownership. It is further pointed out that if the city wants the present regime continued, several important steps must be taken for the relief of the company, namely:

> The company must have a complete monopoly of transportation; the city must establish control of vehicular traffic so as to prevent accidents, and give the street cars right of way at all times; all paving and bridge charges must be rescinded; the city should refund the amount the company has paid for bridges and paving of streets, if possible, also the gross earnings taxes; the company should be free to route cars and regulate traffic; there should be a readjustment of fares.

It is intimated that a valuation of $7,500.000 is set on the company's properties.

Construction Prospects Good

At least three new interurban electric railways will be built out of Dallas, Tex., within the next three years, according to J. F. Strickland, president of the Dallas (Tex.) Railway and the Texas Electric Railway. Mr. Strickland said his company would start work on one of the lines this year. Under the franchises granted the Strickland-Hobson interests covering electric railways, electric lighting and the interurban terminals, at least one line must be begun this year.

Mr. Strickland says three interurban lines: Dallas to Wichita Falls via Denton; Dallas to Greenville, and Dallas to Terrell, are needed now, and that all these lines should yield profitable returns from the beginning of their operation. The Dallas-Wichita Falls line is now projected by other interests than the Strickland-Hobson combine, and it is known that Mr. Strickland and his associates are investigating projects of building lines to Greenville and Terrell.

In a recent address before the Dallas Chamber of Commerce and Manufacturers' Association, Mr. Strickland outlined the history of interurban building in north Texas and gave some interesting statistics regarding the operation of such lines.

Honolulu Case Merely Presented

Owing to various causes, among which was the lateness of the application of the Honolulu Rapid Transit & Land Company, Honolulu, T. H., for legislation with respect to the problems before the company, it was impossible to do more than present the case to the Senate committee. The matter has therefore to go over for two years more. The company met with opposition regarding the terms desired. There is a public utility commission in Hawaii, but this commission has no jurisdiction at present over rates of fare or any authority to order extensions. The public demanded extensions which could not be built by the company under the terms of the present franchise without rendering it impossible for the company to meet its obligations to its security holders.

The work of educating public opinion to the fundamental stand which the company had taken was begun before the introduction of the new legislation and will undoubtedly be continued pending a full settlement of the matter. The problems before the company were made plain in an article which appeared in the ELECTRIC RAILWAY JOURNAL for March 29, page 660. L. T. Peck, president of the company, has said that it is absolutely necessary that the extended franchise should be flexible enough in its terms as to rates and government charges under commission control that the revenues will always be sufficient to provide the very best of service and a fair return on the capital already invested and on that yet to be sought for immediate and future expansion.

Twenty-two Cent Wage Increase Asked

The employees of the Tri-City Railway, Davenport, Iowa, have asked for an increase in the wage scale which will total $250,000 annually. The present contract expires in June. The unions are asking for a one-year contract with a maximum of 62 cents an hour. This is an increase of 22 cents over the present maximum of 40 cents. A nine-hour day is also asked for.

The petition comes from 425 men through Davenport, Rock Island and Moline locals of the Amalgamated Association. The present contract has been running for three years. The wages specified in the contract are: 28 cents an hour for the first year, 29 cents an hour for the second year and 33 cents an hour for the third year.

When the war broke out and high wages in other trades began to cut the force the following scale, still paid, was agreed upon: 36 cents an hour for the first year, 38 cents an hour for the second year and 40 cents an hour for the third year.

The union is now asking 58 cents an hour for the first year, 60 cents an hour for the second year and 62 cents an hour for the third year.

The companies affected are the Tri-City Railway of Iowa; Tri-City Railway of Illinois; Moline, Rock Island & Eastern Traction Company and the Clinton, Davenport & Muscatine Railway, an interurban.

The company has stated that for the last nine months passengers have been carried at a loss due to the increase in cost of labor, materials and operation.

Interurban Employees Strike

Platform employees of the Rochester & Syracuse Railroad, Rochester, N. Y., went on strike on May 16 because of a wrangle between the Amalgamated Association and the Brotherhood of Locomotive Engineers and Order of Railway Conductors. The company is employing Amalgamated motormen and conductors and efforts are being made to maintain service on the interurban lines between Rochester and Syracuse.

The Amalgamated Association's refusal to agree to the operation of cars of the line by brotherhood men within the city of Rochester was back of the company's attempt to induce its employees to join the Amalgamated and do away with the necessity of changing crews at the Rochester city line. The men went on strike rather than abandon the brotherhood organization and the Amalgamated thereupon attempted to furnish men to the company for the temporary operation of its interurban lines.

If the attempt to operate cars entirely by members of the Amalgamated Association wins out the Rochester & Syracuse Railroad will save almost $17,000 a year by eliminating the expense incident to having extra crews meet all cars at the Rochester city line.

There is a feeling that the difficulty may be solved by agreement between the rival unions to permit the employees of the Rochester & Syracuse Railroad to retain the insurance and benefit features of the brotherhood affiliations while permitting the Amalgamated to represent them in dealings with the company.

News Notes

Pay Increase in Springfield.—The Springfield (Ill.) Consolidated Railway has granted an increase of pay to its trainmen from 36 cents to 39 cents an hour.

Not Satisfied With Electrolysis Protection.—The City Commission of Trenton, N. J., has notified the Trenton & Mercer County Traction Corporation that the company's present system for the mitigation of electrolysis is unsatisfactory.

Wage Advance in East Liverpool.—A wage scale, ranging from 43 to 47 cents an hour, was granted motormen and conductors of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, in an award announced on May 23 by an arbitration board. This is an 11 per cent increase over the 1918 scale.

Wage Increase in Montreal.—An arbitration board which considered the demand of the employees of the Montreal (Que.) Tramways for higher wages has recommended that men in receipt of 37 cents an hour be raised to 48 cents and those getting 31 cents be raised to 41 cents. The increases will mean an addition of $650,000 a year to the company's operating expenses. Three thousand five hundred men are affected.

Opening of Modern Cafeteria at Cleveland.—The establishment of the dry law in Cleveland on May 26 was preceded by a dinner at the Hollenden on May 23 attended by a number of railway and supply men who wished to mourn the wake (in Ohio) of John Barleycorn. A jazz orchestra made dull moments impossible. The cafeteria service counter constituted a bar over which floated every known kind of schooner—and some unknown. The Dean of the carbuilding industry officiated. Between 130 and 140 mourners sat up with the spirits.

Wants New Regulatory Legislation.—Declaring that the present situation as regards regulation of public utility rates in New Jersey is such as to warrant "immediate remedial legislation at a special session of the Legislature," Frank H. Sommer, counsel for the associated municipalities opposing the Public Service Railway's zoning plan and associate counsel with City Attorney Kearns in Mayor Gillen's 1-cent suit against the company, has given out a statement criticising conditions which led to a decision being given in favor of the company by District Court Judge Frederic L. Johnson.

Minneapolis Terminal Electrification Report.—Electrification of the railroad terminals at Minneapolis, Minn., suggested as a means to eliminate the smoke nuisance from steam railroad engines, will cost $70,000,000 according to F. W. Cappelen, city engineer, in a report to the City Council. This district would include St. Paul, South St. Paul, Minnesota Transfer and Fridley. The survey necessary to draw plans would cost between $30,000 to $40,000. The Council will continue the investigation, although the engineer believes the railroads are not in a position now to undertake the improvement.

Proposed National Engineering Board.—A bill has been introduced into the Senate of the United States authorizing the organization of a National Engineering Board, to be composed of the Secretary of Commerce and the National Research Council. This board will appoint branch state boards of five engineers in each state and territory. These state boards will supervise and control all engineering and industrial investigations of a public nature such as those connected with the water supply, flood protection, etc., and including "transportation of property and persons on land and water, public lighting and heating, the development of power and of processes for the manufacture of materials useful to the people of the United States." The bill carries the authorization of $15,000 for the payment of each of the state boards and of the national board.

Programs of Meetings

New York Electric Railway Association

The annual convention of the New York Electric Railway Association will be held at the Fort William Henry Hotel, Lake George, N. Y., on June 7. The program was published last week.

American Short Line Railroad Association

A convention of the officers of all short line railroads in the United States will be held at the New Willard Hotel, Washington, D. C., on June 3-5. Among the speakers expected are Director-General of Railroads Hines, Senator Cummings, Senator Smith, John E. Esch, chairman of the House Interstate Commerce Committee, T. DeWitt Cuyler, chairman of the railways executive committee. Invitations to attend this convention are being sent to electric railways which are engaged in the freight business. It is expected that legislation important to short line railroads will be enacted at this session of Congress so an especially large attendance is expected at this meeting.

Financial and Corporate

Baltimore's Worst Year

Revenues Gained 12 Per Cent, but Operating Expenses, Depreciation and Taxes 25 Per Cent

The calendar year 1918, it is said, was in many ways the worst year in the history of the United Railways & Electric Company, Baltimore, Md. The greatest difficulty from a revenue point of view was that wages and the cost of materials were increasing rapidly during the entire year, while the increased revenue from the 6-cent fare was effective during only the last three months of the year.

The gross receipts for 1918 were $11,929,701, an increase of $1,368,864 or 12.96 per cent over 1917. This increase was due to three factors: (1) Increased war activities; (2) increased fare effective during the last three months of the year, and (3) normal increase due to increase of population, riding habit, etc. While there is no satisfactory method of segregating these items, the company believes that the third and most important factor evidenced a satisfactory condition during 1918.

WEATHER AND INFLUENZA AFFECT EARNINGS

On the other hand, the company suffered during the first few months of the year from the worst weather conditions that it has ever experienced. Traffic was interrupted and for brief periods completely shut down by snow and ice conditions and, in common with transportation companies everywhere, there was a rapid falling off in receipts. In October, when considerable relief was expected from the increased fare, the influenza epidemic resulted in the closing down of all theaters and schools and the avoidance, so far as possible, of contact on street cars by the public. The receipts for October and for some little time thereafter were materially below what might otherwise have been expected.

The increase in operating expenses of $1,572,427 or 29.8 per cent was mainly reflected in the cost of conducting transportation. Although the largest increase of wages did not take place until September, the cost of conducting transportation, at $3,518,310, showed an increase of $884,470 or 33.5 per cent. The cost of maintenance of way and structures and equipment aggregated $1,300,879 in 1918, an increase of $377,239 or 40.8 per cent over 1917. The amounts charged to depreciation were increased $68,444 or 12.9 per cent to a total of $596,485. The cost of power at $1,040,158 represented an advance of $189,169 or 22.2 per cent.

The total taxes and public charges in 1918, including the park tax, cost of paving streets, etc., was $1,344,408, or more than 26 per cent of the net receipts after operating expenses. This represented an increase of $186,485 over 1917 and an increase of $271,629 over 1916. The park tax for the year was $755,467, an increase of $83,755. The total amount paid to the city of Baltimore in park taxes alone, since the consolidation of the various electric railway lines in 1899, aggregates $9,398,217.

The gross income of the United Railways & Electric Company in 1918 amounted to $3,416,003, and deductions from income to $3,083,351. This left a net income of $332,652 subject to federal taxes. The company continued its dividend policy, $486,715 of surplus being drawn upon. In addition, special demands, such as contributions incident to war, amounting to $35,574, and income and excess profits taxes for 1917, amounting to $105,035, were charged against surplus, resulting in a reduction of the item of surpluses to $362,370 on Dec. 31, 1918, as compared to the sum of $1,066,987 the year before.

OPERATING RESULTS OF UNITED RAILWAYS & ELECTRIC COMPANY FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918	1917	Increase	Per Cent Increase
Operating revenues	$11,929,701	$10,560,836	$1,368,864	12.96
Operating expenses	$6,839,822	$5,267,395	$1,572,427	29.85
Depreciation	596,485	528,042	68,443	12.96
	$7,436,307	$5,795,437	$1,640,870	28.31
Taxes, licenses, etc	1,160,452	1,079,723	80,729	7.48
	$8,596,759	$6,875,160	$1,721,599	25.04
Ratio of operating expenses to operating revenues:				
Operating expenses (percent)	57.33	49.88	.....	7.45
Depreciation (per cent)	5.00	5.00	.....	.....
	62.33	54.88	.....	7.45
*Taxes, licenses, etc. (per cent)	9.73	10.22	.....	† 0.49
	72.06	65.10	.....	6.96

*Decrease caused by transfer to profit and loss of $105,035 of income and excess profits taxes, whereas in 1917 the corresponding amount was included in the item of taxes, licenses, etc., in the income statement.
†Decrease.

Boston Deficit Grows

April Returns Show a Loss of $316,392 as Compared to $224,920 in March —Repair Charges Bulk Larger

The financial report for April, made public by the trustees of the Boston (Mass.) Elevated Railway, shows a deficit of $316,392 for the month. This compares with deficits of $224,920 in March, $285,124 in February and $219,269 in January. One of the reasons for the larger deficit in April was the excess of track and car repair work above a fair monthly average.

COST PER PASSENGER 9.328 CENTS

The total receipts from all sources for April were $2,386,822. Of this amount $2,309,079 was received from fares. The total cost of service was $2,703,214, of which $1,218,796 was expended for wages. The cost of labor per revenue passenger was 4.203 cents.

The total cost of service per passenger for April was 9.328 cents, as compared with 8.923 cents in March, 9.304 cents in February, 8.970 cents in January and 9 cents for the ten months ended April 30, 1919. The receipts under the 8-cent fare in April, 1919, as compared with the 5-cent fare in April, 1918, showed an increase of $727,170, or 45.96 per cent as compared to 42.32 per cent in March, 44.91 per cent in February, and 43.77 per cent in January.

RECEIPTS AND COST OF SERVICE OF THE BOSTON ELEVATED RAILWAY FOR APRIL, 1919

Receipts:	
From fares	$2,309,070
From operation of special cars, mail pouch service, express and service cars	7,453
From advertising in cars, on transfers, privileges at stations, etc	24,563
From other railway companies for their use of tracks and facilities	4,260
From rent of buildings and other property	8,342
From sale of power and other revenue, (including coal sold, $6,721)	15,239
Total receipts from direct operation of the road	$2,368,937
Interest on deposits, income from securities, etc	17,885
Total receipts	$2,386,822
Cost of service:	
Maintaining track, line equipment and buildings	$415,436
Maintaining cars, shop equipment, etc.	234,854
Power (including 24,396 tons of coal at $5.71 or $139,381)	211,663
Depreciation	167,000
Transportation expenses (including wages of car employees, carhouse expenses, etc.)	804,755
Salaries of administrative officers	7,583
Law expenses, injuries and damages, and insurance	100,566
Other general expenses	72,043
Total operating expenses (of which $1,218,796 represents wages)	$2,013,900
Taxes, proportion	88,179
Rent for leased roads (exclusive of subways)	215,785
Proportion of rent of subways and tunnels to be paid to the City of Boston (exclusive of Cambridge Subway owned by company)	125,645
Interest on Boston Elevated bonds and notes	131,418
Miscellaneous items	8,693
Proportion of dividends under acts of 1918	116,998
Interest on unpaid taxes	2,596
Total cost of service	$2,703,214
Net loss	$316,329

Merger Agreement Modified

Indianapolis Plans Simplification of Corporate Structure Following Order of Public Service Commission

The committee of fifteen stockholders of the Indianapolis (Ind.) Street Railway, which was appointed at a stockholders' meeting some time ago to prepare a plan in keeping with the order of the Public Service Commission calling for a reduction of fixed charges and for expending in improvements the amounts paid into the sinking funds, held a meeting on May 21 and approved certain modifications in the proposed agreement for a merger of their company and the Indianapolis Traction & Terminal Company.

Directors and Committee Approve Plan

This agreement was approved by the board of directors of both companies on May 19. Following this approval by the directors and the committee of fifteen, the proposed agreement was submitted informally to members of the Public Service Commission, and sent to the stockholders who are to meet on June 2. If approved by the stockholders, the matter will then be subject to the final approval of the Public Service Commission and the city of Indianapolis. When the proposed agreement was presented informally to the Public Service Commission, it was requested that the 5-cent fare order of the commission be continued and that the charge to the various interurban companies for use of the tracks and terminals in the city of Indianapolis be increased from 4 cents to 6 cents a passenger.

Fare Case Reviewed

In the report to the stockholders of the Indianapolis Street Railway the committee recites the petition of the Indianapolis Traction & Terminal Company for increased fares. This was filed in November, 1917, and, on account of legal interferences, the hearing of this matter did not come up until August, 1918. Upon this hearing, it developed that the company had been operating for a considerable period at a heavy loss, and in October, 1918, the commission entered an order temporarily fixing a 5-cent fare, which, with other changes, it was thought by the commission, would produce an additional income of $500,000. In this same case, however, the commission ordered wage increases which absorbed approximately $375,000 of the increase granted. An attempt to secure a further increase in fare was denied by the commission in December, 1918.

Interest Payment Postponed

On Jan. 1, the company postponed payment of the bond interest on the Indianapolis Street Railway bonds, and on April 1, the interest on the Indianapolis Traction & Terminal Company bonds. The report also states that for several years the company has been aided in meeting other obligations by the postponement of the payment for power furnished by the Terre Haute, Indianapolis & Eastern Traction Company, which, to May 1, 1919, amounted to approximately $718,000.

As arguments against any separation of the properties, the report states that it would be difficult to determine just what property would belong to each company, as the Indianapolis Traction & Terminal Company has added a great amount of property since the execution of the lease, and the street railway could not continue operations without the use of some of this property. The present stockholders of the street railway are investors and not operators, and to change into a working organization prepared to operate and finance the property is regarded as very difficult.

Plans for New Company

The proposed agreement for consolidation provides that the reorganized company shall issue $5,000,000 of preferred stock and $2,500,000 of common stock, and that each shall have equal voting rights. The $2,500,000 of common stock is to be exchanged for the $5,000,000 of stock of the Indianapolis Traction & Terminal Company on the basis of one share of the consolidated company for each two shares of the terminal company. The $5,000,000 of preferred stock of the consolidated company is to be exchanged share for share for the $5,000,000 of common stock of the Indianapolis Street Railway, which at present is guaranteed a dividend of 6 per cent as rental by the Indianapolis Traction & Terminal Company. Under the new consolidation, this preferred stock will carry a 6 per cent cumulative dividend, and this dividend will not be paid unless earned by the company.

Limit to Bond Issues

The agreement provides further that not more than $15,000,000 of bonds can be outstanding at any time during the existence of the present franchise, which expires in 1933. The bond issues which it is proposed to absorb are $6,000,000 of the Indianapolis Street Railway and $4,000,000 of the Citizens' Street Railroad, and a $5,000,000 issue of the Indianapolis Traction & Terminal Company. Bonds amounting to approximately $2,200,000 have been retired by payments of $120,000 annually into sinking funds in addition to the interest on bonds which are kept alive in the sinking funds, and it is proposed that these retired bonds shall be reissued for the purpose of making extensions and other improvements to the system from time to time. Provisions for sinking fund fixed payments will be retained, but an effort will be made to discontinue paying interest on bonds already in the sinking fund.

The Public Service Commission stated that the agreement would be very carefully considered, and until it had been studied, the commission would express no opinion in regard to same. The city of Indianapolis desires the company to make certain extensions of lines, which will probably be considered in any agreement entered into between the Public Service Commission or the city and the street railway.

Standard Gas & Electric in Oil

H. M. Byllesby, president of the Standard Gas & Electric Company, Chicago, announces the completion of the consolidation of his company with oil and refining interests heretofore known as the C. B. Shaffer interests. The consolidation will result in the formation of a new company to be known as the Shaffer Oil & Refining Company, of which C. B. Shaffer will be president. His entire staff will remain with the new organization. Mr. Byllesby becomes chairman of the board of the new company and Mr. Shaffer becomes a director of the Standard Gas & Electric Company. A statement says:

> The Shaffer interests have for years operated entirely independently and constitute the one remaining large independent complete oil property that has not heretofore been consolidated with other interests.
>
> The new company starts with large cash resources and will adopt an extremely progressive program.
>
> The Standard Gas & Electric Company in the consolidation obtains a majority interest in the new company.

Preferred Dividend Increased

The directors of the Standard Gas & Electric Company have replaced the preferred stock on an 8 per cent annual basis by declaring a quarterly dividend of 2 per cent. The preferred has been paying 6 per cent annually. The following official statement has been issued:

> The company announces that this is to be its future regular dividend policy. The dividend is paid from earnings of the company for the last quarter entirely irrespective of the large earnings of the Shaffer Oil & Refining Company interests which accrue to the Standard Gas & Electric Company from Jan. 1 of this year.
>
> In view of the completion of acquirement of the Shaffer properties and the further large increase in Standard Gas & Electric Company's earnings, President Byllesby appointed a committee to report at an early date upon a plan for liquidation of unpaid accumulated dividends on the Standard preferred stock amounting to approximately 13 per cent.

The Standard Gas & Electric Company has acquired the engineering and management organization of H. M. Byllesby & Company. The engineering and management force will be used by the Standard in its new program of expansion in its gas and electric properties. A new corporation is to be formed, it is understood, embracing in this management organization all of the stock to be owned by the Standard Gas & Electric Company.

As noted elsewhere in this issue a syndicate of bankers is offering for subscription $12,000,000 of Shaffer Oil & Refining Company first mortgage 6 per cent convertible bonds.

Compromise Valuation

Minneapolis Street Railway Makes Offer in Hope of Bringing About Speedy Franchise Settlement

The street railway committee of the Council of Minneapolis, Minn., is considering a valuation offer by the Minneapolis Street Railway, which is about 3 per cent above the city's figure. The sum is $23,232,018 as of Jan. 1, 1919, for all property inventoried by the city, exclusive of the Lake Harriet right-of-way, which is not on city streets. The offer is one of the steps under way to get a base for determination of the terms of a proposed new franchise for the company. The city's figure was $23,533,150 as of Jan. 1, 1916.

In forwarding the offer of the directors of the railway Horace Lowry, the president, wrote:

> In view of the acute situation now existing the company is at this time willing to make a compromise in order to bring about a prompt settlement of the whole problem, but we wish it understood that unless an agreement is now reached the company will have to withdraw the following offer, and in that case it will in the future be governed by conditions then existing.
>
> The city's offer of $22,533,150, as of Jan. 1, 1916, is lower than it is possible for the company to accept, and therefore the directors have decided to make the city a flat offer of value as of Jan. 1, 1919, as follows:
>
> | | |
> |---|---|
> | Value as of Jan. 1, 1919, of property inventoried by the city as of Jan. 1, 1916, (excluding the Harriet right-of-way) .. | $23,232,018 |
> | Value as of Jan. 1, 1919, of the Columbia Heights and Fort Snelling lines outside of the city (not included in city's offer) . | 142,044 |
> | Net additions to and withdrawals from the property from Jan. 1, 1916, to Jan. 1, 1919 (subject to verification by the city) .... | 1,125,938 |
> | Total value as of Jan. 1, 1919 .... | $24,500,000 |
>
> On this valuation we are to be allowed to earn 7 per cent a year, which is a lower rate of return than the company was compelled to pay in its recent refinancing of $5,000,000 of its bonds.
>
> Should your honorable body accept the above and embody it in a modern cost-of-service franchise which the electors ratify, it would be possible for us to re-establish the former high standards of service and provide such extensions as you deem needed at this time.

The discussion at Minneapolis has extended over many months, with the valuation material coming piecemeal. For that reason it is deemed advisable to reprint the various valuation figures as recently summarized for the benefit of local Minneapolis people:

BY THE CITY	
F. W. Cappelen, city engineer	$25,914,308
C.L. Pillsbury, for city	24,300,000
BY THE COMPANY	
Original maximum claim	$35,323,376
Original claim on physical property to reproduce	28,717,033
Compromise figure just submitted	23,232,018
UNOFFICIAL ESTIMATES	
Central Franchise committee, (majority)	$22,156,951
Central Franchise committee, (minority)	15,470,360
Hogarth-Van Lear recheck and reappraisal on physical items of Cappelen report	13,608,730

The figure of $23,232,018, as explained previously, does not include the Harriet private right-of-way. The Cappelen and Pillsbury valuations do include this item. It is pointed out that in order to put all the valuations on the same basis, the sum of $632,000 —the value of the Harriet right-of-way —must be subtracted from the Cappelen and Pillsbury figures and $142,044 added to the figure of each for the Columbia Heights and Snelling lines and $1,125,938 for net additions and withdrawals since their figures were made. The official figures, thus reduced to a common footing are:

Company's minimum, excluding Harriet right-of-way and including Columbia Heights and Snelling lines and net additions and withdrawals since Jan. 1, 1916	$24,500,000
Cappelen figures on same basis	26,560,290
Pillsbury figures on same basis	24,935,982

Receivership If Interest Is Not Waived

The management of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., has sent circular letters to the owners of the corporation's first mortgage 5 per cent bonds acquainting them with the desperate financial condition of the property and asking them to accept interest-bearing notes for a period of three years in lieu of the payment in cash of the coupons as they mature during the interval. The company has also asked the bondholders to waive the operation of the sinking fund until 1925. This is the only alternative to receivership, according to the announcement.

It is imperative that the sum of $400,000 be raised during the next few years in order to rehabilitate the property as ordered by the Public Service Commission of Georgia and to liquidate floating indebtedness, and as the corporation has no other way to obtain funds the bondholders are called upon to forego payment of interest in cash on the securities they own of the company.

The management says that the saving in interest and waiving of the sinking-fund provision will provide the sum needed and a considerable portion of the cash for the redemption of the notes at maturity.

Accompanying the letter is a form of agreement bondholders are asked to sign and return with their bonds to the Central Union Trust Company, New York.

Would Settle Power Debt with Notes

A proposed agreement of the Indianapolis Traction & Terminal Company, Indianapolis (Ind.) Street Railway and Terre Haute, Indianapolis & Eastern Traction Company in regard to a $700,000 debt for power due the Terre Haute, Indianapolis & Eastern from the Indianapolis Traction & Terminal Company, and for further supplying power, has been submitted to the Public Service Commission, together with a letter explaining the agreement and asking for approval.

The agreement is to be carried out in the event of a consolidation of the Indianapolis Street Railway and the Indianapolis Traction & Terminal Company. Because the notes the Indianapolis Traction & Terminal Company is to give will run for more than one year, the approval of the Public Service Commission is said to be required. The proceeding is in view of the meeting of stockholders of the Indianapolis Street Railway on June 2, to vote on a proposed consolidation.

The proposed agreement as to debt for power and for power to be supplied in the future, if a consolidated company is formed, is signed by the officials of the three companies concerned. In addition to providing that fourteen promissory notes of $50,000 each shall be given for the $700,000 power debt, which is to draw 4 per cent interest, beginning May 28, 1921, it is provided that the contract for power between the Indianapolis Traction & Terminal Company and the Terre Haute, Indianapolis & Eastern Traction Company shall continue with the proposed consolidated company until April 7, 1933, the termination of the franchise, except that the question of price shall be readjusted July 1, 1922, and July 1, 1927.

If the proposed consolidated company and the Terre Haute, Indianapolis & Eastern Traction Company cannot agree as to price at the readjustment times, it is provided that each shall appoint an arbitrator. If the two arbitrators cannot agree they shall select a third, and the decision of the three shall be final.

Financial News Notes

Offers Grand Rapids Bonds.—Harris Forbes & Company, New York, N. Y., are offering for subscription at 96.86 and interest yielding 6.75 per cent $1,500,000 of first mortgage 6 per cent five-year gold bonds of the Grand Rapids (Mich.) Railway.

Receivers Made Permanent.—Judge Sandford of the Federal Court at Knoxville has handed down an order making Percy Warner, Nashville, and John S. Graham, Philadelphia, permanent receivers of the Chattanooga Railway & Light Company. The receivership covers only the railway and not the light department of the company.

Mr. Eccles After Linnton Road.—D. C. Eccles, Ogden, Utah, who is interested in the Utah-Idaho Central Railroad, is negotiating for the purchase of the United Railways, operating from Linnton, a Portland suburb, to a tract of timber land some 12 miles out, which is owned by the Oregon Lumber Company, of which Mr. Eccles is a stockholder.

Atlanta Notes Offered.—Edward B. Smith & Company, Philadelphia, Pa., are offering $2,500,000 two and one-half year 6 per cent secured notes of the Georgia Railway & Power Company, Atlanta, Ga., at 99¼ and interest to yield 7.05 per cent. These notes, while issued in 1917 on account of additional hydroelectric developments, are only now offered for sale.

Tax Valuations Increased.—The Corporation Commission of Oklahoma has fixed assessment valuations for taxation purposes of a number of public service corporations of the State of Oklahoma, including a number of interurban and city railway lines. In most cases there has been an advance ranging from 25 per cent to 33 1-3 per cent over the valuations fixed last year.

First Mortgage Ten-Year Bonds.—P. W. Brooks & Company, New York, N. Y., are offering at 96 and interest $950,000 of first mortgage ten-year 6 per cent gold bonds of the Southern New York Power & Railway Corporation, Cooperstown, N. Y. The bonds are dated April 1, 1918, and are due in 1928. They are followed by $500,000 of 7 per cent cumulative preferred stock and $774,900 of common stock.

New Trustee Under New Orleans Mortgage.—The Hibernia Bank & Trust Company, New Orleans, La., has resigned as trustee under the refunding and general lien 5 per cent gold mortgage of the New Orleans Railway & Light Company, New Orleans, La., dated Dec. 6, 1909, and the Empire Trust Company has been appointed acting as successor trustee under said mortgage and supplemental mortgage. dated Nov. 1, 1909, and under the supplemental mortgage of the company.

Must Present Bonds for Indorsement.—In accordance with the terms of supplemental trust deed dated Dec. 31, 1918, as approved by the resolutions passed at the meeting of the first mortgage fifty-year bondholders of the Barcelona Traction, Light & Power Company, Ltd., on Dec. 19, 1918, the bondholders are requested to produce their bonds at the offices of the company in Toronto, Ont., or London, England, for the purpose of having indorsed thereon a memorandum modifying the rights of the bondholders and of the supplemental trust deed executed in pursuance of such resolutions.

Easy Tax Payments Proposed.—The city attorney of Buffalo, N. Y., has suggested a plan to the City Council whereby the International Railway will be able to pay its back taxes amounting to almost $300,000 in five installments. The property of the company was advertised to be sold at a public tax sale on May 28, 1919. The installments would be paid at the rate of $71,000 on May 28; $50,000 on June 30; $25,000, July 31; $150,000, Aug. 31, and the balance Sept. 30. The small amount is promised by the company in July because at that time the company must pay back wages to its employees.

Note Issue Pays for Power Plant.—Halsey Stuart & Company, Chicago and New York, are offering at par and interest three-year 7 per cent collateral gold notes of the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich. The notes are secured by pledge of first mortgage 5 per cent gold bonds in the ratio of $133⅓ par value of bonds for each $100 par value of notes outstanding. The bonds pledged are secured by a first mortgage on all the property. The present issue of notes totals $294,000. The proceeds of the new issue will reimburse the company for expenditures made in building the Superior Falls water-power plant.

Oil Bonds Offered.—Montgomery & Company, Philadelphia, Pa., and Bonbright & Company and H. M. Byllesby & Company, New York, N. Y., are offering for subscription at 95 and interest $12,000,000 of Shaffer Oil & Refining Company first mortgage convertible 6 per cent sinking fund gold bonds dated June 1, 1919, and due June 1, 1929. The bonds are convertible at par into participating preferred 7 per cent cumulative stock of the Shaffer Oil & Refining Company at 105. They are unconditionally guaranteed by the Standard Gas & Electric Company. The Shaffer Oil & Refining Company will acquire the oil interests of C. B. Shaffer and associates in the mid-continent field, as referred to elsewhere in this issue.

Another City Seeks Valuation.—The city of Alameda, Cal., following the example set by its neighboring cities—Oakland and Berkeley—has applied to the California Railroad Commission for a valuation of the properties of the San Francisco-Oakland Terminal Railways operating in the city of Alameda. The application is in connection with the company's appeal for a resettlement franchise, and the tentative plans of the east bay cities based on a determination to take over the properties of the railway upon the expiration of the present franchise provided the communities determine to do so. The valuation is required by the city charter of Alameda, and, in accordance with a stipulation filed by the railway, is to be of the date of May 1, 1917.

Payment for Cars Authorized.—The New Jersey Board of Public Utility Commissioners has approved of a chattel mortgage to secure a note of the Trenton & Mercer County Traction Corporation, Trenton, to the American Car Company for twenty one-man safety cars and at the same time revoked a certificate issued by the board on Mar. 6 last approving an issue of $121,000 of 6 per cent car trust certificates in part payment for the cars. The certificates have not been issued and the plan of a chattel mortgage and note has been substituted as a means of insuring payment for the cars. The board also rules that should it later appear that it is desired by the parties involved to cancel the chattel mortgage and issue the car trust certificates, application may be made to the board for approval of the issue.

Electric Railway Monthly Earnings

ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$12,198	$10,644	$1,554	$342	$1,212
1m., Mar., '18	13,036	9,868	3,168	494	2,674

AURORA, ELGIN & CHICAGO RAILROAD, AURORA, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$197,567	*$161,731	$35,836	$39,205	†$3,369
1m., Mar., '18	168,693	*138,511	30,182	36,093	†5,911
3m., Mar., '19	563,585	*481,359	82,226	116,827	†34,601
3m., Mar., '18	439,408	*410,158	29,250	107,399	†78,149

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$146,116	*$115,800	$30,316	$21,771	$8,545
1m., Mar., '18	151,533	*112,174	39,359	30,747	8,612
12m., Mar., '19	1,854,044	*1,450,521	403,523	276,874	126,649
12m., Mar., '18	1,467,675	*1,249,296	218,379	362,665	†144,286

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$2,073,565	*$1,314,376	$759,189	$540,083	$219,106
1m., Mar., '18	1,756,688	*1,176,802	579,886	488,934	90,952
12m., Mar., '19	23,101,251	*15,293,337	7,807,914	6,210,565	1,597,349
12m., Mar., '18	20,093,014	*13,099,519	6,993,585	5,440,473	1,553,112

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$202,919	*$156,083	$46,836	$56,434	†$9,598
1m., Mar., '18	245,270	*179,104	66,166	73,881	†7,715
12m., Mar., '19	3,156,626	*2,177,275	979,351	813,436	165,915
12m., Mar., '18	3,077,458	*2,139,882	937,576	836,718	100,858

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$369,786	*$262,672	$107,114	$69,545	$37,569
1m., Mar., '18	328,221	*250,282	77,939	67,281	10,658
12m., Mar., '19	4,351,502	*3,405,076	946,426	822,133	124,293
12m., Mar., '18	3,783,627	*2,668,891	1,114,736	792,345	322,391

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$253,387	*$189,323	$64,064	$33,537	$30,527
1m., Mar., '18	215,591	*139,579	76,012	28,476	47,536
12m., Mar., '19	2,817,764	*2,002,774	814,990	357,943	457,047
12m., Mar., '18	2,210,888	*1,452,073	758,815	336,996	421,819

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$29,429	*$17,744	$11,685	$5,956	$5,729
1m., Mar., '18	31,834	*17,356	14,478	6,018	8,460
12m., Mar., '19	311,553	*212,470	99,083	73,450	25,633
12m., Mar., '18	346,535	*217,564	128,971	73,877	55,094

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$2,909.270	*$1,936,255	$973,015	$820,090	†$199,487
1m., Apr., '18	2,588,151	*1,648,095	940,056	800,533	†193,462
4m., Apr., '19	11,126,351	*7,818,631	3,307,720	3,238,155	†258,251
4m., Apr., '18	9,814,091	*6,371,665	3,442,426	3,202,051	†456,375

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$736,167	‡*$441,977	$294,190	$186,152	$108,038
1m., Mar., '18	621,145	‡*372,058	249,087	178,148	70,939
12m., Mar., '19	8,005,241	‡*5,369,294	2,635,947	2,240,505	395,442
12m., Mar., '18	6,387,407	‡*3,855,196	2,532,211	2,139,509	392,702

* Includes taxes. † Deficit. ‡ Includes non-operating income.

‡ In March, 1919, $22,085; March, 1918, $18,732; twelve months, 1919, $549,363; twelve months, 1918, $234,320, included for depreciation.

Traffic and Transportation

In a Sad Plight

Subsidy Essential if Berkshire Street Railway Is to Resume Service on Abandoned Lines

The Berkshire Street Railway has officially notified Mayor William C. Moulton of Pittsfield, Mass., it can do practically nothing this year toward its share of the cost of the paving, amounting to about $60,000, and that even with increased fares that went into effect last November is barely meeting operating expenses, to say nothing of city and town tax levies of between $60,000 and $70,000 and interest of $75,000 on bonds issued before these properties were acquired by the present owner, the New York, New Haven & Hartford Railroad.

The payroll at the present time is between $1,400 and $1,500 a day. The men are seeking a 33 per cent increase. If granted this would mean an additional expense of between $500 and $600 a day or about $187,000 a year. The new fare schedule which went into effect last November raised the gross revenue to substantially what it was before the war, but it has not made up for the 23 per cent wage increase granted the first of last June and 10 per cent the year previous and it does not make up for the enormous increase in cost of materials.

FARE UNIT UNCHANGED

The Berkshire Street Railway did not increase the unit of fare last fall. That unit has remained at 5 cents throughout. As C. O. Richmond, the general manager of the railway, puts it:

> There is a certain psychology in the nickel, which most everybody regards as the proper and just fare for a ride on a trolley car. We believe from the experience of other cities that if the unit is raised, say in Pittsfield and North Adams, it would set more people to walking and the company would actually gain nothing. We believe that keeping the unit a nickel and shortening the zones has been most satisfactory and fair to the traveling public.

So desperate is the case of the company that a conference was held at Springfield with L. S. Storrs, president of the Connecticut Company, owning the line, to discuss its future. Attention was given more particularly at one of the sessions to the matter of branches on which service was abandoned some time ago and which local interests are seeking to have resume now that summer is close at hand. Mr. Storrs said in part:

> In order to enable the Berkshire Street Railway to continue operation of cars through the most populous portion of the territory which it serves it has been necessary to discontinue service over those portions of its lines that have not developed sufficient income to meet the actual costs of doing business, leaving out of consideration all question of paying any return whatever upon the cash invested in the construction of the property. This entire investment has been appropriated to the public uses and all the energy and ingenuity of the officials and employees has been devoted to an effort to give to the public as efficient a service as could be produced with the use of every cent obtained on the cars.
>
> This has not been merely a policy, but an absolute necessity, and in carrying it out the operation between Lee and Huntington has had to be discontinued, as has that between Lanesboro and Cheshire, in which case the tracks have been torn up and the line permanently abandoned. On the line south from Great Barrington the loss was so marked that it was intended to discontinue that service also, and this would have been done had not the towns made an appropriation of an amount sufficient to cover all loss from operation.
>
> In connection with the specific case which we have gathered to discuss, operations were conducted over this line for two seasons, during the first year upon a schedule proposed by the company which did not seem to meet the approval of the communities; during the second season the service was operated upon a plan proposed by representatives of Lee, Huntington and Mr. Eastman of the Public Service Commission.

PLEA FOR A SUBSIDY

> Not enough interest was evidenced by the public in this operation at any time to produce a revenue sufficient to meet operating expenditures and maintain the property in safe condition; as costs have advanced materially since then there is no question as to the inability of the Berkshire Street Railway to start the service.
>
> Briefly, this line is 23.86 miles in length and one of the best designed and constructed in New England, but there is not a sufficient sentiment locally to produce revenue to pay the actual cost to operate the service, and the revenue upon the remainder of the system is not sufficiently profitable for funds to be diverted to make up the losses upon this line.
>
> There is no question but that the continued operation of this line will be of great value. The Berkshire Street Railway is willing to devote this line to the public uses for the coming season, but must be assured of the full cost necessitated for the operation of such service as may be required, together with a sufficient fund to place the trackage in safe operating condition. Under the law the towns of Lee, Otis, Becket, Blandford and Huntington can contribute up to $1 for every $1,000 of assessed valuation, but as this entire tax would amount to only $6,000, there will have to be other funds made available for such appropriation. There is ample precedent for all this, as there are instances where towns have made direct contributions to take up losses incurred by operation of electric railway service and also an instance in which the electric railway received a sum of money to place the trackage in safe condition.

No Change in Coney Island Fare

Lewis Nixon, Public Service Commissioner for the First District of New York, has decided that the dual subway contracts did not intend that a 10-cent fare should be charged on three lines and a 5-cent fare on one and as a result there will be no reduction in the fare to Coney Island this summer. Commissioner Nixon finds that it would be impossible to force the Brooklyn Rapid Transit Company to cut its 10-cent rate on the New Utrecht line before the Culver line is completed to Coney Island as well, which will not be before the first of next year or possibly next summer. Commissioner Nixon rendered his decision in reply to the contention of a taxpayer.

Favors "Measured Service"

"Forum" at San Diego Results in Many Constructive Suggestions—Interviews Also Secured

In connection with the recent suggestion made by the San Diego (Cal.) Electric Railway for a 5 and 10-cent zone system with reduced-rate tickets, in the hearing before the California Railroad Commission, the company is now busily engaged in explaining the plan fully to the public. The zone suggestion was noted in the ELECTRIC RAILWAY JOURNAL of May 17.

Besides publishing a full page advertisement to present a general statement of the facts, the company is running in the morning paper a "Forum," which is made up of letters sent in from citizens who have suggestions to present. The company has stated that it is in a receptive mood, and the people are taking advantage of the opportunity. For some time now the company has had all the letters that space would permit it to print. The letters are answered frankly and fully, in order to acquaint the public with all details of the plan.

INTERVIEWS ALSO SECURED

The company is also interviewing many prominent citizens to get their ideas as to the advisability of a flat-fare increase or a zone system. For example, there has been published an interview with Mayor Louis J. Wilde, in which he declares himself in favor of the company's suggestion. Mayor Wilde says:

> I am a firm believer in "measured service." Pay for what you get; that is what everybody expects to do. The man who rides two or three times a day in the downtown districts is not supposed to be paying for somebody who lives 2 miles out in the country.

At first the idea of a zone system seemed to meet with a great deal of disfavor, especially and naturally among those living in the outer zone. As the situation is understood, however, the company finds that the idea of "measured service" is gaining in favor.

Modification of Skip Stop in Dallas

Modification of the skip-stop plan of operating cars is to be ordered in Dallas, Tex., according to announcement from the office of Lynn B. Milam, supervisor of public utilities. The changes include elimination of all skip-stop regulations after 10 o'clock at night throughout the city, also on rainy days, and the installation of additional stops on certain lines where patrons petition for additional stops. All skip stops will also be abolished in the downtown shopping district, which includes Elm, Main and Commerce Streets from Harwood to Lamar. In connection with the skip stop, the Dallas Railway published a history of the skip stop in Dallas. This was displayed as a five-column advertisement in the various Dallas newspapers.

Yonkers Fare Upheld

The validity of the ordinance permitting the Yonkers (N. Y.) Railroad, included in the system of the Third Avenue Railway, New York, to charge a 5-cent fare within the city and another 5-cent fare when the city limits are passed, was upheld in the decision rendered on May 26 by Supreme Court Justice Joseph Morschauser, in chambers at Poughkeepsie. The ordinance was contested in the taxpayer's suit of Henry Koster.

The chief ground of his case was that the ordinance was passed by a scant majority of the Council instead of three-fourths. It had received only six votes. The court ruled that this simple majority was sufficient, and the ordinance valid. An appeal is considered almost certain.

The 10-cent fare has been charged since April 24. There are about 50,000 riders daily on the Yonkers Railroad, 20,000 of whom go beyond the city limits, and have to pay the double fare. About 15,000 of these riders go into New York city.

At Hastings-on-Hudson, where the service was abandoned altogether, the company has submitted a new franchise, which provides for operation on the Warburton Avenue line, a stretch of 1 mile of track, but does not provide for operation on the Uniontown line. The Uniontown line runs from the center of the village to the outskirts, and is 1¼ miles long. The residents living along this line held a meeting recently protesting against any franchise which did not give service on the Uniontown line.

The proposed franchise would charge 5 cents within the village. The Village Trustees may put it to a referendum vote.

City Agreed on Fare Policy

City Counselor Daues of St. Louis, Mo., has notified Thomas E. Francis, counsel for the United Railways, that the city will not object to a continuance of the 6-cent fare for a reasonable time. C. E. Smith, consulting city engineer, who was also at the conference, indicated that a reasonable period might be from May until next November, when it is expected that the valuation of the properties of the United Railways, which is being made by the Public Service Commission, will have been completed. Mr. Daues also suggested that the period might depend upon conditions which are found by Receiver Rolla Wells after he has been in charge of the property a sufficient length of time to determine what retrenchments can be made.

The conference was in advance of the meeting of the commission in St. Louis on May 19 to decide whether the 6-cent fare should remain in force after June 1. When asked, through Receiver Rolla Wells, what the company's attitude would be on the retention or increase of the fare, Mr. Francis said that the company would lay before the commission figures of cost showing the most recent wage demands on the company.

Ten Fare Districts for Eastern Massachusetts

The committee on street railways of the Massachusetts Legislature reported a bill May 27 giving the Public Service Commission authority to fix rates of fare upon the lines of the Eastern Massachusetts Street Railway, formerly the Bay State Street Railway. Under the act of 1918 placing the road's operation in the hands of public trustees, the trustees were empowered to fix fares independent of the commission. The bill requires the public trustees to divide the system into at least ten fare districts, and in each district the commission is required to "determine the just and reasonable rates of fare for the service performed." At the end of each period of three months following the fixing of fares, the commission is required to report to the State treasurer whether the revenue received by the company has been sufficient to meet its operating expenses. If there is a deficit the amount is to be made up from the State treasury, to be assessed later in the form of a State tax upon the cities and towns in the fare district in which the deficit occurred. The proportion in which the municipalities in any given district are to contribute is to be determined by the commission.

New Fare Terms Accepted

On May 21 the Columbus Railway, Power & Light Company, Columbus, Ohio, filed with the city its formal acceptance of the terms of the ordinance enacted on April 21, which provides for an increase in fare from eight tickets for a quarter to six tickets for a quarter for a period of two years. A similar ordinance for the Central Market division of the road is before Council and will probably be passed.

Petitions containing more than 10,000 names have been filed, asking for a referendum vote on the franchise. Only 7200 are required for the matter to be put to a vote. If a sufficient number of valid names are found on these petitions, the question of an increase in the rate will go to a vote of the electors on Aug. 12.

While it is difficult to tell just how the voters will ballot on this ordinance, Charles L. Kurtz, president of the company, is said to feel that the measure will be approved. Mr. Kurtz some time ago expressed the opinion that the rate granted would not cover the needs of the company, but it is evident that the officers are willing to try it out before refusing it.

As a substitute for the ordinance accepted, Councilman A. E. Griffith had introduced a measure which gave Council additional control over the operation and provided that, if the service requirements ordered by Council were not observed, the old rate of fare would be resumed. It is believed that this ordinance will die in committee, now that the other one has been accepted.

Fare Increase for Schenectady

The Public Service Commission for the Second District of New York has authorized the Schenectady Railway to put into effect a 6-cent fare in Schenectady and to increase the rates of fare on the Troy and Ballston divisions. No increases are allowed on the Albany division, between Albany and Schenectady, and there will be no changes in commutation rates, and all such rates, school and special rates on the entire system will remain unchanged. The company operates 140 miles of line in Schenectady and between Schenectady, Warrensburg, Lake George, Glens Falls, Troy and Albany. Increased fares permitted on the Ballston division are:

Zone 1—Schenectady to Alplaus	From 5 to 6 cents
Zone 2—Alplaus to High Mills Road	From 5 to 7 cents
Zone 3—High Mills Road to Timesons	From 5 to 7 cents
Zone 4—Timesons to Brookline	From 5 to 7 cents
Zone 5—Brookline to Ballston Junction	From 5 to 7 cents
Zone 6—Ballston Junction to Leonards	No change
Zone 7—Leonards to Saratoga	No change

Interzone fares are increased as follows:

From Zone 1 to Zone 2	From 10 to 12 cents
From Zone 1 to Zone 3	From 15 to 18 cents
From Zone 1 to Zone 4	From 20 to 24 cents
From Zone 1 to Zone 5	From 25 to 30 cents
From Zone 1 to Zone 6	From 31 to 36 cents
From Zone 1 to Zone 7	From 37 to 42 cents

Other interzone fares are increased proportionally.

The increased fares on the Troy division are:

Zone 1—From Schenectady to Morgan Avenue	From 5 to 6 cents
Zone 2—Morgan Avenue to Niskayuna	From 5 to 7 cents
Zone 3—Niskayuna to Lathams	From 5 to 7 cents
Zone 4—Lathams to Boulevard	From 6 to 7 cents
Zone 5—Wiswalls	From 6 to 7 cents
Zone 6—Watervliet	No change
Zone 7—Green Island and Troy	No change

Interzone fares are increased as follows:

From Zone 1 to Zone 2	From 10 to 12 cents
From Zone 1 to Zone 3	From 15 to 18 cents
From Zone 1 to Zone 4	From 20 to 24 cents
From Zone 1 to Zone 5	From 20 to 24 cents
From Zone 1 to Zone 6	From 20 to 24 cents
From Zone 1 to Zone 7	From 26 to 30 cents

Other interzone fares are increased in proportion.

Transportation News Notes

Interstate Increase Allowed.—The Bay State Street Railway's petition for increased fares between Fall River, Mass., and Newport, R. I., has been granted by the Interstate Commerce Commission.

Eight Cents in Peekskill.—Starting on May 23 the Westchester & Putnam Street Railway began charging 8 cents instead of 7 cents for fare. Fearing the company might suspend operations, the citizens petitioned for the increase.

New Fare Tariff Filed.—The Troy & New England Railway, Troy, N. Y., operating between Alvia and Averill Park, under a tariff filed with the Public Service Commission for the Second District, and proposed as effective on June 12, will make increases in one-way and round-trip fares.

Increase to Seven Cents in Dubuque.—The Dubuque (Ia.) Electric Company has been granted a fare of 7 cents, with four tickets for a quarter, this increase having been authorized by the City Council in order to allow the company to increase its wages and prevent a strike. Under the terms of the increase the company will continue to allow working girls to ride for 2½ cents.

Five-Cent Fare May Continue.—The April operating report of the Mahoning & Shenango Valley Railway, Youngstown city lines, indicates that the 5-cent fare may be retained there for several months longer than originally expected. The deficit under the service-at-cost plan was $5,382 as against about $9,000 each for the two preceding months and the stabilizing fund on April 30 was $16,000 above the minimum.

Service Satisfactory in Dallas.—Electric railway service in Dallas, Tex., is apparently satisfactory. Mayor Wozencraft recently advertised a public hearing before L. B. Milam, supervisor of public utilities, and the Board of City Commissioners. Wide publicity was given to the hearing and all who had complaints to make regarding service were asked to appear and make such complaints known. On the appointed day only three minor complaints were received.

One-Way Books Authorized.—The Public Service Commission for the Second District of New York has passed orders directing George Bullock, receiver of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to issue a twenty-six one-way family ticket book, valid only on the Hamburg Division, fares computed according to mileage, and a twenty-four one-way ticket book, the latter for $1.44, between Dunkirk and Fredonia, the orders to become effective on June 1.

Wants Fares Raised and Jitneys Abolished.—At a mass meeting in Hutchinson, Kan., on May 18 to determine whether it was necessary to raise fares, a committee was appointed to bring two conditions before the City Commission, a raise of fare from 5 cents to 7 cents on the Hutchinson Interurban Railway and the abolishment of the 10-cent jitneys on the streets. This is in line with the demands made by President Carey, of the railway.

Wants Jitneys Barred.—The Morris County Traction Company, Morristown, N. J., has sent a communication to the City Council, of Summit, N. J., protesting against the operation of the jitney service between Summit and Maplewood in competition with the electric railway. The petition has been referred to the law and ordinance committee. The railway contends that the jitney service is neither a public convenience nor a necessity; that it is not remunerative to the city, and that the service is uncertain and unsafe.

Improvements in Return for Increase of Fare.—The City Council of Canton, Ohio, has received a communication from the Northern Ohio Traction & Light Company to the effect that it will make improvements and extensions amounting to $120,269 if the city will allow it to charge a fare of 6 cents on the city line for the period of one year. The improvements are to be completed before the increased charge is put into effect. This, it is understood, complies with the terms of the city and means a settlement of the matter.

Wants Seven Cents in Niagara Falls.—The International Railway, Buffalo, N. Y., has applied to the Public Service Commission for the Second District, for permission to charge a 7-cent fare in Niagara Falls. The present fare is 5 cents, with transfer privileges. The railway says the 5-cent rate under existing conditions is confiscatory, unjust and unreasonable and not sufficient to give a reasonable average return upon the value of the property used in the public service with due regard for necessity of reservation of income for surplus and contingencies.

May Designate Auto Routes.—Because of chronic traffic congestion in Pittsburgh the city has been allowed the right by the Public Service Commission of Pennsylvania to designate the streets in the East Liberty and downtown districts over which auto bus lines may operate, and to change their terminal loops as conditions may dictate. This ruling was issued at a hearing recently on the applications of the backers of two proposed bus lines between East Liberty and the downtown district. The city and the Pittsburgh Railways opposed the granting of the permits on the grounds that the routes proposed lead through districts of great congestion.

Suburban Fares Revised Downward.—The Louisville (Ky.) Railway, which raised rates on its interurban lines in July, 1918, resulting in the case being carried by country residents before the State Railroad Commission, has lost its fight. An increase of 20 per cent over the old rates was allowed, but the present rates, which were just double the ones in effect prior to July, 1918, have been ordered reduced to the 20 per cent figure. Under the new regulations all 15-cent fares are increased to 18 cents; 20-cent fares to 24 cents, figuring a 1-cent increase on every 5 cents under the old rules. Special rates were made on business books, school books, round-trip tickets, etc.

New Zones on Wheeling Line.—Five new 5-cent fare zones are permitted on three of the principal electric railways of the Northern West Virginia Panhandle, by a decision of the Public Service Commission of West Virginia. The decision was made following application of the Wheeling Traction Company for its own lines and for those of the Panhandle Traction Company and the Steubenville, Wellsburg & Weirton Railway, both of which are controlled by the Wheeling Company under lease. By the same decision the sale of commutation books containing fifty-two tickets for $4.07 is ordered and the company is directed to make immediate improvements in service. The new rates are effective from May 29.

Wants Streets Called in Houston.—The city attorney of Houston, Tex., has drafted and presented before the City Commissioners an ordinance that would revive an old city ordinance requiring conductors on all street cars to call the names of the streets so that all persons on the cars may hear. The ordinance met opposition because of the fact that a number of one-man cars are in operation in Houston and it was claimed that the conductor-motorman could not operate his car with due regard to the safety of passengers and outside traffic and at the same time watch crossings and call the streets as they were crossed. Passage of the ordinance was delayed so that further investigation might be made.

Maine Company Wants More.—A. H. Ford, general manager of the Portland Railroad, which is controlled by the Cumberland County Power & Light Company, Portland, Me., addressed two meetings at South Portland recently in accordance with his promises made in February to report the condition of the Portland Railroad and how the new fare zone and ticket system had worked out. He stated that in four months the deficit of the Portland Railroad had amounted to $112,000 due to large increases in wages, the expense of maintenance and equipment and other items and that the figures taken from the company's books indicated that the 6-cent fare was not sufficient to enable the company to render good service or meet its bills. Mr. Ford said that confronted by these facts the company was compelled to petition the Public Utilities Commission for permission to increase the rate of fare one-third of a cent per zone, making the fare for a three-zone ride 7 cents instead of 6 as at present.

Personal Mention

Mr. Delaney Construction Commissioner

John H. Delaney, Brooklyn, was named by Governor Smith on May 26 as Transit Construction Commissioner for New York City. Mr. Delaney is City Commissioner of Plants and Structures. The office of Transit Construction Commissioner was created by the 1919 Legislature in one of the bills reorganizing the First District Public Service Commission. In a statement announcing the appointment the Governor said he had believed the construction department should be presided over by an engineer, and accordingly had offered the post to William Barclay Parsons and J. Waldo Smith, both of whom had declined. After conferring with Lewis Nixon, commissioner in charge of the division of regulation, he had decided that there existed in the Public Service Commission sufficient engineering ability to carry the proposed subway routes to completion. In this connection he said:

> What is really needed is a clear-headed, common-sense administrator with a knowledge of public office and an appetite for hard work.
>
> Mr. Delaney's ability, energy and willingness to work came to my attention during the year that I sat in the Board of Estimate & Apportionment. In all respects, I regard the Commissioner of Plants and Structures as the best equipped man to take charge of this important work.

Mr. Delaney was Commissioner of Economy and Efficiency in the State government during the Sulzer and Glynn administrations. Governor Smith was active as Democratic floor leader in the Assembly in promoting legislation which abolished that department. Mr. Delaney received his appointment through Governor Sulzer after serving first on a commission to investigate the finances of the State, of which John N. Carlisle, an independent Democrat from Watertown, was chairman. As Commissioner of Economy and Efficiency, Mr. Delaney wrote a work on the "Organization and Functions of the State Government," which was issued as a text book, and accepted as a standard by the Constitutional Convention.

New President of Chamber of Commerce

Homer L. Ferguson, president and general manager of the Newport News Shipbuilding & Dry Dock Company, Newport News, Va., has been elected president of the Chamber of Commerce of the United States. Mr. Ferguson succeeds as president Harry A. Wheeler, Chicago, who declined reelection.

Mr. Ferguson was born at Waynesville, N. C., on March 6, 1873. He was graduated from the United States Naval Academy in 1892, and attended Glasgow University, Scotland, finishing there in 1895. For eleven years he was a constructor in the United States Navy, leaving the navy in 1905 to become general manager of the company of which he is now president. He is a member of the Society of Naval Architects and Marine Engineers, the Society of Naval Engineers, the Engineers' Club, New York, and the Army and Navy Club, Washington.

Charles J. Sibert has been appointed assistant master mechanic of the Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., reporting to the master mechanic.

Donald Stewart, formerly vice-president of the Engineering Supervision Company, New York, N. Y., has been appointed general superintendent of the Ithaca (N. Y.) Traction Corporation.

W. R. Alberger, vice-president and general manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., has been elected president of the California Electric Railway Association.

Frank W. Matteson was elected president of the Providence, Warren & Bristol Railroad at the annual meeting of stockholders in Providence, R. I., on April 28. He succeeds Nathaniel W. Smith.

H. J. Musgrove, who was in the Signal Corps of the Army, has returned and has resumed his former duties of local superintendent of the Central Illinois Public Utilities Company, Marion, Ill.

Everett M. Sweeley, former Mayor of Twin Falls, a well-known attorney, has been appointed by Governor Davis as a member of the Public Utilities Commission of Idaho to succeed John W. Graham, resigned.

Ward S. Hubbard, superintendent of roadway and building of the Bay State Street Railway, Boston, Mass., has resigned and been appointed general manager of Turner Brothers Glass Company, Terre Haute, Ind.

Dr. E. A. Sommer has been appointed chief surgeon of the Portland Railway, Light & Power Company, Portland, Ore., effective June 1, succeeding Dr. E. A. Rockey, who resigned to devote his entire time to private practice.

Norman Oille, North Tonawanda, N. Y., has been elected secretary of the International Railway, Buffalo, N. Y., to succeed the late George W. Wilson. Mr. Oille has been serving as a clerk in the office of Edward G. Connette, president of the company.

Sir John F. Aspinall, formerly general manager of the Lancashire & Yorkshire Railway, has joined the board of the recently consolidated English Electric Company, Ltd., of which railway electrification work at home and abroad forms one of the most important departments. The Lancashire & Yorkshire Railway was one of the pioneers of suburban line electrification in England.

A. A. Dunlap, division engineer at Tipton, Ind., of the Union Traction Company of Indiana, Anderson, Ind., resigned on May 5 to become associated with the Van Briggle Motor Device Company, Indianapolis, Ind. Mr. Dunlap became division engineer on the Union Traction Company in May, 1911, and for several years previous to that served as chief clerk of the way department of the same company.

C. A. Prentice, division engineer at Muncie, Ind., of the Union Traction Company of Indiana, Anderson, Ind., resigned on May 1 to become associated with a brother-in-law in road-building work in Michigan. Mr. Prentice has been connected with the railway at Anderson since Dec. 5, 1910. The employees of the company at Muncie clubbed together and presented Mr. Prentice with a gold watch as a farewell gift.

John T. Conway, superintendent of the Brockton district of the Bay State Street Railway, Boston, Mass., for twenty years, was surprised at the office of the company recently when the clerks and the union employees gathered to show their appreciation of the friendly relations that have existed between the superintendent and his helpers. The clerks presented Mr. Conway a handsome smoking set, with brass lamp attachment, and the members of the union presented him a purse of $150 in gold.

David Curtin, for fourteen years chief engineer of maintenance and way construction for the Bay State Street Railway, Boston, Mass., and earlier prominent in steam railroad construction in the Far West and Rocky Mountain district, has become associated with the G. Ferullo Company, Inc., Boston, as president and manager. Mr. Curtin will make a specialty of electric railway construction and maintenance in his new capacity, and will also undertake a general public works engineering construction business.

Brig.-Gen. George H. Harries, a vice-president of H. M. Byllesby & Company and formerly president of the Louisville Gas & Electric Company, Louisville, Ky., has recently had conferred upon him two new honors. One of these was the American Distinguished Service Cross conferred by General Pershing in recognition of his services at Brest in the early part of the war. The other was conferred by the French General Dupont, General Harries being made a Commander of the Legion of Honor, also in recognition of his work at Brest.

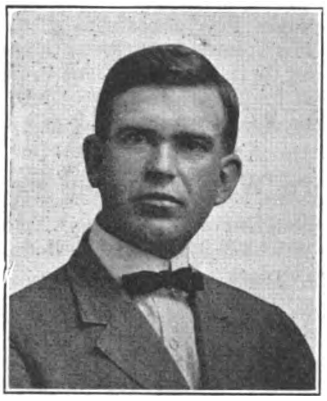
George Newell, superintendent at the Everett offices of the Stone & Webster interests since the construction of the

Seattle interurban nine years ago, succeeds D. C. Barnes as acting manager in charge of the Puget Sound International Railway & Power Company controlling the railway and light properties at Everett. Mr. Barnes, as noted in the ELECTRIC RAILWAY JOURNAL for May 24, has been transferred to Seattle. Mr. Newell has been in the employ of Stone & Webster for years. He entered their offices in Boston when a boy. Later he went to the Northwest and for a time was superintendent of the interurban lines at Seattle when they extended to Cedar Valley. Upon the completion of the line to Everett he was assigned to Everett as superintendent over the entire division.

John W. Belling has been appointed secretary of the New England Street Railway Club, succeeding George W. Knowlton, acting secretary for nearly a year past. Mr. Knowlton retires on account of the increasing pressure of his business interests. Mr. Belling is a native of Alma, Wis. He was graduated in electrical engineering in 1903 from the University of Wisconsin. He spent three years in the testing department of the General Electric Company, Schenectady Works, and during the last year of this service was occupied in testing electric locomotives for the New York Central electrification. The next three years were spent in the construction department of the General Electric Company, and included installation and operating supervisory duties on the Washington, Baltimore & Annapolis Railroad and the West Jersey & Seashore Railroad electrifications. In 1909 Mr. Belling was transferred to the railway department of the Boston office of the General Electric Company, and has since been active in sales engineering work in the traction field. He will continue his work with the General Electric Company. Mr. Belling is a member of the Boston City Club, and has a wide circle of friends in the New England field. He will also be editor of the *Street Railway Bulletin*, the official organ of the New England Street Railway Club.

Maj. John L. Retallack has been appointed by the government of British Columbia to be public utilities commissioner for the province under the new public utilities act, reviewed brefly in the ELECTRIC RAILWAY JOURNAL for May 3, page 876. Major Retallack is a returned soldier, having gone overseas as quartermaster of the Forty-eighth battalion. Later he was transport officer in the railway corps. He is a mining engineer and a member of the Canadian Mining Institute. The new commissioner was born in Quebec on Dec. 2, 1863, and was educated in England. He served for five years with the Royal Northwest Mounted Police before coming to British Columbia in 1890. The appointment of Major Retallack came after several days of public clamor, the government's first appointment of R. H. Gale, Mayor of Vancouver, having met with such opposition from the returned soldiers' organization that Mr. Gale tendered his resignation. When the appointment of Mr. Gale was announced on April 17, gatherings in Vancouver denounced the move and Mr. Gale went to Victoria to consult the cabinet. On his return, on April 19, he announced that he had resigned. Mr. Gale had been active in opposition to the British Columbia Electric Railway and in addition to this fact being urged against him there was a general demand that preference to any vacant position be given to a returned soldier. The commissionership carries with it an annual salary of $7,000.

E. F. Ramey has been appointed general manager and purchasing agent of the Goldsboro (N. C.) Electric Railway. Mr. Ramey was born and reared in Lexington, Ky. He entered electric railway work in 1904 as a conductor with the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., but returned to his home city in 1910 and worked in various departments of the Kentucky Traction & Terminal Company. For the past eighteen months, Mr. Ramey has been with the Columbia Railway, Gas & Electric Company, Columbia, S. C., as general storekeeper. He resigned from the company at Columbia to accept the appointment in Goldsboro.



E. F. RAMEY

W. O. Clure has been made assistant to A. W. Warnock, general passenger agent of the Twin City Lines, Minneapolis, Minn. Mr. Clure has been an instructor in the University of Minnesota, is editor and publisher of *The Progress*, a weekly paper, and has been secretary of the Republican State Central Committee. Horace Lowry, president of the company, announced that "at this time when the railway is dealing with the cities of Minneapolis and St. Paul, it seems advisable to add to our staff an additional man who can meet people informally at their various meetings to discuss the present crisis in the cities' transportation problem." Mr. Clure has for some years made a study of railway franchises and has consented, temporarily at least, to assume the above work as assistant to the general passenger agent.

Obituary

David Tod, president of the Youngstown & Suburban Railway, died at his home in Youngstown, Ohio, on May 14 from an attack of typhoid pneumonia. Mr. Tod was born at Girard, Ohio, in 1870. Besides his connection with the railway, Mr. Tod was director and vice-president of the Commercial National Bank, director of the Brier Hill Steel Company, director of the Bessemer Limestone Company, Stambaugh-Thompson Company and the Ward Nail Company, vice-president of the David Tod Land Company and trustee of the George Tod Estate.

Harry Allan Abbe died at Saranac Lake, N. Y., on May 22, after an illness of eight weeks. Mr. Abbe was born in New Britain, Conn., on Oct. 21, 1885. He was graduated from Yale College, Sheffield Scientific School, in 1905. He was employed by the Westinghouse Air Brake Company for several years, and later entered the employ of Peck-Shannahan-Cherry, Inc., Syracuse, N. Y., as superintendent of the Syracuse & Suburban Railroad. At the time of his death he was superintendent of the Syracuse Northern Electric Railway, Inc. He was married on Nov. 20, 1913, to Elsie M. Peck, daughter of Edward F. Peck, Hampton, Va. He is survived by his widow and two sons.

Henry A. Webster, master mechanic of the Manhattan division of the Interborough Rapid Transit Company, New York, died on May 14. Mr. Webster was born on Feb. 3, 1839, at Plymouth, N. H. He entered railway service in 1858 and continued in that work without interruption until just before the sickness that resulted in his death. From 1858 up to the time of his connection with the New York Elevated Railway in 1878 Mr. Webster served in various capacities on a number of railroads in New England and New Jersey. He served the New York Elevated Railway and its successor, the Manhattan Elevated Railway, from June, 1878, to March, 1899, as general foreman of the car department. From March, 1899, to June, 1899, he was master car builder of the company and from June, 1899, up to the time of his death he was master mechanic of the Manhattan Elevated Railroad and its successor, the Interborough Rapid Transit Company, New York. As master car builder of the Manhattan Elevated Railway Mr. Webster was in charge of all the cars in the steam service and the Ninety-eighth Street car shops. As master mechanic of the company he was in charge of all cars, locomotives and shops and when the locomotives were withdrawn from service on account of the change of power to electricity he had charge of the sale and disposal of all the locomotives and cars.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Storage Battery Car Market Brightening

Estimates Being Prepared on Sixty-One Cars for South America—Domestic Business Awakening

In the recent report of the Railway Storage Battery Company for 1918, an operating profit of upwards of $8,000, instead of the customary deficit, was shown for a year of war conditions. Actual deliveries in 1918 consisted of eight cars, with one car and two chassis now awaiting delivery.

The export trade of the company was reported active with the promise of still greater activity. The company is now figuring on sixty-one cars for export to Latin America. Domestic business, suspended during the war, shows signs of awakening, says President S. C. Steinhardt, and were government restrictions to be removed, it is felt that considerable business would follow.

An arrangement has been made for an exposition and demonstration of the Edison storage battery car at the Railway Master Mechanics' Association, Railway Master Car Builders' Association and Railway Supply Manufacturers' Association Convention at Atlantic City the week of June 18. The tracks of the Atlantic City & Shore Railroad from Atlantic City to Ocean City are to be used for this purpose.

Pole Prices Steady

Buying Picking Up with Better Outlook for Improvement in Late Summer Months

Pole prices, according to advices from the Pacific Coast, have been very steady for a year and a half in spite of increased freight rates, increased cost of handling and other factors. Competition is very keen along the Coast, with its many forests and odd bits of timber land. The past quarter has witnessed a revival of former brisk pole conditions, for there are a number of jobs in sight requiring several thousand poles and many styles of insulators and pieces of pole-line hardware. Eastern business has picked up also.

Stocks of cedar poles in the shorter lengths while not large are sufficient, it is thought, to take care of any business that might come up this year. Large poles are not in such ample supply. Conditions last winter were not favorable to pole cutting and hauling and consequently large stocks could not be piled up.

Dealers look forward to better buying late this summer to take care of fall line maintenance needs.

Transformer Market Improving

Both Domestic and Export Volume of Sales Are Better—Inquiries Also Improving

The transformer market is reviving under the stimulus of business expansion throughout many parts of the country. Orders from the Middle West are active, the Pacific Coast is buying somewhat more freely, and the East is falling into line with increasing inquiries and better sales. Within a month one Middle Western central station has ordered no less than 54,000 kva. in transformers. Foreign business, notably from Spain and Norway, shows healthy gains, these being due largely to hydroelectric developments. Although much more building is to be started later in comparison with the present low volume, central stations are increasing their line extensions in many localities; inquiries are coming into the factories at an unsurpassed rate.

Record Westinghouse Year

Sales Billed During Fiscal Year Amount to $160,379,943 with Unfilled Orders of $76,248,000

Figures were made public on Monday showing the record business done by Westinghouse Electric & Manufacturing Company during the fiscal year ended March 31 last. Sales billed totaled $160,379,943, against $95,735,407 the year previous. Unfilled orders on April 1 amounted to $76,248,000.

Sales billed include shipments by the New England Westinghouse Company and J. Stevens Arms Company from Jan. 1, 1918. After Sept. 1 the New England company's plants will be devoted to producing industrial motors and automobile starting and lighting apparatus.

A condensed comparative statement of operations for the past three years follows:

	Year Ended March 31		
	1919	1918	1917
Gross earnings—sales billed	$160,379,943	$95,735,407	$89,539,442
Cost of sales—Cost of manufacture, including depreciations of property and plant and all selling, administration and general expenses and all taxes	*144,667,402	80,225,937	72,077,752
Net manufacturing profit	$15,712,541	$15,509,470	$17,461,690
Other income	1,623,262	1,325,263	1,386,547
Gross income from all sources	$17,335,803	$16,834,733	$18,848,237
Less—Inventory adjustments, inactive apparatus and materials scrapped, bad accounts and extraordinary items of expense charged to income	†	†	†
Net income applicable to interest and other charges	$17,335,803	$16,834,733	$18,848,237
Interest charges	2,276,795	1,429,052	768,348
Net income available for dividends and other purposes	$15,059,008	$15,405,681	$18,079,889

† Included in cost of sales.

* Includes $15,395,846.16 Federal income and excess profits taxes.

Wire Prices Follow Copper Upward

Rubber Covered Base at 21 Cents—Bare and Weatherproof 18¼ to 20 Cents

Advances in the copper market of the past two weeks have had their expected effect on the prices of copper wire. The prices herein are as of May 28, but there is no telling how long they will last.

Copper started up about three weeks ago, and increased 1 cent to 16.37½ cents a pound. The first ten days showed heavy sales of the metal, but these have dwindled down to a rather quiet market. During this time there were reported large sales of wire rods for England, and domestic electrical manufacturers are reported to have satisfied their copper wants for a few months.

Certain kinds of wire follow the trend of the copper market more closely than do others. Rubber covered wire is least affected by small changes in copper and would hardly be expected to change on fractional changes of copper. When copper changes a cent or two then corrections may be looked for in rubber covered. On May 28 producers were quoting, for the most part, on a 21-cent base. Prior to that a 20-cent base had been holding for about eleven weeks.

Weatherproof wire and bare copper wire follow the copper market rather closely, and a change of one-quarter of a cent is likely to affect the price of these two wires. Bare wire base is around 18¼ and 19 cents a pound. Weatherproof is reported on a 19 to 20-cent base. But a small change in copper is almost sure to change these prices.

The recent advance in cotton will probably be felt in the price of insulated wire if it has not already appeared. Stocks of cotton materials on hand may permit of a postponing for a short time of an added increment to insulated wire price, but if cotton remains up any length of time this addition may be expected. There is better buying of weatherproof wire and a considerable increase in inquiries.

There has been found some increase in orders for signal wire for electric railway use, but in no sense anything like normal buying.

Cotton Advance Reflected in Insulating Materials

Cloths and Oils Show Sharp Advances—Tapes Holding Steady—Repairs Keep Up Demand

Following the recent advances in cotton prices there have been found substantial advances in certain insulating materials. Insulating cloth and oils have been subjected to a decided increase in price. Non-metallic flexible conduit has advanced 20 to 25 per cent. So far as could be learned, however, there have been no advances in friction tapes and white cotton webbing.

The stability in price of these tapes is undoubtedly because of stocks of raw materials on hand sufficient in size to carry along production for some time. One manufacturer expects to see no necessity for a price change for three months.

There has been a better demand for insulating materials of late. The amount of repair work carried on in the railway shops is a factor in keeping a steady flow of this material in the market.

Price Levels Expected to Hold for Some Time

The Electric Bond & Share Company, New York City, has sent out a circular letter under date of May 12 to its utilities that it would keep them informed from time to time on the tendencies of price changes. There was inclosed a copy of the address of Irving Fisher before the Conference of Governors and Mayors at the White House in March, wherein the continuance of the present price level was upheld. The company considers that this address ably presents this side of the subject and expects further reports of a more or less similar nature from possibly different angles as time goes on. These are to be forwarded in order to keep the utilities in touch with the generally accepted belief that the present price levels are to be permanent, and will decrease, if at all, only very gradually.

Electric Railway Projected from Stockholm, Sweden, to Goteborg

According to Commercial Attaché E. W. Thompson, electrification of all the principal railroads of Sweden is most logical in view of the dearth of coal and the wealth of water power. The plan has been recently discussed in the Danish press for an electric road connecting Goteborg and Stockholm.

Rolling Stock

Nashville Railway & Light Company, Nashville, Tenn., has been granted permission by the Tennessee Railroad and Public Utilities Commission to purchase ten new street cars, it is reported. The cost is estimated at $57,980, and permission is granted the company to issue par notes for $33,425 of this amount. The cars will be purchased from the American Car Company of St. Louis.

Recent Incorporations

Levis (Que.) Tramways.—Incorporated as a reorganization of the Levis County Railway and to extend the service in the counties of Levis, Bellechasse, Dorchester and Beavie.

Miami Beach Electric Company, Miami, Fla.—Incorporated to construct an electric railway at Miami Beach. Capital stock, $250,000. Officers: Carl G. Fisher, president; Arthur C. Newby, vice-president, and J. H. McDuffie, secretary and treasurer. [Apr. 26, '19.]

Franchises

Los Angeles, Cal.—The Pacific Electric Railway has received a franchise from the City Council of Los Angeles for the construction of an electric line on Echo Park Avenue and portions of Sunset and Hollywoods Boulevards.

Jackson, Miss.—The Citizens' Public Utility Company has asked the City Council for a franchise to operate electric light and gas plants and an electric railway in Jackson. It is presumed that this company has been organized to take over the properties of the Jackson Light & Traction Company, which went into the hands of receivers recently.

Track and Roadway

Pacific Electric Railway, Los Angeles, Cal—Plans are being discussed for the rearrangement of the San Pedro and Seaside Park lines of the Pacific Electric Railway in Long Beach.

Pacific Gas & Electric Company, San Francisco, Cal.—Extensions and improvements involving an expenditure of $3,400,000 are contemplated by the Pacific Gas & Electric Company during the current year.

Chicago, Fox Lake & Northern Electric Railway, Chicago, Ill.—The Public Utilities Commission of Illinois has ruled that the Chicago, Fox Lake & Northern Electric Railway has no right to build a suspended monorail road between Evanston and Palestine and ordered the company to discontinue issuing securities for financing the project. [May 4, '18.]

Illinois Central Railroad, Chicago, Ill.—The question of equipping the Illinois Central Railroad lines within the city limits for electrical operation is under consideration by the City Council of Chicago. Plans for carrying out the project will be submitted to the Council by the railroad and city engineers.

Pekin (Ill.) Municipal Railway.—The city of Pekin has been offered a quantity of second-hand street car rails for use in the extension of the Pekin Municipal Railway to the East Bluff under terms which are favorable to the building of the line. It is generally conceded that the line should be extended to the East Bluff as soon as possible as there is a wide range of territory to be served there and the public demand for the extension is marked.

West End Street Railway, Medford, Mass.—The Board of Aldermen has granted the petition of the West End Street Railway, the lines of which are leased to the Boston Elevated Railway, for the relocation of its tracks on Main Street from the Somerville line to Mystic Avenue and on Salem Street, from Medford Square to the Malden line.

Mexico (Mex.) Tramways.—While details of the arrangement by which the Carranza government has turned back to the Mexico Tramways company the electric railway system of the City of Mexico and the Federal District have not been made public, it is reported that the conditions require the early carrying out of the company's original plans for the construction of interurban lines between Mexico and Pueblo and Toluca. These two lines were under construction at the time the revolutionary period was inaugurated nearly nine years ago. At that time the company also had its plans well advanced for the building of a scenic railroad up the slopes of Mount Popocatepetl. This road was to have been of the cog-rail type for the last few thousand feet of the ascent.

Perry, Mo.—It is reported that I. S. Fisher of Moscow Mills, Mo., proposes the construction of an electric railway from Perry to Mexico.

Cumberland Railway & Power Company, Fayetteville, N. C.—Construction has been begun by the Cumberland Railway & Power Company of its line in Fayetteville.

Tulsa (Okla.) Street Railway.—Work has been begun by the Tulsa Street Railway on its Pearl Street extension from Hodge Street to the Lowell school.

Guelph (Ont.) Radial Railway.—The city of Guelph plans to issue bonds to pay for the reconstruction of an extension of the Guelph Radial Railway from Hespeler Street north to Mount Forest Street.

Berlin & Northern Railway, Kitchener, Ont.—The Ontario Legislature has authorized the Berlin & Northern Railway to change its name to the Waterloo-Wellington Railway, and has granted an extension of time for three years within which to extend its line from Bridgeport, its present terminus, to Elora and Fergus, Ont.

Montreal (Que.) Tramways.—It is reported that plans are being made by the Montreal Tramways for double-tracking 10 miles of its line on Lawrence Street to Gouvain Boulevard and through the village of Bordeaux to Park Avenue.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—The Charleston Consolidated Railway & Lighting Company is reconstructing its track on the east side of the Meeting Street road from the plant of the Tuxbury Lumber Company to the Five Mile House.

Sudbury-Copper Cliff Suburban Electric Railway, Sudbury, Ont.—The Ontario Legislature has granted the Sudbury-Copper Cliff Suburban Electric Railway a three-years extension of time within which to complete the construction of its proposed extensions.

Montoursville (Pa.) Passenger Railway — The Montoursville Passenger Railway reports that it will reballast and lay new ties on 1 mile of track. The company states that it would like prices on bituminous binders for 1 mile of track.

Power Houses, Shops and Buildings

Iowa Southern Utilities Company, Centerville, Ia.—Construction of a 20-mile extension is planned by the Iowa Southern Utilities Company of its transmission line from Diagonal to Shannon City and Tingley.

United Railways & Electric Company, Baltimore, Md.—A contract has been awarded by the United Railways & Electric Company to the Singer-Pentz Company, Baltimore, for the construction of a shelter station at Sparrows Point, to cost $10,000.

Morris County Traction Company, Morristown, N. J.—This company reports that during the next four weeks it expects to place contracts for the construction of a small dispatcher's office at Summit, N. J., and contemplates the construction of a substation at Denville.

London & Port Stanley Railway, London, Ont.—A report from the London & Port Stanley Railway states that it has awarded a contract to John Hayman & Sons, London, Ont., for the construction of a stone and brick passenger station at St. Thomas, Ont.

West Virginia Traction & Electric Company, Wheeling, W. Va.—The West Virginia Traction & Electric Company has recently completed the installation of new coal handling equipment in its Morgantown power house to facilitate operations.

Wheeling (W. Va.) Traction Company.—The Wheeling Traction Company contemplates the construction of a two-story carhouse and shops at a cost of about $75,000.

Professional Notes

Hubbel & Meaden is the name of a new firm of tax and accounting consulting experts which will have offices at Room 306 Hickox Building, Cleveland, Ohio. Charles H. Hubbell, one member of the firm, was formerly with the Illinois Utilities Commission and later was federal tax consultant of the First National Bank of Cleveland and author of "A Story of the Income Tax" and "A Story of Liberty Bond Interest." Douglas S. Meaden was formerly statistician of the Illinois Public Utilities Commission.

John F. Vaughan, engineer, 185 Devonshire Street, Boston, Mass., has resumed his engineering practice. His resignation of his position as district manager (New England) for the Emergency Fleet Corporation became effective on May 1. Mr. Vaughan had been associated with Stone & Webster and with the late Col. N. H. Heft in the pioneer electrification work of the New York, New Haven & Hartford Railroad on the Nantasket Beach and other lines.

Major George F. Sever, Engineers, U. S. A., has been honorably discharged from the United States Army after a service of fifteen months and will make his headquarters in New York City for consulting engineering practice. Major Sever, during his service, made extensive and detailed investigations of the electric power conditions in New England as well as on the Pacific Coast from Seattle to Los Angeles. His investigations covered careful analyses of the production of power by coal, oil and water, and the comparisons of these different methods.

Trade Notes

A. N. Hargrove, foreign sales manager of the J. G. Brill Company, located at the company's Philadelphia office, has resigned his position.

W. B. Conwell has been elected president of the Safety Car Heating & Lighting Company to take the place of P. M. Dixon, who died a few months ago.

J. P. Alexander, formerly purchasing agent Wheeling (W. Va.) Traction Company and later representative of the General Electric Company at Trenton, N. J., is now connected with the power and mining department of the General Electric Company in New York City.

Walter A. Zelnicker Supply Company, St. Louis, has appointed F. X. Meehan advertising manager. Mr. Meehan was connected with Fairbanks, Morse & Company for six years; the Santa Fé Railroad for two years; and the St. Louis Smelting & Refining Works for two years.

Massey Concrete Products Corporation, Peoples Gas Building, Chicago, announces the appointment of P. E. Longstreet as resident manager of the Western district, in charge of all sales in that territory, with headquarters at 925 South Sixth Street, West, Salt Lake City, Utah.

Elwell Trolley Supply Company has arranged for representation on the Pacific Coast in Portland, San Francisco, and Los Angeles through the Eccles & Smith Company. An office has also recently been established at 332 South Michigan Avenue, Chicago, Ill., with M. O. Payne as manager.

Ohmer Fare Register Company, Dayton, Ohio, announces in "A Record of Recent Business" that twenty-seven different companies adopted Ohmer registers since January, 1918, while forty-nine companies renewed their existing contracts. In addition to these contracts, ninety companies increased the number of registers used on their lines.

R. W. Van Pelt, for the past two years in charge of Western sales of the insulated wire department of the B. F. Goodrich Company, Akron, Ohio, with headquarters in Chicago, has been promoted to charge of Eastern sales, insulated wire department, New York City headquarters. Mr. Van Pelt for a number of years was connected with the American Steel & Wire Company in a sales capacity for its insulated wire and cable department both in the Chicago and the Pacific Coast offices. He joined the B. F. Goodrich Company in 1912.

New Advertising Literature

Van Dorn Electric Tool Company Cleveland, Ohio: Descriptive folder of the company's portable electric grinders.

Joseph T. Ryerson & Son, Chicago, Ill.: Bulletin 20,145 describing the Riley universal elliptic spring forming machine.

Union Switch & Signal Company, Swissvale, Pa.: Bulletin 92, describes the single and double-pole types of "Union Vane Relays."

Locomotive Superheater Company, New York: Bulletin T-2 of the Elesco superheater. Designed originally for a superheater of locomotives, this superheater has been adapted to stationary boilers, where it possesses many advantages.

Allis Chalmers Manufacturing Company, Milwaukee, Wis.: Bulletin No. 137 entitled "Works and Products," presenting in condensed form a description of the company and its capacity for production of prime movers and electrical machinery.

Roller Smith Company, Bethlehem, Pa.: Bulletin sheets Nos. 73 and 74 on "Standard" type alternating current and direct current circuit breakers, both overload and under voltage types, and Bulletin No. 550 on "Imperial" type direct current relays.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 53 New York, Saturday, June 7, 1919 *Number* 23

Constructive Maintenance Raises the Standard of Equipment

ONE of the perplexing problems which progressive superintendents of equipment and master mechanics have to solve is to decide when the additional cost paid for "extra good" material is justified by the results obtained. All realize that the better the material the less will be the trouble experienced in maintaining the equipment, and all are anxious to avoid all the trouble possible. Unfortunately, the cost of a material is not a safe standard by which to judge performance in service. Purchasing agents often cannot understand why the material that is the lowest in price is not the cheapest to buy. Hence the men responsible for the safe operation of the equipment should have at hand plenty of data to prove that it is excessively costly to use poor material.

Aside from the consideration of the cost and trouble resulting from the use of poor-quality supplies, there is another which may be termed "constructive maintenance." By this is meant the renewing of worn-out parts with others which are better than those replaced. By employing such a plan the standard of the equipment is continually raised so that instead of being restored to their original condition, such essentials as motors, controllers and compressors are constantly being put into better condition than ever before. Under high-class maintenance the usefulness, efficiency and life of equipment are always on the increase. With electric railway equipment, where safety in operation is of the highest importance and the first consideration, the best is none too good.

City Track Not an Energy Saver

THAT the originator of the cheap automobile, himself, should have recognized the value of rails for passenger transportation is quite an event. Indeed, the fact should go far to straighten out the confused minds of the still-numerous city officials who are suffering from the effects of the motor-bus virus.

One does not have to go far to find a reason for preferring rails to rubber tires in view of the latter's extremely high cost when used on heavy vehicles. However, it is the cost of tires rather than the economy of steel rails that enforces the use of track. For example, the very general belief that the track effects large energy savings is really erroneous. Indeed, the energy consumption of a reasonably large car in city service will not be greatly different whether the vehicle be on rails or on asphalt streets; rubber tires, of course, being necessary in the latter case. This rather surprising condition is at once explained when one considers that, in city service, all except a small percentage of the energy consumed by the car is expended in acceleration after stops, rolling resistance being only an incidental item. For example, an energy consumption of 150 watt-hours per ton-mile is quite common in city service where frequent stops are demanded. But if the stops are cut out in part, as in interurban service, the energy consumption falls to the vicinity of 75 watt-hours per ton-mile in spite of the greatly increased wind resistance due to the higher speed. If the stops should be cut out altogether, the demand for energy becomes merely that required to overcome wind and rolling resistance at, say, 20 m.p.h. and the friction losses, which amount all told to something like 40 watt-hours per ton-mile for light cars, or in other words make up a total resistance of 20 lb. per ton.

On rails the pure rolling resistance is almost negligible, being probably less than 1 lb. per ton, and this is practically the only component of energy consumption that would be affected if a railway car should be equipped with rubber tires and run upon the street pavement instead of smooth steel. In this case the total energy consumption would rise by the amount of the increased rolling resistance of rubber tires on pavement, and as the total resistance of rubber-tired vehicles on asphalt pavement has been found to about 35 lb. per ton at 20 m.p.h. (equivalent to about 70 watt-hours per ton-mile) it could be said that the difference between this figure and the energy consumption of 40 watt-hours for a free-running railway car would measure the loss due to the use of tires or the saving to be effected by the use of rails. This difference amounts to 30 watt-hours per ton mile. The result is influenced by the fact that the total resistance of automobiles includes a relatively large component of wind resistance because of the relatively light weight and wind-catching form, and there is also a component of opposite value due to the practice of rigidly mounting railway wheels upon their axles, thus involving slippage at curves. However, since the two components are of opposite value they may be considered as offsetting each other, at least sufficiently for present purposes, and therefore they may be canceled out.

Consequently, removal of a railway car from its rails and running it on the street may be considered as resulting in an increase of 30 watt-hours per ton-mile in energy consumption. If the car should have been in a city service demanding 150 watt-hours per ton-mile the energy input under the new conditions would become 180 watt-hours. Then if the car should be put back on rails the saving in energy due to the use of rails would be 16 per cent. Expressed in terms of cost, the saving of 30 watt-hours per ton-mile would be worth about 0.05 cent per ton-mile; or, for a 7-ton car, would be worth 0.35 cent per car-mile. Such a saving, although well worth consideration in these ultra-economical days, becomes insignificant when compared to the interest charges on modern track, and in consequence one must look to the prohibitive cost of the alternative device—the rubber tire—rather than to the inherent economy of a permanent way of steel to warrant the latter's continued existence.

Win Walkers, Save Sole Leather and Make Money

THE statement recently attributed to the president of the Dallas Railway, that if it comes to a point where fares must be raised to avoid bankruptcy he is through with that company, must make strange reading for those who profess to believe that railway men are looking only to abnormal profits when they seek to have the rates of fare advanced. However, if one is to judge by the results on numerous properties which have experimented with higher fares, one is likely to conclude that this is not the best way out of the difficulties which surround the railway industry. A striking illustration of this fact is given in the report of the Boston Elevated for last February when the receipts per revenue passenger were 8.15 cents and the cost per passenger 9.30 cents—this, of course, including a reasonable return on the investment which nowadays is regarded as part of the cost of service.

In this connection it is worth while to consider one of the points made by Harlow C. Clark in an address before the New England Street Railway Club in which he stated that unless the electric railways make people want to ride they will not secure or retain that class of riders who do not have to ride. It is becoming increasingly evident that the ideal fare problem solution has not yet been worked out. It certainly does not appear to consist in advancing fares again and again until a great proportion of the profitable short-haul riders are driven away. The number is growing who think it is more likely to be found in some form of zone fare collections.

While the best form of zone system is being determined, there is every reason why the railways should give serious attention to building up their business by encouraging increase of the riding habit under existing rates of fare. Some roads already have found a happier turn of affairs since the return of war workers and a resumption of certain lines of industry.

The only roads which cannot profit by such increased business are those unfortunate institutions which are said to find additional expense in every extra passenger hauled. Disregarding this class of companies, there should be hope in the present tendency toward heavier travel, and the wise manager is he who knows how to get the best results out of the situation.

As President T. E. Mitten of the Philadelphia Rapid Transit Company said in a letter to the employees of that company on May 28, 1919: "Improve our salesmanship so as to sell more of that which we have for sale—street car rides. We must sell the empty seats in the off-peak hours to those who now walk or use other transportation. Every person in the territory we serve is a possible car rider. As the common carrier for the entire community, we fall short of doing our full duty to the public if we do not make a car rider of every walker, every automobile user and every steam railroad passenger who can be more conveniently and cheaply carried by street car."

Here, as in every instance where public favor is sought, the best means of reaching that end must be studied. The railway operator must learn to distinguish between car service and service in the broadest sense. It is not a question of how many cars are on the street but of operating them when and where they are most needed. The conductors and motormen who run them must be taught how to make friends for the company. Now that summer is at hand there is a greater opportunity for attracting additional business outside the rush hours. Many companies are said to be economizing on advertising of attractions along their lines. They might well consider the possibilities of attracting riders who are likely to be in a mood for relaxation now that the strenuous days of war making are over. Once having secured these patrons every effort should be bent to make of them friends who will come to the front in times of adversity. This is the field for the modern transportation salesman.

"Poland Isn't Lost Yet"

WITH this slogan the Poles comforted themselves through many years of oppression until the day of glory did arrive. To-day it is the electric railway industry which is passing through so dark a period that those who claim to see even a glimmer of hope ahead must produce sound evidence for their slogan: "The electric railway isn't lost yet." The man who is asked to furnish new money cannot be convinced by arguments on the usefulness of electric railways as a class but only by facts and deductions on individual situations. Such individual analyses will prove that it will pay to put new money into a large proportion of our electric railways.

The largest group, namely, small and medium-size properties, can probably invest most profitably by introducing the one-man safety car. When bankers can be shown what a high return this car pays in both money and good-will, they will not be so chary about furnishing the money. Through this type of operation many railways could get their investment in cars back in two or three years: Let us quote the condition on a property recently visited.

This railway is in a small city of the Central States. It used to have the field to itself. After a jitney fever, competition assumed the more menacing form of small motor buses which now carry three times as many passengers as the railway! Because of turnout spacings, the railway cannot give better than a fifteen-minute headway whereas buses are run every two or three minutes. There is no hard feeling against the street railway company. The public simply take the first vehicle that offers, except those people who go to the end of the line, for the buses stop where the paving stops. Because of these very riders, the street railway had to raise its fare from 5 cents to 7 cents while the short-haul buses still continue at 5 cents. This raise in fare caused the loss of more patronage, the 40 per cent increase producing only 12 to 15 per cent more revenue. To summarize: Insufficient track facilities and absence of one-man frequent-service cars are causing the railway to lose at least $300 a day in receipts. Obviously it would not take very long to return the outlay on an opportunity of this kind and bankers ought to be willing to finance it after a personal investigation of the exceptional conditions.

Brooklyn's decision to use 200 safety cars indicates that this car also is suitable to the lighter lines of large city systems, but such properties should find still further opportunities in creating an entirely new class of traffic through short-ride fares. When 25 per cent of the traffic in a city like Aberdeen comes from people who ride less than 0.6 mile it must be clear that there is merit in frequent service and a graded fare which does not penalize the short-haul rider for the long-distance passenger. And why not follow also the example of British municipal roads in eliminating needless track? Surely there are cities where one route with a five-minute service will serve the public better than two routes with ten-minute headways. Also, the more agitation for the removal of duplicate track, the more will the public appreciate the fact that street railways are not uniformly profitable.

Even the interurban, which has suffered so much from the automobile and the motor truck, can face the future with confidence. On the technical side it has much to hope from the automatic substation and from lighter cars; on the operating side, it has barely touched the possibilities of freight development as brought out so thoroughly in A. B. Cole's recent analyses.

There yet remain two groups for which, frankly speaking, there is no hope as commercial propositions. These are the tiny-town and suburban railways, usually the result of land promotion schemes, which should never have been built because of the paucity of customers. The former class ought to face the music and go out of business; the latter must ultimately meet the same fate unless their usefulness to the communities served justifies their being taken over as a community service. There is no more logic in a private operator running an electric railway at a continuous loss than in running a grocery under like circumstances. Although both are essential industries that fact does not bar them from failing through lack of customers.

Crossing Flagmen Cost Less Than Needless Conductors

ONE OF the few valid objections offered to the use of the modern, one-man car is that involved in the flagging of steam railroad crossings. For some rarely-used spur or unimportant crossing, it is sufficient for the operator (of one-man cars) to give a lookout, if there is nothing to obscure his view. At busy crossings where there is no flagman, it is customary with a two-man car for the conductor to look up and down the track before ordering his car across. In one city where there are many grade crossings the management was very timid about adopting one-man cars for this reason. The usual rule about the conductor signaling across the crossing had always been very rigidly enforced and the management thought no other plan was possible. But when the number of flagmen required to protect every live crossing was checked against the number of really needless conductors, it was found that the latter exceeded by six times the number of conductors who had formerly been required. Nor will this advantage be confined to this saving in man-power, which can be applied to a more profitable purpose in giving additional service. It is obvious that when the crossings are flagged, the one-man cars can run over them without the loss of a second instead of causing the annoyance and delay, in fair weather or foul, which is inevitable when a car must be flagged across by a dismounted conductor.

The Electric Railway Power Situation as Disclosed by Census Data

THE 1907-1912 statistics furnished by the United States Bureau of the Census and published in the issues of this paper for April 26 and May 3 furnish a basis for study of the power end of the electric railway business. Briefly stated, they show that in 1917 the electric railways of the country used the enormous total of more than 12,000,000,000 kw.-hr. of energy, 35 and 154 per cent more than the consumptions in 1912 and 1907 respectively. During the semi-decade ending with 1917 the kilowatt capacity of railway power houses increased 17 per cent and the output 21 per cent. In one section the corresponding figures were about 47 per cent and more than 100 per cent, while of course some sections were much below the average.

The data show then that there is a fair growth in the power business of the electric railways in spite of the manifest tendency on their part in some sections to purchase power. The facts in this connection, as disclosed by the report, are these: In 1912 almost exactly two-thirds of the power used by the railways was generated by them and one-third was purchased. The corresponding fractions for 1917 were six-tenths and four-tenths. This is not surprising because in a number of places it is found to be cheaper to buy electrical energy than make it, and in almost all cases it has been difficult to procure capital with which to make extensions, such capital as was available being more urgently needed elsewhere than in the power plant.

The statistics cited above lend interest to some editorial comment in a recent issue of an engineering contemporary. The writer says, in substance, that transportation and not power production is the real job of the electric railway man. And further, apropos of some contemplated extensions on a large electric railway system, he says that it is not good business to make large expenditures for that which is in the nature of a side line when the main enterprise requires all of the capital that can be commanded. While in general the logic of this is sound, several points must not be overlooked. First, there is a railway plant capacity of about 3,000,000 kw. extant. At $100 per kilowatt the corresponding investment is $300,000,000 which must be retired gradually if at all. Then there are many interurban and city lines that are not near efficient and reliable central stations and cannot get a satisfactory energy supply from an outside source even if they desire it. Again there are many highly economical railway plants which are large enough to be operated independently and which are being kept up to date in equipment and operating procedure.

As has been pointed out in these columns before, power generation economy in a modern power plant depends largely on the load factor. Many railway companies have good plants and if they can fill in the depressions of the load line by means of industrial load they are in a good position to compete in economy and in the sale of power with the central stations. Many interurban companies, particularly, have been able to develop a lucrative power business at places along their lines, and there is no reason why this business should not increase. It is important, however, that the railway men who are responsible for the power supply make every effort to keep informed as to developments in this field, for rapid progress is being made in steam and electrical machinery design and manufacture.

Relieving Congestion in Baltimore's Delivery District

Comprehensive Plan Now Being Carried Out Is Noticeably Improving Traffic Conditions, Particularly in the Half-Mile-Square Dense Business Region

By L. H. PALMER
Assistant to the President United Railways and Electric Company

FOR a number of years the congestion of traffic in the business center of Baltimore had been increasing. This condition developed much more rapidly in recent years with the more widespread use of automobiles. Finally the point was reached where practically all the cars possible were being operated on Baltimore and Fayette Streets, the main two east and west business thoroughfares of the city.

Several causes aggravated the difficulty: (1) the considerable grades which are a feature of the topography of the city; (2) the irregularity of the harbor front; (3) the complicated layout of the streets; (4) the narrowness of the thoroughfares; (5) the lack of efficient and modern regulation and control of the traffic situation; (6) the restricted area of the business district, which is about ½ mile square, and (7) the location of a great proportion of the wholesale business in addition to retail, professional, banking and other general business and commercial work, all in this small congested section. Much of the manufacturing is also done either within or on the outskirts of this restricted district. Baltimore has many large establishments for manufacturing clothing, straw hats and similar business which can be carried on in loft buildings, and these industries employ large numbers of persons in proportion to the amount of ground area occupied, compared with other manufacturing, such as rolling mills or similar industries. Much of Baltimore's freight is water-borne and factories have located near the wharves which bound one side of the congested district.

The officers of the United Railways & Electric Company which operates all of the city electric railway service in Baltimore, determined to obtain competent advice upon this serious problem of congestion, in the effort to arrive at a solution which would permit the operation of additional service into and through the congested downtown district and permit also of more efficient handling of their service for the public use. The congestion and the resulting delays had seriously affected not only the rapid movement of passengers, but also the regularity with which they could obtain service, both of these results affecting the main problem of furnishing more service.

In the early part of 1917, A. L. Drum & Company, construction and consulting engineers, who had successfully solved similar problems in other cities, were engaged for this investigation. Exhaustive studies were begun in the spring of 1917 under the personal direction of Mr. Drum, with E. M. Maddox, resident engineer, in charge. The facilities and resources of the company, including the advice and assistance of its operating staff, were placed at Mr. Drum's disposal, and the work was completed in the fall of 1917, when a report was submitted recommending the rerouting of twelve lines. The recommendations were adopted by the railway company.

With one exception, this rerouting was all confined to the congested business district. One new through route from northeast to southwest Baltimore was inaugurated, and as a result one new operating base was established for this new Federal Street-Columbia Avenue line. Later, due to local conditions which developed opposition, the routes of two of the lines were left unchanged, but the general scope and effect of the plan was not destroyed by this revision, although better results would have followed had the original recommendation been carried out.

In summary, the rerouting was predicated upon three

TABLE I—RUSH-HOUR SERVICE IN CARS PER HOUR AT POINTS OF MAXIMUM CONGESTION ON EACH STREET, AND INCREASE OR DECREASE IN CARS PER HOUR UNDER THE REROUTING PLAN

East and West Streets	Former East Bound	Former West Bound	Present East Bound	Present West Bound	Increase or Decrease* in C. P. H. Operated East Bound	Increase or Decrease* in C. P. H. Operated West Bound	Per Cent Increase or Decrease* in C. P. H. Operated East Bound	Per Cent Increase or Decrease* in C. P. H. Operated West Bound
Fayette (Charles to Howard)...	152	132	123	96	*29*	*36*	*19*	*27*
Baltimore (Gay to South).....	155	138	100	85	*55*	*53*	*35*	*38*
Redwood† (South to Charles)......	83	106	82	76	*1*	*30*	0	*28*
Lombard (Howard to South).	30	0	70	73	40	73	133	..

North and South Streets	Former North Bound	Former South Bound	Present North Bound	Present South Bound	Increase or Decrease* in C. P. H. Operated North Bound	Increase or Decrease* in C. P. H. Operated South Bound	Per Cent Increase or Decrease* in C. P. H. Operated North Bound	Per Cent Increase or Decrease* in C. P. H. Operated South Bound
Paca (Baltimore to Lombard)..	..	..	86	80	86	80	..	..
Eutaw (Baltimore to Redwood†).......	19	19	16	16	*3*	*3*	*15*	*15*
S. Howard (Baltimore to Redwood†)...	108	121	30	45	*78*	*76*	*72*	*63*
Park Ave. (Franklin to Redwood†)...	61	58	70	70	9	12	15	21
Charles (Fayette to Baltimore).	48	41	12	12	*36*	*29*	*75*	*29*
Calvert (Center to Pleasant)..	56	60	56	60	..	..	..	..
South (Redwood† to Lombard)....	77	48	28	28	*49*	*20*	*64*	*42*

*Italics indicate decrease.

†Formerly German.

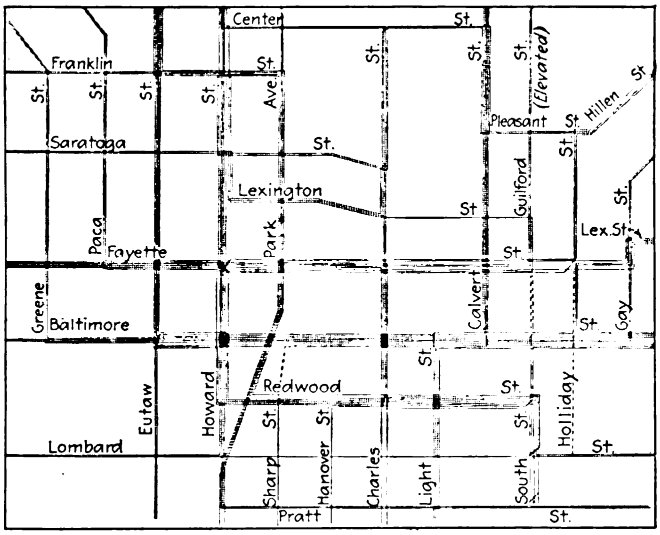
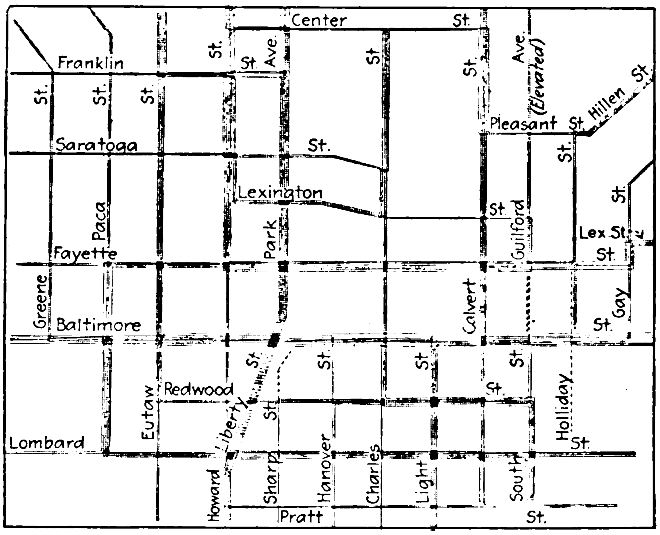

Center
St.
Franklin
St.
St.
St.
St.
St.
Ave.
St.
St.
St.
(Elevated)
Hillen St.
Pleasant St.
Saratoga
St.
St.
Lexington
St.
Guilford
Paca
Fayette
Lex. St.
St.
Greene
Baltimore
Park
Calvert
St.
Gay
St.
Redwood
St.
Holliday
Eutaw
Howard
St.
St.
St.
Lombard
St.
Sharp
Hanover
Charles
Light
South
Pratt
St.

FIG. 1—LINES OF THE UNITED RAILWAYS & ELECTRIC COMPANY, BALTIMORE, MD., BEFORE REROUTING


Center
St.
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Ave.
(Elevated)
Hillen St.
Pleasant St.
Saratoga
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St.
Lexington
St.
Guilford
Paca
Fayette
Lex. St.
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Park
Greene
Baltimore
Calvert
Gay
St.
Redwood
Liberty
St.
St.
St.
St.
St.
Holliday
Eutaw
Lombard
St.
Howard
Sharp
Hanover
Charles
Light
South
Pratt
St.

FIG. 2—BALTIMORE LINES AS REARRANGED UNDER THE REROUTING PLAN

principles, namely, (1) balancing and equalizing the amount of traffic on adjacent streets; (2) locating terminals outside of or on the outskirts of the congested district; (3) providing for turning movements at corners outside or on the outskirts of the congested districts.

Consequent upon these changes, additional loop operation was utilized in the business district, to assist in prompt handling of service. This was particularly desirable because the narrow streets do not lend themselves to the use of crossovers for terminals.

AT SOME POINTS THREE-QUARTERS OF CAR-HOURS WERE TRANSFERRED

Fig 1, showing the routing before the changes, and Tables I and II contain data illustrating the congestion on Baltimore and Fayette Streets compared to the traffic on the two adjoining parallel streets to the south, viz., Redwood (formerly German) and Lombard Streets. It will also be noticed that Howard and Fayette Streets, and Baltimore and Howard Streets were complicated by turning movements which made these two intersections the limiting points on these two thoroughfares. Fig. 2, showing the routing after the changes were effected, together with Tables I and II, indicate how the use of the four parallel and adjacent streets has been balanced.

At the time the rerouting study was made, 638 cars, or 66 per cent of the 960 cars leaving the business district during the maximum evening rush hours, were operated on Fayette and Baltimore Streets. Fifteen lines out of a total of twenty-four leaving this same district were operating practically at their maximum capacity, because of the congestion on these two streets. It was thus evident that service could not be increased without first relieving the existing congestion. As a direct result of the large number of cars on these two streets, the congestion at a number of intersections was such that the service operated through the central area on some of the north and south streets had been limited, and two of the most important intersections, viz., Fayette and Howard Streets, and Baltimore and Howard Streets, had reached their capacity.

TABLE II—STATEMENT SHOWING TOTAL CARS PER HOUR OPERATED ON STREETS IN THE BUSINESS DISTRICT DURING MAXIMUM EVENING RUSH HOUR.

	Former		Present		Increase or Decrease*		Per Cent Increase or Decrease*	
East and West Streets	East Bound	West Bound	East Bound	West Bound	East Bound	West Bound	East Bound	West Bound
Lexington	...	89	...	89	...	...	...	...
Saratoga	40	...	40	...	...	...	...	...
Fayette	196	175	147	120	*49*	*35*	*25*	*29*
Baltimore	190	173	149	145	*41*	*28*	*22*	*16*
Redwood (formerly German)	83	106	82	76	*1*	*30*	...	*28*
Lombard	93	59	70	73	*23*	14	*25*	24

	Former		Present		Increase—or Decrease*		Per Cent Increase or Decrease*	
North and South Streets	North Bound	South Bound	North Bound	South Bound	North Bound	South Bound	North Bound	South Bound
Paca	19	20	82	84	63	64	332	320
Eutaw	59	59	59	59	...	...	...	...
Howard	276	239	207	175	*69*	*64*	*25*	*27*
Park Avenue	61	58	70	70	9	12	15	21
Sharp	...	29	...	29	...	...	...	...
Hanover	35	...	35	...	...	...	...	...
Charles	88	100	88	100	...	...	...	...
Light	40	50	40	50	...	...	...	...
Calvert	56	60	86	60	30	...	54	...
Guilford or South	172	107	123	87	*49*	*20*	*28*	*19*

*Italics indicate decrease.

TABLE III—CARS PER HOUR DURING MAXIMUM EVENING RUSH HOUR AT IMPORTANT INTERSECTIONS IN CONGESTED DISTRICT

	Cars Per Hour Operated at Intersection		Decrease in C. P. H. Operated	Per Cent Decrease in C.P.H. Operated
	Former	Present		
Fayette Street and Howard Street	398	294	104	26.1
Fayette Street and Park Avenue	403	359	44	10.9
Fayette Street and Charles Street	308	243	65	21.1
Baltimore Street and Howard Street	438	267	171	39.0
Baltimore Street and Charles Street	298	216	82	27.5
Baltimore Street and Light Street	267	185	82	30.8
Baltimore Street and Gay Street	293	185	108	36.9
Redwood Street (formerly German) and Howard Street	229	145	84	36.7
Redwood Street (formerly German) and South Street	189	120	69	36.5

TABLE IV—CAPACITY IN CARS PER HOUR OF FORMER MAXIMUM RUSH HOUR WITH ESTIMATED MAXIMUM CAPACITY UNDER REROUTING PLAN

Sections of the City Served	Former Routing, Former Service	Present Routing, Maximum Service	Per Cent Increase
Northeast	244	356	45.9
Northwest	341	462	35.5
Southwest	153	258	68.6
Southeast	222	327	47.3
Total	960	1403	46.1

To quote from the report: "The proposed system of routing contemplates only such changes as are necessary to relieve the present congestion in order to provide for increasing the service on all existing car lines, and at the same time providing all patrons of the street cars with direct service and reasonably good delivery with the least possible inconvenience due to the necessity for changing existing conditions.

"In order not radically to change existing conditions and to obtain reasonably good delivery, it is necessary that the east and west delivery be maintained on a majority of the lines entering the delivery district. The relief in congestion on the main downtown streets of Baltimore is accomplished principally by a more equal distribution of the cars on the east and west streets utilizing the now unused capacity on Redwood (formerly German) and Lombard Streets and eliminating as far as possible the curving movement of cars so as to reduce the congestion at street intersections in the delivery district.

"Under the proposed system of routing the total track capacity of the delivery district is increased about 46 per cent, as shown in Table IV, on page 1083, and the traffic is so distributed that every line has sufficient available capacity to provide for several years' increase before reaching such congestion as to produce the slow and irregular movement now found on Fayette and Baltimore Streets."

INSTALLING SPECIAL WORK AT BALTIMORE AND CALVERT STREETS

It will be noted that for each of the four sections of the city, as a result of the plan proposed, it was estimated that there was a considerable capacity available for future traffic requirements. This increased capacity was estimated at 443 cars per hour or 46 per cent.

The estimated maximum service is based upon fewer maximum rush-hour cars at controlling points than now operated, so as not to produce the slow-moving and congested conditions now found on Fayette and Baltimore Streets. The number of cars allowed in the estimated figures on Baltimore and Fayette Streets is 140, against 155 cars and 152 cars formerly operated at the most congested sections of these streets. The maximum number of cars allowed on the north and south streets crossing these main east and west streets is 100.

It will be obvious that the increased capacity made available is more or less flexible, so that the future increases can be allotted to the lines requiring them.

As an illustration of the results accruing from the rerouting it should be noted that the relief estimated at the point of maximum congestion, eastbound on Fayette Street, was twenty-nine cars during the maximum rush hours, equivalent to 19 per cent of the car movement, and westbound, thirty-six cars per hour, equivalent to about 27 per cent of the present movement. On Baltimore Street, eastbound, it was estimated at fifty-five cars per hour, during the maximum rush hour, or about 35 per cent of the present movement; and westbound fifty-three cars or about 38 per cent. Similarly at the Fayette and Howard Street intersection it was 104 cars during the maximum rush hour or about 26 per cent, and at the Baltimore and Howard Street intersection, 171 cars or about 39 per cent.

It is well known that cars curving around a corner of an intersection materially decrease its capacity, compared with right-angle movements; hence one of the effective means of improving conditions has been the elimination of curving movements at the congested points. As indicating the results to be obtained, the elimination was provided of 103 curved car movements on Fayette St. with an increase of 143 right-angle crossing movements. Similarly the elimination of curved car movements on Baltimore St. was laid down at 142 and the right-angle crossing movements were to be increased by fifty-eight.

One of the most serious problems in a revision of routing, such as that undertaken in Baltimore, is the inconvenience caused to patrons through moving car lines from one street to another, and unless this inconvenience can be shown to be measurably less than the gain to the other parts of the city and of the system, no good can result from making changes.

At the beginning of the study it was recognized that Fayette and Baltimore Streets were more desirable deliveries than Redwood (formerly German) and Lom-

TABLE V.—EFFECT OF REROUTING ON PASSENGER CONVENIENCE AS TO POINTS OF BOARDING AND LEAVING CARS

	Total Number of Passengers On and Off Cars Within Delivery District	Number of Passengers On and Off Cars Required to Change Their Place of Boarding and Leaving Cars Under the New System of Routing	Per Cent of Total Passengers Required to Change Place of Boarding and Leaving Cars
Morning rush hours—6 a.m.-9 a.m.	91,613	15,456	16.9
Evening rush hours—4 p.m.-7 p.m.	101,777	17,536	17.3
Remainder of day	192,214	27,554	14.3
Total	385,604	60,546	15.8
Estimated number of passengers using cars not counted on day of traffic count	39,384	4,563	11.6
Total	424,988	65,109	15.3

bard Streets, and the plan was prepared so as to affect the fewest possible passengers in order to give the relief essential properly to serve all the street car passengers in the city. Quoting again from the report: "In other words, it is the intent and purpose of this plan to serve the public and to afford the greatest convenience to the greatest number, with the least possible inconvenience to the small percentage of passengers affected by the necessary changes."

That this difficult problem was met is shown by the fact that the maximum number of passengers whose points of boarding and leaving cars were moved one block was less than 9 per cent of the total passengers entering and leaving the business district on an average week day, and fewer than 7 per cent of the total passengers had their present points of boarding and leaving cars moved two blocks. These percentages are maximum figures and include many passengers not inconvenienced by the change, as all transfer passengers are included, though the large majority of them were not affected. There are also a number of passengers on these lines who are delivered nearer their destination by the new routing than under the old plan, but no attempt was made to determine what proportion of the 7 per cent and 9 per cent of passengers were thus benefited.

TRACK CONSTRUCTION IN CONNECTION WITH BALTIMORE REROUTING

It should be stated that under the rerouting no portion of any line was moved more than two blocks from its old route.

Table V on page 1084 shows in an interesting way how the percentages were developed.

It will be obvious to all persons familiar with street railway operation and construction that the installation of the special work and the construction of the new track required by the rerouting was a serious task under war conditions. Under the terms of the ordinance, it was necessary for the company to install special work costing upward of $200,000, and new track costing upward of $60,000, within six months. To accomplish this under the war conditions which existed during the summer and fall of 1918 was a most difficult task, the work comprising about 5900 ft. of single track constructed in accordance with rigid specifications and best modern practice.

Special work had to be installed, revised or renewed at twenty-seven locations. The plan also involved the abandonment, for regular operation, of about 5500 ft. of single track, mostly in outlying sections of the city, due to the new through line.

The actual changing of the routes was divided into three steps, which permitted the rerouting to be accomplished with the mimimum of confusion to the public, and enabled the company to install in sequence the various pieces of new track and special work necessary.

The changes were put into effect during the period from Oct. 1 to Dec. 1 and, generally speaking, there have been few complaints from the public, due to the changes in the old time routes, but on the contrary a noticeable improvement in the operation of cars through the congested district, has resulted. The actual results anticipated have not yet been completely realized, due largely to increased traffic congestion.

PUBLIC MUST CO-OPERATE BY CONTROLLING VEHICULAR TRAFFIC CONGESTION

This question of traffic congestion and regulation is among the causes aggravating the problem which confronted the United Railways & Electric Company, as mentioned in the second paragraph on page 1082. No efficient control has been established by the municipal authorities over the use of the streets for parking by vehicles; and Drum & Company in their report, by means of observations which they tabulated, indicate very clearly the difficulties imposed upon the operation of the cars though the failure of the city authorities to adopt modern, progressive methods of traffic regulation and control. The company has been urging this subject upon the attention of the authorities for a considerable period.

During the hearing of the company's 6-cent fare case before the Public Service Commission last winter this subject was brought forcibly and emphatically to the attention of the authorities and the public press, by testimony and graphic exhibits, and since that time an ordinance has been passed by the City Council, which will bring considerable relief when put in force. A gratifying feature of the situation was the fact that the automobile interests gave it their hearty support, recognizing that something had to be done for the benefit of the traveling public. One of the principal things accomplished is the limiting of the parking nuisance, and on certain streets its complete elimination during the afternoon rush hours.

Cars Ready, but No Electricity

A rapid transit electric line running between Osaka and Kobe, Japan, has been extending its lines which will be finished soon. The necessary power for operating this extension was to be supplied by the Osaka Electric Company. The present increased demands for power from this company, however, make it impossible to supply the required amount to operate the transit system. It thus appears that the railroad company must look for power elsewhere, and should it fail in locating a proper supply, the construction of the road must be suspended for the time being.

Supplement to Report 3808

San Diego Electric Railway Adds to Figures Presented to Railroad Commission

AN EXTENDED abstract was published in the ELECTRIC RAILWAY JOURNAL for Feb. 8, 1919, of Application 3808, made by the San Diego Electric Railway to the California Railroad Commission asking for authority to increase its fares. The report went very extensively into the history of the property and showed that in spite of most conservative capitalization and efficient management and including a return on the investment, it was costing the company $1.406 for each $1 of business handled. The report was prepared largely by E. J. Burns, of the company's staff.

A supplementary report has recently been presented to the commission showing, among other things, the estimated operating expenses and revenues for the year 1919 under the present fare, the trend of income and outgo since the organization of the company, etc. These figures are given in great detail. As a summary, the accompanying tables, based on a nickel, were calculated.

A concise definition of each of the items is given in the report. The "investment" is the actual money invested in the property rather than the reproduction cost, this base being taken because the California Commission had indicated its preference for it in its decision in the case of the Town of Antioch vs. Pacific Gas & Electric Company.

TABLE I—SOURCE AND DISPOSITION OF THE NICKEL ON THE SAN DIEGO ELECTRIC RAILWAY FROM 1914 TO 1918, INCLUSIVE

Item	1914	1915	1916	1917	1918
Source of Nickel—Income:					
Revenue from transportation	4.710	4.678	4.715	4.735	4.714
Revenue from other railway operations	0.287	0.257	0.211	0.220	0.250
Non-operating income	0.003	0.065	0.074	0.045	0.036
Total income	5.000	5.000	5.000	5.000	5.000
Disposition of Nickel—Outgo:					
Normal maintenance	.390	.374	.342	.377	.412
Depreciation	1.090	1.330	1.476	1.558	1.404
Power	.435	.442	.402	.639	.650
Conducting transportation	1.415	1.386	1.328	1.421	1.487
Traffic	.130	.283	.098	.120	.067
General and miscellaneous	.442	.542	.534	.656	.690
Total operating expense	3.902	4.357	4.180	4.771	4.710
Taxes assignable to railway operation	.345	.338	.366	.393	.338
Total outgo	4.247	4.695	4.546	5.164	5.048
Net available for fixed charges	.753	.305	.454	*d*.164	*d*.048

d Signifies deficit.

TABLE II—SOURCE AND DISPOSITION OF THE NICKEL ON THE SAN DIEGO ELECTRIC RAILWAY— FROM 1892 TO 1918

Item	Two-Year Period 1892 to 1893 Inclusive	Five-Year Period 1894 to 1898, Inclusive	Five-Year Period 1899 to 1903, Inclusive	Five-Year Period 1904 to 1908, Inclusive	Five-Year Period 1909 to 1913, Inclusive	Five-Year Period 1914 to 1918, Inclusive	Twenty-seven-Year Period 1892 to 1913, Inclusive
Source of Nickel—Income:							
Revenue from transportation	4.90	4.47	4.35	4.63	4.70	4.71	4.68
Revenue from other railway operations	.09	.43	.60	.31	.25	.25	.28
Non-operating income	.01	.10	.05	.06	.05	.04	.04
Total income	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Disposition of Nickel—Outgo:							
Normal maintenance	.40	.94	.87	.44	.59	.40	.51
Depreciation	2.12	2.83	1.47	.74	.81	1.37	1.17
Power	.90	1.11	.70	.48	.48	.49	.52
Conducting transportation	2.31	1.95	1.53	1.29	1.35	1.41	1.40
Traffic	.02	.03	.08	.10	.12	.14	.12
General and miscellaneous	.88	.41	.45	.35	.37	.58	.47
Total operating	6.63	7.27	5.20	3.40	3.70	4.39	4.19
Taxes assignable to railway operation	.09	.11	.10	.10	.19	.35	.25
Total outgo	6.72	7.38	5.30	3.50	3.89	4.74	4.44
Net available for fixed charges	*d*1.72	*d*2.38	*d* .30	1.50	1.11	.26	.56
8 per cent return on average investment	2.01	2.08	1.64	1.20	1.28	1.79	1.56
Surplus or deficiency of the nickel	*d*3.73	*d*4.46	*d*1.94	.30	*d* .17	*d*1.53	*d*1.00

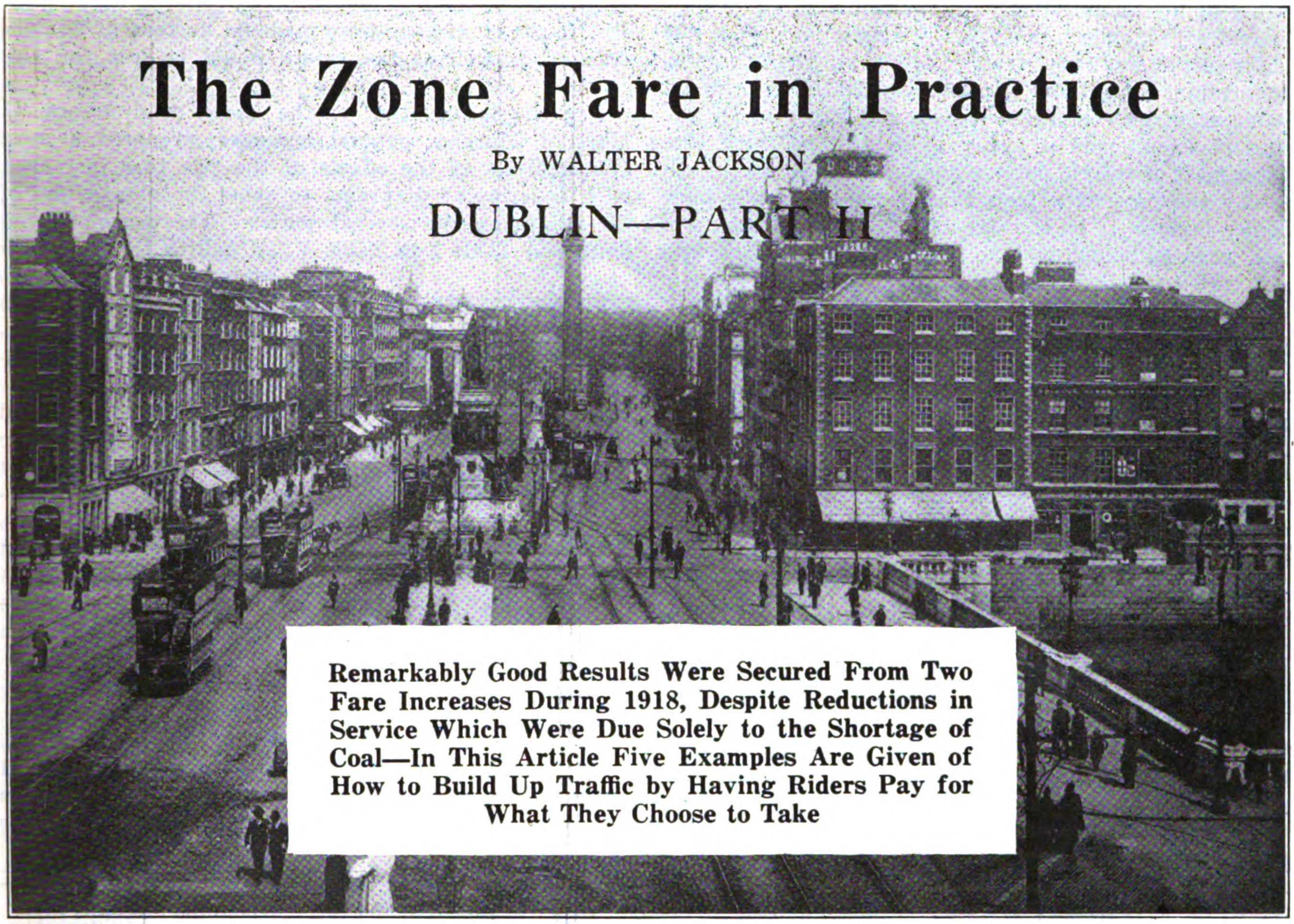
d Signifies deficit.

The Zone Fare in Practice

By WALTER JACKSON

DUBLIN—PART II

Remarkably Good Results Were Secured From Two Fare Increases During 1918, Despite Reductions in Service Which Were Due Solely to the Shortage of Coal—In This Article Five Examples Are Given of How to Build Up Traffic by Having Riders Pay for What They Choose to Take



NELSON'S PILLAR AND SACKVILLE STREET, DUBLIN'S GREAT THOROUGHFARE

UP TO MARCH, 1918, the Dublin United Tramways managed to continue the pre-war services, fares and stages despite the burdens imposed by the war. By that time, however, the need to conserve coal became so urgent that service had to be reduced, as outlined in Part I in the ELECTRIC RAILWAY JOURNAL of May 31, 1919. Similarly the cost of operation had reached the point where more revenue per car-mile was necessary.

As the company was bound by various franchise agreements, it could not change the fares so freely as otherwise. For example, one condition in the Dublin franchise is that the fare within an inner boundary (shown in the map on page 1039 of the issue for May 31) must not exceed 1d. Furthermore, in an agreement made with the municipality in 1897, it was specifically stated that the fare between many of the city termini and the city boundary should not exceed 1d., provided the distance did not exceed 1½ miles, and no fare within the city on any one of the lines should exceed 2d. From Nelson's Pillar as the common terminus, in the sense of this agreement, the company is giving 1½ miles per penny and even a little more where the old boundary happens to be in waste territory.

The first revision of fares, which became effective on April 27, 1918, resulted in raising all but the penny statutory fares to 1½d. The fares on the Dalkey and Howth suburban lines were raised from 5d. to 6d. and the stages were shortened. A few penny fares not required by statute still remained. Following a further advance in wages, the fares were increased a second time on Nov. 4, 1918. Almost all of the overlapping stages were eliminated and other stages were shortened. The fares on the Dalkey 9-mile line and the Howth 9.5-mile line were raised to their present maximum of 7d. and season tickets on these lines were also discontinued during the year. An idea of the increased cost to the suburbanite may be gained from considering that the original one-way fares and round-trip fares on these lines were 5d. and 8d. respectively, which are still the steam rates.

The characteristic features of the first fare revision were the elimination of a few overlaps and the substitution of a 1½d. for a 1d. fare on certain overlaps or on sections which exceeded the statutory length of a penny stage from the center of the city. The adoption of the 1½d. fare did not, of course, affect the majority of the riders, as they could still ride 1½ miles or so to or from the center of the city. Likewise the through 2d. rider remained unaffected. The increased revenue came entirely from former 1d. passengers who had been getting a maximum ride. Many of these actually pay 2d. because they do not think it worth while to walk several hundred yards at the end of the 1½d. stage merely to save a half-penny. This effect was the result of good psychology on the part of the management. If it had not given the passenger the option of saving the half-penny, he would have walked to and from the end of the statutory penny stage wherever possible.

In the second revision of fares a large number of overlaps were eliminated, partly to simplify fare collection. The shorter lines were divided into two zones, the first being approximately the statutory penny stage and the second a 1½d. stage for a slightly longer journey in the outer section and in less settled territory. The terminus-to-terminus fare, however, remained 2d. Thus the 2d. habit acquired voluntarily by the passenger under the first revision made it easier to secure the same rate after most of the old options had been wiped out. Even to-day the passenger feels that he is exercising some choice because if he chooses to pay 2d. at once he will not, when outbound, have to pay another 1½d. if he does not care to walk in the second stage. Then, too, an inbound passenger from the outer zone does not begrudge the payment of a penny more if he gets frequent service.

In discussing the principles that should govern a fare increase, D. Brophy, traffic manager of the company, put much stress on the policy of disturbing as few patrons as possible, of placing a burden where it would fall most justly on the long riders and of making the revisions in a way that left some choice to the riders. There was a limit to raising fares at any given time. Personally, he believed that if the fare to the outer zone were made 3d. instead of 2d., the revenue as well as the riders would be less for this zone.

For the information of the board of directors, G. Marshall Harriss, general manager, prepared a most able analysis of the effects of the two fare increases, with a series of diagrams to show the shortening of the stages on the several routes. The accompanying figures in Table I to Table V, as well as the diagrams reproduced in Fig. 1 to Fig. 5, are taken from Mr. Harriss' analysis.

TABLE I—SUMMARY OF RESULTS OF TWO FARE INCREASES OF DUBLIN UNITED TRAMWAYS TO NOV. 30, 1918

	Jan. 1-March 20 Full Service at Ordinary Fares	March 21-April 26 Reduced Service at Ordinary Fares	April 27-Nov. 3 First Revision of Fares	Nov. 4-Nov. 30 Second Revision of Fares	Totals
Receipts:					
1918.....	£81,946	£38,315	£251,516	£31,361	£403,139
1917.....	66,806	32,033	197,915	26,015	322,771
Increase..	15,139	6,282	53,600	5,345	80,368
Passengers:					
1918.....	15,777,725	7,230,865	37,320,885	4,667,208	64,996,683
1917.....	12,957,682	6,137,591	36,508,494	5,036,469	60,640,236
Increase..	2,820,043	1,093,274	812,391	*369,261	4,356,447
Car-miles:					
1918.....	1,671,614	678,593	3,414 263	431,955	6,196,425
1917.....	1,630,196	756,374	4,080,068	560,185	7,026,823
Increase..	41,418	*77,781	*665,805	*128,230	*830,398
Car-days:					
1918.....	16,523	6,653	33,134	4,202	60,512
1917.....	16,354	7,613	41,130	5,638	70,735
Increase..	169	*960	*7,996	*1,436	*10,223
Receipts per car-mile (pence):					
1918.....	11.76	13.55	17.68	17.42	15.61
1917.....	9.83	10.16	11.64	11.14	11.02
Passengers per car-mile:					
1918.....	9.43	10.65	10.93	10.80	10.49
1917.....	7.94	8.11	8.94	8.99	8.63
Cars per diem:					
1918.....	209.15	179.81	173.47	155.70	181.18
1917.....	207.02	205.75	215.34	208.81	211.78

*Decrease.

Table I gives the general results of the changes in fares and service during 1918 up to Nov. 30. It was only during the heavy influenza period of Nov. 4 to Nov. 30 that there was a decrease of passengers compared with the same period of 1917, but even at that there was a substantial increase in revenue. Furthermore, thirty cars less were run every day between Jan. 1 and Nov. 30, 1918, as compared with the same period of 1917.

TABLE II—RESULTS OF FARE AND SERVICE CHANGES ON TERENURE LINE

	Jan. 1-March 20	March 21-April 26	April 27-Nov. 3	Nov. 4-Nov. 30
Receipts:				
1918.....	£7,716	£3,665	£21,257	£3,113
1917.....	6,453	2,989	16,842	2,510
Increase..	1,263	675	4,415	603
Passengers:				
1918.....	1,531,691	730,662	3,539,286	491,869
1917.....	1,281,860	593,777	3,328,092	498,665
Increase..	249,831	136,885	211,194	*6,796
Car-miles:				
1918.....	145,514	59,017	273,968	38,427
1917.....	139,432	64,681	341,296	48,716
Increase..	6,082	*5,664	*67,328	*10,289
Car-days:				
1918.....	1,513	642	2,846	416
1917.....	1,521	705	3,729	524
Increase..	*8	*63	*883	*108
Receipts per car-mile (pence):				
1918.....	12.72	14.90	18.62	19.44
1917.....	11.10	11.09	11.84	12.36
Passengers per car-mile:				
1918.....	15.26	12.38	12.91	13.28
1917.....	9.19	9.17	9.75	10.23

*Decrease.

TABLE III—RESULTS OF FARE AND SERVICE CHANGES ON INCHICORE LINE

	Jan. 1-March 20	March 21-April 26	April 27-Nov. 3	Nov. 4-Nov. 30
Receipts:				
1918.....	£5,381	£2,354	£14,156	£2,046
1917.....	4,322	1,954	11,323	1,607
Increase..	1,059	400	2,833	439
Passengers:				
1918.....	1,079,111	471,096	2,411,323	341,249
1917.....	872,477	396,795	2,304,346	330,099
Increase..	206,634	74,301	106,977	11,150
Car-miles:				
1918.....	90,824	38,537	185,832	24,935
1917.....	85,913	40,194	207,889	29,339
Increase..	4,911	*1,657	*22,057	*4,404
Car-days:				
918.....	910	374	1,959	256
917.....	879	413	2,139	303
Increase..	31	*39	180	47
Receipts per car-mile (pence):				
1918.. ..	14.24	14.66	18.28	19.70
1917.....	12.07	11.67	13.07	13.15
Passengers per car-mile:				
1918.....	11.88	12.22	12.97	13.68
1917.....	10.15	9.87	11.08	11.25

*Decrease.

TABLE IV—RESULTS OF FARE AND SERVICE CHANGES ON DONNYBROOK AND CLONSKEAGH LINES

	Jan. 1-March 20	March 21-April 26	April 27-Nov. 3	Nov. 4-Nov. 30
Receipts:				
1918.....	£11,886	£4,932	£29,356	£4,087
1917.... .	9,831	4,554	25,773	3,848
Increase..	2,054	377	3,582	239
Passengers:				
1918.....	2,441,122	990,127	4,900,244	662,171
1917.....	2,032,324	942,330	5,300,428	792,901
Increase..	1,913	28,725	140,128	22,946
Car-miles:				
1918.....	236,451	79,051	417,638	57,475
1917.....	234,538	107,776	557,766	80,421
Increase..	1,913	*28,725	*140,128	*22,946
Car-days:				
1918.....	2,459	807	4,134	584
1917.....	2,472	1,142	5,880	847
Increase..	*13	*235	*1,746	*263
Receipts per car-mile (pence):				
1918.....	12.06	15.00	16.86	17.06
1917.....	10.06	10.14	11.09	11.48
Passengers per car-mile:				
1918.....	10.32	12.52	11.73	11.52
1917.....	8.66	8.74	9.50	9.85

*Decrease.

TABLE V—RESULTS OF FARE AND SERVICE CHANGES ON DALKEY LINE

	Jan. 1-March 20	March 21-April 26	April 27-Nov. 3	Nov. 4-Nov. 30
Receipts:				
1918.....	£15,692	£8,008	£62,046	£7,287
1917.....	12,571	6,417	42,805	5,081
Increase..	3,120	1,590	19,241	2,206
Passengers:				
1918.....	2,188,865	1,085,139	5,813,569	659,403
1917.....	1,772,612	890,281	5,563,009	707,283
Increase..	416,253	194,858	250,560	*47,880
Car-miles:				
1918.....	283,633	132,477	646,407	82,272
1917.....	274,482	129,305	717,528	97,209
Increase..	9,151	3,172	*71,121	*15,077
Car-days:				
1918.....	2,425	1,155	5,608	701
1917.....	2,412	1,166	6,354	835
Increase..	13	*11	*646	134
Receipts per car-mile (pence):				
1918.....	13.27	14.51	23.03	21.25
1917.....	10.99	11.91	14.31	12.54
Passengers per car-mile:				
1918.....	7.71	8.16	9.00	8.01
1917.....	6.45	6.88	7.75	7.27

*Decrease.

Through the courtesy of W. McHugh, secretary, the figures in Table I are supplemented by the following, which give the car-mile receipts for the entire calendar year 1918 as compared with 1917:

RECEIPTS PER CAR-MILE (IN PENCE)

	1918	1917
Period in 1918 prior to first revision of fares or from Jan. 1 to April 26	12.28	9.94
Period in 1918 from date of first revision, April 27 to Nov. 3, 1918	17.68	11.64
Period after second revision, Nov. 4 to Dec. 31	18.25	11.44
Receipts per car-mile per annum	15.86	11.63

Note—The receipts per car-mile in 1914 were 9.63 d.

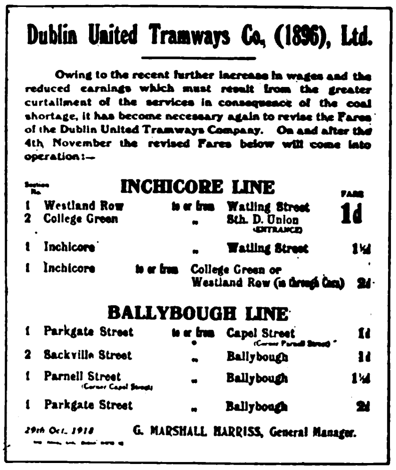
It will be seen from Mr. McHugh's figures that the earnings per car-mile are now nearly twice those of 1914 and compare favorably with American figures.

HOW CHANGES WORKED OUT ON TYPICAL LINES

Table II to Table V and Fig. 1 to Fig. 5, as prepared by Mr. Harriss, show the outcome of the fare and service changes on typical individual lines. These exhibits should be considered in the light of the general route map, in the issue of May 31, and the following information:

The Terenure line originally had two end-on and two overlapping 1d. stages and one 2d. stage all the way, as shown in the top diagram in Fig. 1. On April 27, 1918, only the statutory 1d. stage remained, the other three 1d. stages having been raised to 1½d., with the 2d. stage as before, as shown in the middle diagram. On Nov. 4, the two overlapping 1½d. stages were abolished, the other stages remaining as before, as shown on the bottom diagram. The results of these changes are indicated in Table II.

The Inchicore line had the pre-war fares up to April 27, 1918, as shown on the top diagram in Fig. 2, there being two stages end-on with three overlapping stages, which had 1d. fares with a 2d. fare all the way. On March 21 came the first reduction in service. On April 27 there was a further reduction in service, and both fares and stages were altered as follows: The running to Westland Road (Nelson's Pillar) was abolished, and all cars were turned at College Green. The 1d. fare from College Green to South Dublin Union remained. The 1d. fare from Inchicore to Watling Street was raised to 1½d. All other 1d. fares were abolished, and the 1d. stage from Nicholas Street to Kilmainham was shortened to Old Kilmainham for 1½d.



Dublin United Tramways Co, (1896), Ltd.

Owing to the recent further increase in wages and the reduced earnings which must result from the greater curtailment of the services in consequence of the coal shortage, it has become necessary again to revise the Fares of the Dublin United Tramways Company. On and after the 4th November the revised Fares below will come into operation:—

INCHICORE LINE

Section No.				Fare
1	Westland Row	to or from	Watling Street	1d
2	College Green	"	Sth. D. Union (ENTRANCE)	
1	Inchicore	"	Watling Street	1½d
1	Inchicore	to or from	College Green or Westland Row (in through Cars)	2d

BALLYBOUGH LINE

Section No.				Fare
1	Parkgate Street	to or from	Capel Street (Corner Parnell Street)	1d
2	Sackville Street	"	Ballybough	1d
1	Parnell Street (Corner Capel Street)	"	Ballybough	1½d
1	Parkgate Street	"	Ballybough	2d

29th Oct. 1918 G. MARSHALL HARRISS, General Manager.

HOW INDIVIDUAL ROUTE PATRONS IN DUBLIN ARE TOLD OF FARE INCREASES

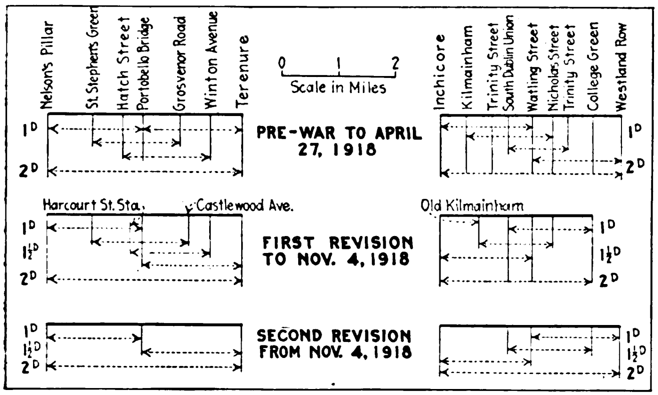

Nelson's Pillar
St. Stephen's Green
Hatch Street
Portobello Bridge
Grosvenor Road
Winton Avenue
Terenure
0 1 2
Scale in Miles
1D
2D
PRE-WAR TO APRIL 27, 1918
Harcourt St. Sta.
Castlewood Ave.
1D
1½D
2D
FIRST REVISION TO NOV. 4, 1918
1D
1½D
2D
SECOND REVISION FROM NOV. 4, 1918
Inchicore
Kilmainham
Trinity Street
South Dublin Union
Watling Street
Nicholas Street
Trinity Street
College Green
Westland Row
1D
2D
Old Kilmainham
1D
1½D
2D
1D
1½D
2D

FIG. 1 FIG. 2

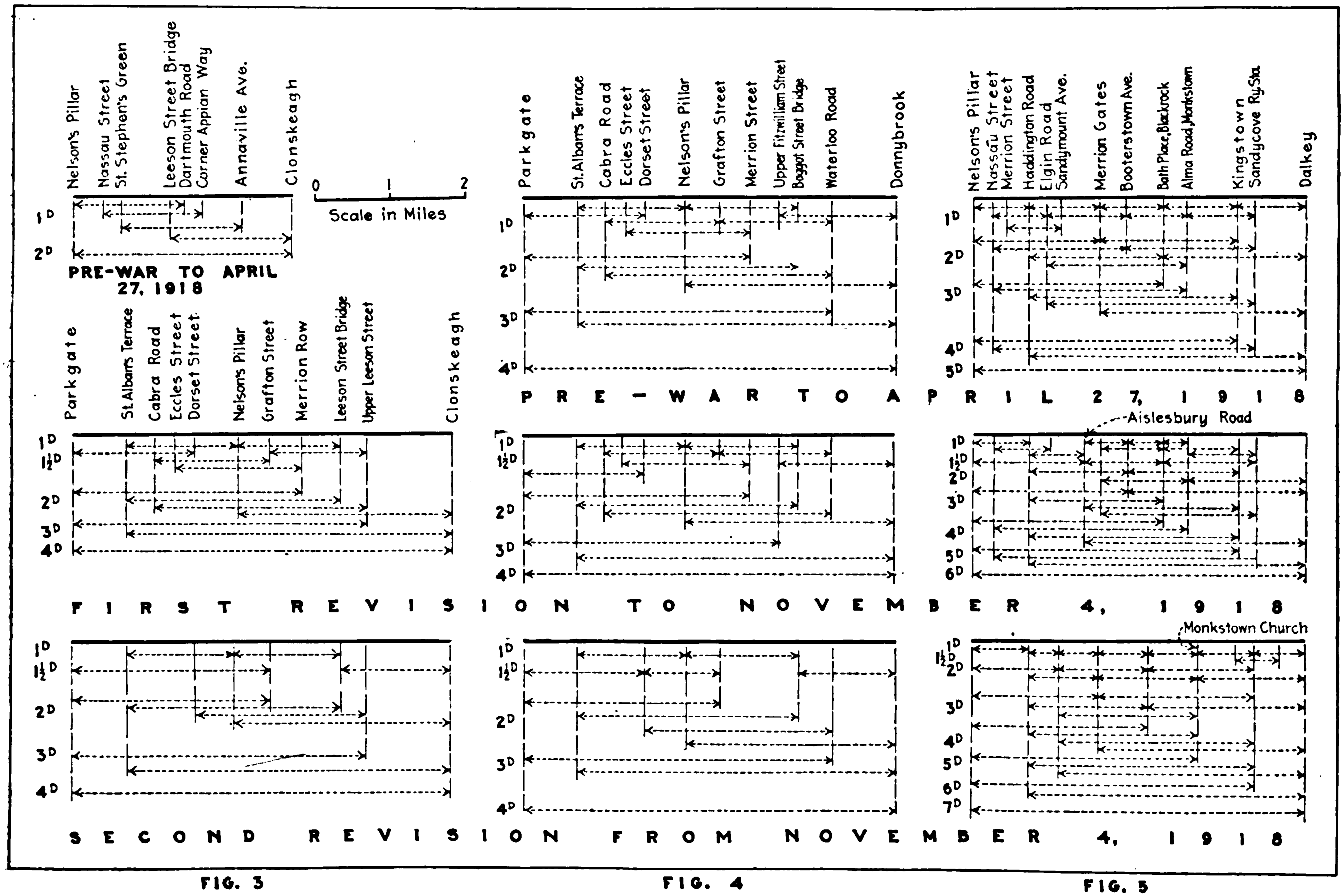

Nelson's Pillar
Nassau Street
St. Stephen's Green
Leeson Street Bridge
Dartmouth Road
Corner Appian Way
Annaville Ave.
Clonskeagh
0 1 2
Scale in Miles
1D
2D
PRE-WAR TO APRIL 27, 1918
Parkgate
St. Alban's Terrace
Cabra Road
Eccles Street
Dorset Street
Nelson's Pillar
Grafton Street
Merrion Row
Leeson Street Bridge
Upper Leeson Street
Clonskeagh
1D
1½D
2D
3D
4D
Parkgate
St. Alban's Terrace
Cabra Road
Eccles Street
Dorset Street
Nelson's Pillar
Grafton Street
Merrion Street
Upper Fitzwilliam Street
Baggot Street Bridge
Waterloo Road
Donnybrook
1D
2D
3D
4D
Nelson's Pillar
Nassau Street
Merrion Street
Haddington Road
Elgin Road
Sandymount Ave.
Merrion Gates
Booterstown Ave.
Bath Place, Blackrock
Alma Road, Monkstown
Kingstown
Sandycove Ry. Sta.
Dalkey
1D
2D
3D
4D
5D
PRE-WAR TO APRIL 27, 1918
Aislesbury Road
1D
1½D
2D
3D
4D
5D
6D
FIRST REVISION TO NOVEMBER 4, 1918
Monkstown Church
1D
1½D
2D
3D
4D
5D
6D
7D
SECOND REVISION FROM NOVEMBER 4, 1918

FIG. 3 FIG. 4 FIG. 5

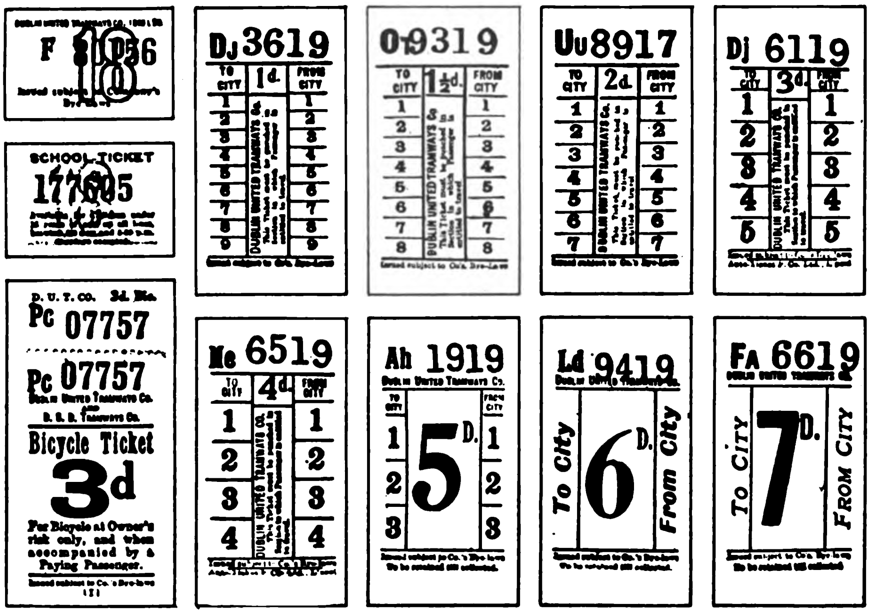
HOW ZONE FARES WERE SHORTENED FOR TWO FARE INCREASES IN DUBLIN

Fig. 1—Terenure Line. Fig. 2—Inchicore Line. Fig. 3—Clonskeagh Line (now Donnybrook-Clonskeagh). Fig. 4—Donnybrook Line. Fig. 5—Dalkey Line

The fare from Inchicore to College Green remained 2d, as shown on the middle diagram.

On Nov. 4 came a second alteration in the stages. The running to Westland Row had been previously restored partially to meet morning and evening trains, and the stages were now altered to suit, as shown on the bottom diagram. The 1d. fare from College Green to South Dublin Union remained as an overlapping stage to the original 1d. stage, Westland Row to Watling Street, which was restored, and the 1½d. stage from Watling Street to Inchicore remained as an end-on stage. The original 2d. fare for the whole distance was also restored, as shown in the bottom diagram. The results are given in Table III.

The combination of the originally independent Clonskeagh service with an arm of the Donnybrook-Phoenix Park through line was carried out in the following manner: Originally the Clonskeagh line ran from Nelson's Pillar via Leeson Street and Appian Way to Clonskeagh, with four 1d. stages and 2d. stage all the way, as shown in the top diagram in Fig. 3. On April 27, 1918, the Phoenix Park-Donnybrook line via Stephen's Green was diverted to Clonskeagh, and the original Clonskeagh line was taken off. Penny and 1½d. stages were then introduced as shown on the middle diagram. On Nov. 4 the 1½d. stages were cut down to three, and one of the 2d. stages was shortened to end at Grafton Street instead of Merrion Street. Other stages remained as shown in the bottom diagram.



DUBLIN'S ZONE-NUMBERED TICKETS, SCHOOL AND MESSENGER TICKETS AND BICYCLE TICKETS

On the Donnybrook line (Fig. 4) there were originally seven 1d. stages, as shown in the top diagram. On April 27 only the two statutory 1d. fares in the city remained, for the other 1d. stages were raised to 1½d. as shown in the middle diagram. On Nov. 4 two of the 1½d. stages were abolished. Of the three remaining, two were shortened as shown in the bottom diagram. The results of the Clonskeagh and Donnybrook changes are presented in Table IV.

On the Dalkey suburban line (Fig. 5) there were originally ten 1d. stages with 3d., 4d. and 5d. stages respectively to Blackrock, Kingstown and Dalkey, as shown in the top diagram. On April 27 the stages were revised all along the line. Four 1d. stages remained with six 1½d. stages, while the stages to Blackrock, Kingstown and Dalkey were raised respectively to 4d., 5d. and 6d., as shown in the middle diagram. On Nov. 4 there was a second general revision. Only the statutory 1d. stages remained with eight 1½d. stages, and the Blackrock, Kingstown and Dalkey stages were again raised to 5d., 6d. and 7d., as shown in the bottom diagram. The results are given in Table V.

The figures given in the foregoing tables surely are sufficient to prove that the traffic of the Dublin United Tramways has not suffered unduly despite increases in fare and decreases in service. The company had no desire to cut service, and with the improvement in the coal situation it will restore pre-war conditions as rapidly as possible. That the increased revenue was needed may be gleaned from a few figures in the report for the fiscal year ended Dec. 31, 1918, and some comparisons prepared by Mr. McHugh:

> In 1918 coal cost 36s. 4¾d. per ton as compared with 27s. 6¾d. for 1917 and 9s. 7½d. in 1906.
>
> In 1918 3.798 lb. coal was required per kilowatt-hour, and in 1917, 3.44 lb.
>
> In 1918 traffic wages were £95,723, and in 1917, with more mileage, £79,942.
>
> In 1918 gross receipts were £463,998, and operating expenses, £321,934; and in 1917 gross receipts were £371,572, and operating expenses, £251,951.
>
> In 1918 power cost 1.686d., maintenance 3.131d., and traffic 3.976d. per car-mile, and in 1917 power cost 1.142d., maintenance 1.782d., and traffic 2.887d. per car-mile.
>
> In 1918 general charges, sundries, franchise charges and fixed charges were 3.972d., and in 1917 3.229d.

Traffic receipts for 1918 were 44.9 per cent greater than in 1914, and passengers carried were 21.8 per cent greater, while the car mileage showed a decrease of 12 per cent. The percentage ratios of expenditures to traffic receipts were:

	1918	1914
Power station operation	10.6	7.1
Maintenance of cars, track, etc	19.7	13.5
Traffic (wages only)	21.6	21.4
Total traffic expenses	25.0	24.8
General charges	14.7	14.8
Ratio of expenses to receipts from parcels traffic	82.0	55.0
Ratio of expenses to receipts from goods carried	63.0	56.0
Ratio of total operating and general expenses to total receipts	69.7	59.0

CLASSIFICATION OF RIDERS AND CHARACTER OF TICKETS

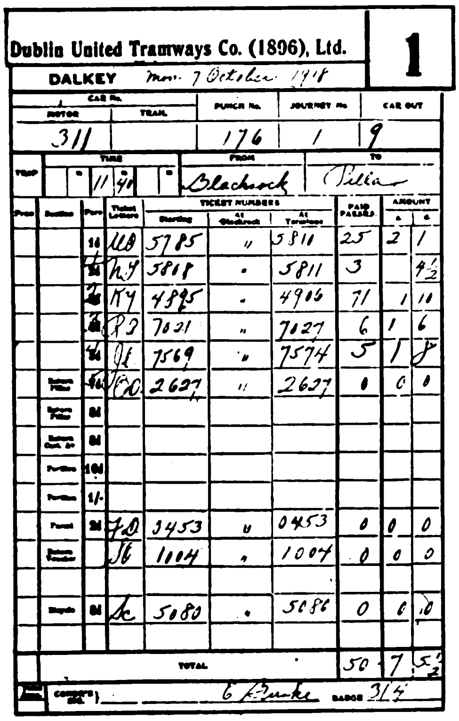
Because of the two revisions in rates of fare during 1918, important differences will be observed in Table VI showing the classification of passengers carried during 1917 and 1918. During this period the average fare per passenger advanced from 1.274d. to 1.498d. It is clear that the average passenger fare in Dublin is not so far below what it has been in the United States when allowance is made for the transfer.

The figures in Table VI require little explanation. It is plain that the losses in penny passengers were more than made up by the creation of 1½d. passengers and the augmentation of 2d. passengers, and that the suburban traffic did not suffer. That this is a remarkable showing for the industrial conditions obtaining at Dublin goes without saying.

Of the various rates of fare referred to in the table,

TABLE VI—CLASSIFICATION OF DUBLIN RIDERS ACCORDING TO FARES

	1918		1917	
	Number	Per Cent	Number	Per Cent
1d	41,792,380	58.85	53,372,025	80.11
1½-d	9,834,981	13.85	None	......
2d	14,156,317	19.94	9,812,603	14.73
3d	1,850,145	2.60	1,339,122	2.01
4d	1,139,025	1.60	417,046	0.63
5d	1,130,172	1.59	98,321	0.15
6d	702,599	0.99	None	......
7d	50,978	0.07	None	......
6d. round trips	10,588	0.01	71,100	0.10
7d. round trips	80,217	0.11	347,627	0.52
8d. round trips	48,812	0.07	316,942	0.48
Miscellaneous	212,441	0.30	849,540	1.27
All passengers	71,008,655	100.00	66,624,326	100.00
Passengers per car-mile	10.58	......	8.69	......
Journeys per inhabitant	182.00	......	170.83	......
Miles run per inhabitant	17.19	......	19.65	......



Dublin United Tramways Co. (1896), Ltd. **1**

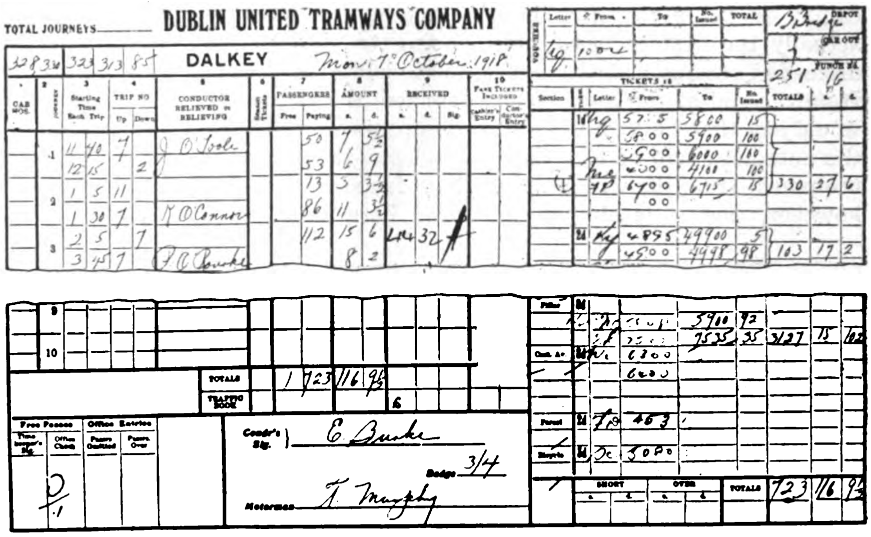
DALKEY Mon. 7 October 1918

Car No. Motor	Car No. Trail	Punch No.	Journey No.	Car Out
311		176	1	9

Trip — Time 11 40 — From Blackrock — To Pillar

[illegible]	Section	Fare	Ticket Letters	Starting	At Blackrock	At Terminus	Paid Passes	s.	d.
		1d	UB	5785	"	5811	25	2	1
		[illegible]	hY	5818	"	5811	3		4½
		[illegible]	KY	4895	"	4906	71	1	10
		[illegible]	RJ	7021	"	7027	6	1	6
		[illegible]	Ql	7569	"	7574	5	1	8
	Return Pillar	[illegible]	PO	2627	"	2627	0	0	0
	Return Pillar	6d							
	Return Cash. &c	6d							
	[illegible]	10d							
	[illegible]	1/-							
	Parcel	2d	FD	3453	"	0453	0	0	0
	Return Voucher		Jb	1004	"	1004	0	0	0
	Bicycle	2d	Sc	5080	"	5080	0	0	0
	TOTAL						50	7	5½

Condr's Sig. E. Burke Badge 314



TOTAL JOURNEYS ____ **DUBLIN UNITED TRAMWAYS COMPANY**

328 330 323 313 85 DALKEY Mon. 7 October 1918

1 Car Nos.	2 Journey	3 Starting Time Each Trip		4 Trip No. Up	4 Trip No. Down	5 Conductor Relieved or Relieving	6 Season Tickets	7 Passengers Free	7 Passengers Paying	8 Amount s.	8 Amount d.	9 Received £	9 Received s.	9 Received Sig.	10 Fare Tickets Included Cashier's Entry	10 Fare Tickets Included Conductor's Entry
	1	11	40	7		J O'Toole			50	7	5½					
		12	15		2				53	6	9					
	2	1	5	11					13	3	3½					
		1	30	7		T O'Connor			86	11	3½					
	3	2	5		7				112	15	6	£4	4 32			
		3	45	7		P C Burke				8	2					
	9															
	10															
						TOTALS		1	723	116	9¾					
						TRAFFIC BOOK						6				

Vouchers: Letter	From	To	No. Issued	TOTAL
Vg	1002			

Depot B'bridge — Car Out 7 — Punch No. 251 16

Section	Fare	Letter	From	To	No. Issued	TOTALS	s.	d.
	1d	Ug	5785	5800	15			
			5800	5900	100			
			5900	6000	100			
		Ng	4000	4100	100			
		4P	6700	6715	15	330	27	6
			00					
	2d	Ky	4895	4900	5			
			4500	4598	98	103	17	2
Pillar	6d	[illegible]	[illegible]	5900	92			
		[illegible]	[illegible]	7535	35	3127	15	10½
Cash. &c.	6d	Wc	6300					
			6000					
Parcel	2d	FD	453					
Bicycle	2d	Dc	5080					

Short s.	Short d.	Over s.	Over d.	TOTALS		
				723	116	9¾

Free Passes: Time keeper's Sig. — Office Check. Office Entries: Passes Omitted — Passes Over. 2/1

Condr's Sig. E. Burke Badge 3/4

Motorman T. Murphy

AT LEFT. DUBLIN CONDUCTOR'S WAYBILL FOR ONE-WAY TRIPS. AT TOP, CONDUCTOR'S MASTER WAYBILL FOR WHOLE DAY'S WORK

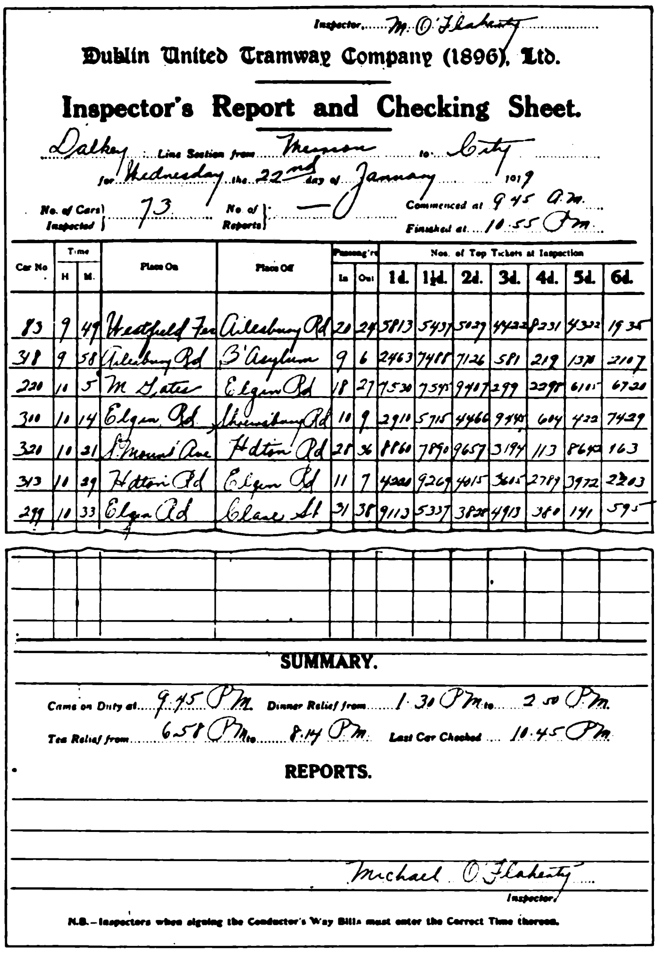
the round-trip (return) ticket has been abolished as well as the season ticket. Of special fares there are few. The number of workmen's cars run according to statute is very small in the morning, and at night only one such car is operated. School tickets are sold in penny strips at 3s. 9d. for sixty, which is a 25 per cent reduction. Similar strip-ticket books are also sold at full price to employers for the use of messengers. With regard to free riding for charities, the company finds it wiser to donate money. Thereby it discourages the idea that transportation costs next to nothing. Furthermore, such donations are more appreciated than passes, which would be considered a matter of course.

The standard fare receipts of the Dublin United Tramways carry zone numbers as illustrated, the two tickets without zone numbers being for end-to-end suburban runs. The use of numbers in place of names is, as noted in regard to Belfast practice, a great convenience in avoiding the printing of like rate tickets for different lines, and especially in meeting sudden increases in travel on a given line. The Dublin public, however, is not so pleased with the numbered tickets as with the kind that bears the names of the stages on the line used. Possibly an identification system on fare signs and poles would eliminate any uncertainties that now prevail.

COLLECTING AND ACCOUNTING FOR FARES

Fares are collected within the car, and receipts are issued in the customary way. The London "Bell" punch is used on a rental basis, the charge for 820 punches averaging a monthly expense of about $1.25 to $1.50 per punch. Both the public and the conductors are so accustomed to the system that few fares are overlooked and still less are stolen, the abolition of short overlapping zones having much to do with this desirable condition. One day's report showed an apparent loss of only four fares on the entire system! On the city lines with the 2d. fare over all, it is to the passenger's interest to pay the full fare at once, for otherwise he will have to pay an extra half-penny as explained earlier in this article. Warnings concerning over-riding are not posted, as they would be resented.

The possibility of stealing where every passenger expects a receipt for the exact fare paid is very small. In rare instances, a conductor taking on a passenger in the last outbound zone might risk giving him no re-



Inspector, M. O'Flaherty

Dublin United Tramway Company (1896), Ltd.

Inspector's Report and Checking Sheet.

Dalkey Line Section from Merrion to City

for Wednesday the 22nd day of January 1919

No. of Cars Inspected 73 — No. of Reports — 0 — Commenced at 9 45 a.m. — Finished at 10.55 Pm.

Car No.	Time H.	Time M.	Place On	Place Off	Passeng'rs In	Passeng'rs Out	1d.	1½d.	2d.	3d.	4d.	5d.	6d.
83	9	49	Westfield Ter	Ailesbury Rd	20	24	5813	5437	5029	4422	8231	4322	1935
318	9	58	Ailesbury Rd	B'Asylum	9	6	2463	7488	7126	581	219	1378	2107
220	10	5	M Gates	Elgin Rd	18	27	7530	7545	9407	299	2298	6105	6720
310	10	14	Elgin Rd	Shrewsbury Rd	10	9	2910	5715	4466	9440	604	422	7429
320	10	21	S Mount Ave	Hdton Rd	28	36	8860	7890	9657	3194	113	8640	163
313	10	29	Hdton Rd	Elgin Rd	11	7	4220	9269	4015	3605	2789	3972	2203
299	10	33	Elgin Rd	Clare St	31	38	9113	5337	3828	4913	380	141	595

SUMMARY.

Came on Duty at 9.45 Pm. Dinner Relief from 1.30 Pm to 2.50 Pm.

Tea Relief from 6.57 Pm to 8.14 Pm. Last Car Checked 10.45 Pm.

REPORTS.

Michael O'Flaherty Inspector.

N.B.—Inspectors when signing the Conductor's Way Bills must enter the Correct Time thereon.

INSPECTOR'S REPORT AND CHECKING SHEET IN DUBLIN ceipt; or he might give him a receipt for what is actually the first inbound zone, hoping to pick up the discarded receipt and issue it to an inbound passenger from the end of the line. When detected, the conductor would say that he had already made up his way-bill for the outbound trip or else that he had put the ticket in the punch from the wrong side. Such fraud is so risky, however, that it is simply mentioned here as being a possibility and not a regular practice, because under the fare-receipt system the passenger has an interest in the conductor's actions which he cannot be induced to take otherwise. The success of this plan is indicated by the fact that the Dublin company does not count ticket punchings more than once or twice a day—a significant compliment to the honesty and the ability of Dublin conductors!

GRAFTON STREET, IN THE HEART OF DUBLIN

CITY HOUSES FRONTING ON STEPHEN'S GREEN

VISUAL PROOF THAT THE BUSINESS SKYSCRAPER IS UNKNOWN IN THE IRISH CAPITAL

Of the twenty inspectors along the line, four supervise traffic and sixteen carry on ticket checking. The full force of ticket inspectors is on duty during the rush hours. During hours of normal traffic, a ticket inspector will board a car every three to five minutes. From the typical "Inspector's Report and Checking Sheet" reproduced, it will be seen that seventy-three cars were inspected between 9.45 a.m. and 10.55 p.m., except for dinner relief from 1.30 p.m. to 2.50 p.m. and tea relief from 6.58 p.m. to 8.14 p.m. The conductors do not initial the report for the boarding of the inspector. Whether or not conductors should do this seems to be a moot point among British tramway managers. Some hold that it is not wise to have a conductor act, seemingly, as a checker on his superior officer; others maintain that initialing of reports is an excellent way of avoiding disputes afterward.

On beginning the day's work, the conductor receives from his local carhouse clerk (called locally a "depot inspector") a box which contains his tickets, punch and waybills as transmitted from the head office. The all-day waybill gives the conductor his in-and-out times, starting numbers of tickets and other data shown on the form reproduced. This waybill formerly carried calculating tables, but this practice was found unnecessary in view of the tests which a new conductor must pass.

In addition to the all-day waybill, the conductor is supplied with waybills for his individual half or one-way trips on which he will find his times for the day written in for him by the depot inspector. The notations of punch number, journey number, etc., are written in by the head office. The conductor himself writes down the serial numbers of his tickets on every half trip and figures out the cash. He does not hold the cash until the end of the day but turns in as much as he cares to every two or three trips to the depot official, in the case of short lines, or to a boy sent to the car from a collector at Nelson's Pillar, in the case of the through lines. In each instance, of course, a receipt is tendered for the money collected. The individual waybills also go with the cash, but they do not have to correspond. It is only in the case of the last return with the all-day waybill that money and tickets must check. This master waybill is the one used for checking by the head office, whereas the individual trip waybills are the checking means of the local cash collectors and forwarders. The totals of one set must tally with the totals of the other set.

Cash is forwarded to the cashiers of the head office several times a day, but the boxes containing the punch, master waybill and unsold tickets of the individual conductors are returned but once daily. While one box is in use, the head office is preparing a second box for the conductor. Each conductor works two orders of serial numbers of tickets as a consequence of this system. Thus, if he begins a "3600" pad on Monday, he may get a "3700" pad on Tuesday, but on Wednesday he will have to work off the remainder of the "3600" tickets.

The general office comprises the following staff:

Duty	Number of Employees
Receiving Department, under Chief Accountant:	
Issuance of tickets and punches, and checking of same when returned each day	8
Issuance of waybills and summaries to conductors	3
Audit or reconciliation of tickets issued and cash received	8
Cashiers (two during the day and one at night)	3
Total	22
Remainder of General Office:	
All accounting and general counting house work	28
General manager's, secretary's and traffic manager's offices, shares transfer, etc.	8
Stenographers	2
Grand total	60

Of the depot inspectors, who also carry on miscellaneous transportation duties, there are fourteen. There is also the cash collector at Nelson's Pillar, who is assisted by a boy.

Examining the Electric Railway Situation

The Public Utilities Committee of the National Chamber of Commerce Is Told of Efforts Being Made in Leading Cities to Preserve the Carriers

AT THE second hearing before the public utilities committee of the Chamber of Commerce of the United States, held in Washington on May 28 and 29, various experts gave their views of the electric railway situation and of efforts which have been made and should be made to secure relief. A preliminary note in regard to this hearing was published in the ELECTRIC RAILWAY JOURNAL of May 31, 1919.

The subjects discussed before the committee were of two general types. The first dealt with the electric railway situation in Buffalo, Cincinnati, Chicago, Cleveland and Connecticut, and the second with general matters like franchises, skip-stop economies and the present price situation. Detailed abstracts of the discussion on these latter topics will be included in this article. Since most of the information in regard to the railway situation in the communities named, however, was presented to give the committee members knowledge which readers of this journal already possess, only the "news" points contained in the various recitals will be mentioned here.

EXPERIENCE OF TYPICAL CITY LINES

The situation in Buffalo, N. Y., was described by John W. Van Allen, attorney and vice-chairman of the committee on public relations of the "All-for-Buffalo" Committee (257 citizens). Mr. Van Allen said that in the Milburn 5-cent fare agreement of 1892 there is a reservation that the contract does not interfere with the right of the Legislature to establish rates of fare. In view of the Quinby decision, however, that whatever power the Legislature has over franchise rates has not been delegated to the Public Service Commission, it is not certain that the commission can grant a higher fare to the International Railway. This point, however, is now before the Court of Appeals for decision. If the commission does not receive power to act, a receivership is likely to result but efforts will be continued to get a service-at-cost plan through the Legislature, perhaps with a compromise on joint control through the commission and the city. Buffalo, however, objects to the Massachusetts plan of a State guarantee of company finances, for it believes that a community should pay for what it gets without asking even for temporary aid from the State.

Both W. C. Culkins, director of street railways of Cincinnati, Ohio, and Walter A. Draper, vice-president Cincinnati Traction Company, discussed the local situation. Mr. Culkins laid especial emphasis upon the elasticity of the service-at-cost plan in this city and upon the reward for efficiency and economy on the part of the company. He also mentioned the fact that under a service-at-cost plan the adjustment of wages is a community affair, although the public has not yet fully realized the fact that such a franchise is not solely a company proposition. In M. Culkins' opinion, the Cincinnati ordinance gives all the advantages of municipal ownership without imposing upon the city and the public its disadvantages.

Mr. Draper directed attention to the non-desirability of providing in a service-at-cost franchise for such specific automatic fare revision as to make it impossible to adopt a zone system if riding decreased with higher unit fares. Moreover, he declared that the incentive reward to the company should not be abolished when the fare passed a certain point, as 6 cents in Cincinnati, for the inspiration to the company to do its best, and the right of the public to receive the best should not be limited because of economic forces beyond the company's control.

Britton I. Budd, president Chicago (Ill.) Elevated Railways, told of the efforts to secure higher fares in Chicago in order to offset the increased cost of labor and materials. In his opinion electric railways are in a deplorable condition, and unless the public can be led to pay the cost of service, insolvency and the consequent ill-effects upon the communities are certain. Mr. Budd urged that greater use be made of employees as publicity agents.

The great problem of electric railways is to prove their case, believes L. S. Storrs, president The Connecticut Company, so that the public will recognize the needs of the carriers and use the service. Mr. Storrs related how in one case, where the fare reached 7 cents, the people bought bicycles, one manufacturer even buying 1000 to sell to its employees on a weekly payment basis. Mr. Storrs felt that a small group of the public can be convinced personally and some through railway employees, but that it is more difficult to educate the politicians. Until the public understands its interest in good transportation, the politicians will not favor the railways.

RESULTS OF CLEVELAND'S EXPERIENCE

Cleveland's nine years of experience with its service-at-cost plan was described by Fielder Sanders, street railway commissioner of that city. In Mr. Sanders' opinion the strong points of this franchise are these: (1) Close supervision of expenditures by the city; (2) absolute control of service (except employment). He criticised the franchise, however, for the lack of an incentive to efficiency and economy. In 1909 the city opposed the idea of a reward on the ground that the company would skimp in the interest of stockholders and in the long run injure them, and the company objected that the city would show a tendency to reduce the annual operating allowance by the amount of the company's savings in the prior year. Mr. Sanders stated that the management had operated the property in a good way but that some subordinates had displayed a tendency toward inefficiency. When the franchise recently came up for revision, he suggested an amendment modeled after the Montreal reward plan, but the people did not see the necessity of improving the franchise. Mr. Sanders also criticised the Cleveland plan on the ground that some method is needed for the regulation of labor trouble when the public interest becomes involved.

In regard to taxes, Mr. Sanders said that the Cleveland Railway pays the federal and state corporation taxes, the excise tax and the ordinary property tax, and it maintains the pavement between the tracks and one foot outside. There are, however, no paving renewals, no new paving construction, no franchise tax and no sprinkling and snow removal expenses. Just now the city officials are co-operating with the company to secure a reduction in the assessment for state taxes. Mr. Sanders believes that a company should maintain the paving along its tracks but that the imposition of other street expenses on the car rider is an improper form of taxation.

A query as to whether or not a service-at-cost franchise should contain a maximum fare limit elicited from Mr. Sanders the reply that the controlling element is public confidence. Electric railway men can devise a perfect franchise, but if the public does not believe in it it will not be granted. One way to get public support is to show that there is a limit to the fare, although theoretically there should be none. The franchise can then be amended if necessary, as the Cleveland one was last year.

GENERAL MATTERS DISCUSSED

The two witnesses on the general topic of franchises were L. R. Nash, of Stone & Webster, Boston, Mass., and Halford Erickson, of Hagenah & Erickson, Chicago, Ill. The paper of the latter, who was not able to attend the hearing in person, will be abstracted in a later issue.

Mr. Nash presented to the public utilities committee reprints of his article on "Recent Developments in Service-at-Cost Franchises for Utilities" in the ELECTRIC RAILWAY JOURNAL of Jan. 4, 1919. He also described in detail the salient points of the various plans and expressed the conviction that the Philadelphia one has more elements of broadness and fairness than any other one. In his opinion, flexibility should be the chief aim, and he is not sure that it is wise to fix a definite fare schedule instead of leaving this to the supervisors appointed under the franchise.

The subject of prices was treated by T. S. Holden, economics investigator, Bureau of Public Works and Construction Developments, United States Department of Labor, and by Irving Fisher, professor of political economy, Yale University, New Haven, Conn. Their remarks are abstracted elsewhere in this issue.

John A. Beeler, consulting engineer, New York, N. Y., testified in regard to the advantages of skip stops, as the detailed abstract printed on page 1097 shows. He also stated his belief that in Washington, where the plan has been used in combination with rerouting, rescheduling and other improvements, the estimated annual saving of $250,000 for one company and of slightly less for the other company has been more than realized.

Mr. Beeler was of the opinion that the frequent-service safety car could be used to advantage on a very large part of the present mileage. The principal opposition will come from employees, but the cars should not be installed with the idea of reducing platform expenses, for business is increased. A company should start the use of such cars on some line where service can be doubled, thus keeping all employees, and then extend the use. Where the one-man car has been properly installed and fairly tried, its operation has proved to be a great success.

Higher Prices Are Sure to Continue

Failure of Fares to Correspond to Other Prices Is One of Most Conspicuous Examples of the Injustice of the Depreciated Dollar

BY IRVING FISHER
Professor of Political Economy, Yale University, New Haven, Conn.

I AM very glad of the opportunity to speak on the subject of prices of money, material and equipment in reference to electric railways. This is not because I am competent to speak from any special knowledge as to the particular materials and equipment of these companies. I shall speak entirely from the point of view of the general level of prices—in other words, from the point of view of the purchasing power of money.

In 1915 I testified on this subject in certain arbitration proceedings in Boston held to settle a wage dispute between the Bay State Street Railway and the union of conductors and motormen. I then took the ground that this railway should raise the wages of its employees in order that these should be adjusted to the lower purchasing power of the dollar—in other words, in order that their wages should overtake the high cost of living. I argued that any inability to pay such high wages could and should be remedied by raising the railway's fare.

These views were not accepted by a majority of the arbitration tribunal. The idea of raising fares, which was the key to the situation, was then too new to seem practicable. Since that time fares have broken away from the traditional 5 cents in many cases. The principle that fair wages ought to be paid just as truly as a fair price for copper or any other requisite of the railways, irrespective of the adequacy of the 5-cent fare, has been adopted by the United States War Labor Board as it had, previously to my testimony, been adopted by Justice Higgins of Australia.

The whole question is one of adjustment to a lowering purchasing power of the dollar. No adjustment should be repressed, and the sooner all the adjustments are made the better. All except one of these adjustments will be against the interests of the electric railways but that one, the adjustment of fares, can and should compensate, so far as compensation is necessary and just.

NICKEL HAS DEPRECIATED FIFTY PER CENT

The truth is that the purchasing power of the dollar is to-day about one-half of what it was before the war and one-third of what it was in 1896. If, therefore, a 5-cent fare was just in 1896 and if the other factors in the case, wages, material, equipment, etc., have on the average risen proportionally with the general rise in prices, that is, are nearly three times what they were in 1896, then the "fair fare" for the companies should be to-day from 12 to 15 cents!

To put it the other way around, if to-day a 5-cent fare is just and expenses in 1896 were lower than now in proportion to prices in general, the just fare in 1896 should have been about 2 cents!

I do not venture to say which of these two statements represents the truth, or whether some intermediate statement represents it, for I am ignorant as to whether the expenses of the companies have risen proportionately to other prices and as to whether the profits of the companies in 1896 were fair or unfair. Both of these points, however, are capable of determination.

The failure of trolley fares to correspond with other prices is one of the most conspicuous examples of the havoc which has been played by depreciation of the dollar. The vitally important question is, will prices drop, or is the present depreciation of the dollar permanent?

While prediction in the economic field is always dangerous I am strongly inclined to believe, on the basis of considerable study of the subject, that this generation will never again see the pre-war price level, or anything like it, and that the dollar has suffered a permanent impairment of purchasing power.

To take a world-wide view, the money in circulation in the world outside of Russia has increased during the war from $15,000,000,000 to $45,000,000,000, and the bank deposits in fifteen principal countries from $27,000,000,000 to $75,000,000,000. That is, both money and deposits have been trebled; and prices, on the average, have perhaps trebled also. The conclusion is that in this war as in general, in the past, the great outstanding disturber of the price level has been money. What can be done about it? So far as the past is concerned, comparatively little. Bygones must largely be bygones. As far as wages and salaries are concerned, the remedy must be to raise them rather than to lower the high cost of living. While some kinds of work have had excessive wages during the war, this has not been true in general, public opinion to the contrary notwithstanding. I quite agree with Mr. Gompers that the wage level should not be lowered if it could. On the contrary, it should be raised to catch up with prices, just as was done after the Civil War. In the same way, the fares of electric railways should be adjusted to the new level of prices. But in regard to contracts little relief for past injuries can be expected.

FIX THE DOLLAR'S PURCHASING POWER

The real culprit being the dollar, the real remedy is to fix the purchasing power of the dollar. In order to secure a dollar constant in its purchasing power over goods in general, it should, in effect, be a composite of these very goods in general. It would be just as simple then to keep the price of the composite package of say 100 commodities invariable (however widely its constituents might vary among themselves) as it is now to keep the price of gold invariable. The price of that composite would always be a dollar, just as to-day the price of gold is always $20.67 an ounce. [The plan of Professor Fisher for a "goods dollar" was summarized in the ELECTRIC RAILWAY JOURNAL of April 19, page 780—Eds.]

By all means, let us keep the metal gold for the good attributes it has—portability, durability, divisibility, salability—but let us correct its instability, so that one dollar of it will at all times buy approximately that composite basketful of goods. Money to-day has two great functions. It is a medium of exchange, and it is a standard of value. Gold was chosen because it was a good medium, not because it was a good standard. And so, because our ancestors found a good medium of exchange, we now find ourselves saddled with a bad standard of value! The problem before us is to retain gold as a good medium and yet to make it into a good standard.

The method of rectifying the gold standard consists in suitably varying the weight of the gold dollar. If we add new grains of gold to the dollar just fast enough to compensate for the loss in the purchasing power of each grain, or vice versa take away the gold to compensate for a gain, we shall have a fully "compensated dollar," a stationary instead of a fluctuating dollar, when judged by its purchasing power.

And if we circulate paper representatives of gold exclusively, instead of including any gold coins, monthly changes in the weight of the gold dollar can be made even more easily than the occasional changes were made which history records. In actual fact, gold now circulates almost entirely through "yellow-backs" or gold certificates. The gold itself, often not in the form of coins at all but of "bar gold," lies in the government vaults. It would therefore be little more than expressing in law an existing custom if gold coins were abolished altogether.

If gold thus circulated only in the form of paper representatives, it would evidently be possible to vary at will the weight of the gold dollar without any such annoyance or complication as would arise from the existence of coins. That is, each month the proper government bureau would calculate from current market prices how much would have to be paid for the composite basket of goods. This figure it would publish, and this figure would then afford the needed official sanction to the Secretary of the Treasury to change the rating of the gold dollar—that is, to change the amount of gold which the mint would give or take for a gold certificate, and thus increase or diminish the purchasing power of that certificate.

The result is that the price level would oscillate only slightly. Instead of there being any great price convulsions, such as we find throughout history, the index number would run, say 101, 100½, 101, 100, 102, 101½, 100, 98, 99, 99, 99½, 100, etc., seldom getting off the line more than 1 or 2 per cent.

Present Conditions Fix "Normal" Prices

Utility Owners Have the Right to Expect Public Authorities in Determining Fares to Consider Operating Conditions and Production Costs That Prevail in 1919

BY THOMAS S. HOLDEN
United States Department of Labor

MUCH has been said and written as to whether prices are fair or whether they represent excess profits; as to whether present high levels can be maintained or will decline to a level near that prevailing before the war. Some statements have been wisely made; much that has been said has been beside the point.

It is not surprising that the price situation has bewildered many of the most intelligent business men. It has been stated by a competent authority that the purchasing power of the money of the world has shrunk more during the four years of war than it did during the four hundred years from 1300 to 1700. Prof. Irving Fisher has called what has taken place "a price revolution"; this name designates most accurately what has occurred.

The bewilderment of intelligent men concerning the price situation has been largely due to the fact that most have had to learn to think correctly about prices. We have thought one way with one side of our brain in our capacity as buyers, and we have thought another way with the other side of our brain in our capacity as producers and sellers.

In our capacity as buyers of commodities we have proceeded on the assumption that it was desirable for prices to fall. Falling prices, however, rarely stimulate business. They usually stimulate waiting for further declines. A period of falling prices is usually a period of business depression. The past six months has been remarkable for the small number of business failures. It is entirely possible that a sharp decline in prices might have been accompanied by a greater number of business failures than there has been, attended with a much greater menace of unemployment. A financial panic might have been within the bounds of possibility.

WHAT IS NORMAL PRICE?

Many of those who have been deferring building projects and the resumption of production of commodities have stated that they were waiting until prices and wages should have returned to "normal." The word "normal" has been used extensively in this connection and most of those who have used it have not appreciated the true meaning of the word. Not only in connection with prices and wages has this term been used incorrectly, but courts and public utility commissions have used the term loosely when speaking of valuations of properties.

Just what does this word "normal" mean? In a paper entitled "Appraisals and Rate Making," read on March 20 at the annual meeting of the Illinois Gas Association, Cecil F. Elmes presented with the utmost clarity and force certain aspects of the price situation as affecting valuations of public utility properties and the principles of rate making. In the course of his discussion Mr. Elmes dwelt at some length on the misconception of the term "normal." He presented curves showing the fluctuations of prices in England on five basic articles, wheat, iron, lead, cattle and sheep, covering a period of six centuries. He also presented curves showing fluctuations of artisans' wages, both in terms of money and in terms of the quantity of wheat the wages would buy, covering the same extended period. He pointed out that in the case of each one of these curves the fluctuations are so erratic that it is impossible to draw a horizontal straight line, an oblique straight line, or a mathematical curve which can in any sense serve as an axis about which the prices or wages fluctuate. Consequently it is not possible to define mathematically in terms of past experience the "normal" price of a given commodity, or "normal" wages. Nor is it possible to thus define a "normal" rate of increase in prices or wages.

PRESENT COSTS DETERMINE NORMALITY OF PRICES

Not everyone has the opportunity to consult the records of the British museum, as Mr. Elmes has had, for the purpose of studying this subject. There is, however, another authority which is readily accessible to all, *Webster's Dictionary*, which defines the term in connection with economics as follows:

> Pertaining or conforming to a more or less permanent standard, from which, if the individual phenomena deviate on either side, such deviations are to be regarded as self-corrective. This, in economics, the normal price is a price which corresponds to the cost of production.

The standard to which a price must confirm is, therefore, not necessarily a price to which we are now accustomed or were accustomed five years ago. Mr. Elmes has shown that past experience has established no mathematical standard to which a price may be expected to conform. Webster says that the standard is the cost of production. In 1919 the standard is the cost of production in 1919, and not the 1914 cost of production. There is no justification for the assumption that $12 is an unfair price for a pair of shoes today simply because the same pair of shoes might have been bought in 1914 for $6. The only criterion for the present price of shoes is the present cost of production of the shoes plus a reasonable margin of profit to those concerned in the making and the selling of the shoes.

Similarly "normal" wages in 1919 must not necessarily conform to the wage scale of 1914. "Normal" wages in 1919 must cover the cost of living in 1919 with a reasonable margin.

Similarly, the fact that the customary street-car fare in the past has been 5 cents is not necessarily an indication that a 5-cent fare is the "normal" fare in 1919. As in the case of prices and wages, the standard of the rate to be paid for the services rendered by any public utility corporation is not fundamentally the rate the public has been accustomed to pay, but the cost of production of the commodity that is being sold, whether it be gas, electric power or transportation.

In connection with valuations of public utilities and the fixing of rates, although the basic principle which applies to the price of commodities and wages of labor and valuation of real estate constitutes the standard of normality, it is fully realized that, in practice, restrictions, legal and otherwise, operate to modify the application of this principle. It is evident to all, however, that as long as these properties are owned and operated by private interests the return must ultimately be in proportion to the cost of production of that which is sold to the public. When operated by the public through government officials, if the rates paid for the service are not sufficient to cover the costs, the deficit has to be paid out of public funds.

MONEY SUPPLY INFLUENCES PRICES

If a curve representing the average of prices of a great number of basic commodities be drawn, the fluctuations are much less marked than those of any particular commodity. Prices and productions costs, which constitute the norm of prices, are measured in terms of money. Wages and the cost of living, which is the norm of wages, are measured with this same yardstick, money.

During the last forty-six years, in the United States, the curve of the price index for basic commodities has kept very close to parallelism with the curve representing the stock of legal tender in the country.

According to figures of the Bureau of Labor Statistics the maximum level of wholesale prices of basic commodities was reached in September, 1918, the index figure being 207. This figure is based on the average for the year 1913 as 100. The index figure for February was 197, for March 200 and for April 203. Weekly quotations continue to show more commodities advancing than declining. Thus it is seen that the price level is again within hailing distance of the maximum. The question today is not whether prices will fall or how much they will fall; it is rather how much higher will they go? The cost of living is still increasing and the dollar is still on the decline. The problem is to arrest this decline in the purchasing power of the dollar.

During the last few months there has been evident a growing tendency on the part of the public to accept present prices and to wait further only for some assurance that prices would not fall. The growing volume of building operations throughout the country indicates that the public has largely given over its policy of waiting. The Department of Labor is daily in receipt of statements from leaders in business and finance attesting the correctness of the statements it has published concerning prices.

WORLD-WIDE CONDITIONS PROHIBIT PRICE-LEVEL RECESSION

It took thirteen years after the Civil War for wholesale prices to get back to the prewar level. The circumstances of that period were much more favorable for price reductions than they appear to be at the present time. As compared with the war just ended the Civil War was a purely local affair.

The reason why the present situation has been so difficult to understand is the fact that it is a world-wide phenomenon. The scope of the economic changes has been as wide as the war itself. In January of this year the Bureau of Labor Statistics' index figure for wholesale prices of all commodities showed an increase of 102 per cent over 1913. At the same time the price level in England was 117 per cent higher than in 1913; in France it was 249 per cent higher. It is a significant fact that France, which showed such a marked rise in the price level, resorted to inflation to a much greater extent than did either England or the United States. In England and in Americe it has been considered wise to pay a large proportion of the expenses of the war through the levying of heavy taxes, thus minimizing the necessity for extension of the public debt and the inflation of currency. In those countries where it was considered expedient to avoid high taxation and to resort to inflation the people are now paying the piper through the high prices they are obliged to give for the necessities of life.

Whether you believe with the majority of economists that the price level is the result of the amount of money, or whether you agree with the minority that the quantity of money accomodates itself to the price level, the present condition of world-wide high prices accompanied by a world-wide increase of money and credits must be considered. Either prices in the future will be less because of a contraction in the amount of legal tender, or lower prices in the future must be accompanied by a decrease in the amount of legal tender. Hence the problem of future prices depends upon the solution of the financial problem and a solution of that can not be wholly controlled by any one country.

Lord D'Abernon, an eminent British financier, has been quoted as follows:

> If there were to be any attempt to-day to bring about a rapid return to the gold currency basis of 1914, it would almost double the weight of the world's indebtedness and would certainly lead to the bankruptcy of many nations.

The governments which have borrowed cheap money would, in the case of contraction, have to re-pay with dear money. Individuals who have borrowed cheap money would have to pay back with dear money. It is extremely unlikely that the governments of the world can be reasonably expected to decrease appreciably the world inflation within a brief period of years.

PRODUCE MORE GOODS

The best way for Americans to set about arresting the shrinkage of the dollar is to produce more goods, thus remedying the existing disparity between commodities and money. But great as is the actual and potential demand in this country for consumers' goods, perhaps even more insistent is the demand for houses. Scarcely second to this need is the necessity of making many repairs and improvements in the various systems of transportation and other public utilities.

The public has a right to expect that its servants will safeguard its proper interests in whatever adjustment of rates is made. The owners of public utilities have equally a right to expect the public officials to take into consideration operating conditions and costs that prevail in 1919.

Economies of the Skip-Stop

Skip Stop on Basis of Elimination of One Stop Per Mile, at 1.3 Cents per Stop, Will Save $30,000,000 Annually

BY JOHN A. BEELER
Consulting Engineer, New York, N. Y.

THE importance of the skip stop as a method of improving operation for electric railways by speeding up schedules and reducing the energy consumption through the medium of eliminating unnecessary stops has recently attained national prominence.

In horse-car days, which began in New York in 1829, the horses stopped when they heard the bell. With the advent of cable cars, which first appeared in San Francisco on Sutter street in 1873, a notice was carried to the effect that "Cars will stop at street corners only and cannot stop on curves." This was the beginning of the skip-stop system.

As the horse-car lines were electrified and new electric lines built, some companies followed the horse-car method of making stops at any point, while others spaced them out more in accordance with the cable practice. The first commercial electric railway in the United States was the East Cleveland (Ohio) Horse Railway, which was started in 1884. The electric cars, which were operated by the underground system, were run between the horse cars on the same track and on the same schedule. Cleveland also was the scene of the first comprehensive effort to eliminate stops, when in 1912 under the direction of Peter Witt, then street railway commissioner, the plan proved a marked success. The example was followed by a number of other cities, where the skip-stop system was used to a limited extent.

WASHINGTON FOUND THE SKIP STOP A BENEFIT

With the coming of the great war, the adoption of the skip stop was speeded up. In Washington, D. C., for example, the great influx of war workers congested all transportation facilities to such a point that the service was breaking down. One of the methods advanced by the writer to clear up the congestion on the principal streets of the business district was the elimination of all unnecessary stops. The first step in this direction was taken in the vicinity of the Treasury Building, where on Feb. 17, 1918, one-half the original stopping places were eliminated. The effect was so marked that on April 7, 1918, the plan was extended over a large share of the business district and on April 21, 1918, was made to cover the entire District of Columbia. Altogether the railways eliminated about a third of the former stopping places, leaving an average of slightly less than eight to the mile.

The effect of the skip stop in this case was immediately advantageous. The running time was reduced an average of 13 per cent. Especially in the rush hour cars which had formerly run late were able to keep on schedule and get to the end of their trips on time. This resulted in great benefit to the public, as eighty-seven cars under the new conditions were able to do the former work of 100. This gave the company the advantage of additional equipment—though it was unable to purchase more cars under war conditions—and the public had the advantage of improved transportation.

The indorsement of the plan was nearly universal, only thirty-three complaints being received from a population of half a million. Not a single one was made against the principle of the skip stop.

SKIP STOPS SAVE TIME

The skip stop properly applied is nothing more than a means of correcting an inheritance of the horse-car days. It is self-evident that the more often a car stops the slower its progress is. An ordinary street car has a free running speed of about 20 m.p.h. Without any stops it will make a mile in three minutes. Require it to make eight stops to the mile and it will have a reduced speed of 10 m. p. h. and take six minutes for a mile. If it must make fourteen stops to the mile, the speed will be reduced to 7 m. p. h.

Eight stops to the mile—every 660 ft.—means that the motorman must throw off the power, apply the brake and bring the car to rest, the doors must be opened and closed and then the motorman must release the brakes and feed up the power—every forty-five seconds. One-half the time of all persons on the car is spent in making these stops.

The importance of controlling the number of stops is apparent. For example, consider a passenger making a 2-mile trip. If fourteen stops per mile are required, the passenger will consume seventeen and one-tenth minutes in riding the full distance. With but eight stops to the mile, the ride will take twelve minutes, five and one-tenth minutes being saved. There will be a slight addition to the average walk, amounting to about 70 ft. at either end, which will take four-tenth minute additional. Thus the net gain through the stops being reduced from fourteen to eight per mile is to save the passenger four and seven-tenth minutes. If the trip is longer, the gain will be correspondingly more.

The amount of service that can be given with a certain equipment is entirely dependent on the number of stops that must be made. I have seen many lines where the points designated as stopping places average as high as eighteen to twenty per mile. True, cars do not stop at every point each trip. But on certain trips, especially during the rush hours, the cars are making an excessive number of stops. It is then that the fatal effect of the too-frequent stops becomes apparent. Either the cars are hopelessly delayed or else schedules are slowed down and the public delayed during the period when the demand for service is most urgent. Extra cars must be furnished for the sole purpose of making the additional stops, without adding one bit to the service. In some congested cities the situation has been so bad that with more cars added the speed was reduced so much that actually fewer cars per hour were moved along the street.

As a means of relief, a reduction in the number of possible stopping places makes a marked improvement. Not only does it save the time consumed in making the stops, but it aids the schedule maker by giving him a much more definite idea of what is likely to happen on each trip. With a definite basis to work on, he can place the equipment where it will afford additional service to patrons instead of being used to make extra stops.

METHODS OF ELIMINATING STOPS

In reducing the too numerous stops of the past, electric railways have used a number of methods with justice to all the car riders. The recognized arrangements of skip stops are: Simple, staggered, odd-and-even, selective, arbitrary or measured, and express and local.

In the simple skip stop every alternate corner is eliminated as a stopping place, stops in both directions being made at the same street. The staggered skip stop calls for a stop at alternate corners by inbound, and at the remaining corners by outbound, cars. The odd-and-even system is a modification of the last, applicable principally to the cities with numbered streets. Cars marked "odd" stop at odd-numbered streets, and those marked "even" stop at even-numbered streets. With the selective system the locations for stopping places are determined with reference to the traffic, without rigid adherence to the uniformity of the spacing. The arbitrary or measured method, sometimes known as the European plan, locates the stops at even distances apart without reference to the street intersections or the character of the territory served. The express and local method is self-explanatory, being an application of the steam railroad method of designating certain points as express stops.

SKIP STOPS SHOULD BE MAINTAINED

In addition to being a time-saver for the public, the skip stop saves coal for the railroads. With proper operation, a reduction in power comparable with the gain in speed can be made. After the successful installation in Washington, the United States Fuel Administration determined to advocate the general introduction of the skip stop in all cities of more than 25,000 population in order to save fuel for war purposes. An order was issued and the skip stop was installed beginning August, 1918, a spacing of eight stops per mile in city districts being recommended. Unfortunately it was hastily put in on some lines, without shortening schedules or affording patrons any benefit whatever. In such cases the public, seeing no feature but the inconvenience resulting from this arrangement, has since demanded the abolition of the practice.

A very great reduction in accidents of different classes has followed the adoption of the skip stop, according to the actual records kept in Detroit and Philadelphia. The reduction has been especially marked in boarding and alighting accidents and collisions.

In round figures the electric railways of the United States are now operating 2,500,000,000 car-miles and handling 15,000,000,000 passengers annually. They are earning on the average about 32 cents per car-mile, the operating expense being about 23 cents on a ratio of 72 per cent.

The total investment is approximately $5,000,000,000. The gross receipts are about $800,000,000, making a $6 investment per $1 of business. After the payment of operating expenses of 72 cents, there remains 28 cents on each $1 received. This is equal to 4⅔ per cent on the investment, from which must be provided interest, depreciation and replacements. It must be remembered that this includes all lines, good, bad, and indifferent. Many of the latter should never have been built.

Electric railways are to-day carrying more people and taking in greater receipts than ever before in their history. It is indeed a significant fact that in the face of the tremendous increase of automobiles in daily use, the demand for good street-car service was never so great as to-day.

If the skip stop does nothing more than save one stop per mile, it will at 1.3 cents per stop, as estimated by J. F. Layng, engineer of the United States Fuel Administration, save more than $30,000,000 annually. This important saving warrants that the skip-stop-plan be installed with great care in order to insure its permanency. Making eight stops per mile a car will make a schedule speed of 10 m. p. h. but with ten stops the speed is reduced to 9 m. p. h. With average car earnings at 32 cents, the slower schedule will earn but $2.88 while the faster one will bring in $3.20 per car-hour. As the great bulk of all the expenses are controlled by the time element feature, the importance of this fact is apparent. Savings through the skip stop and through other legitimate means, such as rescheduling, rerouting, reduction of lost time and lost motion, and the use of safety cars wherever practicable, will enable many a company to show a good balance on the right side of the ledger.

Side Lights on the Zone Fare—Good Service Absolutely Essential

No Matter How Low the Fare, Short Riders Cannot Be Developed Unless They Can Be Offered Comfortable Travel

BY WALTER JACKSON

WHOEVER has had the opportunity to analyze classification of passengers according to individual maximum length of ride cannot fail to observe that the British tramway has a much greater proportion of patrons to whom a car ride is not a necessity but merely a convenience. Roughly speaking, the minimum fare passengers of Great Britain's street railways are about half of the total. Although the unit-fare American systems do not offer the same valuable differentiation in length-of-ride data, we know from the few surveys made to get such statistics and from the traffic shrinkage immediately following an increase in fare that the same class of short-ride traffic is nearer 15 per cent than 50 per cent.

The difference between these percentages goes a long way toward explaining the operating philosophy of unit-fare *vs.* distance-fare properties. The unit-fare operator inevitably comes to think in terms of expense reductions because he feels that most of his passengers must use the cars in any case; hence the temptation to handle the same number of riders in bigger cars at longer intervals with fewer men. Just as inevitably the distance-fare operator comes to think in terms of income increases because he knows that a reduction in service will cut down the largest and most promising part of his business.

Since no exceptional talent is required to reduce mileage, it is easier to get on in the first class of properties, but only too often a penny saved is a nickel spurned. It requires courage—a willingness to try new ways—to seek to increase the net by adding service that creates travel.

If American operators feel that the war did dreadful things to them, let them contemplate what happened to the British managers who saw nearly 80 per cent of their tried and true men go forth to the carnage of war, who had in many cases to pay double wages for their help plus war allotments to the families of the men in the field, who experienced greater difficulty probably than Americans in getting repair and maintenance material during the war and who had to endure a coal shortage that was not confined to Mondays but froze on all through the week.

And did the British manager trained in selling transportation make any reductions in service voluntarily? Not one that we know or heard of! Service reductions there were; but they were reductions compelled by man shortage, car shortage and fuel shortage. These hunters of the short rider knew that they could not afford to let the street railway's only dangerous competitor—the human foot—get into its stride. Accordingly, each and every one of them was only too anxious to restore pre-war conditions as rapidily as possible.

From their policy it is clear that frequent service and good service are of prime importance in building up short riding. No fare, no matter how low, will induce a walker to board a car unless that car comes before he is well on his way and unless that car has seats available or in early prospect. He is not asking for speed or costly fixtures—he is asking only for reasonable comfort.

So here we have arrived at the natural answer to those who ask: "Won't we be plagued during the peak load with a lot of short-ride undesirables?" No, fear not. The short rider will let you severely alone during those hours when most of your passengers are long riders anyway. But if you are giving reasonably frequent service during the off-peak hours, the shopper, the solicitor, the carpenter, the plumber, the delivery clerk, the teacher, the pupil and the pleasure rider will fill seats that now are empty.

Important Hearing on Mail Pay in New England

New England electric railway circles are keenly interested in the hearing to be given at Boston, Mass., on June 13, by the Interstate Commerce Commission upon rates of compensation for carrying mail. This is one of the series of hearings throughout the country beginning in Washington on June 9.

The New England Street Railway Club has appointed the following committee to represent its members at the Boston hearing: Chairman R. B. Stearns, first vice-president Bay State Street Railway, Boston; Clarence K. Reed, general auditor Boston Elevated Railway; and D. P. Abercombie, vice-president and general manager Northern Massachusetts Street Railway, Greenfield, Mass.

The New England committee has sent a questionnaire to about sixty companies, asking for comparative financial data and other information which will enable the case to be thoroughly presented. It is earnestly requested that all possible co-operation be rendered in the forwarding of the desired material. A large attendance is expected at the Boston hearing, which will be held at 10 a. m. at the Federal Building, First District Court room.

American Engineering Standards Committee Adopts Revised Constitution

New Plan Involving Enlargement of Scope and Change of Name to A. E. S. Association Has Been Submitted to Government Boards and National Societies

THE raison d'etre, organization and proposed procedure of the American Engineering Standards Committee were comprehensively set forth in the presidential address of Comfort A. Adams before the American Institute of Electrical Engineers in February. (See ELECTRIC RAILWAY JOURNAL, March 1, 1919, page 407.) A plan for the enlargement of the organization was explained by Dr. E. B. Rosa, chief physicist United States Bureau of Standards, in the issue of this paper for May 3, 1919, page 859. This plan has now progressed to the point where a tentative draft of a revised constitution has been approved and adopted by the committee and is now before the interested governmental bureaus and national societies for their consideration.

The committee has prepared a statement of the situation, from which the following digest has been made:

In the first place the new constitution replaces the committee name by "The American Engineering Standards Association," more adequately to suggest the scope of its activities.

The objects of the association are stated as follows: (1) To unify and simplify the methods of arriving at engineering standards, to secure co-operation between various organizations and to prevent duplication of standardization work. (2) To promulgate rules for the development and adoption of standards. (3) To receive and pass upon recommendations for standards submitted as provided in the Rules of Procedure, but not to initiate, define or develop the details of any particular standard. (4) To act as a means of inter-communication between organizations and individuals interested in the problems of standardization. (5) To give an international status to approved American engineering standards. (6) To co-operate with similar organizations in other countries and to promote international standardization.

Means are provided for increasing the number of representatives in the association by invitation or on request. Several important organizations interested in standardization will be invited to appoint representatives as soon as the necessary power is obtained.

The routine work of the association will be conducted by its secretary under the direction of a board of directors. This board will have power to deal with all of the affairs of the association except the final approval of the standards submitted to it.

Any organization may request the association to approve standards which it has formulated, or to approve committees that it has appointed, and by so doing becomes a "sponsor society." Such a request is entirely at the option of the organization that has formulated or expects to formulate the standard. At the request of the sponsor, approval of the standards is given when they are the substantially unanimous conclusions of a committee made up as follows:

(a) Sectional committees dealing with standards of a commercial character (specifications, shop practices, etc.), shall be made up of representatives of producers, consumers and general interests, no one of these interests to form a majority. A producer is a person, or the representative of a firm or corporation, directly concerned in the production of the commodity involved. A consumer is a person, or the representative of a firm or corporation, that uses the commodity involved, but is not directly concerned with its production. General interests include independent engineers, educators, and persons who are neither consumers nor producers, as defined above.

(b) Sectional committees dealing with scientific or non-commercial standards shall consist of persons specially qualified, without regard to their affiliations.

It is anticipated that in nearly all cases the approval of standards and committees by the association will be requested. In case it is considered advisable, the association is authorized to call a meeting of those who would be interested in the formulation of a new standard or the revision of an old one, to select one or more sponsor societies. The sponsor society or societies will appoint a sectional committee to formulate or revise the standard. This sectional committee will report to the sponsor when its work is completed. The sponsor may then request the association to approve. The association deals only with the sponsor and acts only at its request. Provision is made in all publications that a standard must be referred to as that of the sponsor, using whatever title the sponsor has given it, followed by the statement "approved by the American Engineering Standards Association." The approval may be given as "recommended practice," "tentative standard" or "standard," the expectation being that nothing will be approved as standard until it has shown that it is generally acceptable.

The association thus acts only to bring together those interested in a common object, and when they have completed their work, will at their request, certify that it has been done in such a manner as to justify its adoption. In addition to assisting in the selection of committees and certifying that their work has been done under proper conditions, the association will act as a bureau of information regarding standardization. It will collect information regarding existing standards and as to the bodies that have formulated and adopted them. This will enable it promptly to give necessary information to those who select a committee to formulate a new standard or revise an old one. It will also enable it to furnish information desired by the working committees regarding what has been or is being done on similar or related lines. It will establish relations with similar bodies in other countries.

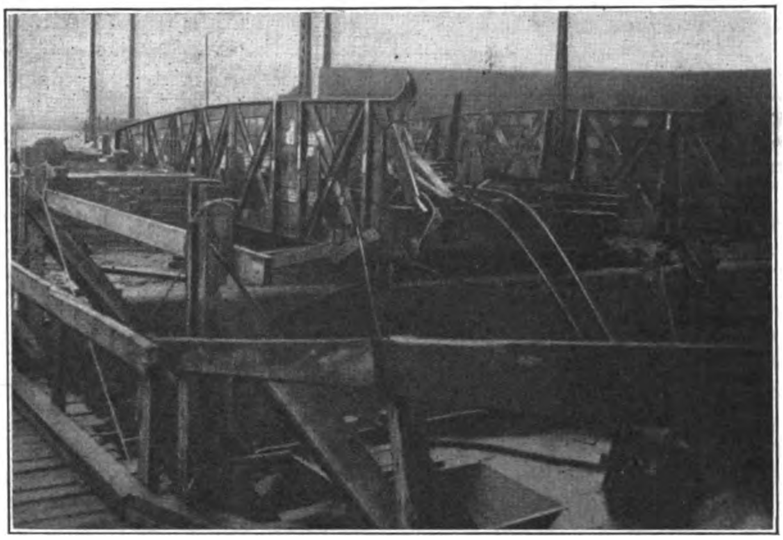
Canvass of Local Chambers of Commerce

The public utilities committee of the United States Chamber of Commerce, which is holding a series of hearings in regard to the general electric railway situation, is planning to send out to all local chambers of commerce a questionnaire on the subject. The purpose is to have these bodies give their views in regard to electric railway franchises, operating economies, taxes, the public interest in good transportation and the price situation. General information along these lines, as brought out by witnesses at the first two hearings before the committee, has been published in ELECTRIC RAILWAY JOURNAL of May 3, 10 and 31 and in this issue.

Rehabilitation of French Tramways

Condition of Those In and Near the War Zone Described by an Eye-Witness—Many Destroyed and All French Tramways in Poor Physical Condition—Extension of Credit by American Manufacturers Necessary If Sales for Renewing Properties Are to Be Made

By DANIEL T. PIERCE
Recently with the American Red Cross, Paris



WHY FRENCH ELECTRIC RAILWAYS CANNOT RESUME OPERATIONS —A TROLLEY BRIDGE IN THE DEVASTATED REGIONS BLOWN UP AS THE GERMANS RETREATED IN OCTOBER

THROUGHOUT the strip of territory, extending from Ostend to Nancy, which constitutes the devastated region of Belgium and France, there is to be observed almost total destruction of electric railways, including track, structures and rolling stock. In Ypres everything is destroyed. It is one of those cities which now consist of only a few walls and is not to be rebuilt, if we can believe the reports as to the determination of the Belgian government. Lille and Valenciennes are next encountered. Lille was a big industrial city and had several lines of electric railway, all of which were abandoned during the long period of German occupation, largely on account of the scarcity of coal. The scarcity was even more severe immediately after the armistice. People who are freezing can get along without even electric lights and railways. In January the track was in deplorable condition, and no steps had been taken to restore the service. In fact part of the motor equipment had been carried away, along with great quantities of textile machinery—some of it originally bought from German makers! Almost identical conditions existed in Valenciennes.

Arras is a scene of complete destruction and desolation, as is also Cambrai. If the latter city ever had any electric lines no sign or vestige of them remain—not, that is, in such shape as to be noticed by a casual visitor who was not searching especially for the remains of railways.

Amiens, the next large city, is in much better condition. It is officially stated that only 25 per cent of Amiens is totally destroyed, meaning that twenty-five out of every 100 houses are classified as not being worth rebuilding or repair. Even before the armistice the electric power plant was in operation and shortly afterward a few electric cars were run in a desultory way over routes that were not obstructed by demolished buildings. If the electric railways of the city were found to be 25 per cent (much less 75 per cent) intact, I should be surprised, but this is not an estimate made on the basis of exact information; it is merely the impression that one gets from visiting the city three or four times, at different intervals before and after the armistice was signed. Péronne and St. Quentin are in the same classification as Cambrai — almost totally destroyed—railways in common with every other utility, including the water supply, being non-existent.

Montdidier, Beauvais and Compiègne present quite different conditions. They were shelled but little, only badly bombed. Such railways as they had are in about the same state as the towns themselves—shattered here and there, and where intact badly worn and down at the heel. Château Thierry had only one electric line running along the river, the larger part of the town lying on the side of a steep hill which rises northward. The track had not been restored in February when I last visited the town and only temporary bridges crossed the river.

Soisson had not attempted to restore electric traction as late as March. What I saw of its track, overhead and depots suggested that there might be a salvage of perhaps 25 per cent of the plant formerly operated. In Rheims, another large city of a population of more than 100,000, there is practically nothing left of the electric lines. The four years of shelling which destroyed all but fifteen out of 15,000 dwellings, not to mention other structures, tore up the track and demolished the overhead, and repeated direct hits by shells of enormous caliber reduced the carhouses to masses of twisted iron, half-burned cars and debris. On some of the very narrow streets the feed wire was carried on arms projecting from the walls of houses. Even these were gone for stretches of several blocks. I happened to be following a car track in Rheims last year in the hope that it would lead to the railroad station. It ended in a huge shell hole, which combined with the debris from houses on either side completely blocked the street. This perhaps will give some idea of the condition of electric railways in Rheims and elsewhere in the war zone.

The few kilometers of track in Châlons and Épernay, which were on the southern edge of the devastated region, were operated after a fashion with the exception of a few months. The cars and equipment appeared to be fit only for the junk pile. I cannot recall seeing any electric railway in Ste. Menehould and Bar-le-Duc, although the latter city probably possesses the usual single-track line through the town, but certainly not on the main street. Verdun on the other hand had rather an extensive system, all of which is wiped out and must be replaced *in toto*. In Toul and Nancy on the other hand the railways operated throughout the war and, relatively speaking, are intact—if that is a proper term to apply to railways which have had no maintenance for more than four years.

CARS THAT RUN ON THEIR NERVE

In Paris and Lille the tram lines appear to be in fair condition; the equipment is in better shape than the track because the latter has gone to pieces along with the total abandonment of street repairs of all kinds. In Bordeaux, Tours and other cities and towns in middle and southern France the condition of electric lines, is, of course, deplorable by reason of the long-continued lack of maintenance and replacement. The equipment, like the Paris taxicabs, impresses one as something likely to fall to pieces at any moment. "How on earth do they keep running?" an American in Bordeaux asked, as a double-decked rattle trap swayed down the quay. "On their nerve, I guess," was the most satisfactory answer that could be given.

And that is how most of the machinery, electric railways, motor trucks, and other moving equipment in France has been kept going during the war. Every man in France was mobilized and every ounce of man-power was needed for the war. If a thing did not directly contribute to the winning of the war it was of no account. The steam railways were fairly well cared for, but France had few if any heavy electric or interurban lines. Electric railways therefore were not important for transport of men or munitions, and France has let them go to pieces. The Frenchman, however, has a gift for making things go. His motor transport during the war was disreputable in appearance but it kept on going. A motor car that an American would push into the ditch and abandon would be coaxed along indefinitely by a Frenchman. French cities therefore will probably keep their lines going somehow where there is anything left of them.

PRESSING NEED FOR ELECTRIC RAILWAY MATERIAL

But evidently there is a pressing need for vast quantities of everything that goes into the making of an electric railway. France could not in many years make this equipment; she must buy it here or in Britain or elsewhere—everything from rail to power-house equipment. France bought largely of electrical equipment from Germany; that supply is now eliminated unless the rest of the world forces France to buy from the only seller who will give her reasonable prices and long credit.

That practically all the electric railways in France are municipally owned will, of course, deter purchases from her enemies. The feeling against Germany is, however, only a deterrent; it is not an absolute bar against trade with Austria and Germany. As between a friendly seller who asks much the higher price and demands cash and a hated seller who quotes a low price and will give three years for payment, the Frenchman will eventually turn to the latter. Anyone who counts upon a refusal by France to trade with Germany if Germany offers much the best terms, is doomed to disillusionment. The Frenchman when the present intense bitterness is over will trade where he can get the best bargain. This is not only true of Frenchmen but of Italians and others, and of course it applies also to other commodities than electric railway equipment.

At the present time Frenchmen find it difficult to trade with anyone. There are high tariff barriers, the law against "export of capital" which prevents the payment of foreign debts except by express permission of the minister of finance; there is the back-breaking depreciation of the franc which means that French buyers have to pay Frs. 6.50 for every dollar's worth and there is the fear of further increase in the balance of trade against the republic.

SALES MUST BE FINANCED

Frenchmen hear that United States banks will "finance" French purchases here; they will doubtless derive much satisfaction from the speech of Mr. Vanderlip, and the proposal in Congress to form a semi-governmental corporation to "carry" French and other foreign buyers. But up to date about the only terms quoted—actually quoted as distinguished from being talked about in the newspapers—are cash against ship documents, *i.e.*, cash long before delivery on the other side. Within the past week I was interviewing a manufacturer in regard to certain machinery for export to France. Before he went very far into the discussion of what he could supply he wanted to know whether or not a cash credit had been opened here to pay for the goods. If this is to be our idea of "helping France" she will inevitably look elsewhere for help or get along without it.

The conditions call for some tangible plan of which the average buyer can take advantage by which French purchases in this country can be carried here by banks, for it cannot be expected that the manufacturer will extend two or three years credit. Until this is brought about, France must wait for the rehabilitation of her railways—at least so far as we are concerned. That she wants to buy here is certain; we must make it possible for her to do so—or lose the business. There are radical differences in French and American railway standards—notably in the weight of all equipment—but the extent of the business to be done is so great that it would seem to be worth while for American manufacturers to give the French roads what they want.

As a footnote to this subject attention may be called to a report made from Milan by a representative of the Chamber of Commerce of the United States. He says: "There are thousands of bicycles of German manufacture at Chiasso ready to flood the market. There are also carloads of chemicals and dyestuffs which have already been offered Italian merchants at extremely low prices. The high rate of American exchange makes Italian trading with Americans most difficult while the German mark is at its lowest ebb. This makes the price when translated into liri most attractive. The dollar exchange costs the Italians three times as much as the mark exchange. Naturally the prices of German goods in liri are very low."

Transpose lire to franc in this quotation and you have a correct statement of the situation as it applies to France. Nor does this situation affect only bicycles, dyestuffs and chemicals. Germany—defeated Germany —disrupted by Bolshevism and disorganized by war—

this year sold an electric locomotive in Switzerland to the government at a far lower price than was offered by any other country. It would be profitless to characterize this condition of affairs; it speaks for itself in loud tones to the American manufacturer.

Buffalo-Niagara Falls High-Speed Line Completes Successful Year

Frequent Service, High Speed, Attractive Scenery and Comfortable Cars Have Contributed to Attract a Large Patronage

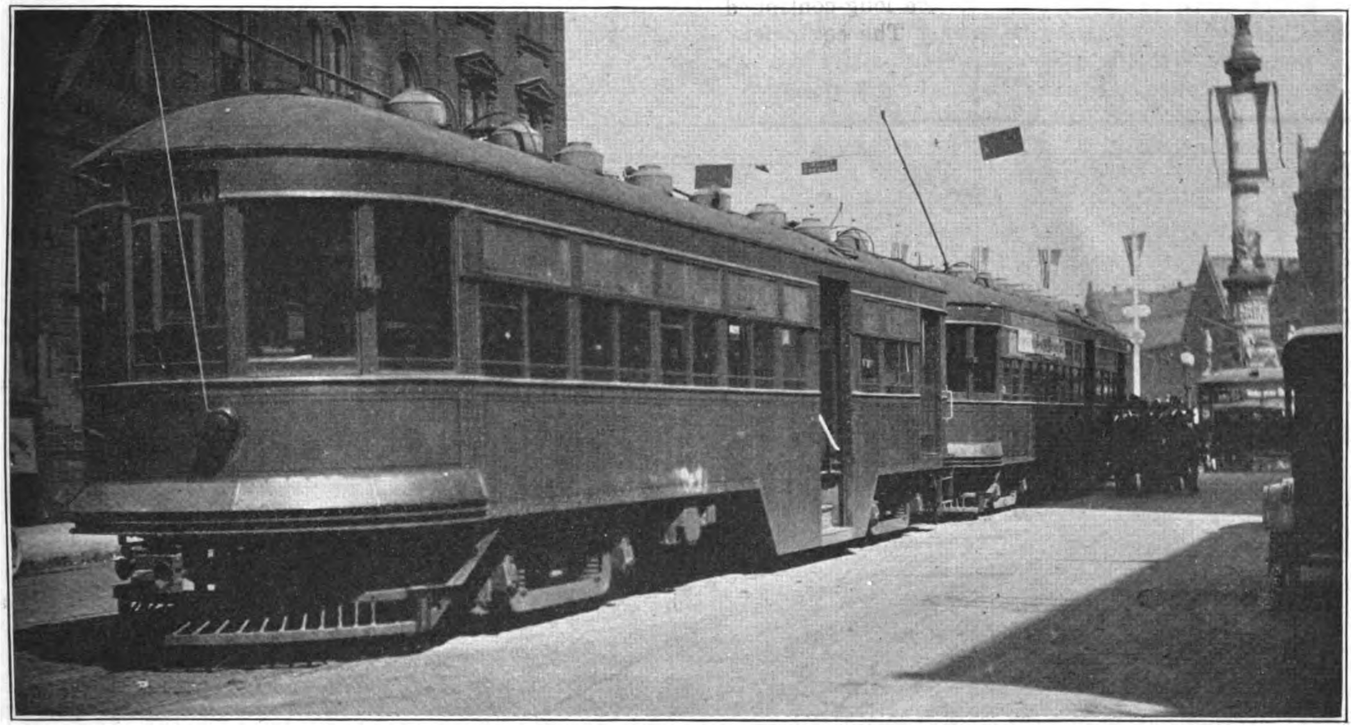
THE high-speed line of the International Railway between Buffalo and Niagara Falls is just rounding out its first year of operation, as it was opened to traffic on June 9, 1918. The line connects Main Street, Buffalo, and Portage Road, Niagara Falls, passing through Tonawanda, North Tonawanda and La Salle. It was described in detail in the issues of the ELECTRIC RAILWAY JOURNAL for July 13 and Aug. 10, 1918. During the year cars have been regularly operated over the line on a thirty-minute headway.

The business which the new line has gathered may be considered all its own, because the old Niagara Falls line of the company, which leaves Buffalo by way of Niagara Street and Military Road, has held up its traffic fairly well. Comparisons are, however, difficult to make because the winter of 1917-1918 was a severe one for the older line, and higher fares were also inaugurated during that season. Comparisons are complicated farther by the fact that the war situation and the steps taken by the government to curtail passenger traffic on the steam roads operated partly to reduce the 1918 summer traffic between Buffalo and Niagara Falls on the new line because the tourist traffic was curtailed. On the other hand, a certain advantage accrued to the new line because the number of steam passenger trains between Buffalo and Niagara Falls was limited. All in all, however, it appears that the new line has developed new business for the company.

The principal factors, of course, in the success of the new line were the high running speed, permitting a running time of one hour between Main and Court Streets, Buffalo, and the Terminal Station at American Falls, Niagara Falls; the frequency of the service; and the wonderful scenic features of the route. The number of stops between terminals was reduced to a minimum, there being a half dozen or less required stops and five signal stops.

Thirty-minute service last summer consisted of two-car trains, which seldom left either terminal city with unfilled seats. As winter came on the operation of two-car trains was confined to the busy periods of the day. W. J. Whiteside, traffic agent of the railway, states that it is planned to operate three-car trains during the coming summer and schedules are being revised accordingly. The general plan is to utilize three-car trains on Sundays, holidays and other days of heavy traffic and two-car trains ordinarily. With three-car trains a twenty-minute schedule is proposed with adequate layover. An alternative under consideration is the operation of two-car trains at intervals of fifteen minutes with a layover of fifteen minutes for the crews at each end.

By reference to the preceding articles it will be noted that the new line is 23 miles long, about 4 miles being through Main Street, Buffalo. Between city limits the distance is 17 miles, and the roadbed is on a private right-of-way. To avoid crossings at grades 3½ miles of track was built on an embankment which in places is 26 ft. high. The road curves around the Tonawandas, taking in the outskirts. The rolling stock consists of twenty interurban cars of special type, built by the G. C. Kuhlman Car Company.



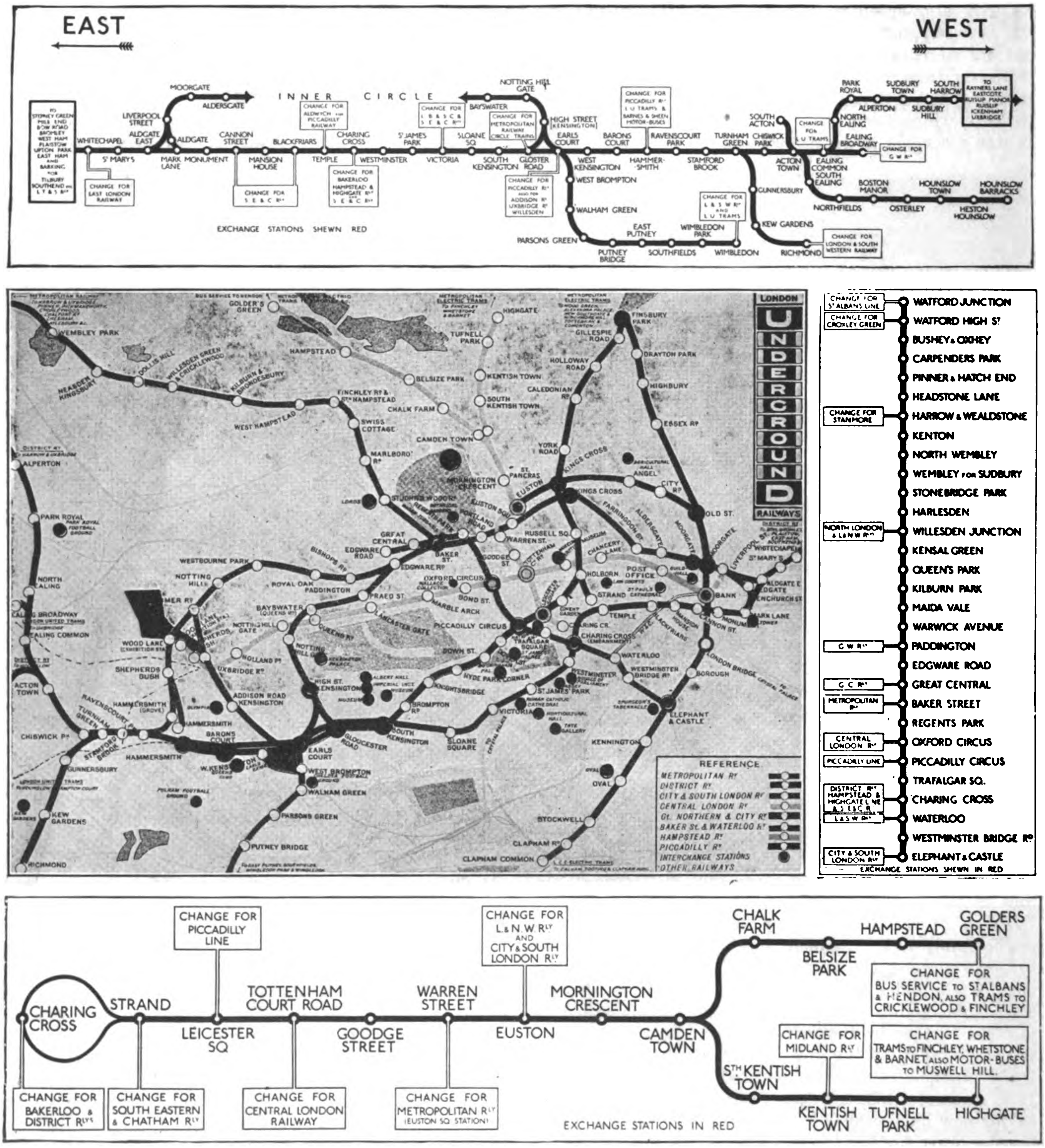
HIGH-SPEED LINE TRAIN LOADING AT BUFFALO

Why London Riders Don't Go Astray Underground

Maps Showing Routes and Direction of Travel, Enamel Station Signs and Other Directional Publicity Prevent Confusion

COMPARED with the rapid transit systems of other large cities—especially New York with its paralleling north and south lines—that of London looks a hopeless welter of traffic ganglia. Yet it is doubtful whether the stranger in New York or Chicago can get around so readily without asking questions as he can on the London Underground Railways which comprise eight different lines totaling 98.5 miles. It would seem that appreciation of the very complexity of its system made the management determine that it would leave nothing undone for either the out-of-town patron or for the native visiting unfamiliar sections. From the time that the passenger sees the blue-and-white enamel signs that advertise the presence of a station to the moment that he reaches the street again, he is continually reminded of what to do to keep on the right road.

In pre-war days, the entrance to an underground station was the brightest spot in the neighborhood, particularly at night. The old conditions have not yet


EAST
WEST
INNER CIRCLE
MOORGATE
ALDERSGATE
LIVERPOOL STREET
ALDGATE EAST
ALDGATE
WHITECHAPEL
ST MARY'S
CHANGE FOR EAST LONDON RAILWAY
MARK LANE
MONUMENT
CANNON STREET
MANSION HOUSE
CHANGE FOR S E & C Ry
BLACKFRIARS
TEMPLE
CHARING CROSS
WESTMINSTER
ST JAMES PARK
VICTORIA
SLOANE SQ
SOUTH KENSINGTON
GLOSTER ROAD
BAYSWATER
NOTTING HILL GATE
HIGH STREET KENSINGTON
EARLS COURT
WEST KENSINGTON
WEST BROMPTON
WALHAM GREEN
PARSONS GREEN
PUTNEY BRIDGE
EAST PUTNEY
SOUTHFIELDS
WIMBLEDON PARK
WIMBLEDON
BARONS COURT
HAMMERSMITH
RAVENSCOURT PARK
STAMFORD BROOK
TURNHAM GREEN
CHISWICK PARK
SOUTH ACTON
ACTON TOWN
GUNNERSBURY
KEW GARDENS
RICHMOND
CHANGE FOR LONDON & SOUTH WESTERN RAILWAY
EALING COMMON
SOUTH EALING
NORTHFIELDS
BOSTON MANOR
OSTERLEY
HOUNSLOW TOWN
HESTON HOUNSLOW
HOUNSLOW BARRACKS
EALING BROADWAY
CHANGE FOR G W Ry
NORTH EALING
ALPERTON
PARK ROYAL
SUDBURY TOWN
SUDBURY HILL
SOUTH HARROW
EXCHANGE STATIONS SHEWN RED
LONDON UNDERGROUND RAILWAYS
REFERENCE
METROPOLITAN Ry
DISTRICT Ry
CITY & SOUTH LONDON Ry
CENTRAL LONDON Ry
Gt. NORTHERN & CITY Ry
BAKER St. & WATERLOO Ry
HAMPSTEAD Ry
PICCADILLY Ry
INTERCHANGE STATIONS
OTHER RAILWAYS
CHANGE FOR St ALBANS LINE
CHANGE FOR CROXLEY GREEN
CHANGE FOR STANMORE
NORTH LONDON & L & N W Ry
G W Ry
G C Ry
METROPOLITAN Ry
CENTRAL LONDON Ry
PICCADILLY LINE
DISTRICT Ry HAMPSTEAD & HIGHGATE LINE & S E & C R
L & S W Ry
CITY & SOUTH LONDON Ry
WATFORD JUNCTION
WATFORD HIGH St
BUSHEY & OXHEY
CARPENDERS PARK
PINNER & HATCH END
HEADSTONE LANE
HARROW & WEALDSTONE
KENTON
NORTH WEMBLEY
WEMBLEY FOR SUDBURY
STONEBRIDGE PARK
HARLESDEN
WILLESDEN JUNCTION
KENSAL GREEN
QUEEN'S PARK
KILBURN PARK
MAIDA VALE
WARWICK AVENUE
PADDINGTON
EDGWARE ROAD
GREAT CENTRAL
BAKER STREET
REGENTS PARK
OXFORD CIRCUS
PICCADILLY CIRCUS
TRAFALGAR SQ.
CHARING CROSS
WATERLOO
WESTMINSTER BRIDGE Rd
ELEPHANT & CASTLE
EXCHANGE STATIONS SHEWN IN RED
CHANGE FOR PICCADILLY LINE
CHANGE FOR L & N W Ry AND CITY & SOUTH LONDON Ry
CHALK FARM
HAMPSTEAD
GOLDERS GREEN
BELSIZE PARK
CHANGE FOR BUS SERVICE TO St ALBANS & HENDON, ALSO TRAMS TO CRICKLEWOOD & FINCHLEY
CHARING CROSS
STRAND
TOTTENHAM COURT ROAD
WARREN STREET
MORNINGTON CRESCENT
LEICESTER SQ
GOODGE STREET
EUSTON
CAMDEN TOWN
CHANGE FOR MIDLAND Ry
CHANGE FOR TRAMS TO FINCHLEY, WHETSTONE & BARNET ALSO MOTOR-BUSES TO MUSWELL HILL.
Sth KENTISH TOWN
KENTISH TOWN
TUFNELL PARK
HIGHGATE
CHANGE FOR BAKERLOO & DISTRICT Rys
CHANGE FOR SOUTH EASTERN & CHATHAM Ry
CHANGE FOR CENTRAL LONDON RAILWAY
CHANGE FOR METROPOLITAN Ry (EUSTON SQ. STATION)
EXCHANGE STATIONS IN RED

SAMPLES OF MAPS BY WHICH THE LONDON UNDERGROUND RAILWAYS GUIDE PATRONS been restored because of the fuel shortage, but there is reason to believe that they will be.

On entering the station, the patron will note a large map like the upper one reproduced; also a smaller map which shows the immediate vicinity of the station. These maps could not be kept up to date during the stress of the war period, but when the abnormal conditions with regard to traffic, high price of paper and printing, etc., let down, these effective means of conveying information will be used as before. The map reproduced is among the first of a new issue. Another shows the route numbers of nearly 150 bus lines in addition to the names of all the underground stations.

Whether or not the patron consults a map he is not likely to buy a ticket to the wrong place. It is enough for him to mention the station to which he wants to go, whereupon he is advised that the cost is so and so, depending upon the distance. On examining his ticket, he will usually find specific directions as to where to transfer in case he is going to another line. Thus a Hampstead passenger desiring to go to some station on the District line is informed that Charing Cross is his transfer station. In some instances several transfers may be necessary.

The purchaser now proceeds to a lift or elevator where the attendant examines and notches his ticket. When the level of the boarding platform is reached, a multiplicity of signs tell him that this is the "Way out" and that that is the way "To trains." Where there are three or more passages, fingerboard posts are used.

As he reaches the train platform, he cannot fail to see the list of stations posted on the wall opposite. If his station is not on the list, he can walk to the other platform where he will find a list of stations covering travel in the other direction. This is not all. An illuminated destination indicator overhead tells him what train is coming next, so that if it is not his train he can step aside to avoid the rush. If perchance he has failed to see this indicator, he is not likely to miss the illuminated destination sign carried at the head of the train itself.

Should he feel nervous about passing his station or getting off the car too soon, he need only look at the diagram maps of station order, two or more of which are tacked up in the roof of the car, four on bulkhead panels and two painted on opposite sides of an illuminated overhead box sign in the center of the car. These signs show the order of stations, red being used to designate those stations where interchange is made with other underground lines or connections afforded to the steam railroads, trams, etc. The two roof signs also have arrows indicating the direction of travel. As the train enters the station, even the bewildering variety of advertising posters will be unable to hide the great red disks, up to 4 ft. or more in diameter, which serve as a background for the blue field and white lettered enameled name of the station.

If, after all these directions, the passenger gets off at the wrong station he will be set aright verbally by the liftman or liftgirl who takes up his ticket.

The foregoing by no means exhausts the efforts of the railway to make riding easy. In peace days, the company issued leaflets by the hundreds of thousands. For instance, there was a monthly pocket circular called "London's Guiding Star," made up of the general map on one side and eight pages on the other. In addition to the list of permanent attractions and steam line connections with the nearest station thereto, similar information was furnished concerning exhibitions and events of the month. One of the eight miniature pages carried a theater district plan of London, showing with the aid of numbers just where these places of amusement were located and the nearest station to each. Publications like this are greatly appreciated.

In spite of such elaborate and painstaking practices to aid the passenger, the management does not feel that perfection has been attained. It is always studying possible improvements and at this very time is figuring on a plan of identifying lines by letters so that ticket and station directions may be simplified—the letter Y, for example, being use to guide passengers destined for the District line, X for the Metropolitan line and so on.

Engineers' Unfortunate Experience

National Service Committee of the Engineering Council Reports Volunteer Officers Cannot Collect Traveling Expenses

ENGINEERS who were enrolled in the Reserve Corps at the beginning of the war will be interested in the circumstances related below as given out by the National Service Committee of the Engineering Council. If other engineers had a similar experience they are urged to send a detailed statement to the office of the committee, McLachlan Building, Washington, D. C. If the experience was common, the combined testimony may be sufficiently strong to induce Congress to provide for reimbursement. It is not probable that corrective action can be secured on the basis of a few instances. Therefore the engineers who have knowledge of similar cases and who fail to respond to this invitation may be depriving other engineers who are not so indifferent as to the consequences.

The following letter was addressed to the American Society of Civil Engineers by one of its associate members resident in the Philippines, and by progressive reference finally came to the Washington office of the Engineering Council.

THE AMERICAN SOCIETY OF CIVIL ENGINEERS,
New York, U. S. A.

DEAR SIRS:

As you are doubtless aware, the American Society during the recent war played a very considerable part in obtaining the services of engineers for the Army. Literature descriptive of the Engineer Officers' Reserve Corps was circulated throughout our membership and the society's appeal for men was probably responsible for a very large number of volunteers. In view of this fact, I am taking the liberty of advising you of certain instances in which the War Department through the Chief of Engineers seems to have violated the agreement under which the engineer officers were induced to offer their services. I am doing this with the hope that the society may be instrumental in securing legislation that will result in a partial reimbursement to the men for some of the financial loss that they suffered through certain rulings of the War Department.

Among other things, we were informed that Reserve Corps officers when ordered to active duty would receive the pay and allowance that officers ordinarily do when changing stations. Any number of Western engineers, several of them located in Alaska, applied for commissions in the First Engineer Reserve Corps. After their applications had gone forward the reserve corps was abolished by the War Department. Without receiving any information to this effect these men were telegraphed offers of commissions in the Engineers, U. S. A. They were accepted and ordered to Camp A. A. Humphreys, Va., for duty as students. Upon their arrival at camp they were informed that they would receive no travel allowances at all. The 7 cents a mile that they expected was not due

> them because they had accepted commissions in the regular army, not in the reserve corps. This was the first intimation that they had as to their new status. Most of the men, particularly those from Alaska, had been to a very considerable expense in traveling, as much as $350 in some cases, and naturally consider themselves unfairly treated.
>
> Another instance, one which covers my own case, occurred as follows: Some twenty-five or thirty of us entered the service in the Philippine Islands. We were discharged in the States, most of us in the eastern part. Our discharges came just too late to catch the December transport for the Philippines so we were forced to wait for the January boat which arrives in Manila about Feb. 15. We were thus more than two months without pay, our army pay having stopped on the date of our discharge and our pay as civilians not beginning until our arrival in the Philippines. Anticipating these conditions, some of the men requested that they be ordered to the Philippines and discharged there or that they be returned to the inactive list in the Reserve Corps so that they could return to their homes with pay. Both of these requests were refused and the men were discharged along with the rest.
>
> Several of us called on various army officials in Washington and were told in every case that new legislation was necessary before we could be reimbursed. It is to acquaint you with these facts and to solicit your assistance in securing the necessary legislation that I am troubling you with this letter.
>
> We all received a letter of appreciation from Major General Black in which we were heartily thanked for the way in which we had responded to our country's call, etc. A little consideration in the orders getting us into and out of the service would have been more to the point.

On May 1 a letter was addressed by the National Service Committee to the Secretary of War in which the above communication was quoted with a request as follows:

> Will you be good enough to inform the Engineering Council through the undersigned whether the facts as related in the letter above quoted are interpreted by the War Department in the same way as by Mr. ——— and whether there is an official intention to present the facts to Congress for the purpose of securing authority to reimburse discharged engineer officers of the Army whose experiences were similar to that above related.

Up to May 24 no response had been received from the War Department but the National Service Committee still has "hopes." While the author of the above letter recites an unfortunate train of circumstances, which seemingly reflects discredit on some one, the committee thinks that judgment should for the time being be tempered with consideration. This war has been so big a thing that the mental capacity of man has been quite inadequate to direct everything rightly. An injustice has been done, but the correction in this case lies not in placing the blame but in securing reparation. Our government is essentially just and the Congress will not advisedly do injury to any man. "Let us have all the facts," says the National Service Committee.

Keep Inflammable Material Out of the Fill

AN ILLUSTRATION of the importance of care in selecting and inspecting material for fills is furnished by the experience of Newark, N. J., with the embankment installed in conection with the development of Port Newark. A smoldering fire has been burning in the fill for months and members of the fire department of the Submarine Boat Corporation nearby and employees of the city's engineering division on several occasions have attempted without success to extinguish the blaze by playing a hose upon the burning area. The trouble is due to the fact that street sweepings and other organic material form a considerable part of the filling material.

Fill Up the Empty Seats

The Philadelphia Rapid Transit Company Urges Its Employees to Develop Salesmanship for Rides

A UNIQUE method was recently used by the Philadelphia Rapid Transit Company for bringing forcibly to the attention of each of its 10,000 employees certain information about the electric railway business of particular interest and importance at this time.

The management feels that too often the "front office" is working so close to the gigantic problems confronting the industry in connection with rates of fare, revenues and expenses, that it is assumed all of the employees throughout the organization are just as well informed and are giving the same serious consideration to these factors, which make for the success or failure of the business.

As a matter of fact, many of the employees have no comprehension of these larger basic matters for the simple reason that no one has taken the trouble to explain the facts to them.

Appreciating the increasing necessity for recognition on the part of electric railway managements of the "merchandising" or "salesmanship" end of the business, President Mitten addressed a letter to all of the employees as follows:

> TO ALL EMPLOYEES:
>
> I desire to thank each of you for the fine spirit of cooperation and loyalty you have shown during the trying conditions brought about by the war.
>
> Continuance of the present high standard of wages during the reconstruction period can be best assured by our all now striving together with renewed effort to accomplish two things:
>
> 1. Build up our "Factory Organization" so as to produce street-car service of the best quality at the lowest cost. In this, all of us—transportation, rolling stock and buildings, electrical, way, and general offices—have important work to do. It means going heart and soul after such things as accident prevention, keeping the cars properly spaced on the streets, careful inspection and cleaning of cars, regularity and economy of power, track betterment, office efficiency, and the elimination of ALL wasted effort.
> 2. Improve our "salesmanship" so as to sell more of that which we have for sale—street-car rides. We must sell the empty seats in the off-peak hours to those who now walk or use other transportation. Every person in the territory we serve is a possible car rider. As the common carrier for the entire community, we fall short of doing our full duty to the public if we do not make a car rider of every walker, every automobile user and every steam railroad passenger who can be more conveniently and cheaply carried by street car. You, the conductors and motormen particularly, by your alertness and courtesy, have it within your power to stimulate and encourage the short-ride habit, especially among those who now walk.
>
> The best selling asset in this business is cheerfulness.
>
> A smile will usually win. A grouch always loses.
>
> I invite your thoughtful attention to the enclosed pamphlet by the Hon. William D. B. Ainey, chairman of the Public Service Commission of Pennsylvania.
>
> May 28, 1919. T. E. MITTEN, President.

This letter was printed on the face of an open-end envelope 4¼ in. wide by 6⅞ in. high, and within the envelope was inclosed a pamphlet containing an address by William D. B. Ainey, chairman Public Service Commission of the Commonwealth of Pennsylvania, which was delivered before the public utility group of the United States Chamber of Commerce in St. Louis, and reprinted in the ELECTRIC RAILWAY JOURNAL of May 3, 1919. Chairman Ainey's address emphasized the necessity for better "merchandising" by selling the empty seats, and discussed the effect of rates of fare on the riding.

Federal Commission Appointed

President Wilson Chooses Body to Investigate Electric Railway Situation and Recommend General Solution

FEDERAL action looking toward a solution of electric railway problems throughout the country was taken through the creation of the "Federal Electric Railways Commission" by President Wilson. This action was taken pursuant to a recommendation sent to the President on May 15, 1919, by William C. Redfield, Secretary of Commerce, and W. B. Wilson, Secretary of Labor, as noted in this paper for May 24, page 1015.

The President approved this recommendation and appointed the following members, to serve without compensation: Edwin F. Sweet, Assistant Secretary of Commerce; Royal Meeker, Commissioner of Labor Statistics, Department of Labor; Louis B. Wehle, general counsel of the War Finance Corporation, who will act during the absence in Europe of Eugene Meyer, Jr., managing director of the corporation; Charles E. Elmquist, president National Association of Railway and Utilities Commissioners; Charles W. Beall, of the American Investment Bankers' Association; Philip H. Gadsden, American Electric Railway Association, and William D. Mahon, Amalgamated Association of Street and Electric Railway Employees of America. The President has also designated a representative of the American Cities' League of Mayors, but an acceptance has not yet been formally received and an announcement of the mayor who will serve will be made later. The new commission met on June 4 and organized by electing Mr. Elmquist as chairman and Mr. Sweet as vice-chairman.

The commission has no authority to hear and determine specific controversies in any community or in respect of any company. It will attempt to determine the general principles which should govern the regulation, operation and service of electric railways. It will not interfere in any way with the regulatory functions of state regulatory bodies or municipal authorities, its functions being confined to investigation and recommendations. The election of Mr. Elmquist as chairman is the best evidence that it is not the intention of the new commission to interfere in any way with the powers of states or municipalities.

The methods by which the commission hopes to reach its conclusions have not been developed, but will be announced from time to time. "Mr. Elmquist at the conclusion of the meeting said that the commission will not start off with any preconceived notions. It wishes to make its investigation broad and comprehensive with the view to making recommendations which will be a positive contribution to the solution of the problems which now confront the country. Those problems grow out of the expansion and improvement of service which the public properly demands; out of the great increases in the payrolls; out of the high prices for materials; out of controversies which center around financial organization and methods, and out of franchise relations."

In order to explain to all the regulatory bodies the character of the general investigation contemplated, Mr. Elmquist has sent out to all commissioners a copy of the letter to President Wilson from Secretaries Wilson and Redfield [ELECTRIC RAILWAY JOURNAL of May 24, page 1015] with the following comment:

> The President has decided to create a commission to make a study of the general franchise and operating conditions of the electric railways in their relation to rates, including service-at-cost plans, state and municipal taxation, local paving requirements, and internal economies that may be effected.
>
> During the war, some of the utilities were in favor of having the President take over certain street and electric lines as a war measure and fix their rates, since the government was fixing the price of fuel and labor, and controlling to a large extent the output of the steel mills and other factories. You will recall that the war committee of our association opposed this plan but suggested to the President, in lieu thereof, that he appoint a federal board to make a study of the utility situation and submit its recommendations to the local commissions and municipalities simply for their help and guidance in the determinaton of utility questions.
>
> It was felt for some time that such a board would be created, but final consideration seemed to end with the signing of the armistice. It is reported that the readjustment period has not thus far brought any relief to the utilities and that the condition of many of them is critical. A letter from Secretary Redfield and Secretary Wilson was wired to the President May 15 and resulted in his determination to create a commission. I think it is in the interest of the public that the state commissioners be represented on this board, because the problem is, after all, local in its nature, and all obtainable information should be brought to the board's attention.

Three Zone System in Detroit

The accompanying diagram shows the method of zone collection used on the Royal Oak suburban division of the Detroit United Railway. Fare boxes are used. The plan followed is an adaptation of the pay-enter pay-leave system, but is somewhat more flexible because of the introduction of what is known as an "identification check." This check, on northbound cars, is given to passengers in zone 1 or the city zone who pay cash fares and request it when they pay their fare. It is not given to passengers who ride on transfers.

On northbound cars, zone 1 is operated in the usual way as pay-enter. Passengers who wish to ride into zone 2 without extra charge and pay their fare in cash ask for an identification check at the time of paying fare as mentioned above. Zones 2, 3 and 4 are operated pay-leave with a 5-cent fare, but a passenger may use the identification check in zone 2 on alighting from the car in place of a cash fare.

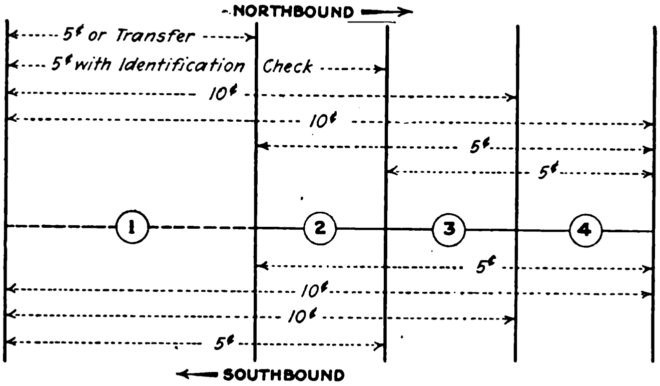


DIAGRAM SHOWING ZONE FARE SYSTEM

On southbound cars, all fares are pay-enter. In zones 4 and 3 a passenger may pay 10 cents and get an identification check or 5 cents and receive no such check. In zone 2 he receives his identification check with his 5-cent fare if he says he is expecting to travel into zone 1. At the entrance to zone 1 an identification check or an additional 5-cent fare is collected from all passengers, and in zone 1 pre-payment collection is made in the usual way. Zones 2, 3 and 4 are about 1 mile in length.

Cutting Most of the Compromise Out of the Compromise Joint

Experience of Brooklyn Rapid Transit Company with Experimental Joint Shows It to Be Economical of Material and, to Date, Durable

THE problem of successfully connecting rails of different heights and shapes has had any number of possible solutions, some of which are quite effective. Nevertheless, the compromise joint, as such, continues to give considerable trouble and to cause far greater expense than ordinary joints. Hence any means of reducing costs and bettering the joint conditions should be of interest, particularly when it is remembered that regular compromise joints as furnished with special work will cost from $12 to $15 each.

It is quite safe to assume that many compromise joints are still made up in the field by the blacksmith, using ordinary joint plates found on the job. By far the greater number are used for making connections of parts of special work with tangent tracks and an examination of special-work layouts on almost any system will disclose at least one and generally several of these joints which are defective. The purpose of this article is to explain one plan for reducing joint cost which is being tried out in Brooklyn.

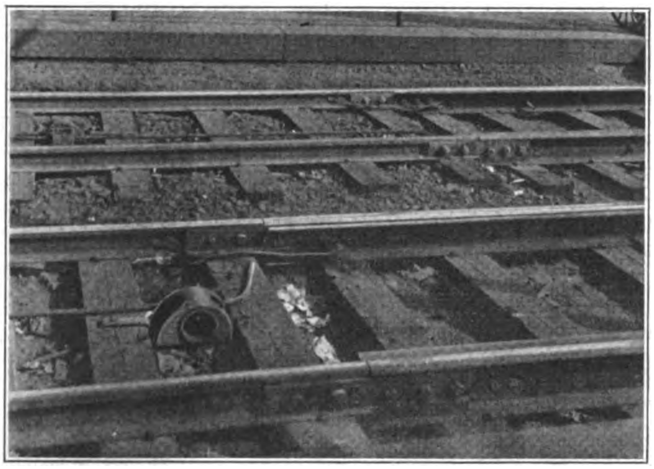


FIG. 1—EXPERIMENTAL "R. P. W." COMPROMISE JOINTS AFTER A YEAR'S SERVICE

These are located at the Brooklyn end of the Williamsburg Bridge, connecting 80-lb. A. S. C. E. and 7-in. 122-lb. association standard groove girder rails. Car traffic more than 3000 per day.

The scheme here illustrated and described was devised by R. P. Williams, formerly inspector of special work for the Brooklyn Rapid Transit System. It is but a short time since the castings were obtained, due to delays from war conditions and for this reason the device is only getting into service, although the experimental joints shown in Fig. 1 have been in use more than a year at the Williamsburg Bridge, where the schedule calls for a traffic of 3000 cars or more per day. It is estimated that the device will result in a saving of from $3 to $5 per joint and that when its use is extended, a total saving of from $1,800 to $3,000 per year should be effected in one particular type of compromise connection alone.

The principal feature of the idea is the means provided for the use of standard splice plates for association standard 7-in., 122-lb. groove girder rail in making connections between 7-in. and 9-in. rails. Similarly the standard angle bar for 5-in., 80-lb. A. S. C. E. rail is to be used in connecting it with 7-in. groove girder rail. This is accomplished by malleable iron base castings, shown in Fig. 2, which are installed upon the upper part of the base of the deeper rail, being held in place by arc welding. The castings are I-shaped, 13 in. long, with webs and flanges about ½ in. thick and reinforcing ribs about 4 in. apart. They weigh about 10 lb. each. The tops of the castings have the same bevel as the upper part of the rail base, thus reproducing the fishing angle at the same level with the lower or shallow rail. Here it may be said that advantage is taken of the fact that this angle is a constant for most rails which are found in Brooklyn.

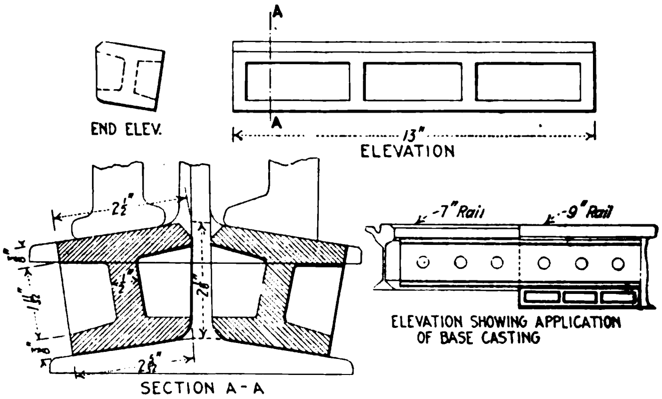


FIG. 2—BASE CASTINGS FOR "R. P. W." COMPROMISE JOINT ASSEMBLED FOR CONNECTING 7-IN. GROOVE GIRDER AND 9-IN. TRAIN GIRDER RAILS

There is occasional trouble in connection with the fishing angle at the top of the joint plate, sometimes due to sectional differences and sometimes due to head wear. This is taken care of by welding a flat shim or liner on top of the joint plate, as indicated in Fig. 3. Of course, the tops of the rail heads are ground to a true surface as soon as the joint is made up. It is also necessary, as of old, to offset the plates at times to line the gage lines of different sections. The base castings are made of a width sufficient to permit the arc welding of the joint plates to them if desired. The cost reduction previously referred to is mainly due to difference in the cost of deep ¾-in. x 8-in. bar steel formerly used for compromise joints when made in the shop, together with the elimination of the waste of steel lost by cutting out the 2-in. vertical step as compared with the cost of ordinary joint plates plus the castings. The experimental joints shown in Fig. 1 are made of bar steel planned to fit 80-lb. A S C. E. rail, while the bases on the 7-in. rail, in this instance, are made from steel bars cut from joints made up for deeper work which otherwise would have been scrapped. In the experimental joints shown the joint bars are held by ordinary bolts and are also welded to the deep rails and special bases.

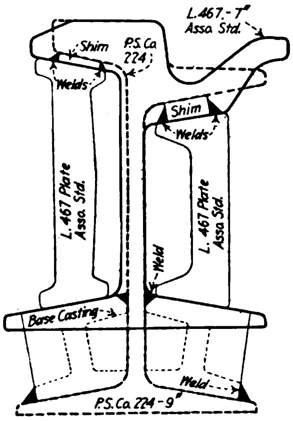


FIG. 3—SHIMS WELDED TO PLATES TO TAKE UP SECTIONAL DIFFERENCE IN FISHING SPACE

Suggestions for Mechanical Ticket Issue As Applied to a Differential Fares Scheme

BY THEODORE E. THOMAS
London County Council Tramways

THE issue of tickets by mechanical means has always been a more difficult problem for tramways in Great Britain than is the case in America. The chief attraction of the flat fare is the resultant simplification of ticket issue. Most of the tramways undertakings in the London area have, however, now adopted a uniform fares system in place of the more arbitrary system previously in force. Each route is divided into penny stages, each of which is in turn subdivided into sections varying in length (but not in number) according to the incidence of traffic points. The introduction of such a scheme at once suggests the possibility of the issue of tickets by a machine on the platform as passengers board the car. I propose to set out briefly the functions which such a machine should be able to fulfill, with the difficulties to be met, and, if possible, overcome.

The fare for the journey to be taken would be paid to the conductor when the passenger enters the car. Each kind of ticket would be issued from a separate receptacle in which a roll had been placed.

Tickets would be printed to indicate all fare stage points and would be cancelled in the section to which a passenger was entitled to travel.

At each fare stage point the machine would be set so that cancellation at the correct place on the ticket would be automatic.

In the case of return (round-trip) tickets they would only be recorded on issue, and when used for the return journey need only be punched by a cancelling machine.

The machine would record the number of tickets of each variety, thus providing a check upon the record obtained from the starting and finishing numbers on the rolls. Packets of tickets could, if desired, be sold separately and punched by the conductor, with the cancelling machine. In the event of the machine becoming defective a seal would be broken and the tickets removed and punched with the cancelling machine.

Passengers on alighting from the car would be required to hand their tickets to the conductor so that any who had overridden could be excessed.

I can well believe that such a system as has been briefly described sounds complicated and so it is as compared with the simplicity of the flat fare. But the flat fare stands condemned with the great reduction in the value of money caused by the war.

Some of the difficulties that will arise are: (1) Dealing with passengers who lose their tickets. This is not a new problem, as it arises on all railways. (2) At very busy points loading may be unduly delayed. (3) Heavy capital expense. (4) The need for special provision being made for cars not working on their proper routes. (5) Passengers must board and alight from the car at the conductor's platform which is inconvenient at terminals with a heavy traffic in both directions.

The worst side of the story has now been told and it only remains to show what compensating advantages would be obtained.

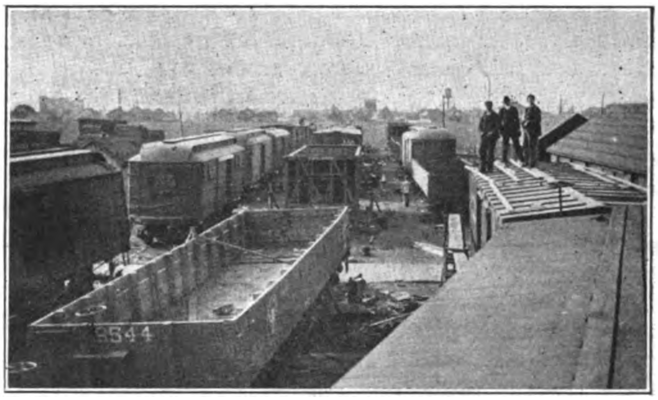
These are briefly: (1) Every passenger must take a ticket, which is very far from being the case at present. (2) The conductor is always on the platform—a matter of some importance in avoiding delay at stopping points and reducing the risk of accident. (3) Correct cancellation of tickets is insured. (4) All tickets are collected and available for repulping.

It may be that the writer has not faced all the difficulties, but they must indeed be great if they accumulate to the size of only one objection to the present British practice. I refer to the conductor's struggle to get round to all the passengers on a crowded car. This should be stopped at almost any cost, it tempts honest men and provides a rich harvest for the dishonest.

Freight Car Repairing Facilities of An Interurban Line

IN THE PROCESS of rearrangement and rehabilitation through which the Decatur yards of the Illinois Traction System are now passing, the facilities for repairing freight cars have been considerably increased. Six tracks with a total capacity of sixty cars have been laid, three on each side of a line of new buildings devoted entirely to the work of maintaining the more than 900 freight cars operated by the company.

At one end of the layout is an office building, 25 ft. x 30 ft. in size, for the inspectors. The next building, of the same width and about 100 ft. long, is a storehouse containing only stock used for the car repairing. In one end of this building is a room in which the men may rest and eat their lunch in cold weather. Each stock bin in the stockroom has a card tacked on the outside, and every piece of material taken out is entered on the card by the storekeeper, who is on duty during all working hours. This procedure is followed not solely to maintain a running inventory but to enable the storekeeper closely to estimate the quantity of each article needed per day and thus keep a plentiful supply on hand.



THREE OF THE SIX FREIGHT CAR REPAIR TRACKS AT THE DECATUR YARDS OF THE I. T. S.

The third building is about 50 ft. long by 25 ft. wide and has a cinder floor. This is to be the freight car repair blacksmith shop and will contain pipe cutter, bolt cutter, drill press, forge, anvil, etc. There is a large rolling door in the center of each side so that the heavy parts of the cars, such as drawbars, bumpers, etc., can be easily handled in the blacksmith shop.

A plank flooring extends along both sides of the entire stretch of buildings and also between them. Beyond the buildings will be stored all lumber and other materials used in the repairing of the cars and not kept in the storeroom. Clear passageways across the tracks are maintained between the main shops and the inspector's office and the storeroom and between the woodworking shop and the lumber pile and blacksmith shop.

Speedy Erection of Trolley Poles with Gin Poles on Wheels

A RECORD in the rate of setting up trolley poles along the track of the Chicago, Milwaukee & St. Paul Railway has been made by the use of a gin pole built up on a push car and operated along the track. Using this device, poles up to 50 ft. long have been set with a crew of four linemen and about three helpers, including a teamster, the team being used for hoisting the trolley pole and moving the push car from setting to setting. Additional men, of course, were used to line poles and backfill, following the setting crew.

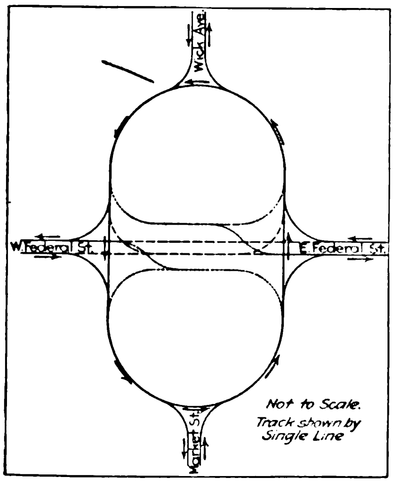
With this rig the rate of progress has been as high as 108 settings per day and has averaged about seventy poles per eight-hour day. Before the portable gin pole was built the average made by the hand method was about fifty poles per day, and this meant hard work on the part of the crew. The gin pole has a total length of about 18 ft. and is slung, about 6 ft. from its lower end, on a horizontal pin supported on a heavy frame built up from an ordinary push car. The gin pole itself is strengthened with longitudinal steel cables passing over central struts so as to form trusses.

The trolley poles are laid with the pickup point immediately over the hole, thus making it possible to place them with a direct lift. The use of this rig avoids the danger of knocking dirt into the hole in course of erection and thereby decreasing the effective depth.

The hoisting equipment consists of a block and tackle slung from the upper end of the gin pole from which the hauling line runs through a snatch block attached to the rail below. The team does the pulling. The gin pole can be easily reversed in its supports for use in setting the poles on the opposite side of the track.

Data for the foregoing were supplied by F. B. Walker, superintendent of electrical construction, Chicago, Milwaukee & St. Paul Railway, Seattle, Wash.

The "Diamond" Loop at Youngstown



PROPOSED TRACK LAYOUT

IN THE diagram printed in the May 31 issue of this paper, page 1062, in connection with the communication by W. B. Yereance, 128 Broadway, New York City, a "key" was inadvertently omitted from the diagram stating that Mr. Yereance proposed leaving the present track to the extent indicated by the solid lines, adding that shown by the dotted lines and removing that shown by the dash lines. As Mr. Yereance points out in a letter to the editors it would make an unnecessarily complicated layout if the last-named track were not removed. This diagram is reproduced again this week for convenience in reference.

LETTERS TO THE EDITORS

Cars Should Carry Passengers, Not Seats

CLEVELAND, OHIO, May 31, 1919.

To the Editors:

Before one despairs too greatly on the electric railway situation I think it would be sensible to give serious consideration to the remedy for high costs and fares with which I have been bombarding railway operators for a long time, namely, abandoning their sacrosanct notion that the first use of a street car is to carry seats instead of passengers. The gain of space that would result from doing away with only a few of the present quota of seats and properly equipping such space for standing passengers would rapidly increase car capacities, as anyone can readily compute.

Under present conditions, the public must largely ride standing in any event, and, at the same time, pay high fares for the privilege. There is little objection or complaint nowadays by the majority of car riders, because they do not get seats; there is great complaint, however, of the cost. My studies indicate that it is entirely practicable to change the space now occupied by seats in a car into standing places in a manner that would abundantly satisfy all conditions. Such plans, in the present emergency, are worthy of close examination on the part of those, at all events, who are inclined to sink back into a hopeless and helpless wonderment as to whether or not the "trolley is in danger of becoming extinct."

GEORGE C. WING.

Mr. Ford and Light Vehicles

MILAN, ITALY, May 16, 1919.

To the Editors:

The editorial in your issue of April 26, entitled "Mr. Ford's New Car May Be a Wonder, but—" and Mr. Kingsley's very interesting discussion of the matter in the same number prompts me to ask leave to state my humble and European opinion on the matter.

Although there is no possibility of discussion about the relative cost of gasoline and electricity as prime movers of street railway vehicles, I would say that, being an automotive man myself, I have too much respect for Mr. Ford's technical skill to believe that he may involve himself in such a series of blunders as many people seem to think.

Perhaps he may be wrong in believing that he may beat electricity with gasoline, although the last word hasn't been said as yet about economical internal combustion engines, but we mustn't look at him as a gas motor engineer. More than anything else Mr. Ford must be considered as the pioneer in standardized construction of light-weight vehicles, and as such he may solve at least one part of the problem which has already been tackled by Mr. Birney.

Street railways have still to learn a great deal from the automotive field; structural iron, or steel as you Americans are wont to call it, must give way to high strength, steel alloys, while the use of aluminum and its light-weight alloys should be seriously considered for the replacement of a multitude of accessory parts which are now made of copper, brass, etc. The use of hardwood should be restricted to a very few parts by its substitution with stampings of light-weight metals, while cast iron and common iron should absolutely be proscribed from the mechanical and structural part of the ideal car.

Of course, this may be a very difficult goal to attain, but, as a matter of fact, doesn't every real achievement require a deal of time and perserverance?

Mr. Birney has blazed the path with his light-weight one-man car, but being practically a traction man, he had to follow the trend of traction practice, cutting off only such apparent waste as he safely could without breaking the age-long rules of electric railway custom. Mr. Ford, being independent both of the time-worn customs of the railway field and the actual rules of the automobile world, may perhaps achieve something really worth while.

Anyway, in my opinion, it is much better to have the automobile engineers working with the old street cars than against them, and Mr. Ford's move is certainly an indication of a better understanding between the two most important branches of street transportation.

FERDINANDO C. CUSANI.

Effect of Vibrations on Rail Failures

LOS ANGELES, CAL., May 24, 1919.

To the Editors:

Referring to the editorial comment in your issue of May 10 in which it is stated that rail conditions are responsible for rail breakage near welds and in special work, please be advised that for several years I have observed in both paved and open track that at welds and splice bars deterioration of the rail, if any, is always more pronounced on receiving rail ends in one-way track. From this fact I have reached the conclusion that the problem is for the physicist rather than for the metallurgist.

I have noticed that the less the mass of metal in contact with the rail ends, the less deterioration is evidenced and this would indicate that the theory of vibrations enters into the problem through the presence of vibrations in wheels and rails. An analagous situation prevails in special work which is a problem in itself, but the solution for joints, it would seem, lies in the application of a minimum mass of metal at the rail ends, consistent with track resistance. W. M. PEGRAM.

Seatless Cars Tried in Tokyo

THE overcrowding of the electric cars in Tokyo has become so acute as to necessitate taking some measures to increase the capacity of the system. One of the expedients adopted is the seatless car, the greater portion of the seats in these cars having been removed, leaving but a small seating space in the middle. Additional straps have been added to provide support for the passengers. A few of these cars have been put on the main route and the result is being watched eagerly by the promoters of this scheme. It is thought that standing room may perhaps be preferable to no room at all.

Another measure which has been proposed in order to lessen the congestion is to decrease the number of stops and at the same time increase the schedule speed of the car. This latter has not been put into effect as yet as it conflicts with the present police regulations and these must be changed first in order to permit of the trial.

AMERICAN ASSOCIATION NEWS

Exhibit Committee Now Assigning Space

CHARLES R. ELLICOTT, Westinghouse Traction Brake Company, chairman American Electric Railway Association exhibit committee, has sent out blank forms for use in filing applications for exhibit space on the "Million Dollar" pier at Atlantic City.

Acting with Mr. Ellicott on this committee are Edwin Besuden, Chicago Varnish Company; Fred C. J. Dell, National Railway Appliance Company; J. J. Dempsey, Brooklyn Rapid Transit Company; Frank H. Gale, General Electric Company; George Keegan, Interborough Rapid Transit Company; J. C. McQuiston, Westinghouse Electric and Manufacturing Company; A. M. Robinson, The J. G. Brill Company; R. T. Senter, Philadelphia Rapid Transit Company; E. B. Smith, American Brake Shoe & Foundry Company.

The committee states that all applications for space received before June 20 will be considered as of that date and will have equal preference as to location.

The general convention committee comprises L. S. Storrs, The Connecticut Company, chairman; Charles R. Ellicott, Westinghouse Traction Brake Company; L. E. Gould, Economy Electric Devices Company; C. L. Henry, Indianapolis & Cincinnati Traction Company; J. J. Stanley, Cleveland Railway; E. P. Waller, General Electric Company; T. W. Wilson, Wilmington & Philadelphia Traction Company.

Connecticut Section Ends Prosperous Year

WITH the exception of an outing to be held in June the meeting of the Connecticut Company section held at Hartford on May 27 was the last of the season. About 250 men dined together at the Hotel Garde. The membership committee reported an increase in membership from 311 to 339 for May.

The speakers at the meeting were Robt. P. Butler, assistant corporation counsel of Hartford; Harlow C. Clark, New York City; Rev. Joseph Sullivan, Chicopee, Mass., and Charles C. Peirce, Boston, Mass.

Mr. Butler spoke on "Public Servants," and said that while the public of Connecticut has a right to expect much in the way of service from the railway company, the company can rightfully expect much of the people. Dr. Sullivan made and illustrated three points, namely, that the railway man's job is one well worth while, that the prime requisite in doing the job is loyalty, and finally that whole-hearted service is necessary to success.

Mr. Clark impressed upon his hearers the fact that the electric railway is in a bad way, showing by statistics how the financial status has fallen during a few years. He said that the situation will improve but the railways must utilize the car riders as a force in securing a square deal. Mr. Peirce traced the history of electric traction and showed why the railways find themselves in their present straits. They will get out of these through the application of merchandizing principles to their business. He quoted statistics to show that the country is now prosperous, but that there will be a labor shortage soon with no immediate falling in prices. The electric railway will in time share in the general prosperity.

Recent Happenings in Great Britain

Labor Program Is Adopted—Increased Fare Movement, Hitherto Mostly Talk, Now Well Under Way

(From Our Regular Correspondent)

For the present at least the labor crisis in Great Britain seems to be over. The coal miners and the railwaymen have accepted the terms offered by the government as to shorter hours and improved conditions of employment, and the federation of transport workers has come to an agreement with the employers. Even more important is the fact that a national industrial conference of employers and employed, representing nearly all the great industries of the country, has adopted a series of far-reaching recommendations brought forward by a committee appointed at a previous conference. Among the chief recommendations so adopted are:

A legalized maximum normal working week of forty-eight hours in all industries.

Legalized minimum time rate of wages to be of universal application.

Discouragement of systematic overtime.

Trade conferences to consider how war advances and bonuses should be dealt with.

A full and frank acceptance in trade negotiations of employers' organizations and trade unions.

Organized short time and regulation of government orders and pushing forward of government housing schemes to prevent unemployment.

An adequate provision for the maintenance of the unemployed.

Child labor age to be raised, and more generous provision for sickness and infirmity benefit and old-age pensions.

The establishment of a permanent National Industrial Council of employers and workers to advise the government on national industrial questions.

It is perhaps significant of the differences between the British national temperament and that of European continental countries that on May Day, when Socialist demonstrations were producing riots in Paris and when half of Europe was—as it still is—plunged in anarchy, a further peaceful meeting of the provisional joint committee of the British National Industrial Conference was held in London at which a guarantee was received from the government to pass the legislation necessary to carry the above recommendations into effect. The undertaking was contained in a letter from Lloyd George, the Prime Minister, to the joint committee, and it was read by Sir Robert Horne, the Minister of Labor.

THE NEW INDUSTRIAL DAY

In this letter the Prime Minister said that foreign countries were looking to Great Britain to give them a lead in the foundation of a new and better industrial order, and the report of the committee marked the beginning of such a foundation. He fully accepted the principle of maximum hours and minimum wages. For the purpose of the former a bill was being drafted, and it would provide elasticity to meet the circumstances of particular industries. As regards wages, the question of the best method was complex and full of difficulties, and the government would in the first place set up a commission to report on the whole matter. He hoped that the National Industrial Council would speedily address itself to the important question of unemployment. The council after hearing the letter adjourned to permit all the subjects to be further considered by representatives of employers and trade unions.

Never before has anything of the nature of a national agreement on such subjects been brought about, and hopes for the industrial future are correspondingly bright. It was stated in Commons, shortly before the Easter adjournment, that Whitley joint industrial councils for all the leading industries except four have now been constituted.

In the domain of tramways, it will be remembered that such a joint industrial council has recently been constituted, and that a forty-eight-hour working week has been agreed to. The shorter week is now coming into operation on the tramway undertakings throughout the country, though the new organization can hardly be completed until all or nearly all the employees who were serving in the forces have been got back. Estimates have been issued by many of the tramway authorities of the increased working expenses which will be involved.

INCREASE IN FARES NECESSARY

The only way to meet the increase is with further increases of fares. Such increases are now being made where the existing fares are not already up to the statutory maxima. Where the point has already been reached, application is being made to the Board of Trade for authority to make further increases. That arrangement, however, is likely to be only a temporary one, and there may be further legislation of a more permanent kind, as it is clear enough that working expenses will not materially fall for a long time. In any event, the tramway authorities at present have easier and cheaper machinery for getting increases of fares than that which seems to be open to the electric railway companies of America. We do not hear of receivers being appointed to any great extent on the company undertakings, while the municipal railways always have the rates to fall back upon in case of a deficit.

LONDON FARES GO UP

In order to meet additional expenditures, a further increase in fares on the London County Council Tramways came into force in the end of April. The average distance for which the passenger is carried for a penny is reduced from 1.8 mile to 1.5, with a single overlap in place of the present double overlap. Each route is divided into sections, of an average length of 0.75 mile, two consecutive sections to be traversed for 1d., four for 2d., six for 3d. and eight or more for 4d. The new workmen's fares are 2d. for a return journey over a stage of 2 miles (total journey 4 miles), 3d. for a return journey over a stage of 3 miles (total 6 miles), 4d. for a return journey over 4 miles (total 8 miles), and a 5d. ticket for a total journey above 8 miles, with transfer facilities.

It is estimated that, under the new scale, the loss on workmen's cars will be reduced from £160,000 to £105,000 a year, and that £40,000 a year will be forthcoming as the result of improved collection consequent on greater efficiency resulting from the reduction in hours. The total increased revenue is estimated at £416,000.

GLASGOW ABOUT TO SUCCUMB

Even in Glasgow, where the entire capital cost of the municipal tramway undertaking has been repaid out of receipts, so that there are no interest or sinking fund charges, the necessity of increasing fares is becoming urgent. Glasgow is probably the only place in the country where the halfpenny fare has not yet been abolished. At a meeting of the finance sub-committee of the tramways committee on April 30, it was decided by the casting vote of the chairman to recommend the abolition of the halfpenny fare, the minimum to be 1d., rising by stages of ½d. according to distance to a maximum of 3d.

This decision as regards Glasgow was reached after full consideration of a report by James Dalrymple, the general manager. In this Mr. Dalrymple stated that it was absolutely necessary to increase the revenue in order to meet the increase in wages and the high cost of materials. Regarding a suggestion that an increase in revenue should be obtained by a further reduction in fares, he pointed out that the department could not possibly, with the present plant, carry any more passengers.

WAGES CLIMBING IN GLASGOW

During the past few months the average number of passengers per car-mile in Glasgow had reached twenty. Were it not for the overcrowding, the financial position of the department would be hopeless. With an average revenue per passenger of about ¾d., it was impossible to make ends meet. For the year ending May 31, the estimated revenue was £1,521,215 and the expenditure £1,474,800, giving a surplus of only £46,415. The amount set aside for depreciation, £124,000, which was the same as for the previous year, was now quite inadequate owing to the great increase in wages and cost of materials. The wages bill for the year 1913-14 was £441,048, last year it was £649,749, for the current year it was estimated at £830,000, and for next year at £950,000. Mr. Dalrymple estimated the revenue for next year at £1,571,000, and the expenditure at £1,736,560 (including £245,000 for depreciation and renewals), showing a deficit of £165,560. He recommended the increase of fares which the sub-committee adopted. It involves an increase of ½d. on each hitherto existing fare.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

San Francisco M. O. Review

Having Embarked on Municipal Ownership San Francisco Must Needs Carry Out Its Work

The annual report of M. M. O'Shaughnessy, city engineer of San Francisco, Cal., for the year 1917-1918, submitted to the Board of Public Works at San Francisco under date of Jan. 2, 1919, contains a general review of the San Francisco Municipal Railway and the problems confronting the building and operation of that system.

WANTS CITY'S RIGHTS STRENGTHENED

Mr. O'Shaughnessy says that, while the municipal charter has been instrumental in fostering the promotion and growth of the municipal railway system, it has been seriously defective in that it has prevented rapid transit service being given to new and outlying districts which were naturally tributary only to privately-owned systems and which could not be properly reached by extensions from the municipal system.

According to Mr. O'Shaughnessy there are several causes tending to limit the extension of the municipal system. The city has a limit of bonded indebtedness of 15 per cent of its assessed valuation. At the present time the city, with projects to which it is committed, has almost exhausted this limit and there are yet other urgent purposes for which bonds must be issued in the near future. He says that the difficulty could be eliminated by an amendment to the charter which would reduce the limit of bonded indebtedness to 8 per cent for non-earning projects but which would remove all limit of bonds which might be issued for self-sustaining public utilities. This would put the city in the same position as a private concern desiring to raise money for the construction of such properties.

Since the completion of the work contemplated in the original bond issue the only extensions that have been built have been from earnings. With the natural tendency to a rising wage scale, it is safe to assume that future earnings on a 5-cent fare will be adequate only for wages, maintenance and renewals, bond interest and bond retirement.

PLEA FOR UNIFIED MANAGEMENT

Mr. O'Shaughnessy says that under unified management it would be possible to eliminate a great deal of unnecessary service, particularly where the privately-owned and the municipal systems operate along parallel routes. According to him, the necessity for the city acquiring the United Railroads is extremely urgent. This, he says, is appreciated even by those who are opposed on general principles to municipal ownership. As the time approaches for the expiration of the franchises of the United Railroads the necessity of the city taking over the lines will become more urgent and more apparent.

According to Mr. O'Shaughnessy, as long as the present conditions limiting bonded indebtedness exist it will probably be impossible for the city to issue bonds to cover the entire purchase price of the United Railroads. He feels, however, that if the bonds were issued to buy the property at a fair price the interest on the bonds could be paid out of the earnings of the system and a sinking fund created which would free the entire property of encumbrance within twenty-five or thirty years and at the same time provide for reasonable extensions to the system.

THE CITY'S ACCOMPLISHMENT

Mr. O'Shaughnessy points out that what the municipal railways have done is best realized when it is observed that, while the city has constructed and acquired some 48.94 miles of track in the 1910 and 1913 bond issues, it has constructed 10.16 miles out of the surplus earnings of the road, and in addition to this has paid the interest on the bonds, set aside $923,456 in its depreciation reserve, $35,339 in its injury insurance fund, and has retired $303,000 of its bonds.

Improvements Planned for Seattle

An ordinance recently passed by the City Council of Seattle, Wash., and sent to Acting Mayor Lane for approval, provides for the issuance and sale of $790,000 of utility bonds for extensions and betterments to the Municipal Railway. A bill has also been introduced in the City Council, at the request of the city utilities department, providing for a loan from the city railway fund to the Municipal Railway betterment fund of 1919, to cover the cost of several immediate improvements which Thomas F. Murphine, superintendent of public utilities, recommends.

The first work proposed by Mr. Murphine is the construction of a double-track line on Third Avenue, from Stewart Street to the south margin of Pine Street; connections of the tracks at the south end of the Ballard bridge and the connection of tracks of Division A and the Fremont-Ballard lines at Twenty-fourth Avenue, N. W., and West Sixty-seventh Street; extension of Division A at Fremont Avenue to the Fremont Avenue bridge. The improvements are estimated to cost $49,650.

Buffalo Arbitration Stops

Governor's Veto of Service-at-Cost Responsible—Railway Officials Are Still Hopeful

The City Council of Buffalo, N. Y., has voted to discontinue the arbitration proceedings started some time ago to fix the valuation of the properties of the International Railway within the city to be used as the basis of a service-at-cost agreement with the company and also determine upon a rate to be allowed the company as a return upon the investment fixed by the arbiters. This step was taken as the result of Governor Smith's veto of the service-at-cost bill which was passed by the Legislature and which had the approval of the Mayor.

STATEMENT OF COMPANY

The current issue of the *Service Spot Light*, the official organ of the railway, says:

> The International Railway is disappointed at Governor Smith's veto of the act enabling the city and the company to get together on some service-at-cost plan, just and equitable to all concerned. We had hoped for better treatment. Governor Smith may be right from his standpoint, but it is difficult to convince the people that they haven't the right to enter into an agreement on a matter that concerns them and them alone. But we aren't crushed.
>
> We still hold firmly to the belief that some way will be worked out to your satisfaction and to ours. We are maintaining a war scale of wages—a wage higher than it ever seemed possible for us to pay. We have paid a greatly increased rate for supplies and materials. We counted greatly on the institution of the service-at-cost plan to restore us to a satisfactory equilibrium. Out of the present confusion may come the real solution.

In the same issue of the *Service Spot Light*, the railway calls attention to the case in the State Court of Appeals in which the company asks that court to uphold the contention of the Appellate Division in the right of the Public Service Commission to fix fares in muncipipalities even though the fares are limited by local franchises. One section of the company's franchise says:

> Nothing in this contract shall be construed to prevent the Legislature from regulating the fares of said companies, or either of them.

Officers of the railway contend that this clause allows the Public Service Commission to determine the reasonableness of fares charged by the International Railway and fix an adequate rate.

The sale of the company's properties in Buffalo to satisfy a lien for unpaid taxes was prevented on May 26 by the payment of $71,000 in back taxes by the company to the city. The balance of the $350,000 in taxes will be paid in installments.

Wages and Fares Considered

General Discussion of Detroit's Problems Diverted by Demands of Men for Wage Increases

The meeting of Detroit's Mayor and Council and Detroit United Railway officials on May 23 was scheduled to discuss final arrangements for extensions, and plans for rerouting lines in the congested sections. These matters, however, received second consideration due to the fact that the railway employees had issued an ultimatum to the company asking practically a 50 per cent increase in wages and backed up their demands by threatening a strike. The men who are now paid 43, 46 and 48 cents an hour, varying with the length of service, are asking 65, 70 and 75 cents an hour. The company has requested the union to withdraw its objection to the employment of women. This request was vetoed by the union.

COMPANY STATES ITS ATTITUDE

The stand taken by the company was not that the demands of the men were unjust, but that the money to provide for the increase in wages would have to be provided by an increase in fares. Prior to the meeting Mayor Couzens stated that he considered the railways would have to have a higher rate of fare if the men were to have their wages properly increased, but he did not state what he considered a fair increase. He also said the company must state its financial needs and allow the city time to verify the figures, all of which was promised by President Brooks at the meeting of the company on May 9.

The Mayor scored the officials of the company for waiting until two or three days prior to the threatened strike before submitting figures and requesting higher fares. The first figures presented by E. J. Burdick, the company's assistant general manager, were unsatisfactory to the Mayor, in that they were based on assumptions which the Mayor would not admit. It was shown by these figures that the company faces an alleged deficit of $1,074,383 for the present year, under present conditions without making provision for the increase in wages demanded by the employees. It was stated by Mr. Burdick that the estimated deficit for 1919 was based upon figures for the first three months of the year.

COUNCIL DIVIDED ON FARES

The Council was divided on the question of fare boost. Some members admitted that they would consider a change of rates if it could be shown by the company that higher wages could not be granted the men without the increase. Councilman John A. Kronk, author of the Kronk 5-cent fare ordinance, stated that service and sensible routing of the cars were in his opinion more essential than an argument about the rate of fare.

The Twelfth Street extension and St. Jean Avenue extension were discussed and it was agreed that they should be built at once and that the rate of fare should be the same as now exists on other of the city's non-franchise lines. All propositions of the company relative to rerouting downtown cars were tabled for future consideration. The meeting was adjourned and the conferees met again on May 26.

The threatened strike was postponed by the men at a later meeting for two weeks, to give the Council time to act, after the Mayor had assured representatives of the union that he and the Council were endeavoring to reach an honest agreement with the company.

The Council has ordered an exhaustive audit of the accounts of the railway in order to determine if the increase in wages could be granted the men. City Comptroller George Engel was asked to report immediately on the length of time needed to complete the survey. If his estimate of one week proves correct the Council will have that length of time to consider the question and decide a just rate of fare which will enable the company to operate without deficit and pay the increased rate of wages to its employees.

AUDIT STARTED

The audit of the Detroit United Railway's accounts to determine the possibility of its paying wage increases on the present rate of fares, begun by the city on May 27, was practically completed by June 2, and it was expected that the matter would be acted upon by the Council on June 3.

A meeting of the railway employees is set for June 7. The men have announced a strike will be voted then unless they receive some definite assurance of being granted higher wages.

Accountants from the offices of Barclay Parsons & Clapp, Marwick-Mitchell-Peat Company, the Detroit Bureau of Government Research, as well as from his own office, are working under the direction of George Engel, city comptroller.

The results of the audit tend to verify the statement of the railway officials to the effect that a deficit of $675,000 for the year 1919 would result if the company continued to operate at present fares and wages.

The Board of Street Railway Commissioners, realizing that the settlement of the wage question now at hand will not dispose of the problem which has confronted public officials of Detroit for years, and that conditions now are intolerable and daily growing worse, express belief that the efforts of the city officials should be redoubled to the end that some plan may be evolved which will grant relief to the community.

It is set forth by the commission that the defeat of the two former municipal proposals by the voters of Detroit is in no sense a rejection of the municipal ownership principle, but rather a disapproval of the form of acquisition. It is also stated that since the election of April 7, numerous and conflicting suggestions have been offered by citizens, each of whom expressed a belief that his proposal was the proper one for the adjustment of present difficulties. They are principally: Municipal ownership by a revised purchase agreement plan; municipal ownership by the condemnation plan; municipal ownership by piecemeal construction; private ownership with municipal control under a settlement similiar to the Cleveland so-called service-at-cost plan; municipal ownership of a rapid transit system of subways and elevated railways.

The commissioners state that the board is not in a position to know positively which proposal best suits conditions, but they believe that a pole of public sentiment could be taken at a nominal cost which would enable the city authorities to proceed with some plan that they would know would have a reasonable chance of securing adoption when submitted at an election.

The Council approved the appropriation of $10,000 for conducting a postcard canvas of opinions of voters to decide what action the city should take. The questions to be asked are:

1. Do you wish the administration to proceed with plans leading to the acquisition by the city of the street railway system? If so, which of these plans do you prefer? (a) Acquisition of the surface lines by purchase. (b) Acquisition of the surface lines by condemnation. (c) Acquisition of a partial surface system by piecemeal construction.
2. Do you favor an agreement with the Detroit United Railway for a five or ten-year period, similar to the Cleveland plan, calling for municipal control of privately-owned surface lines?
3. Do you favor the preparation of plans for the acquisition of a rapid transit system to consist of subways and elevated railways, independent of whatever action may be taken with regard to the surface lines?

In the opinion of the board it is obvious that such a questionnaire plan will enable the voters, both men and women, to discuss the issue in their homes before indicating a preference, and an expression will be obtained without the inconvenience of going to a polling booth.

Strike in Muskogee

All conductors and motormen employed by the Muskogee (Okla.) Traction Company went on strike at midnight of May 29 and the city has been without railway service since that date. R. D. Long, general manager, made no attempt to operate the lines when the men quit. The strike is the result of the refusal of the company to grant demands for a sliding wage scale of 44 cents to 50 cents an hour. The present scale is 24 cents to 30 cents an hour. The company offered a compromise of 30 cents to 41 cents an hour. There has been no trouble of any kind. One-man cars are operated in Muskogee. About 100 men are involved in the strike.

Scranton Wage Award Announced

P. F. Calpin and John B. O'Malley, who represented the men on the arbitration board that heard the arguments on wages for employees of the Scranton (Pa.) Railway, have received the award made by Chairman Charlton Ogburn, representative of the War Labor Board, and refused to sign it. The award did not grant any increase in wages to the conductors and motormen, except for overtime, allowing them time and a half for overtime, instead of time and a quarter. Attorney H. C. Reynolds and W. L. Connell, representing the railway on the arbitration board, affixed their signatures to the award.

The carhousemen and shopmen of the company are to have an eight-hour day with the same daily wage that they are now receiving for ten hours of work. The trackmen are to have a nine-hour day with the same daily wage as they are now receiving for ten hours of labor. Mechanics in various lines employed by the company are to receive slight increases.

The following table shows the rate of wages per hour asked by all of the men and the amount that has been granted them by Charlton Ogburn, representative of the War Labor Board and chairman of the arbitration board:

	Rate Awarded	Rate Demanded
Conductors and Motormen:		
First three months	$0.41	$0.58
Next nine months	.43	.59
Second year	.45	.60

Third year and after the men asked same as second-year men and got 45 cents an hour, same as second year.

	Rate Awarded	Rate Demanded
Trackmen	$0.42½	$0.57
Trolley tenders	.42½	.57
Track foremen	.49	.64
Teamsters	.45	.57
Blacksmiths	.518	.71
Drill pressmen	.467	.68
Pitmen	.442	.68
Car cleaners	.42½	.57
Firemen	.46.4	.62
Oilers	.42½	.57
Pitmen helpers	.42½	.68
Painters	.46.4	.68

Unions at Odds

The strike of the platform employees of the Rochester & Syracuse Railroad, Rochester, N. Y., referred to in the ELECTRIC RAILWAY JOURNAL for May 31, page 1066, was settled on May 23. The men were out more than a week. Both the Amalgamated Association and the Brotherhood of Locomotive Engineers were involved. As a result of the settlement Brotherhood members have returned to their jobs as members of the Amalgamated Association.

The issue involved was clean cut. The Amalgamated refused to agree to the operation of cars over the local Rochester lines by Brotherhood men. The interurban men went on strike rather than abandon their Brotherhood affiliation. The Amalgamated thereupon agreed to furnish men to operate the interurban. The strike settlement has been explained as follows:

> The men return to their former jobs with their seniority and without prejudice, and each one has made application to the Amalgamated Association for membership. The final determination of the question will be submitted to the American Federation of Labor for solution.
>
> The Brotherhood never has been affiliated with the American Federation of Labor, while the Amalgamated has. At the last convention of the Brotherhood a request for affiliation was formulated. It is expected that favorable action will be taken in June.
>
> The Amalgamated has claimed that the Brotherhood has no rights on electric railroads. The Brotherhood defends its rights on the ground that railroads are rapidly becoming electrified throughout the country. The counter proposition that Amalgamated men had no right to operate cars over steam roads was brought up during the strike just settled.
>
> This is the question, then, that is to be solved by the American Federation of Labor, presumably at its June convention.

Railway Plans Bus Service

In connection with the proposed motor bus service asked for by the Connecticut Valley Street Railway, Greenfield, Mass., it is the intention of the company, if its petitions are acted on favorably by the Publc Service Commission, to start motor bus service between the railroad station in Greenfield and terminals in Turners Falls, at the head of the thoroughfare known as Avenue A.

This proposed new service will be in addition to and will supplement the company's present car service. The rate of fare on the buses will correspond with the rate at present in effect on the cars of the railway, a minimum fare of 6 cents with a rate of 3 cents per mile. The company looks forward to this service as a means of preserving to the railway its legitimate business between these two points.

Spokane Men Want to Organize

To have the Washington Water Power Company, Spokane, Wash., grant its trainmen permission to join a union, a delegation from the central labor council conferred recently with D. L. Huntington, president, and W. E. Coman, vice-president and general manager of the power company. Mr. Huntington said he did not care to have his men organize.

In a statement made for publication, Mr. Huntington said in part:

> A committee composed of representatives of several unions called upon me to ascertain the attitude of the company regarding unionizing the trainmen. I told them that our relations with our employees are excellent and that we could see no reason to change our well-known policy in these matters. Our methods of handling directly with our own employees all questions regarding our relations with them have been entirely successful and satisfactory, both to the employees and to the company. Contrary to the statement in an evening paper, the question of unionizing is not being brought up by our own employees.

The committee that called on the officers of the company was composed of Everett J. Parker, president of the trainmen's union; D. P. Reid, representing the electrical workers; Fred W. Green, president of the musicians' union; James McGowan of the steam engineers, and Robert Cullen of the culinary workers. This committee is regarded in labor circles as fully representative of the original trade of Spokane.

Wage Payment Made

The employees of the Rhode Island Company, Providence, R. I., whose wages were increased last October by award of the War Labor Board, the decree being retroactive to July 1, have been paid the back wages due them, a total of $155,000 being disbursed among 3600 employees.

The Rhode Island Company was unable to pay the amount in a lump sum as ordered by the War Labor Board and a subsequent decree directed the company to make the payments in three installments. The first payment was made on time, but the second payment was allowed to lapse and before the date due for the third payment the company went into the hands of a receiver.

Permanent receivers were later appointed and they applied to the Superior Court for authority to make the payment. This authority was at first refused, but the carmen's union took the matter up and when the employees voted to strike the court authorized the receivers to make the payment. Under the law thirty days was allowed in which appeals from the ruling of the court could be taken and the receivers were obliged to await the expiration of that period before distributing the money. The time expired on May 24, and on that date the employees received the money due them.

Preparing for Pittsburgh Wage Hearings

Hearings of the electric railway wage controversy at Pittsburgh, Pa., will open before Charlton Ogburn, public utilities representative of the War Labor Board, in Pittsburgh on June 16. Mr. Ogburn will hear testimony from the receivers and the men to establish the points of fact in the differences that led to a four-day strike, beginning on May 14.

After Mr. Ogburn has briefed the testimony offered before him in Pittsburgh and sent it to the War Labor Board, that body will announce a date for hearing arguments of counsel before William Howard Taft and Basil Manley, joint chairmen of the board, in Washington.

The question at issue before the board is purely one of wages. The men demand a 12-cent increase over the present schedule of 43, 46 and 48 cents an hour. Questions of operating conditions, which the receivers sought to raise early in the controversy, were dropped upon the insistence of union officials at the conference at which the agreement to submit the matter to the Labor Board was entered into. It was this agreement that ended the strike. The receivers had hoped to get better "tripper and trailer" conditions in return for some wage concession, but the men would have none of this.

As it stands the proceedings before the Labor Board do not amount to arbitration, strictly speaking. Neither side is definitely bound to accept the award. The United States Court firmly refused to enter into binding arbitration, holding that such would be illegal delegation of part of its authority. So the men have retained the right to strike again if the court rejects an award in their favor or fails to act upon the award within twenty days after it is made.

St. Louis Loop Development Urged

John D. Knapp, a member of the free bridge committee of the Tenth Ward Improvement Association of St. Louis, Mo., has reported to the president of that association and the members of the free bridge committee in regard to the plan initiated by the association for a city-wide campaign for finishing the St. Louis Free Bridge and for new interurban and steam terminal business via the bridge.

Mr. Knapp says that the city government is now busily engaged in stringing wires for street car and interurban service and that work has commenced on the construction of the loop at the western end of the bridge approach. He recommends to the association a number of steps to be taken by the city properly to finish the loop on both sides of the river.

He suggests the condemnation in St. Louis of an entire block as a site for the loop. He also recommends the construction of a loop in East St. Louis sufficiently large for the municipal railway which will operate over the bridge and for a spur connection to permit the East St. Louis lines to operate over the loop.

Preparing for Wheeling Arbitration

Following several conferences at Charleston, W. Va., between the various traction officials and the representatives of the railway workers relative to the new wage scale, it is reported that the demands of the linemen, engineers and firemen will be taken up first by the arbitration committee.

It was also announced that C. R. Parrs, Huntington, an official of the Ohio Valley Traction Company, would represent the companies involved as a member of the arbitration committee. W. Roy, an official of the eastern Ohio district miners' nuion, will be the umpire.

Arbitration was decided upon following a strike at Wheeling on May 1, when all lines in the entire Wheeling district and in this section of eastern Ohio were tied up and all power plant employees affiliated with the unions ceased work.

It is reported that it is practically agreed upon by the traction officials and representatives of the carmen's union that the firemen's, engineers' and linemen's compromised advanced wage scale will be arranged without any difficulty, but that it will not prove so easy to dispose of the platform men's scale. The number of platform men involved is about 600.

Boston Wages Negotiations Under Way

Conferences were begun during the week ended May 31 between the management of the Boston (Mass.) Elevated Railway and representatives of the employees' union relative to the formulation of a new wage scale to take the place of the agreement which expired on May 1, after a term of three years. No official statement has been made as yet regarding the subject matter of the conferences, but it is understood that a demand for a maximum wage of 73 cents an hour was set forth by the union early in the meetings, and that in a nutshell the employees are now seeking an eight-hour day on the basis of nine hours' pay.

The present maximum wage is 48 cents an hour. Under the existing 8-cent fare the company's operations showed a deficit of $316,392 for April, compared with deficits of $224,920 in March, $285,124 in February, and $219,269 in January. Total receipts in April were $2,386,822, and the cost of service per passenger was 9.328 cents. Receipts under the 8-cent fare in April, 1919, showed an increase of $727,170 or 45.96 per cent compared with April, 1918, under the old 5-cent fare.

It seems probable that the company will be obliged to institute a 10-cent fare later in the season unless plans for the trial of a zone system are put into effect, although no official statement to this effect has as yet been forthcoming. The size of the April, 1919, deficit was in large measure due to excess of track and car repair work above a fair monthly average.

Would Continue National Employment Service

Secretary of Labor Wilson has recommended to Congress the enactment of legislation creating a permanent public employment service for the United States and has transmitted an outline of a bill which calls for the continuance of the United States Employment Service, developed during the war, as a permanent bureau in the Department of Labor and in charge of a director general appointed by the President, and a system of public employment offices, operated by the states and co-operating with the Federal Employment Service. The federal government would contribute funds to the states for the maintenance of their offices, which would work under standard rules and regulations prescribed by the United States Employment Service, the national service handling labor clearances between states, inspecting and gathering of information as to labor and employment conditions. At the conference which agreed upon this outline were representatives of thirty states, including nearly all the industrial states, and representatives of employers and labor.

News Notes

Increase in Wages Granted.—The Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, has decided to increase the wages of its men 5 cents an hour, dating from May 1. The men had asked back pay from Aug. 16, 1918. A conference will be held within a few days to discuss this matter.

Wage Increase in Fargo, N. D.—Five cents an hour for all trainmen and other employees of the Fargo and Moorehead division of the Northern States Power Company is an advance already effective. The increase affects about fifty men and will mean an addition of $7,000 to the payroll for the year.

Examination for Special Work Inspector.—The Civil Service Commission of New York State will shortly conduct an examination for an inspector of special track work installation for the Public Service Commission for the First District. The salary is from $1,501 to $1,800. Five years' experience is required. The position is open to non-residents.

Wage Increase in East Liverpool.—A new wage scale, ranging from 43 to 47 cents an hour has been awarded the platform employees of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, by a board of arbitration which has been considering the demands of the men for several weeks. This is an increase of 11 per cent over the 1918 scale.

Trial Put Over to November.—The trial of Bruce Cameron, superintendent of the United Railways, St. Louis, Mo., on charges made in connection with the disappearance of petitions for a referendum on the so-called "Compromise United Railway Ordinance" has been deferred until the November term of court by Judge Dearing of the Reynolds County Circuit Court at Centerville, Mo.

Believes Municipal Ownership Plan Unconstitutional.— Senator J. Turner Butler believes the bill which has passed the House requiring the County Commissioners of Duval County, Florida, to build an electric interurban railway to Pablo and Atlantic Beach from the profits of the municipally owned electric light and water plants of Jacksonville, is unconstitutional, and he will not pass the measure through the Senate.

Auto Bill Fails.—By withholding his signature from the bill permitting electric railways to engage in the jitney automobile business, Governor Holcomb has prevented the measure from becoming a law. The Governor acted in response to the appeals of several of the electric railways, which announced that they considered the bill useless in the form in which it was finally passed on the last day of the General Assembly session.

Commission After Violator of Its Order.—The first case in court of the Public Service Commission of Pennsylvania against a public service defendant is now under way in the Common Pleas Court of Allegheny County. The action is a test case brought by the commission as a warning against violations of public service laws. A. W. Behling, a motor bus operator of Pittsburgh, is accused of ignoring an order of the commission to desist from serving as a public carrier without a certificate.

City Has Motor Bus Rights.—Walter F. Meier, corporation counsel of Seattle, Wash., has advised Thomas F. Murphine, superintendent of public utilities, that the city has the authority to operate motor buses as feeders to the Seattle Municipal Railway. The Council has been asked by several communities to start bus service from outlying sections to connect with the city railway lines. Residents and property owners of Magnolia Bluff have agreed to give the city two large motor buses provided they are operated in connection with the railway lines into that district.

I. T. S. Using Keokuk Power.—The Quincy (Ill.) Railway, included in the Illinois Traction System, has made arrangements whereby power from the Keokuk dam can be transformed in the company's power house. On one or two occasions previously, in emergencies, the cars have been run with Keokuk power, but it has always been obtained through the plant of the Quincy Gas, Electric & Heating Company. The use of Keokuk power transformed directly marked an interesting step in the rehabilitation of the Quincy Railway. After their completion of the installation of the three rotaries, the steam plant will be closed down and held for emergencies when the Keokuk power may be off temporarily.

Bay State Labor Difficulties Easier.—Labor difficulties on the Bay State Street Railway, Boston, Mass., which threatened to involve many divisions in a strike, have become less disturbing through conferences between company and union officials and the pending arbitration of disputed points. During the week ended May 31, a two-day strike took place on the Lawrence (Mass.) division over the refusal of the company to reinstate a motorman. The strike was called off by advice of J. H. Reardon, Worcester, international vice-president, who stated that the walkout was in violation of the agreement between the men and the company. It was announced at Lawrence that the company will provide employees with passes subject to photographic identification.

Union Buttons a Problem Again.—After a tie-up of six hours, service on the railway lines of the Toledo Railways & Light Company, Toledo, Ohio, was resumed on May 30 pending receipt of official word from the War Labor Board at Washington, that the wage increase granted the conductors and motormen included the right to wear the union button, one of the principal points in the controversy, which resulted in a lockout three years ago. Union officials said they had received the official award from the War Labor Board. Frank R. Coates, president of the Toledo Railways & Light Company, said he had not received official notification of the award; but rather than disappoint the holiday crowds had instructed the cars to be operated regardless of whether or not the men wore their union buttons.

Restraining the Auto "Nuisance."—An ordinance will be introduced in the City Council of Seattle, Wash., revising the traffic laws of the city, and placing rigid restrictions on automobile traffic. Drastic steps are to be taken to prevent inexperienced drivers from operating automobiles, and Thomas F. Murphine, superintendent of the public utilities, is recommending the passage of such an ordinance. The ordinance will embody the recommendations of the police and utilities departments, and it is believed will do much to relieve the congestion of traffic in the downtown district. One of the provisions of the ordinance will be that every purchaser of an automobile be required to show his qualifications as a driver before being permitted to drive his car downtown. No person will be permitted to drive a car without a permit.

Separation of Construction and Regulation Now Complete.—The rapid transit construction work formerly vested in the Public Service Commission for the First District of New York has been turned over to John H. Delaney, recently appointed by Governor Smith as transit construction commissioner, under the bill separating the functions of the commission, passed by the Legislature of 1919. Commissioner Delaney assumed his new duties on June 2. The rapid transit construction functions were taken over by the Public Service Commission for the First District from the old Rapid Transit Commission on July 1, 1907. Under the commission the contracts were entered into for practically all of the newer lines embraced in the dual system of rapid transit. Mr. Delaney will take up this work and proceed to the completion of the system. A large part of the engineering force of the old Public Service Commission will be under the jurisdiction of Mr. Delaney. The regulatory functions formerly exercised by the Public Service Commission for the First District are vested in Commissioner Lewis Nixon, who, as a single commissioner, succeeded the former body composed of five commissioners. Mr. Nixon has also, since taking office, exercised the rapid transit construction functions.

Programs of Meetings

Pennsylvania Street Railway Association

The annual meeting of the Pennsylvania Street Railway Association will be held at the Penn-Harris Hotel, Harrisburg, on June 27 and 28.

City Officials to Discuss Railways

At the tenth annual conference of city officials of New York State at Schenectady on June 10 to 12, one session is to be devoted to a discussion of the electric railway situation. This session will open at 9.30 o'clock on Wednesday morning, June 11, and will be presided over by Mayor Leroy Barnes of Binghamton. The speakers, as announced in last week's issue of this paper, will include T. E. Mitten, Delos F. Wilcox, Harlow C. Clark and Thomas Conway, Jr.

Central Electric Railway Association

Final arrangements are being made for the mid-summer meeting and cruise of the Central Electric Railway Association from June 30 to July 3. It is planned to restrict the number to 350 to avoid crowding. Up to June 1 tickets had been sent out for nearly 250. It is therefore evident that those who desire to go should make the earliest possible application to secure reservation. In this connection it is pointed out particularly that electric railway officials outside the Central Electric Railway Association territory have been extended the privilege of joining the excursion.

The program for the meeting will probably be announced very shortly. Arrangements for the trip itself were completed some time ago. They include the reservation of the steamer *South American*, one of the finest passenger steamers on the Great Lakes. This vessel, built in 1914, has accommodations in her dining room for seating more than 280 at a time, and is strictly modern in all other appointments.

The *South American* is scheduled to leave the White Star Line docks at Toledo at 9 a. m. on June 30, proceed from Toledo to Lake Erie and up the Detroit River to Detroit, thence through Lake St. Clair and River St. Clair into Lake Huron, thence to Perry Sound, Georgian Bay, Owen Sound, Mackinac Island, from whence the ship will proceed down Lake Michigan, running into Harbor Springs, thence to Benton Harbor, thence across Lake Michigan to Chicago, where the boat will dock on July 3 at about 4 o'clock in the afternoon.

Tickets for the trip on the steamship, including meals and berth for the three days cruise from Toledo or Detroit to Benton Harbor or Chicago will cost $26.50 each, including government war tax. Tickets should be secured from John Benham, vice-president of the International Register Company, 15 South Throop Street, Chicago, Ill.

Financial and Corporate

Detroit Decline Stops

Increased Earnings in 1918 Almost Succeed in Meeting High Expenses of Operation

During the calendar year 1918 the Detroit (Mich.) United Railway succeeded in largely checking its financial losses. Although the net income in 1918 still showed a falling off of $80,947 or 3.2 per cent below that of 1917, this was very small compared with the decrease in net income of $705,262 or 24.4 per cent in 1917 below that of 1916.

The main reason for this showing is that during 1918 the increase in gross earnings from operation was more than sufficient to take care of the rise in operating expenses, as was not the case in 1917. In 1918 the gross earnings from operation gained $1,586,079 or 9.1 per cent, while the operating increases rose $1,498,549 or 11.3 per cent. In 1917, however, the gross earnings advanced $1,391,270 or 8.6 per cent and the operating expenses $2,043,988 or 18.2 per cent.

TABLE I—INCOME STATEMENT OF DETROIT UNITED RAILWAY FOR CALENDAR YEARS 1917 AND 1918

	1918		1917	
	Amount	Per Cent	Amount	Per Cent
Gross earnings from operation:				
Passenger	$ 17,696,782	93.1	$16,370,239	93.9
Express	1,265,311	6.6	1,000,869	5.7
Mail	12,433	0.1	11,748	0.1
Special car	39,492	0.2	45,083	0.3
Total	$19,014,018	100.0	$17,427,939	100.0
Operating expenses	14,758,339	77.6	13,259,790	76.1
Net earnings from operation	$4,255,670	22.4	$4,168,149	23.9
Other income	449,736	2.3	411,737	2.4
Gross income	$4,705,415	24.7	$4,579,886	26.3
Interest on funded and floating debts and taxes	2,610,831	13.7	2,404,355	13.8
Net income	$2,094,584	11.0	$2,175,531	12.5
Amount credited to depreciation reserve	$600,000	3.1	$800,000	4.6
Amount provided for federal taxes	150,000	0.8	150,000	0.9
Dividends paid	1,200,000	6.3	1,118,750	6.4
Total	$1,950,000	10.2	$2,068,750	11.9
Balance transferred to surplus	$144,584	0.8	$106,781	0.6

TABLE II—DETROIT PASSENGER AND MILEAGE STATISTICS

	1918	1917
Revenue passengers	319,843,176	356,208,429
Transfer passengers	103,608,353	119,962,125
Employee passengers	7,416,741	8,557,264
Total passengers	430,868,270	484,727,818
Receipts per revenue passenger	$0.0553	$0.0459
Receipts per passenger	0.0410	0.0337
Car mileage	53,931,394	58,957,941
Earnings per car-mile	$0.3526	$0.2956
Expenses per car-mile	.2736	0.2249
Net earnings per car-mile	.0790	0.0707

NOTE.—In addition to the Detroit city lines, the foregoing statistics embrace all the lines owned and controlled by the Detroit United Railway.

The largest part of the gain in 1918, of course, came from the passenger earnings. These showed an increase of $1,326,543 or 8.1 per cent. The express earnings, however, showed a marked improvement, the gain amounting to $264,442 or 26.4 per cent.

The net earnings from operation in 1918 showed a gain of $87,530 or 2.1 per cent, which was increased by an advance in other income. The increase in interest charges and taxes, however, was sufficient to cause the above-mentioned decline of $80,947 or 3.2 per cent in net income. Dividend payments were increased from $1,118,750 to $1,200,000, but the depreciation allowance was reduced from $800,000 to $600,000. As a result the balance transferred to surplus in 1918 amounted to $144,584 as compared to $106,781 in 1917.

WHAT THE TABLES SHOW

The foregoing figures, shown in detail in Table I, summarize the business of the Detroit United Railway, the Rapid Railway System, the Sandwich, Windsor & Amherstburg Railway, the Detroit, Monroe & Toledo Short Line Railway and the Detroit, Jackson & Chicago Railway.

Table II gives passenger and mileage statistics of the system for the last two years. The points to be noticed are the decreases in passenger traffic and in car mileage and the increases in receipts per passenger and car-mile earnings for the combined lines.

$1,079,278 FOR ADDITIONS

During 1918 the Detroit United Railway and its affiliated lines spent $1,079,278 for additions to property. The largest items were $239,858 for right-of-way, $123,733 for rails, rail fastenings and joints, $94,059 for grading and $91,698 for track and roadway labor.

The $425,000 of first consolidated mortgage bonds of the Wyandotte & Detroit River Railway, which matured on Dec. 1, 1918, were paid and a like amount of Detroit United Railway first consolidated mortgage bonds was issued; likewise with $50,000 of Detroit Railway bonds.

Indianapolis Merger Approved

Stockholders of Street Railway and of Terminal Company Sanction Corporate Changes

At the meeting of the stockholders of the Indianapolis (Ind.) Street Railway held on June 2 to consider the merger of the company and the Indianapolis Traction & Terminal Company, as outlined in the ELECTRIC RAILWAY JOURNAL for May 31, page 1068, it was decided by vote of 27,879 shares to 14,863 shares to combine the two properties.

PLAN AMENDED

Amendments were offered and voted upon to meet certain objections offered by the city and others against the merger agreement as first submitted. One amendment provides that the consolidated company shall take over all obligations of existing franchises. This was provided to meet the objection that the consolidated company would be under no franchise limitations of the constituent companies. Another amendment provides that if the new consolidated company should fail in any year to pay 6 per cent on the $5,000,000 of preferred stock to be issued, then the exclusive voting rights shall go to the preferred stockholders as long as the default continues. A further amendment provides that the right to refund existing bonds under the old mortgages by the issuing of the new merger bonds of the consolidated company shall not be exercised before April, 1931, thus leaving only two years in which the bonds maturing in 1933 can be exchanged to meet the new bond issue. This amendment was made to meet criticism that under the merger the fixed charges of the company might be greatly increased by further bond issues.

SOME PROTESTS ENTERED

During the meeting, protests were heard from attorneys representing certain stockholders who were doubtful as to the advantages to be gained in exchanging Indianapolis Street Railway stock for the new consolidated stock. Mr. Hornbrook, representing the stockholders' committee, asserted that it was shown at the hearing of the fare case before the Public Service Commission last fall, and had been virtually admitted by the Mayor and Corporation Counsel, that the property of the Indianapolis Traction & Terminal Company more nearly represented the value of the bonds and securities issued than did the property leased from the Indianapolis Street Railway, and that by the feature of the proposed agreement, which provides that more than $2,000,000 of bonds of the two companies retired by sinking fund payments may be refunded to supply money for conditions and betterments, it will be possible for the consolidated company to finance the extensions and improvements which have been requested by the city of Indianapolis.

The boards of directors of the Indianapolis Street Railway and the Indianapolis Traction & Terminal Company met on June 3, and confirmed and approved the amendments offered at the stockholders' meeting. The merger agreement was then executed by the officials of both companies and now awaits the approval of the Public Service Commission of Indiana.

Segregation in Pittsburgh

Way Opened to This End in Decision Holding Rights of Mortgagor Are Absolute

The way was opened for the segregation of the properties making up the Pittsburgh (Pa.) Railways on May 29 when the United States Court of the Western Pennsylvania District handed down a decision granting permission to the Union Trust Company as trustee to foreclose the mortgage it holds on the properties of the Southern Traction Company.

COURT ESTABLISHES POINT

Incidentally it was established that, in Pennsylvania at least, the contract rights of a mortgagor must be recognized by a federal court as paramount to the public interest. Counsel for the city of Pittsburgh and the receivers of the company, who are operating the lines under the direction of the Federal Court, had raised this objection to the petition of the trustees of the bondholders for permission to foreclose, but in his opinion Judge Charles P. Orr dismissed this plea without entering into its merits.

There appears to be no immediate prospect of actual foreclosure proceedings. Counsel for the bondholders' trustee admit this, in view of the intention of the city law department to oppose the foreclosure by further court proceedings. The next move will be the filing of exceptions to Judge Orr's ruling by C. K. Robinson, special traction counsel for the city. It is expected that counsel for the receivers will join the city in this opposition.

ANOTHER SNARL ADDED

At all events the foreclosure proceedings, when opened, undoubtedly will add another snarl to the almost inextricably tangled skein of the Pittsburgh Railways' affairs, for the question will arise then as to just what the Southern Traction Company is. On the face of things it is merely one of the underlying companies of the railways. But when the Pittsburgh Railways was organized one of the steps was absorption by the Southern of the Consolidated and the United Traction Companies, the three including the great bulk of the properties now forming the Pittsburgh Railways. One of the probabilities in the case, recognized by counsel for both the city and the receivership, is a claim by the Southern's bondholders for all of the rolling stock of the Pittsburgh Railways, a claim many attorneys feel might be established in court, leaving the receivers with plenty of track but no cars. In the narrower view the bondholders of the Southern Traction Company are protected only by a mortgage on certain lines operated by it before the consolidation.

The petition for permission to foreclose was presented as a result of default in the semi-annual interest on the first mortgage 5 per cent bonds of the Southern Traction Company. This issue is of $4,000,000 and as interest was defaulted last October and April the sum directly in question is $200,000 and interest.

Ranking, as to interest, with the permission of the court to foreclose, is its ruling that bondholders' rights can stand in a federal court in Pennsylvania, against claims of public interest. Heretofore the Federal Court, ruling on the affairs of the Pittsburgh Railways, has seemed to take a somewhat different attitude. Last fall when Charles A. Fagan, one of the receivers, took a decided stand against the further payment of fixed charges while the public was inadequately served by the railway, he was sustained promptly by the court. Shortly after that his colleagues in the original receivership, J. D. Callery and H. S. A. Stewart, withdrew, being succeeded by S. L. Tone and W. D. George.

BASIS OF COURT RULING

Judge Orr based his ruling on two recent decisions of the Pennsylvania Supreme Court, in which the right of a mortgagor to foreclose under the terms of his mortgage is found to be absolute. These cases are Philadelphia Trust Company, trustee, vs. Northumberland County Traction Company, 258 Pa. St., 152, and Columbia & Montour Electric Company vs. North Branch Transit Company, 258 Pa. St., 447. He explains that he accepted the guidance of the highest State court in the matter because the Southern Traction Company is a creature of the State of Pennsylvania and the mortgage in question was made under the laws of Pennsylvania.

The opinion sets forth that to prevent the trustee from proceeding or even to cause the trustee temporarily to postpone exercise of the remedy provided by the mortgage would be to some extent an attempt by the court to impair the obligation of a contract. In answer to a hypothetical objection that the constitutional prohibition against impairment of contracts is intended against legislative and not judicial acts, Judge Orr replies that, as a creature of the Legislature, a court of inferior jurisdiction ought not to have powers higher than those of its creator. So the permission to foreclose is granted, the only stipulation being that proceedings be instituted in the United States Court of the Western Pennsylvania District.

Judge Orr remarks, early in his opinion, that the sole answer to the petition brought by respondents was an offer to prove that granting of it would be against the interest of the public. At the hearing this was objected to by counsel for the bondholders' trustee, and the court reserved decision on the objection. In the opinion the objection is sustained and evidence that foreclosure would be contrary to public interest is ruled out as incompetent, irrelevant and immaterial.

Authorizes $20,000,000 of Receiver's Certificates

Judge Julius M. Mayer, in the Federal District Court, has signed a decree authorizing Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, to issue $20,000,000 of receiver's certificates.

In the memorandum filed with the decree, Judge Mayer explained his reasons for deciding as to certain disputed points. He dwelt especially upon the point that had been urged by ex-Judge Samuel Seabury, representing tort claimants for the Malbone Street accident last December in which nearly 100 persons were killed and for which claims for damages aggregating $1,500,000 have already been filed. Judge Mayer made it clear that there is no intention of neglecting such tort claims. but he pointed out also that such claimants are as much interested as other creditors of the system in preserving the property of the company and having it conducted in such a way as to insure an adequate return from the money invested.

Judge Mayer also made a brief reference to the objections that were raised at a hearing on the subordination provision in the proposed decree under which the first refunding gold mortgage of July 1, 1902, with the Central Union Trust Company, as trustee, under which $27,627,000 of bonds have been authenticated, would be subordinated to the present issue of certificates.

$25,000,000 Note Issue

Henry L. Doherty & Company, New York, N. Y., associated with the management of the Cities Service Company, are forming a syndicate to underwrite an issue of $25,000,000 sinking fund, convertible 6 per cent notes of the Empire Gas & Fuel Company, which is the principal oil subsidiary of the Cities Service Corporation.

The notes will be dated June 15, 1919, and will mature on June 15, 1924. They are convertible at any time par for par into a new issue of 8 per cent cumulative preferred stock of the Empire Gas & Fuel Company. The notes will be offered at 97½. The net earnings of the Empire companies for the twelve months ended Feb. 28 are reported to be approximately $23,000,000.

Growing Too Complicated

Special Master Inquiring Into St. Louis Receivership Proceedings Issues a Warning

The United Railways receivership suit now being heard at St. Louis, Mo., is becoming so complicated, in the opinion of the special master hearing the case, that there is danger of both the court and counsel losing a proper perspective of the matter.

COURT ITSELF CONFUSED

Toward the close of the session on June 2, and just before adjourning the hearing to June 5, Special Master Lamm declared from the bench:

> This case is growing very complicated. It has come to a point where if I have got to pass on it, I want briefs. I'll give counsel a week in which to file the briefs. There is such a thing as this getting so complicated that the master won't understand it, the court won't understand it, and counsel themselves may be in doubt.

The hearing on June 2 was given over to arguments of Charles H. Cole, Chester, Ill., and W. B. Thompson, St. Louis, for leave to intervene on the part of the defense in the suit for receivership and accounting of John W. Seaman, New York, against the United Railways. The petitioners contended that the company by filing an admission of insolvency in the Adler receivership proceedings disqualified itself for the task of defending itself. They argued that the stockholders should be permitted to defend the company against the charge of insolvency and asked that Mr. Seaman be required to furnish bond to cover cost of the suit and the possible damages of a receivership.

In commenting on the argument of attorneys for the intervenors Mr. Lamm said:

> My mind has been dwelling on the timeliness of this intervention. This case has been pending nearly a year and you are just filing this action. It is a question in my mind whether you have not passed the days of grace.

COMPANY ABLY REPRESENTED

During the discussion Henry S. Priest, general counsel for the United Railways, declared that the United Railways as a matter of fact is not insolvent. He said the company was unable to meet its obligations as they matured chiefly because of the agitation aroused through this litigation. Mr. Priest said that he had on his desk a circular from one of the city's best known financial heads saying that an effort was being made to mature the company's general mortgage bonds and cut out the St. Louis Transit Company bonds and other indebtedness. He added that "the extreme depression because of the war" helped to impair the company's ability to meet its obligations as they matured.

In referring to the argument of Attorney Ford Thompson for the intervenors that the company through its admission of insolvency in the Adler suit made it impossible to prove its solvency at the present hearing, Special Master Lamm took occasion again to compliment Attorney Priest, whose argument in answer to the closing argument of attorney for Seaman during the previous week brought out a strong laudatory expression from the bench. It had been his observation that the defense has been very ably represented in this case, Master Lamm said to Attorney Thompson at the close of his plea for permission from the court to "assist the defense."

Dallas Tells the Public

Company Adopts Policy of Giving the Public Monthly Data on Financial Condition

The net earnings of the Dallas (Tex.) Railway for April, 1919, amounted to $32,636, an increase of $6,093 or 23 per cent over the earnings for the corresponding month of last year. The net earnings for April were equivalent to a net return of 4.98 per cent a year on the agreed property valuation. The present franchise allows a 7 per cent return.

Setting forth the financial condition of the Dallas Railway, the directors have published in all the local newspapers of Dallas a five-column advertisement showing in detail the property valuation, earnings since the properties were taken over, authorized return of 7 per cent and deficit. In this advertisement the company makes the following statements:

> During 1917 the street railway situation was submitted to the voters for a full discussion and to an election held on April 3, 1917, at which time a certain franchise was granted by the voters of the city to the Dallas Railway. Appreciating that the growth of the city is inseparably linked with the success of the street railway company, and that the surest manner of securing the friendly co-operation of our patrons is by keeping the public fully advised as to the financial condition and the various problems confronting the company, the management, with the sanction of the board of directors, submits the following:

Total property value, determined in the manner provided by the franchise — close of business April 30, 1919	$8,082,682
Authorized return (7 per cent on property value) for April	45,898
Gross return from all sources, month of April, 1919	202,238
Operating expenses, April, 1919	169,602
Balance earned for return, April, 1919	32,636
Shortage in permitted return, April, 1919	13,262
Amount net earnings for April available for distribution to stockholders	None
Amount net earnings for April available for transfer to surplus reserve	None
Total shortage for nineteen months (from Oct. 1, 1917, to April 30, 1919, inclusive) on permissible return	355,285

> The management feels that the railway's problems are also the public's, as a financially crippled railway system cannot expand and give adequate service. From month to month we will keep you fully advised in this manner. If we succeed, we want you to know it; if we are not succeeding, we likewise want you to know it.

This statement is signed by J. B. Walker, secretary-treasurer; Richard Meriwether, vice-president and general manager, and the company's directors. The deficit of $355,285 is said to be due to three things—First, operation of the jitneys; second, the increased cost of labor, and third, the increased cost of materials.

Council Approves Valuation

Minneapolis Body Fixes Upon $24,000,000 and a Return of 7 Per Cent for Local Railway

The City Council of Minneapolis, Minn., by a vote of sixteen to ten has approved the report of its committee on street railways placing the value of the property of the Minneapolis Street Railway at $24,000,000 with a guaranteed return of 7 per cent to the company.

The company now has ten days in which to accept the proposal. If it accepts, a service-at-cost franchise will be drawn and submitted to the company for approval and if approved will go before the voters within ninety days thereafter. Socialists voted against the adoption of the committee report by the Council.

MANY VALUATIONS MADE

Various valuations have figured in the long drawn out preliminaries, that of the city engineer being $25,914,307, of the City Council $22,553,150 and of the company $24,500,000. The franchise will be drawn under the enabling act, Chapter 124, General Laws of Minnesota for 1915, which permits the city to negotiate with the company and submit a franchise to referendum vote before the expiration of the present franchise grant in 1923.

Charles D. Gould, the city attorney, has proposed as purposes in the franchise the following:

> 1. To furnish the Minneapolis public with adequate street car service at all times, at a rate of fare sufficient to provide the facilities for such service, meet the legitimate cost of operation maintain the property continuously in first-class condition, and pay to the company its fixed minimum return upon capital investment.
> 2. To provide for effective public control of service and extensions.
> 3. To provide for such methods and measures of public supervision of the property as will assure honest, efficient and economical management thereof in the public interests.
> 4. To provide for an equitable division of the surplus earnings between the city and the company.
> 5. To provide for the purchase of the property by the city, and the terms, times and conditions thereof.

MAYOR OPPOSED TO MEASURE

By decision of the Council at its meeting on May 29 the fourth section is waived as the city will control the division of surplus earnings, and will be able to utilize it to lower fares, retire bonds, make improvements, or for any purpose specified in the ordinance. A clause will give the city right to buy the property at the end of each five or ten-year period, at the end of the period of the franchise (which may not be more than thirty years without renewal), and thereafter at the end of any five-year period upon the furnishing of a one-year written notice to the company.

Mayor J. E. Meyers, who holds that a $20,000,000 valuation and a 6 per cent guaranteed return are enough for the company, is expected to make a campaign against the adoption of the franchise as proposed.

Sale of Collateral Postponed

The sale of all the capital stock of the International Railway, Buffalo, N. Y., advertised to have been held in New York on May 27, has been adjourned until June 25. The postponement has been consented to by the bondholders' protective committee of the International Traction Company, of which Elliott C. McDougal, Buffalo, is chairman. The junior security holders of the traction company sought the postponement, until after the State Court of Appeals has handed down its decision on the right of the Public Service Commission to intervene and regulate fares in Buffalo under the operation of the Milburn agreement.

The junior interests include those who own the stock, both common and preferred, of the traction company or the debentures that are junior to the traction company bonds. In the event of the sale of the collateral back of the traction company bonds, the interests of these junior debenture holders would be wiped out.

The holders of the stock of the railway company desired a postponement of the sale in order that they might have an opportunity to work out a solution of the financial problem of the International Railway and the International Traction Company. For some time negotiations have been in progress between the traction company bondholders' committee and representatives of the railway and holders of the traction company stock for the purpose of bringing about some sort of an agreement.

Financial News Notes

Memphis Makes Up Interest Payment.—The receivers of the Memphis (Tenn.) Railway have deposited with the Central Union Trust Company, New York, N. Y., funds for the payment of the interest due in January, 1919, on the consolidated mortgage 5 per cent bonds of the company, together with five months' interest at 5 per cent on the deferred payment.

Would Abandon Bartlesville Loop.—Application has been made to the Oklahoma Corporation Commission by the Bartlesville (Okla.) Interurban Railway for permission to abandon and take up a portion of its track on the "loop" within the city limits of Bartlesville. The company set forth that little business was done on this line and that the steel and ties were badly needed for use elsewhere on the system. The matter has been taken under advisement.

Sale of Collateral Advertised.—The American Railway & Power Company, having defaulted in the payment of interest due on Nov. 1, 1918, upon its 6 per cent three-year gold coupon notes dated May 1, 1916, the Columbia Trust Company, New York, N. Y., trustee under the agreement of May 1, 1916, will sell the securities pledged with it, to wit: $276,000 of 6 per cent cumulative preferred stock of the Burlington Railway & Light Company, Burlington, Iowa, a Delaware corporation. The sale is scheduled to take place in New York, on June 11, 1919.

New Owners in Control at Claremont.—The railway lines of the Claremont Railway & Lighting Company, Claremont, N. H., have passed to the ownership of the Claremont Street Railway. The stockholders in the Claremont Street Railway, a new corporation, granted a charter at the last session of the Legislature, are local manufacturers, who bought the bonds of the old company and brought foreclosure proceedings. The road was struck off to them at public auction recently for $85,000, no other bidders making an appearance.

Progress Made on Spokane Merger.—Progress is being made in the efforts to work out a consolidation of the city lines of the Washington Water Power Company and the Spokane (Wash.) Traction Company. The engineers of the two companies have agreed upon the lines to be retained, but the details are still under consideration. Waldo G. Paine, vice-president of the Spokane & Inland Empire Railroad, prefers that the proposed charter changes and merger franchise be submitted at a special election and not be deferred until the regular election in November, as suggested at the City Hall.

Common Dividend Payment Made.—A semi-annual dividend of 1¾ per cent has been declared on the $9,460,000 outstanding common stock of the American Railways, Philadelphia, Pa., payable on June 14 to holders of record of June 10. This is the first distribution on the common stock since December, 1917, when a semi-annual dividend of 2 per cent was paid. The declaration of the dividend insures the payment of the semi-annual interest on the $6,479,750 of National Properties Company collateral trust bonds due on July 1. The bonds now bear 4½ per cent interest. American Railways common furnishes the collateral for the issue of bonds.

Default on Lafayette Bonds.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., having given notice that default would be made in the payment of interest due on June 1, on Lafayette Street Railway first mortgage 5½ per cent bonds, a committee consisting of Dimner Beeber, president of the Commonwealth Title Insurance & Trust Company, Philadelphia, Pa., Warren G. Griffith, and Walter L. Haehnlen of Charles Fearon & Company, Philadelphia, has been formed for the protection of the interests of the bondholders of the Lafayette Street Railway. The committee has asked holders to deposit their bonds with the Real Estate Trust Company, Philadelphia.

Another Abandonment Hearing.—The Public Service Commission for the Second District of New York at the hearing on May 21 on the petition of the Southern New York Power & Railway Corporation to abandon the Normal School line in Oneonta, decided not to receive evidence of operation of the entire road. The railroad, at a hearing on May 7, sought to introduce evidence which it had overlooked covering operating receipts and expenses and necessary repairs in Oneonta and outside, including an estimate that $423,000 would be required to put its main line in condition. The commission received evidence as to the Oneonta operation, but reserved decision as to admission of further evidence relative to operating expense and receipts for the entire system. The commission on May 19 decided that it would not take evidence covering the entire road. The case is still open.

Would Purchase Leased Line.—Negotiations are reported to be pending for the purchase by the Interstate Public Service Company of the interurban property of the Indianapolis & Louisville Traction Railway between Seymour and Sellersburg, Ind. The Interstate Public Service Company controls the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, and operates under lease the property of the railway between Seymour and Sellersburg, for which it is now negotiating. This purchase will give the Interstate Public Service Company entire control of the interurban line between Louisville and Indianapolis, as the section between the two cities was the only portion that it did not own, with the exception of the bridge over the Ohio River. The company uses the Big Four bridge over the river.

$1,036,000 of Bonds Authorized.—An order has been signed by Public Service Commissioner Lewis Nixon permitting the Hudson & Manhattan Railroad to issue and sell bonds of the face value of $1,036,000, under its first lien and refunding mortgage of $65,000,000 made on Feb. 1, 1913. The proceeds of the bonds are to be used to reimburse the treasury of the company for expenditures made from income between June 1, 1915, and Dec. 31, 1917. The money was spent principally to make payments on real estate mortgages and to meet installments on purchases of cars. The bonds are to draw 5 per cent interest and become due on Feb. 1, 1957. Interest is payable semi-annually. The bonds are to be sold at not less than 80 per cent of par. The company was allowed to use all or such portion of $207,200 as might be necessary to meet discount and expenses of the sale of the bonds, which sum, however, must be amortized from earnings of the company.

Traffic and Transportation

Jersey Hearings Continue

Experts Approve Principle of Zoning Plan—Professors Richey and Jackson Testify for Commission

Prof. Albert S. Richey testified for the commission before the Board of Public Utility Commissioners of New Jersey on May 20 in the Public Service Railway zone fare hearing. It was his opinion that in the future charges for electric railway service must be upon the basis of service rendered with fares arranged to correspond with the actual distance traveled. Professor Richey also appeared as a witness on May 21. His only criticism of the zone plan as proposed was that it was not flexible enough. He thought that the initial fare of 5 cents should cover not less than two zones, instead of one zone as contemplated in the report of the company. Professor Richey was again a witness on May 26. He was examined as to his business relations with the Public Service Railway prior to the present zone fare hearing.

DAY OF FLAT FARES GONE

On May 27, Robert M. Feustel, of Sloan, Huddle, Feustel & Freeman, was a witness for the commission. He said that the zoning arrangement could be made applicable to the Public Service Railway providing the mechanical difficulties of fare collection were overcome. He contended that flat fares must be eliminated before just and reasonable rates could be established. He favored a zoning system under which passengers could board cars at any point and ride for at least two zones for an initial 5 cents. He regarded the Public Service Railway zone report as a very courageous attempt to solve the American electric railway problem.

On May 28 Frank H. Sommer, counsel for the municipalities opposing the zone fare plan, objected to having the plan go into effect on July 1 and asserted that the municipalities which he represented should be allowed sufficient time to prepare as comprehensive a case against the zone plan as had been allowed to the company. The court took the question under advisement and then announced that the zone hearing would be adjourned until June 4. President McCarter of the Public Service Railway declared that any attempt which would result in delaying the proceedings very long "means a receivership for the railway, if it means anything." The company could not continue to go on unless relief were granted within a reasonable time.

On June 4 the hearings were resumed with Lieut.-Col. Philander Betts, chief engineer of the commission, on the stand. He testified that the commission has the information needed in checking the valuation figures presented by the railway company, and that the commission had approved expenditures of about $35,000,000 during the period of its jurisdiction.

On June 5 Lieut.-Col. Dugald C. Jackson took the stand for the commission. Quotations were read from his book on "Street Railway Fares" to show that for years he had favored a zone system. As to the system proposed, he is quoted as saying: "It is a definite well-planned effort to solve the problem."

The following extract from a *Newark Evening News* editorial entitled "The Long and Short of It," summarizes the situation from the standpoint of that paper:

> A proper zoning system, in which the general welfare is conserved, appears the correct solution. Such a system, however, must not place an undue burden either upon the city riders or upon those from the outlying districts. The charges must be equalized on the basis of the benefits conferred. This equalization must be provided for here. The question now before the Public Utilities Commission is whether this has been done in the Public Service zone plan. The underlying principle may be right, and yet the details of the superstructure may be wrong or the charges excessive. This is the crux of the whole business in New Jersey. The latest expert evidence given would seem to indicate that a revision may be needed to make the plan equitable.

Increase for Winona Company

The Public Service Commission of Indiana has authorized the Winona Interurban Railway, Warsaw, Ind., to increase its basic passenger fare from 2.5 cents a mile to 2.75 cents a mile; to charge 5 cents straight for fares in Peru; to sell 2000-cent coupon books at $17.50, and twenty-coupon books at 15 per cent less than the basic fare and to establish a 10-cent minimum fare for interurban service.

The commission found that the road has been earning only 4.03 per cent gross on its tentative value of $26,500 a mile, and authorized the road to increase fares, but not to the limit proposed by the company. The commission directed the company to credit its city lines with 2.5 cents for each passenger carried to and from the city terminals on interurban cars. The commission denied the road an added cash fare excess charge to be refunded later.

The commission has denied the petition for rehearing filed by the Chicago, Lake Shore & South Bend Railway, which some time ago sought to have its passenger basis increased to 3 cents a mile. The basis now is 2.75 cents.

The commission has denied also the petition of the Central Electric Traffic Association to cancel the Chicago, Lake Shore & South Bend interchangeable and local 2000-cent coupon books.

Berkshire Service Considered

Matter Before Commission of Resuming Operation on $3,000,000 Line with 8000 Tributary Population

Resumption of passenger service over the $3,000,000 Lee-Huntington line of the Berkshire Street Railway, Pittsfield, Mass., was urged before the Public Service Commission of Massachusetts at a hearing in Boston on May 29, the petitioners being officials and citizens of the towns connected and adjacent to the line. The line was built about six years ago and is of unusually heavy construction. It forms the only through connection between eastern Massachusetts and the Berkshire district, and has been operated at various periods separated by suspension of service due to severe winter conditions, the influenza epidemic of last fall and inadequate revenue. The company was represented by A. M. Robinson its counsel, and C. Q. Richmond, Pittsfield, Mass., general manager.

The financial disabilities of the Berkshire company, it was urged, render the resumption of service over the Lee-Huntington line inexpedient. The first four months of this year show a loss of $30,780 below the bare cost of operation plus accrued taxes on the system as a whole. Interest on the funded debt is not included. The company owes the Federal Railroad Administration $50,000 in back freights and demurrage, and there are $60,000 of last year's taxes yet to be paid. A fare increase was effective in November, 1918.

TRAINMEN WANT WAGE INCREASE

The platform men ask for a wage increase to $5 a day of eight hours, with increases in proportion for other employees. It is estimated that the desired increases in wages now under consideration would cost the company $275,000 a year. Mr. Richmond said that the private automobile has cut heavily into the company's revenue. Seventeen one-man cars have been purchased from the Wason Company and an attempt is being made to recapture some of the lost business. On the Pittsfield-Dalton line, for instance, it is proposed to provide a fifteen-minute headway with light cars and it is believed that this will enable the company to compete with the existing jitney service. The Berkshire company has paid no dividends since 1912.

Mr. Richmond said that the total tributary population along the Lee-Huntington line is only 8000, and that the gross earnings per car-mile in April, 1918, when it was reopened after a severe winter, were 10.81 cents, compared with an average of 31.96 for the entire system. In August the line earned 29.06 cents per car-mile, compared with 38.16 cents for the system. In six days of October the total fares collected on the last fare limit entering Huntington were only $18.50. After the line was apparently completed it was necessary to expend $41,831 in preparing it for operation by the installation of safety-catch sidings, a portable substation, electric locomotive, etc. The line is 24 miles in length and has no car-housing facilities except at Pittsfield, 12 miles from its westerly end. Two substations must be started to secure service. The Federal Court decree requiring the New York, New Haven & Hartford Railroad to dispose of its electric railway properties by 1921 stands in the way of the Berkshire company's securing financial assistance from the New Haven. Its competitive possibilities as a through route have been greatly exaggerated. The company has not refused to handle freight over the line to and from various industries located upon it, but there seems to be no present means of supplying a paying passenger service.

At a recent conference in Westfield, Mass., to which reference was made in the ELECTRIC RAILWAY JOURNAL for May 31, page 1071, L. S. Storrs, president of the Berkshire company, offered to provide passenger service on the line if the towns involved would agree to make up the excess of its cost over revenue, but these communities have so far refused to assume any share of the burden. The hearing has been closed.

Two-Cent Transfers for Capital

Commission Grants Increase to Washington Railway & Electric Company and to Two Non-Petitioning Competitive Lines

The Public Utilities Commission of the District of Columbia on May 29 granted a transfer charge of 2 cents to the Washington Railway & Electric Company, to be added to the present 5-cent fare. Though the competitive Capital Traction Company and Washington-Virginia Railway had not applied for relief, the same charge was granted to them.

Though the commission had not finished the study of the valuation data recently compiled in the case of the Washington Railway & Electric Company, it estimated the fair value on April 30, 1917, as $14,919,427. Upon this it said the return should not be less than 6 per cent, adding that "even though in normal times a greater rate of return may be advisable, the commission feels that during the present reconstruction period justice to the public requires distribution of the war burden." Upon this basis the commission estimated that the company would need a net operating income of about $900,000, and after disallowing as rate factors recent increases in maintenance and damage allowances, the commission determined that $300,000 should be raised through a rate increase.

THREE METHODS SUBMITTED

Continuing, the commission said:

The company through its expert witness, Prof. Albert S. Richey, submitted three methods of raising additional revenue; one, an increase to 7 cents in the flat rate of fare; another, a charge of 2 cents for transfers; the third, a two-zone system, with fares of 5 cents in the first zone and either an additional 5-cent cash fare in the second zone or tickets at the rate of 3 cents each. After considering all the arguments that have been advanced in favor of each of these methods and having in mind the additional revenue needed, the commission is of the opinion that the best means of raising that amount is by a charge of 2 cents for each transfer.

The number of transfer passengers carried on the Washington Railway & Electric Company's system during the calendar year 1918 was 23,002,474; during the first four months of 1919 the number was 7,754,655, or an increase of 10 per cent over the corresponding months of 1918. Assuming that this rate of increase will obtain for the balance of the present calendar year, the commission estimates that the number of transfer passengers for that period will be 15,327,533, which at 2 cents each will amount to $306,550. There may be some falling off in the number of transferring passengers when a charge is made for that privilege, but the extent to which this will affect the revenue is problematical and will not be considered at this time.

The other electric railways in the District of Columbia, namely, the Capital Traction Company, the Washington-Virginia Railway, and the East Washington Heights Traction Railroad have made no request for increased revenue, and if these companies were in no sense competitive with the Washington Railway & Electric Company and were serving different parts of the district, the commission might be justified in authorizing rates of service for the Washington Railway & Electric Company different from those authorized for the other companies.

The Capital Traction Company, however, is to a very large extent in competition with the Washington Railway & Electric Company, as is the Washington-Virginia Railway. If a charge for transfers were made on the Washington Railway & Electric Company's system and not on the lines of these two companies a very large amount of traffic would be diverted from the Washington Railway & Electric Company's system to these two companies; and if this were done the probable decrease in revenue from this source would more than offset the increase in revenues due to the charge for transfers.

The East Washington Heights Traction Railroad does not come into competition with any of the other companies. Its line is very short, so that the commission will not order any change in the present free issue of transfers between this company and the Capital Traction Company.

The imposition of a charge for transfer service has long been recognized as justifiable when increased revenues for an electric railway system must be provided. It does not put so great a burden upon the public as a whole as would an increase in the flat rate, and it does add the burden to those passengers who avail themselves of the extra service involved in a transfer. As a general rule, the burden will fall upon long-haul passengers rather than short-haul passengers.

When this commission required the companies to grant free inter-company transfers, it did so upon the theory that so far as possible the street railway systems of the city should be treated as one. In applying this charge to both intra-company and inter-company transfers, the same theory is adopted.

It is the present practice on several of the lines of these companies to issue transfers or identification checks to passengers presenting transfers from other lines either of the same company or of other companies. If the 2-cent charge now proposed for all transfers were applied without distinction, it would require some passengers now paying 5 cents for a ride between two points involving the use of two transfers or a transfer and an identification check, to pay 9 cents for the same ride. To avoid this excessive rate of fare for such rides, the commission is of the opinion that no charge should be made for the second transfer or identification check.

The 2-cent transfer charge took effect on June 1, 1919, and will remain in force until Jan. 1, 1920. On Jan. 1, 1920, the old rates shall be restored automatically unless the commission shall have ordered otherwise.

The decision is the outcome of an application made on Feb. 18 for a further increase in rates after the companies had operated for five months under an increase of fare of 20 per cent.

San Juan Wants Ten Cents

The Porto Rico Railway, Light & Power Company, San Juan, P. R., has applied to the Public Service Commission for an increase in the street car fare to 10 cents. The petition is an amendment to a similar petition filed in April, 1918, asking for a 7-cent fare. At that time, the company states, it was thought that a 2-cent increase would provide gross revenue sufficient to show a reasonable earning on the capital invested in the railway system. It is now estimated that a 10-cent fare is required in order to make the enterprise reasonably profitable.

Unfair jitney competition, together with wage increases granted by the board of arbitration last December without corresponding increased revenues, and the present high cost of materials, are the causes given for the poor showing. Following the filing of the petition the company made a statement in part as follows:

The company had invested in its railway business on Dec. 31, 1918, $1,601,510. The gross earnings for the first three months of this year amounted to $81,897, while the operating expenses for the same period were $75,879, leaving net earnings from operation of $5,651.

On this basis the railway earnings for the year would amount to $22,567, equivalent to only 1.49 per cent of the investment, without any allowance for depreciation of the property.

There are two reasons for this poor showing:

1. The loss of business resulting from jitney operation, and

2. The very large additional expense due to the increase in wages granted our employees in accordance with the award made by the Board of Arbitration appointed by the Governor in December last, and the greatly increased cost of all materials and supplies.

We estimate that in the event of our application being granted by the commission, there will be a decrease of about 25 per cent in the number of passengers carried due to the higher rates, according to the experience of companies elsewhere under similar conditions, and our net earnings for a full year operation on this basis would be $177,243 at the rate of 11.6 per cent on the capital now invested, without any provision being made for depreciation.

Every effort has been made by the company since the beginning of the war to cope with the rapid increase in the cost of operation by effecting economies wherever possible consistent with the service the public demanded, but the infringement on its earning capacity by the unfair jitney competition on one hand and the large increase in wages granted the men in December last without any provision being made for increased income to meet the increased wages, on the other hand, has placed the company in a position where it must have immediate relief in the form of increased fares applied for, failing which two courses are open, namely, to reduce the wages of men to the same rate that was in force prior to the arbitration award while at the same time materially curtailing the service (which course would not be satisfactory to the employees or the public), or suspend operations entirely.

Had the jitney competition been eliminated, it is quite possible that notwithstanding the greatly increased cost of operation, the company could have continued to operate at the present rate of fare and derive a fairly satisfactory return on its investment, but under existing conditions that is impossible.

Spokane Increase Disappoints

According to figures compiled by Henry J. Bender, superintendent of public utilities in the office of Mayor Fassett, the financial troubles of the railways there have not improved with the increase in fare to 6 cents, which took effect early in April. While the revenues of the Washington Water Power Company from its city lines increased $1,263, or 6 per cent, during April, this did not meet the increase in wages made to the men on the strength of the advance in rates. The wage advance had been estimated to cost $4,000 a month. The company sustained a loss of 11½ per cent in travel.

The earnings of the city lines of the Spokane & Inland Empire Railroad increased $1,279, or 10 per cent, during April, while the loss of travel was only 4 per cent. The more favorable showing by this system is believed by Mr. Bender to be due to the longer hauls. He thinks the slump in travel was mostly in the short hauls. The traction company also increased the wages of its men 6 cents an hour at the time the increased fares went into operation.

When the question of the increase of 20 per cent in carfares was under consideration by the City Commissioners, the railway managers said that there would be a slump in travel but thought that the 6-cent fare would bring an increase of 15 to 16 per cent in revenues. The actual results of the first month's showing have been disappointing and have demonstrated the need for speedy action to improve conditions.

Waldo G. Paine, traffic manager of the Spokane & Inland Railroad, stated that there was some question in the minds of railway men as to whether a flat increase of fare was the proper remedy. He referred to the zone system as the alternative.

Permanent Increase Denied

The Public Utility Commission of Maine has refused the application of the Lewiston, Augusta & Waterville Street Railway, Augusta, to make permanent the 7-cent fare adopted by the company in June, 1918, with the approval of the commission. The commission has, however, ordered that the schedule which has been in effect "be continued for one year from June 1, 1919, unless sooner canceled by the commission." The commission is "convinced from our examination of the accounts of the company, and from our general knowledge of conditions on this particular railway and on the electric railways generally throughout the State and throughout the country, that no reduction in fares is at present warranted." The commission commented as follows on the results so far obtained:

> The company at the hearing on May 21 this year presented a statement of its operating revenues and expenses for the years 1913, 1914, 1915, 1916, 1917 and 1918, and a detailed statement of its revenues and expenses by months from June, 1916, to May 1, 1919. This statement shows that while the revenues since June, 1918, have been materially greater (with the exception of one or two months) than they were in either of the other years, it also shows that the cost of operation has in most of the months outrun the increase in revenue. It has resulted in the necessity of the passing by the company of its dividends on preferred stock and since October, 1918, has resulted in a deficit each month—such deficit ranging from $1,751 in April of this year, up to nearly $20,000 in October, 1918, and it shows that for the calendar year of 1918 the deficit was $135,915 and that the deficit for the eleven months ending May 1, 1919, was $57,680.
>
> This latter deficit is, however, substantially less than for the same period a year previously, when the deficit was $81,759. While the statement is not entirely encouraging, it is not anywhere near as discouraging as were the conditions the company faced a year ago. But in spite of the better showing during the past year a substantial deficit still exists, and the company faces the proposition that wages will probably remain, for a time at least, at the present level and other costs of operation will not be materially lessened for a considerable period of time.

Portland Company Wants Fare Increase

The application of the Portland (Me.) Railroad, included in the system of the Cumberland County Power & Light Company, for a 7-cent fare was formally presented to the Public Utility Commission of Maine on May 26 by A. H. Ford, vice-president and general manager, Mr. Ford in his petition stated that the Portland Railroad operated in 1918 with a deficit of $110,255, and that for the first four months of the current year the deficit has been $112,038.

It was further shown at the hearing that the 6-cent fare schedule has been operative for two months, and that there had been a substantial increase in gross passenger earnings, but that the company still fails of earning its operating expenses and rentals. Furthermore, expenditures for railroad improvements and municipal improvements which must be made this year will probably produce a heavy deficit for 1919.

Mr. Ford introduced a letter from Prof. Albert S. Richey supporting his contention. The following schedule of proposed changes drawn up by Professor Richey was also submitted to the commission:

> Mile zones, transfer limits, etc., to remain the same.
> Rate of fare—by ticket—2⅓ cents per mile.
> Rate of fare, if paid in cash—3 cents per mile.
> Minimum fare, by ticket—3 miles, 7 cents.
> Minimum fare, by cash—3 miles, 9 cents.
> Transfer privileges as at present.

Professor Richey suggests that while the new schedule appears unequal to furnishing the total revenue needed, relief through legislation from unjust burdens as to paving, taxation, etc., would meet the balance of deficits as now appear inevitable.

It is proposed to charge 2⅓ cents per mile by ticket or 3 cents per mile for cash fares, with a minimum fare of 7 cents by ticket and 9 cents by cash. It is estimated that an increase of 10.15 per cent in revenue of the company will follow the introduction of the new schedule.

California Interurban Wants More

The Oakland, Antioch & Eastern Railway, Oakland, Cal., has filed with the Railroad Commission an application for authority to increase its passenger fares on its commercial line between Oakland and Sacramento. The petition says the increased fares asked for are mainly between points competitive with the United States Railroad Administration lines, and are in all but a few instances the same and in no cases higher. The increase in rates is necessary, according to the company, because of the increase in cost of operation and because the revenue is insufficient to pay operating charges and a reasonable return upon investment. Comparative proposed and present rates follow:

Between	(One-way Fares) Proposed	Present
San Francisco and Sacramento	$2.70	$2.50
Oakland and Sacramento.....	2.55	2.50
Oakland and Antioch.........	1.45	1.35
Oakland and Bay Point......	1.10	1.00
Bay Point and Canyon.......	0.80	0.70
Bay Point and Pinehurst.....	0.75	0.65
Bay Point and Moraga.......	0.65	0.60

The company asks for a round-trip week-end fare between San Francisco and Sacramento of $3.60 instead of the present rate of $3.35 and a round-trip week-end fare between Oakland and Antioch of $2.25.

Fairmont Company Gets Increase

The Public Service Commission of West Virginia handed down a decision on May 27 granting the Monongahela Valley Traction Company, Fairmont, W. Va., a uniform 7-cent fare on all city lines and on all zones of the interurban lines. The company operates about 150 miles of track. In addition to the fare increase the commission established a new schedule of power rates giving an average increase of approximately 20 per cent.

The new rate affects principally the cities of Fairmont and Clarksburg. The increases in passenger rates were from 5 to 7 cents in the cities, and from 6 to 7 cents on the interurban line, except between Fairmont and Barrackville. Increase between these places was protested and the commission will further investigate regarding it.

An extensive publicity campaign, conducted by Glenn Marston, New York, was of material assistance in enabling the company to secure increased fares.

The publicity campaign was for the purpose of making clear to the general public the necessity of increased rates if the property was to be maintained in first-class condition. Much of the company's property is situated in the heart of the West Virginia coal fields, and the employees of the coal companies have secured large wage increases since 1914. They were quick to realize the increased costs to which the railway was subject. There were only two protests to the commission during the legal period preceding the hearing. Both of these were withdrawn when the conditions were made clear. The absence of protests is attributed to the efficacy of the publicity campaign, which went thoroughly into all phases of operating conditions and showed wherein the company was subject to the same increases in living cost as the private citizen. The company was represented by George M. Alexander, president.

New York Commissions Urged to Act

Joseph K. Choate, chairman of the committee on ways and means to obtain additional revenue for the New York State Electric Railways, on June 5 sent a letter to Chairman Lewis F. Nixon of the Public Service Commission of the First District of New York, and F. R. Hill of the Second District, enclosing copies of correspondence between himself and Governor Smith relative to an investigation of the electric railway situation in New York State, and urged upon the two commissions that following the suggestion of Governor Smith they institute an investigation of the traction situation in both the first and second districts with a view to making recommendations for corrective and remedial legislation at the next session of the Legislature.

Mr. Choate's letter was written at the suggestion of the Governor, who had been previously requested, by Mr. Choate, in behalf of the committee, to appoint a committee of citizens for the same purpose.

Transportation News Notes

Wants Six Cents in Ashtabula.—The Ashtabula (Ohio) Rapid Transit Company has asked the City Council of Ashtabula for a new franchise which will provide for a 6-cent fare. Some months ago the company asked for a 7-cent fare. This was refused.

Six-Cent Fare Continued.—The 6-cent fare of the United Railways, St. Louis, Mo., was continued in effect for sixty days by order of the Public Service Commission of Missouri on May 29 to give City Counselor Daues of St. Louis an opportunity to study the financial exhibits of the railway. Mr. Daues did not oppose the temporary continuance of the 6-cent fare. At the end of the sixty-day period the commission will set a date for a hearing on the general subject of railway rates in St. Louis.

Fare Prospects Brighter.—The hearing of the application of the Topeka (Kan.) Railway for an increase in fare to 6 cents will be held by the Public Utilities Commission on June 10. On a previous application the commission denied the increase. Speaking informally, a member of the commission is reported to have said that there was no doubt that railway expenses had increased materially and that the Topeka Railway would have a chance to prove its financial condition.

Canton-Massillon Fare Controversy.—It is believed the Northern Ohio Traction & Light Company, Akron, Ohio, will not accept the franchise prepared by the Stark County Commissioners for the line between Canton and Massillon, Ohio, as long as it contains a provision fixing the rate of fare. The company has asked for another conference with the commissioners for the purpose of adjusting the fare question. The rate incorporated in the draft is 10 cents.

Jitneys Want Seven Cents.—The members of the Long Branch (N. J.) Auto Bus Association have threatened to stop operating their machines unless the City Commission passes a 7-cent fare ordinance or moves to repeal the ordinance under which bonds may be given. Some of the jitney drivers say they have to mortgage their cars to raise the premium on the bonds. The drivers say the public is willing to pay the higher fare. The business men of Long Branch have petitioned the City Commission to repeal the bond ordinance.

Akron Would Enforce Service Requirement.—A resolution has been introduced in the City Council at Akron, Ohio, to appoint a committee of four to employ counsel to take action against the Northern Ohio Traction & Light Company to enforce the clause in the present franchise which provides for adequate service. Under the resolution engineers and accountants may be employed to investigate the service. As a means of enforcing the requirement the resolution provides for the reduction of the jitney license fee from $25 to $2 a year in order to increase the jitney service.

One-Mile City Line Asks Increase.—Application has been filed with the Public Service Commission for the First District of New York by the Van Brunt Street & Erie Basin Railroad for permission to increase its rate of fare from 3 cents to 4 cents. The distance traversed by the line, from Hamilton Ferry to the Erie Basin, is a trifle more than 1 mile. The company buys its power from the Brooklyn Rapid Transit Company. The application says the wages of its employees have been increased from $3 to $3.60 a day, that there soon will be a further increase to the standard wage of $4.10, and that the Broklyn Rapid Transit Company has raised the price of electric current.

Freight and Express Service in Kansas City.—A freight and express service over the lines of the city is contemplated by the Kansas City (Mo.) Railways. Already the company is hauling rock and other building materials for contractors, and contracts for hauling paving materials to contractors building streets near car lines probably will be made by the company. The freight business will be handled so as not to interfere with passenger traffic, and much of it will be hauled at night. Another source of revenue to the company is expected to develop through an express system. The plans are now being worked out. The express cars will handle crosstown shipments to district stations.

Slight Fare Reduction in Cleveland.—Fares on the lines of the Cleveland (Ohio) Railway will be reduced to eleven tickets for 50 cents with a 1-cent charge for transfers, starting on July 1. The present fare is 5 cents with a 1-cent charge for transfers. Announcement of the change in fare was made by Street Railway Commissioner Fielder Sanders after receiving the report of the earnings and expenses of the Cleveland Railway for April. This report showed that the interest fund, the fare barometer, climbed $205,468 in April, making the total interest fund on May 1 $568,700. When the fund reaches $700,000 the fare goes down. Indications for May were that the fund would climb above the $700,000 mark.

Obtaining Local Consents First.—The villages of Port Chester and Rye have agreed to an increased fare on the lines of the New York & Stamford Railway, which operates between New Rochelle, N. Y., and Stamford, Conn. The towns of Rye, Harrison and Mamaroneck, and the villages of Mamaroneck and Larchmont have not taken action. The company seeks approval before putting the case for an increased fare before the Public Service Commission. Under the new arrangement, a 5-cent fare will give a ride within the village limits, but another fare must be paid after the line is crossed. Free transfers from the main line to local lines or vice versa are eliminated. Three cents will be charged for transfers.

Basis of Kingston Increase.—The Public Service Commission for the Second District of New York recently authorized the Kingston (N. Y.) Consolidated Railroad to put a 6-cent fare into effect for a period of one year from April 15. The company operates a street surface railroad about 8 miles in length in the city of Kingston. The basis of the complaint in a general way was the large increase in operating costs caused by the war. It is interesting to note that while the petition in this case was filed in June, 1917, the only ground on which an increase could possibly be considered was the estimated figures for the year 1919. The local authorities appeared and formally objected to the proposed increase, but did not cross-examine the petitioner's witnesses or introduce any evidence, the Mayor stating for the record that if a *prima facie* case were made the city would be satisfied with the determination of the commission, increasing the fare.

Personal Mention

French Electric Railway Commission Here

Its Members Are Studying American Electrification Practice in Numerous Cities

An official commission of French electric railway engineers, interested in railway electrification, is visting this country. The commission is made up of the following members: Chairman, Professor Mauduit, professor of electrical engineering, Nancy University; Major D'Anglards, official representative, Minister of Public Works; and Messrs. Balling, chief engineer; Parodi, chief electrical engineer, and Sabouret, assistant manager, Paris-Orleans Railway; Japiot, chief mechanical engineer, and Ferrand, electrical engineer, Paris, Lyons & Mediterranean Railway; Debray, electrical engineer, and Barilliot, electrical engineer, French State Railway; Bachellery, assistant manager, and Leboucher, assistant motive power superintendent, Midi Railway.

The commission has made an inspection of the various properties around New York, and has visited among other cities New Haven, Schenectady, Philadelphia, Washington, Bluefields, Altoona, Pittsburgh, Erie and Chicago. It is in the last named city that the commission has been this past week. The Chicago, Milwaukee & St. Paul Railway electrification will be visited before the party returns East.

C. E. Martin, formerly auditor of the Pittsburgh, Harmony, Butler & New Castle Railway and the Pittsburgh, Mars & Butler Railway, Pittsburgh, Pa., has been appointed secretary and treasurer succeeding P. E. Seddon, resigned.

J. R. Perkins has been named as assistant to J. S. Pevear, general manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala. Mr. Perkins is an engineer and an expert operating man. He has been connected with the operating department of the American Cities Company since 1913.

Anton G. Hodenpyl has retired from the presidency of the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., on account of ill health. He will be succeeded by George E. Hardy, vice-president of the company. Mr. Hodenpyl has been president of the company since its organization about ten years ago. He will remain a member of the board of directors.

J. M. McElroy, general manager of the Manchester (England) Corporation Tramways, who has been spending a considerable period at Torquay, the noted seaside resort, has now fully recovered and is back in Manchester. This will be good news to those who had the pleasure of meeting Mr. McElroy when he visited this country some time ago to study American operating practices with a view toward relieving traffic congestion at Manchester.

Clarence K. Reed has been appointed general auditor of the Boston (Mass.) Elevated Railway. Mr. Reed is a native of Boston. He has been in the employ of the Boston company since 1902. Previous to that he was engaged for a short time in commercial activities. He began railway work at Boston as invoice clerk in the auditing department and has successively filled every post in the department of which he is now the head. Mr. Reed is at present a member of the New England Street Railway Club committee on electric railway mail compensation, and is actively preparing for the hearing to be held at Boston on this matter on June 13 by the Interstate Commerce Commission.

George M. Wood has been appointed supervisor of power plants for the Connecticut Company, New Haven, Conn. Mr. Wood has been connected with the Connecticut Company in the power department for a period of eight years, first serving for two years as draftsman and later being connected particularly with erecting jobs on the company's power plants and heating systems. In 1913 he was made assistant engineer in the operating department and in 1915 was transferred to the construction department. Mr. Wood is a native of the town of Branford, near New Haven, where he still resides. He was graduated from the Sheffield Scientific School of Yale University, in 1908, from which he holds the degree of Ph. B.

Robert L. Norton, publicity manager of the Boston (Mass.) Elevated Railway, has resigned to become Washington correspondent of the Boston *Post*, Mr. Norton was formerly political editor of the *Post*, and succeeded J. Harvey White in the Boston Elevated organization upon the latter's resignation several months ago. Mr. Norton left for Washington on May 21 to open an office at that city, the *Post* having never been directly represented among Washington correspondents until now. In his few months tenure of office on the Boston Elevated, Mr. Norton made many friends and performed excellent service in co-ordinating local newspaper interest in the operation of the elevated railway by its public trustees and the publicity requirements of the latter work.

W. J. Grambs, after almost two years service for the government in the recruiting service of the United States Shipping Board, has returned to private life, and will devote his time to the office of manager of auxiliary operations of the Puget Sound Traction, Light & Power Company, Seattle, Wash. Mr. Grambs tendered his resignation as supervisor of the recruiting service to take effect on May 1, but was requested to continue in charge until June 1. Mr. Grambs was appointed section chief for the Pacific Northwest in August, 1917, in charge of the government free navigation and engineering schools for the training of deck and engineer officers. In May, 1918, he was appointed supervisor of the sea training bureau of the United States Shipping Board in the Northwest.

H. H. Crowell, a vice-president of the Michigan Railway and the Consumers' Power Company, who has represented the Commonwealth Power, Railway & Light Company interests for the last eight years, has been elected a vice-president of the Electric Bond & Share Company, New York, N. Y., to fill the vacancy recently created by the death of George E. Claflin. Mr. Crowell has been identified with the electrical industry since 1889, when he entered the service of the Thomson-Houston Electric Company. Later he was New York State agent of the Thomson-Houston Motor Company and assistant New York State manager of the Thomson-Houston Electric Company, until the organization of the General Electric Company, in 1893. He was manager of the Syracuse and Buffalo offices of the General Electric Company until 1906 when he became chief engineer of the Commission of Gas and Electricity of New York State and later of the Public Service Commission for the Second District. Since 1911 he has been with the Commonwealth Power, Railway & Light Company properties in Michigan. Mr. Crowell is a member of the national committee of public utility conditions, which has represented the public utilities in Washington during the war.

A. G. Carson, now manager of the Manitowoc & Northern Traction Company, Manitowoc, Wis., and also of the business of the Wisconsin Public Service Company in Manitowoc and Two Rivers, including the Manitowoc steam station, has had his field of operations extended by the additional appointment as general superintendent of the Wisconsin Public Service Company, Green Bay, Wis. This appointment adds to his present duties the supervision of the electric light and power department and the railway department of the Public Service Company at Green Bay, reporting directly to C. R. Phenicie, vice-president and general manager. Mr. Carson will divide his time between Manitowoc, Two Rivers and Green Bay, taking charge of the railway department and the electric light and power department at Green Bay at once, thus becoming principal assistant to Mr. Phenicie, who, through the relief afforded by Mr. Carson will be able to spend more of his time at Manitowoc and Two Rivers. Mr. Carson was born in Michigan thirty-three years ago. Before coming to Manitowoc he was superintendent of the Eastern Wisconsin Electric Company, Fond du Lac. He was chief engineer of the Wisconsin Electric Railway and the Eastern Wisconsin Electric Railway & Light Company, Oshkosh, for several years when J. P. Pulliam was general manager and Clement C. Smith president of those companies. The assignment of a larger field of work to Mr. Carson is in recognition of his long and efficient service with the organization.

Leake Carraway, who for some time has been in charge of publicity work for the Southern Public Utilities Company at Charlotte, N. C., has severed his relations with the company to become publicity director in charge of public relations for the Virginia Railway & Power Company. He will handle the company's affairs in Norfolk, Berkley, Portsmouth, and Newport News. He will report directly to President T. S. Wheelwright at Richmond. Mr. Carraway went to Charlotte in 1911 as a free lance on the Charlotte *News* from the Arkansas *Democrat* the largest afternoon paper in that State, of which he was editor-in-chief. A year later he was elected secretary of the Greater Charlotte Club and during his term as secretary took active part in a number of civic improvements, among them being the installation of the White Way on Trade and Tryon Streets and also in the putting in of the under pass on East Trade Street. Since his connection with the Southern Public Utilities Company, he has taken a very active interest in newspaper work outside of his regular duties, "covering" many big stories for the papers and keeping in intimate contact with the newspaper men of Charlotte to whom he has been "a friend in need" many times. He has always maintained a policy of frankness with the newspapers and has built up a spirit of understanding between his company and the citizens. To be exact, Mr. Carraway entered upon his duties at Charlotte five years ago.. He was one of the first men regularly employed in work of the kind, and so far as the South is concerned he was a pioneer. He edited the company's monthly magazine, which was both informative and inspiring. The Charlotte *Daily News* regards his going as a distinct loss to that city and the other communities which the company served, for as it says "Mr. Carraway has served to strengthen the ties that exist between employer and employee" and "has aided in no small measure in the creation of a feeling of sympathy and co-operation between these two factors within the organization. The results of his work at Charlotte have been the subject of comment in the ELECTRIC RAILWAY JOURNAL.

Obituary

Jesse W. Lilienthal Dead

President of City Electric Railway at San Francisco Dies Suddenly While at Luncheon

Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., dropped dead of apoplexy in the midst of a luncheon address at the St. Francis Hotel, San Francisco, on June 3.

When the United Railroads became involved in financial tangles and, worse still, had incurred the opprobrium of the public, it was determined that a new leader must be found to fill the president's chair and rehabilitate the affairs of the company. Mr. Lilienthal was urged to undertake this work, and although he had an aversion to politics he was induced to accept this commission as an opportunity to accomplish a great work. In order to give his attention to affairs of the railways he had to relinquish much of his share in activities of the law firm of Lilienthal, Raymond & McKinstry, of which he had been the senior member for many years. Under his leadership the United Railroads made very considerable progress in gaining public esteem, and the policy of this company on the subject of public relations has become known the country over.

Mr. Lilienthal personally conducted the negotiations with San Francisco city authorities on the questions of conflict with municipal railway rights and the purchase of the United Railroads by the city.

Mr. Lilienthal was born in 1855 in New York City. While still a young man his family removed to Cincinnati, Ohio, where he received the greater part of his primary education. Finishing his course in the public schools, Mr. Lilienthal entered the University of Cincinnati, from which institution he transferred to the Harvard Law School, receiving his degree there in 1876.

Mr. Lilienthal's career as a lawyer began in New York City, where he practiced for a period of fourteen years after his graduation from college. Owing to the ill health of his wife he moved to San Francisco in 1894. Since then he has been a moving factor in the business life of that city.

Among his other interests, Mr. Lilienthal was a director of the Oakland, Antioch & Eastern Railway and was a director or in other ways active in ten or twelve other organizations in the San Francisco Bay region. He was president of the Society for the Study of the Exceptional Child and had been appointed by the Judge of the Superior Court to membership of the probation committee of the Juvenile Court.

It is stated that Mr. Lilienthal's death will not have any effect upon the plans for the financial readjustment of the United Railroads, announcement of which is expected to be made shortly after a study of many months.

W. E. Blake, superintendent of the Underground Electric Railways, London, England, died on May 8 following an operation. Mr. Blake, a few weeks previously, was directing the removal of a car when he slipped and received a slight injury to his leg. Septic poisoning resulted and it was necessary to amputate the limb. Mr. Blake, who was fifty-five years of age, was unable to survive the shock of the operation. Those who knew this jovial, generous and hard-working operator will extend their condolences not only to his family but to every one whose daily association with him made a pleasure out of their daily task. Some of Mr. Blake's work with the Underground Electric Railways will be referred to in one of the forthcoming articles on British electric railway practice.

Charles Whitman Wetmore, formerly for many years president of the North American Company, New York, N. Y., which controls the electric railways in Milwaukee, St. Louis and other cities, died on June 2 at his summer home in the sixty-fifth year of his age. Mr. Wetmore was born in Michigan. He was educated there and at Harvard, and was graduated from the law school in 1877. After graduation Mr. Wetmore went to New York and began the practice of law with the firm of Barlow & Olney, which afterward became Barlow & Wetmore. In addition to his connection with the North American Company Mr. Wetmore was one of the organizers of the Montana Power Company. About five years ago he retired from active business and lived in Surrey, England, until the war broke out, when he returned to the United States and took up his residence in Washington.

George T. Hanchett, consulting electrical and mechanical engineer of New York City, died at the Battle Creek Sanitarium on May 6. Mr. Hanchett, who was born at Hyde Park, Mass., Sept. 4, 1871, was a gradute of the Massachusetts Institute of Technology. In 1895 Mr. Hanchett joined the editorial staff of the *Electrical World* and later, after he had opened an office as consulting electrical engineer in New York, became a frequent contributor to the ELECTRIC RAILWAY JOURNAL. In 1900 he published a book entitled "Electric Railway Motors," containing in part articles on this subject which he had written for this paper. Other work which he did in the electric railway field was the invention, with F. B. Sage, of a direct reading ohmmeter, and the perfection and installation of a sectional third-rail system in the Belt Line tunnel of the Baltimore & Ohio Railroad. Mr. Hanchett suffered a stroke of apoplexy a year ago, and the recurrence of that trouble is given as the immediate cause of his death. He was a Fellow of the American Institute of Electrical Engineers.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Better Purchasing of Trolley Wheels

One Manufacturer Reports Volume of Sales This Year Running 33 Per Cent Ahead of Last Year

From all appearances there is a returning confidence among purchasers of some railway material. In the case of trolley wheels and harps there have been found instances where the orders have taken on a rather normal size.

There is without doubt sufficient purchasing to keep the overhead current collectors in operating shape, but when a manufacturer states that he believes railway people are buying these parts of equipment in quantities beyond their immediate requirements, there is added hope in the market.

One Eastern company just ordered 1000 trolley wheels, and other smaller size orders have come to notice. One manufacturer's sales to date are ahead of last year's sales for the corresponding period about 33 per cent. With this in mind it hardly seems that prices will have to be guaranteed to stimulate buying. With rising copper there has been found no intention on the part of manufacturers of copper and brass goods to guarantee any prices.

Some of the large railways are purchasing in better quantities than in the past two years, and are ordering with the prices open. This, it seems, shows the trend of thought regarding present prices where the financial conditions of the road permits of buying.

There are no indications that prices will be lower. In fact, with the higher price of copper it seems more likely that collectors will reach higher price levels before there will be any indications of a recession.

Cotton Advance Sends Bell Cord Higher

Prices Are Up Four and Five Cents a Pound, with Further Increase Anticipated

The rise in price of raw cotton, which took effect about two weeks ago, has left its mark on the price of woven cord for bell ropes and register cords. This product has been found up 4 to 5 cents a pound over the price of two weeks ago. It cannot be said, however, that the demand for cord for these purposes has materially increased, as merely sufficient quantities are being purchased by traction companies to keep their cars equipped. No evidence has been found where any amount of cord has been purchased for stock.

With the signing of the peace treaty it is expected that exporting of cotton will set in in great volume. The present cotton yield is only about 75 per cent of normal, it is stated, so it is reasonable to expect that the heavy foreign demand with the curtailed supply will result in much higher prices. One manufacturer of cord stated that he would not be surprised to see cotton rise to a price level of 50 or 60 cents a pound.

It is not improbable that bell cord will go higher as it is practically the same cord as is used for window weights. The resumption of building in large volume will undoubtedly have its effect on this market with the result of higher prices.

Manufacturing conditions are somewhat better than a few months ago. Although labor is not found any more efficient or any lower in price, it is easier to procure. For the present there is reported sufficient raw material on hand to satisfy present needs.

Copper and Brass Products to Reach a Higher Level

Gradual Advances Expected to Bring Rubber-Covered Wire Up to 25 Cents or Better in the Fall

Within the past month buyers have seen copper products such as wires and brasses advance on a rise of a little more than 1 cent in the copper market. Indications are that this is but the first of a series of rises to last well into the fall months.

In spite of the fact that there are immense stores of copper available, current quotations may be considered as a bottom level. Current prices are not to be taken as any indication of the relation between supply and demand. Psychology rather than the old laws of economics govern the present market.

Copper has been steady now for a couple of weeks. Just as soon, however, as any consumer demand develops prices will advance again, and they will continue to advance just as long as buying continues. When buying begins to ease up price will be stationary. There is no indication that a slump in buying will be accompanied by a falling market.

Advances will probably be made in steps of about 1 cent at a time. The upper limit which should occur in the fall is expected by those in a position to forecast more or less accurately to reach and perhaps exceed 20 cents. That would put rubber-covered wire on a 25-cent base or higher.

Condition of Market for Car Seatings

Demand Better for Repairs, but New Work Is Dull—Supply of Rattan Is Better

The activity in the car seat market is not pronounced. The small number of new city and interurban cars where plush or imitation leather might be used has kept that end of the market dull. The one-man type of car which is coming quite generally into vogue now employs any one of a variety of seat coverings and materials, so that with only a rather light car market anyway, the business created for each kind of material is light. There has been found a better market in repairs, but this in itself is indeed light enough.

The use of waterproofed veneers for car seats has been reported to be in slightly better demand. It was found necessary during the influenza epidemic to leave windows open, and during inclement weather some veneer seats became wet and warped. Slats are rather giving way to veneers on account of their excess weight.

The supply of rattan is coming through from the Orient now in better shape than during the war. No reduction in cost is anticipated so long as freight rates continue high and the Oriental laborers receive a higher wage. There has also been reported a shortage in cargo ships.

Steel Poles Find Good Foreign Demand

Exports of Expanded Type Have Grown in Spite of War—Domestic Business Continues Good

According to A. J. Bates, president Bates Expanded Steel Truss Company, export of the company's steel poles for electric railway service has grown during the last four years in spite of the handicaps set up by the war.

Among the first foreign customers was the Swedish State Railways, which bought these poles for the famous Kiruna-Riksgränsen line—the only electrification within the Arctic Circle! The results on that line have been so satisfactory that the Norwegian State Railways has made the same pole standard for the forthcoming 45-mile electrification between Christiania and Drämmen. From Italy, the demand became so insistent that an Italian company, Società Anonima Italiana Expansione Ferro Bates, has been organized, with headquarters at 2 Salita del Carmine, Genoa. The machinery for this company has already been shipped. Negotiations are now under way for the formation of a British company.

Still more remarkable are the wartime shipments to such remote spots as Johannesburg, South Africa, and Bombay, India. Through Charles T. Stork & Company, New York, an order came for electrification material for Soerabaya, Java, while Colin S. Douglass of Sydney, New South Wales, has secured orders from properties like Perth, West Australia; Adelaide, South Australia; Sydney, New South Wales, and Hobart, Tasmania. A good domestic business also has been done.

More Manufacturing in Pacific Coast Shops

Jobbers Carry Smaller Stocks in Far West, but Manufacturers Are Increasing Supplies

Electric railways of the Pacific Coast during the war learned to use their own shops for manufacturing far more extensively than ever before. Not only high prices, but delays in deliveries or even the difficulty of getting orders filled at all, made it necessary to turn the repair shop into a factory whereever possible. This was in keeping, too, with the policy that a higher degree of efficiency must prevail in maintenance work. The junk pile on hand was resorted to and nothing was added to it which could, by repair and reconstruction, be made to serve a purpose somewhere.

Trolley poles worth $2.60 in 1915 cost $4.25 last November and $4 now. In face of the difficulty in getting funds for any purchases whatever, trolley poles that would formerly have been scrapped as damaged beyond repair are now carefully rebuilt. Not only does this avoid the higher price but it keeps the cost in the shop account which ordinarily can be defended more readily than can the purchase of new equipment. Four-inch trolley wheels that sold for 68 cents in 1915 were worth $1.40 last November and sell for $1.35 now.

Fearing a drop in prices some jobbers and manufacturers' agents are carrying light stocks. Where the normal stock used to be twenty-five track jacks, for example, ten are now carried. On most lines (excepting supplies) the manufacturer has given the agent a price change protection up to July 1. In some lines, say about 25 per cent, this protection extends to next January. Manufacturers, on the other hand, are generally carrying heavier stocks than before the war with the idea of giving better service and while there is practically no movement at the present time there is an optimistic feeling that the electric railways are here to stay, that profitable freight business is in sight for the interurbans and that conditions must improve.

The probability of price reductions is considered unlikely until labor costs and taxes decrease. There has been some slight drop in prices but in the main they are steady and not considered likely to decrease. Changes in the value of copper alone have not and cannot materially affect this condition.

Rolling Stock

Berkshire Street Railway, Pittsfield, Mass., it is announced, has sold ten large open-type cars, which are being shipped to Knoxville, Tenn.

Kansas City (Mo.) Railways, it is reported, has placed in service on the Westport line ten safety cars. This completes the twenty-five safety cars, the equipment of which was given in these columns on April 5. An order was recently placed with the American Car Company for five more.

Track and Roadway

Kansas City (Kan.) Railways—New car line extensions in Kansas City, Kan., are being contemplated by the Kansas City Railways. It is planned to extend the Eighteenth Street line from Central Avenue south to Kansas Avenue. A new line will be built on Seventh Street from Central Avenue, south to connect with the Seventh Street viaduct, and in this event the Wyandotte line on Fifth Street from Riverview south to the Seventh Street viaduct probably would be abolished. The plans also contemplate the changing of the Sixth Street tracks from the private right-of-way at Riverview, to Sixth Street proper between Central Avenue, north to Riverview Avenue, where the present north and south line now connects with Sixth Street.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Board

NEW YORK METAL MARKET PRICES

	May 15	June 5
Copper, ingots, cents per lb	16.00	16 62½
Copper wire base, cents per lb	17.25 to 18 00	18 25 to 18 75
Lead, cents per lb	5 00	5 25
Nickel, cents per lb	40.00	40.00
Spelter, cents per lb	6 40	6.47½
Tin, cents per lb	†72.50	†72.50
Aluminum, 98 to 99 per cent, cents per lb	31.00 to 33.00	32 00 to 33.00

† Government price in 25-ton lots or more f.o.b. plant.

OLD METAL PRICES—NEW YORK

	May 15	June 5
Heavy copper, cents per lb	13 50 to 14 00	14 50 to 14 75
Light copper, cents per lb	11 00 to 11.25	11 75 to 12 50
Heavy brass, cents per lb	7 50 to 8 00	8 00 to 8.50
Zinc, cents per lb	5 00 to 5 25	5 00 to 5 50
Yellow brass, cents per lb	6 50 to 7 00	7 25 to 7 75
Lead, heavy, cents per lb	4 25 to 4 37½	4 50 to 4.60
Steel car axles, Chicago, per net ton	$23 00 to $24 00	$23 00 to $24 00
Old carwheels, Chicago, per gross ton	$21 00 to $22 00	$21 00 to $22 00
Steel rails (scrap), Chicago, per gross ton	$16 50 to $17 00	$16 50 to $17.00
Steel rails (relaying), Chicago, gross ton	$16 50 to $17 00	$16 50 to $17.00
Machine shop turnings, Chicago, net ton	$6 00 to $6 50	$6 00 to $6 50

ELECTRIC RAILWAY MATERIAL PRICES

	May 15	June 5
Rubber-covered wire base, New York, cents per lb	20	21
Weatherproof wire (100 lb. lots), cents per lb., New York	23.00 to 23.25	23.25 to 24.00
Weatherproof wire (100 lb. lots), cents per lb., Chicago	23.75 to 37.35	24 50 to 24 75
T rails (A. S. C. E. standard), per gross ton	$49.00 to $51 00	49.00 to 51.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	$47.00 to $49 00	47.00 to 49.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$45.00 to $47.00	45.00 to 47.00
T rail, high (Shanghai), cents per lb	3	3
Rails, girder (grooved), cents per lb	3 75	3.75
Wire nails, Pittsburgh, cents per lb	3.25	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3 35	3.35
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	2.75	2 75
Tie plates (brace type), cents per lb	2.75	2 75
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb	3	3
Angle plates, cents per lb	3.90	3.90
Angle bars, cents per lb	3.90	3.90
Rail bolts and nuts, Pittsburgh base, cents per lb	4 35	4.35
Steel bars, Pittsburgh, cents per lb	2 35	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4 20	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.25	5.25
Galvanized barbed wire, Pittsburgh, cents per lb	4.10	4.10

	May 15	June 5
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.70	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount †	80%	80%
Car window glass (single strength, first three brackets, B quality), New York, discount	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount	81%	81%
Waste, wool (according to grade), cents per lb	14 to 17	14 to 17
Waste, cotton (100 lb. bale), cents per lb.	8 to 12½	8 to 12½
Asphalt, hot (150 tons minimum), per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	....	....
Asphalt filler, per ton	$30.00	$30.00
Cement (carload lots), New York, per bbl	$2.90	$2.90
Cement (carload lots), Chicago, per bbl.	$3.05	$3.05
Cement (carload lots), Seattle, per bbl.	$3.13	$3.13
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.59	$1.66
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.61	$1.68
White lead (100 lb. keg), New York, cents per lb	13	13
Turpentine (bbl. lots), New York, cents per gal	78	94

† These prices are f. o. b. works, with boxing charges extra.

of Public Utility Commissioners of New Jersey has modified its recent demand that the Trenton & Mercer County Traction Corporation make immediate temporary repairs to the road at a cost of $3,300 and agrees to President Rankin Johnson's plan to more permanently improve the system at a cost of $55,000, if allowed a period of two years to make the changes. The board orders certain necessary repairs to the trackage be made at once and that these repairs be maintained in good condition by the use of a track welder.

Interborough Rapid Transit Company, New York, N. Y.—The work of constructing the elevated portion of the Pelham Bay Park branch of the Lexington Avenue subway from Whitlock Avenue to Pelham Bay Park has been started, following the execution of a contract between the City of New York as represented by the Public Service Commission for the First District and Terry & Tench Company, Inc., whose bid price for the work was $586,700. The column foundations upon which the elevated structure will be constructed are already completed, so that the erection of the steel may progress at once. It is hoped to have practically all of the elevated construction completed by the end of the year, and a large part in service.

Cincinnati (Ohio) Traction Company—In a recent letter to Street Railway Director W. C. Culkins, Walter Draper, president of the Cincinnati Traction Company, states that most important changes in engineering structures along the routes of the system, involving the reconstruction of the Ida Street bridge and the bridge over the Canal at Ludlow Avenue and the reconstruction of various inclined planes, with the possibility of the abandonment of the Bellevue plane, will be made necessary by the substitution of new double-truck cars for single-truck cars on a number of lines.

Power Houses, Shops and Buildings

Southwestern Gas & Electric Company, Texarkana, Ark.—The Southwestern Gas & Electric Company will construct a repair shop, blacksmith shop, carpenter shop, paint shop, machine shop, woodworking shops, storage room and carhouse, all of fireproof construction. The cost will be about $60,000.

Pacific Gas & Electric Company, San Francisco, Cal.—Plans are being made by the Pacific Gas & Electric Company for the early resumption of work in connection with the establishment of a hydro-electric power plant in the Big Bend of the Pit River with extensive power development in this district. The project is estimated to cost about $12,000,000.

Chicago, Milwaukee & St. Paul Railroad, Chicago, Ill.—The 100,000-volt transmission line built by the Inter-mountain Power Company from the Washington water power plant at Long Lake, Wash., to Taunton, the first station west of Othello, Wash., was recently completed at a cost of $550,000. It is one link of the line to supply power for electrification of the Chicago, Milwaukee & St. Paul Railroad from Othello west to the Coast. The Chicago, Milwaukee & St. Paul Railway is building the transmission line from Taunton to Tacoma. Only a 17-mile gap between Beverly and Ellensburg remains. The line will be completed by the middle of next month. Electrification of one division of the railway, from Tacoma to Cle Elum, is expected to be completed between July 1 and 10. Between Cle Elum and Othello the work is partly done and will be finished in several months. Two divisions, between Avery, Idaho and Othello, are to be electrified later.

New Orleans Railway & Light Company, New Orleans, La.—For the purpose of facilitating current repairs and running maintenance, the New Orleans Railway & Light Company is installing additional machinery at a cost of $8,000 in the Magazine Street shop. The equipment consists of a new and larger acetylene welder, a large lathe and a radial drill.

Trade Notes

Railway Audit & Inspection Company, Philadelphia, Pa., has opened a Boston office in Rooms 546-547 Little Building. H. G. Hathaway is in charge.

The Lincoln Bonding Company, Cleveland, Ohio, has opened a Chicago office at 504 Fisher Building. This new branch is under the supervision of W. C. Burdick, sales manager.

Inquiry No. 29434.—A man in Portugal requires machinery, rails and electrical materials for railways. He also desires an agency. Terms, letter of credit in New York. Correspondence may be in English.

Inquiry No. 29,436.—A merchant in Italy desires to secure an agency from manufacturers for the sale of materials and supplies for electric railways. Terms, cash. Apply, using number, to Bureau of Foreign and Domestic Commerce, Washington, D. C.

Poole Engineering & Machine Company, Baltimore, has moved its general sales office from that city to 50 Church Street, New York. W. C. Tyler, formerly district manager at New York, has been appointed general sales manager in charge of all the selling activities of the company.

George Shields, for ten years purchasing agent of the American Car Company, of St. Louis, and later with the National Safety Car & Equipment Company since its organization, has become associated with the Dayton Manufacturing Company as sales representative, with headquarters at Dayton, Ohio.

Roller-Smith Company, New York, has appointed A. H. Savage its representative at St. Paul, Minn. Prior to 1914 Mr. Savage represented the Fort Wayne Electric Works in St. Paul and in 1914 he became a representative of the Wagner Electric Manufacturing Company of St. Louis, he now being in charge of the St. Paul office of that concern. He is also treasurer of the Dakota Light & Power Company of Flandreau, S. D., and president of the South Dakota Power Association.

Cafeteria for Kuhlman Employees.—The G. C. Kuhlman Company has opened at its Cleveland works an extensive cafeteria for its employees. The excellence of the appointments of this cafeteria in every particular were appreciated by a party of about 140, made up of electric railway and supply men, who visited the shops on March 23 as guests of D. B. Dean of the Kuhlman Company. A short account of the dinner was published in the issue of May 31, but the place of the dinner was incorrectly given in that issue as the Hollenden Hotel.

American Steam Conveyor Corporation, Chicago, announces the appointment of Charles H. Florandin, formerly of the National Electric & Welding Company, New York, as general manager of its Eastern territory with headquarters at 110 West Fortieth street, New York City. Mr. Florandin, who assumes charge of his new duties May 1, was born in France and received his technical education at the Lycée de Marseilles. He is an engineer by profession and upon coming to the United States did important work with the Brooklyn City Railway Company in the early days when the road was being electrified. After five years' service with this company he joined the C & C Electric Company, New York, where he held a responsible position with them for many years. After a brief connection with the Western Electric Company, he returned to the C & C Electric Company and later organized the National Electric & Welding Company. During the war Mr. Florandin was a member of the welding committee of the Emergency Fleet Corporation.

New Advertising Literature

Chicago Mica Company, Valparaiso, Ind.: Catalog No. 26 deals with "Micabond," electrical insulating material.

Unit Railway Car Company, Boston, Mass.: Bulletin describing new "unit" passenger and baggage car driven by steam engine mounted on the truck. The boiler is oil-fired and mounted in the front part of the car.

Curtain Supply Company, Chicago, Ill.: Revising its catalog and printed matter for reissuing in the form of bulletins illustrating and describing its various devices. The first of these is bulletin R-2 on the "Rex All-Metal Roller."

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, June 14, 1919 *Number* 24

These Are the Three Ways Out

IN THE admirable informal remarks made by E. A. Maher, Jr., the incoming president, at the Lake George meeting of the New York Electric Railway Association last Saturday, the speaker made the point that the railways are confronted with the two-fold and urgent necessity, on the one hand, of introducing every possible operating economy and, on the other, of securing more income. He did not have time to elaborate his thought, but in the minds of his hearers undoubtedly the second of these alternatives automatically subdivided itself into two parts, namely, securing a higher fare per average passenger and increasing the number of passengers, particularly those of the most profitable varieties. There may then be said to be three ways out of the present difficulty, and while every effort is being made to increase (in a positive direction) the margin between income and outgo per passenger, the expanding of the business needs attention also. And not only are more passengers to be secured but as many of them as possible are to be persuaded to ride at other times than during the rush hours. The fact is that if the business can be properly expanded it will be considerably easier to maintain the much-desired margin already referred to.

Electricity As a Rival of Steam on Railroads

LESS than usual has been heard lately regarding electrification of steam railroads because war work has absorbed attention. Electrification is too much of a long-time process to have been favorably affected during those months of quick results. Now that times of comparative peace have arrived, and attention is being directed as never before in the line of conservation, this topic is bound to come in for renewed consideration.

Electrification offers a wonderful opportunity for saving in capital expenditure, particularly in those cases where expanding business demands new facilities which by other means would be inordinately expensive to provide. This was the prime consideration with the Norfolk & Western Railway and the Pennsylvania Railroad (Philadelphia terminal), and an important one in other instances. In the case first mentioned the higher, sustained speeds of electrically-hauled trains on heavy grades offered an irresistible opportunity to expedite traffic. In the second case cited the situation was different, the flexibility of make-up and movement of multiple-unit suburban trains being the deciding factor. To some advocates of judicious electrification the conservation of capital appears to be the predominating element.

Possibily the matter of anticipated fuel economy has been urged more forcibly than other arguments by the proponents of electricity as a source of railroad motive power. The fact that it offers the only possible connecting link between the waterfall and the locomotive gives it an unique position, analogous to that of alternating current in the general power distribution field. It is possibly more difficult to "prove out" the economy of electric operation on this basis, but it is certainly sound over-all conservation to use to the limit a form of motive power that cuts down materially the rate at which the supplies of coal and fuel oil are being depleted. The general public ought if necessary to be willing to help in financing a proposition that will accomplish this result.

Nothing has been said here as to the electrification of tunnels and city terminals, where considerations other than capital or operating economies have ruled. Here the expenditure must be justified on grounds of necessity, and there is nothing left for argument once the controlling premises have been laid down.

Electric Locomotives Must Be Handled as Such

AMONG the articles in this issue which bear on the subject of heavy electric traction, one that contains a direct message to the men responsible anywhere for the operation and maintenance of electric locomotives is that by A. H. Babcock, consulting engineer Southern Pacific Railroad. The message should be taken to heart by the interurban railway man who has freight locomotives under his care, as well as by his brother in the steam railroad field. The message is that in view of the characteristics of electric motors they cannot be handled in the same nonchalant fashion as is possible with steam engines. The very property which lies behind the virtues of the electric locomotive renders it subject to possibility of abuse, inadvertent possibly, but nevertheless injurious.

When the steam pressure from a locomotive boiler is given free access to the engine piston it can produce a definite force and no more. And this force can do no harm to the machine as a whole. If the load is too heavy the engine "stalls," that's all. But there is nothing to limit the current that can be drawn by an electric locomotive except the power plant and line capacity, the setting of the circuit breakers or the breakdown point of the motor insulation. Years ago W. S. Murray pointed out the proneness of engine operators, transferred from steam to electric locomotives, to overload the latter. If this is done the result is excessive maintenance cost and all-around and undeserved condemnation. At the same time it is not desirable to give the protective devices too low a setting because it may be necessary at any time to impose upon the motors for a short time overload. The operator must not permit the "willing horse" to pull too hard.

Taking Out a New Lease On Industrial Life

THERE seem to be three classes of people in the electrical railway business at present, as disclosed by the strenuous period through which it is now going. One sees a big future of usefulness and reasonable profitableness ahead, after some difficult but soluble problems have been mastered. Another wishes to salvage the present investment and get into some line of activity where good work is better appreciated. The third doesn't care a rap what happens. The industry and the public are to be congratulated that the first class is large and that there are hosts of able men who will fight to the last ditch to safeguard the business. The men in the second class will stand by if they see a reasonable chance of victory. Good riddance to the others if they quit! What is needed now is a freshening of hope and faith in the integrity and stability of the business, with a renewal of the vigor and vim of the early nineties.

Standardization Must Take a Logical Course

RAILWAY officials who are buying equipment to-day consider that the motor of two years ago is quite obsolete and insist on having the latest design for their new equipment. Probably these motors of to-day will be superseded in their turn by others as the art advances, although it is reasonable to expect that changes will be less frequent and radical as time lapses. The railway motor has been mentioned simply as an example and is but one of the various parts which comprise the car equipment. In developing a satisfactory design the manufacturer produces the best that he can at the time that it is manufactured. This equipment is placed in service, and perhaps some of the detail parts do not work out in an entirely satisfactory manner. In the next design the engineer will try to overcome these troubles and objections, and although the changes at first may be considered as very insignificant, they often lead to far-reaching changes in design.

As an example let us consider the changes which have been made in the contour of the teeth in the gears of some of our late-type railway motors. A few years ago manufacturers would have been willing to say that they could standardize on a tooth of a particular shape. One of our foremost motor designers stated that by the change in the shape of the teeth used he had been able to eliminate one tooth from the pinion of a railway motor. But in doing this he changed the gear ratio and required a corresponding change in the speed characteristics of the motor. This speed adjustment actually produced a far-reaching economy which would never have been expected as a result of a small change in the shape of the teeth in the gears.

If a standard is adopted for any detail of the equipment the manufacturer will endeavor to build the other parts of the construction around this standard. In doing so, is it not possible that some standard may be adhered to when a small change might produce results beyond those intended and lead to unexpected progress? The interest of the manufacturer and the purchaser is a mutual one in regard to using standard parts. The manufacturer desires to minimize the number of special dies and tools required, and by using parts of the same dimensions, or parts exactly alike, in the various types of construction, great economy in their manufacture results. Operating officials are equally interested in keeping down the number of repair parts which it is necessary to carry in stock to maintain their equipment. The stocks of these soon reach enormous proportions and in comparing some parts which vary only in a few slight dimensions the official sometimes concludes that proper foresight has not been used in their design, or that proper co-operation among the manufacturers has been lacking. On a large scale operating engineers will admit that it is not practical to expect standardization. A universal motor that can be built by all manufacturers would soon be obsolete. Automobile manufacturers bring out a new model every year. A universal motor that changes every year would be of no benefit as far as reducing the number of spare parts necessary to maintain it is concerned. Each new customer brings new ideas in construction and new problems in operation and maintenance to be overcome. Equipment designs advance by using the best of these ideas and by solving the problems for the industry. Interchangeable armatures, field coils, brush-holders and bearings in a modern railway motor would discourage advancement, but no doubt many small parts which have been used for years and continue to be used, could be standardized so as to help improve conditions. We hope something can be done along this line.

The Low-Cost Producer Merits His Reward

THE grant of a 2-cent transfer charge to the car lines in Washington, D. C., while apparently made merely as an expedient to give the particular amount of additional revenue deemed to be necessary, will in all probability bring results of great interest to electric railways in general.

That the cost of transporting a passenger for two-line riding is greater than that for single-line riding has been widely recognized, and it has been admitted that the imposition of a transfer charge is theoretically justifiable. But in particular cases questions of practicability have often been raised. Transfer riding is to a large degree convenience riding; will it not therefore be seriously reduced by an added charge? The transfer passenger who is required to pay extra for a ride of a few blocks around the corner is not likely to view with equanimity a long free ride for others on the main line past the transfer point; will there not therefore be an incessant clamor for through routing?

These troublesome matters, together with the fact that the financial needs of electric railways have generally been such as to demand greater aid than that obtainable even theoretically from a transfer charge, have caused the trials of this device to be very limited. Consequently the results, upon traffic, routings and revenues, of the addition of a 2-cent transfer charge in Washington to a flat 5-cent fare, are likely to be instructive, even if the suitability of a transfer charge as the main means of revenue assistance in most cases must be doubted.

The novelty of the Washington decision, however, lies not so much in the transfer charge itself as in the grant of such aid both to the needy Washington Railway & Electric Company and to the inferentially non-needy Capital Traction Company and Washington-Virginia Railway. The commission finds justification for this unusual proceeding in the fact that owing to competition a transfer charge for merely the Washington Railway & Electric Company would result in a diversion to the other companies of sufficient traffic to offset the gain in revenue from the transfer charge.

Regardless of this matter of traffic, the award of the transfer charge to the more prosperous companies has economic justification. The cost of production—the price determinant—is in the case of the Washington Railway & Electric Company not that of the least efficient high-cost *entrepreneur* but that of a representative average-cost producer. It is economically just that this average cost should fix the normal price of the railway ride in Washington. To be sure, the other companies—the low-cost producers—will reap the gain of ability and fortune, but until such time as the public does everything in its power to effect a unification of all lines upon a consolidated cost basis the low-cost lines are fully entitled to their reward.

Where Hope for the Railways Lies

WE BELIEVE that the most encouraging event of the last few years in electric railway affairs has been the appointment of two impartial commissions to investigate the existing electric railway problem, the one to represent the United States Chamber of Commerce and the other the United States Government. It has not been difficult for those who are actually engaged in electric railway operation to have foreseen for a long time that a crisis was coming in the affairs of these properties. For many years the margin has been growing smaller between income and outgo, but although electric railway operators realized this fact, they had difficulty in making anyone else understand it. The depreciation of the dollar during the past two or three years has of course accentuated these conditions tremendously, so that not only has all new construction now stopped but the whole industry has been projected into the condition with which our readers are unfortunately too familiar.

A solution of the matter is now to be sought by interests which are outside of the railway industry proper but, at the same time, are vitally interested in the maintenance of railway credit and service. The two commissions are admirably fitted for their tasks, the Chamber of Commerce body being able to enlist the interest in the investigation of chambers of commerce throughout the country while the federal body represents federal, state and municipal governments, the investors, the operators, and labor. On these two commissions will devolve the task not only of investigating the condition but suggesting a remedy. It would be useless now to speculate on what the best solution is to be. That is the question to be decided by the two committees. We may express the hope, however, that the study will be carried forward with dispatch. The high standing of the members and the sacrifice which all are making to participate in this hearing indicates an appreciation by them of the seriousness of the situation.

Electric railway companies will be derelict to their trust if they do not assist the two commissions in every way which is open to them. Presumably, some data will be required after both investigations get well under way, and possibly some personal testimony on the condition of the industry. Both of these the industry and all connected with it should cheerfully furnish. This, at least, is one way in which the railways can assist and it is essential.

Help the Schedule Maker to Save Car-Hours and Car-Miles

"MOTIONLESS cars cannot increase a company's income." In this statement may be summarized several of the strong points made in a recent address before the Public Service Railway company section by Alexander Jackson, which was abstracted in our issue of May 31. Another fundamental truth is "the timetables of an electric railway property are the cornerstone upon which the financial structure is built."

Some years ago, before the unions were insisting on easier working conditions, the minimum day's pay was hardly known and schedules were arranged so that tripper cars could be placed where needed without adding seriously to platform expenses. This, of course, was an advantage to the riding public. Later, as the unions had their way, many companies were compelled to pay for six, seven or eight hours' work whenever a trainman was assigned to a run, and the result was a penalty on tripper service. Moreover, contracts with unions on certain properties called for payment of bonus time at the beginning of a day's work, at the end of a day's work, for dinner reliefs, etc. All of which meant other additions to car-hours which had to be paid for by the companies.

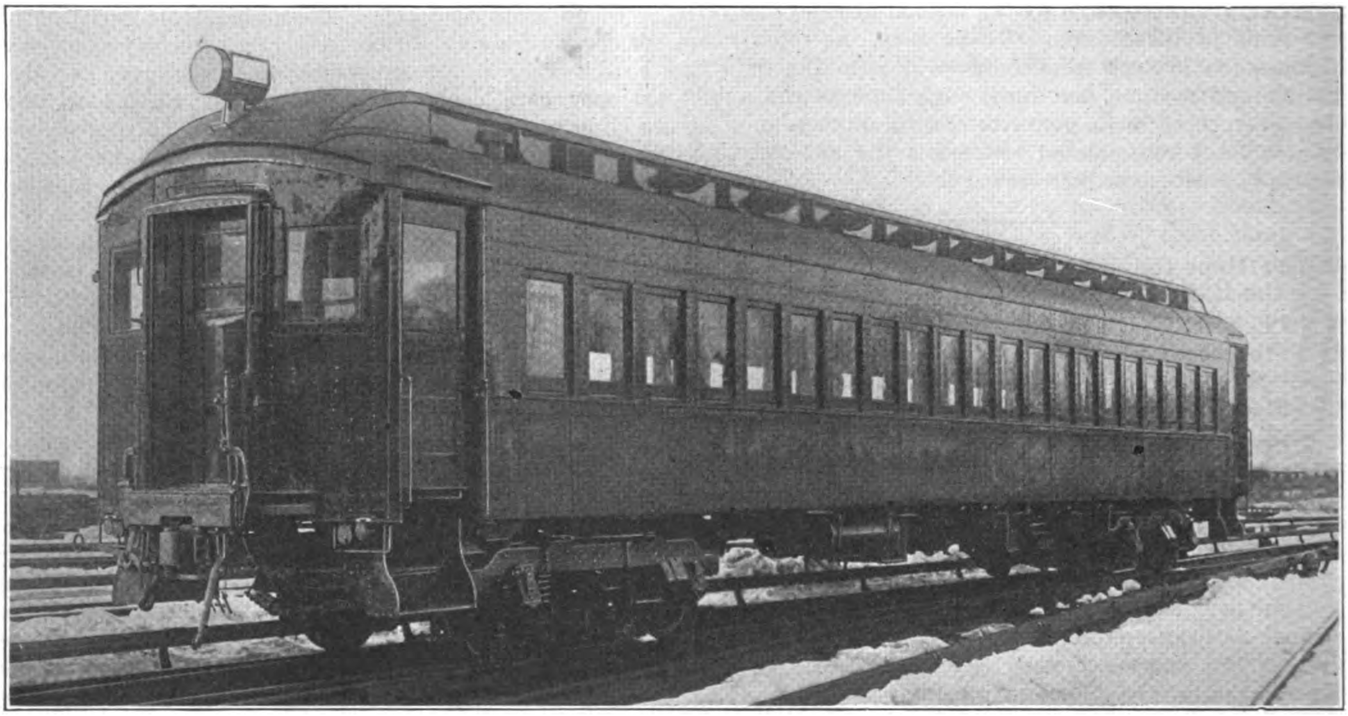
Mr. Jackson shows that $150,000 would be added annually to platform wages on the Public Service property if only two minutes were allowed as additional layover time on the 14,274 trips operated daily by that company. A person who is not familiar with schedule making or with operating details would be likely to overlook the serious effect of such a change in schedules. Hence the necessity for giving serious heed to the advice which Mr. Jackson offers to division superintendents and other officials upon whose recommendations timetable changes usually are made.

In city service where delays are frequent it would be impracticable, of course, to build schedules on the exact uninterrupted running time between terminals. There must be allowance in the schedule for "slack" to permit the cars to leave on time even if an ordinary blockade takes place. The amount of this "slack," however, can only be determined by an efficient schedule maker, and if the best results are to be secured the men who are intrusted with such work must have the support of the management against the protests of road officers who may be incapable of weighing the company's interests against the demands of some dissatisfied trainmen.

Every competent operator knows that it is just as easy to give too much service as too little, and he is aware also of the dangers in either extreme. Schedules, of course, should be based on preliminary surveys of traffic requirements. They should be supported by adequate supervision of service with a view to preventing bunching of cars. Frequently it will be found that there are enough cars on the various lines if they are properly distributed. Division superintendents and supervisors can perform a very useful duty in reporting inadequacy of service or too liberal layover time at terminals, and the operating executive should never let them lose sight of the fact that each car must earn its proportion of revenue and that it cannot do this unless it holds its place on a well-considered schedule. A car on the street (when traffic awaits it) is worth a dozen in the depot or at lay-over points. "A rolling stone gathers no moss" was not written of the electric car.

New York Central's Latest Motor Cars

For Suburban Service on Its Electrified Zone the New York Central Railroad Has Just Placed in Operation a Number of 59-Ft. Multiple-Unit Passenger Cars That Differ From the Company's Previous Equipments in Many Respects, Both in Structural Details and Electrical Equipment



COMPLETELY EQUIPPED CAR READY FOR SERVICE

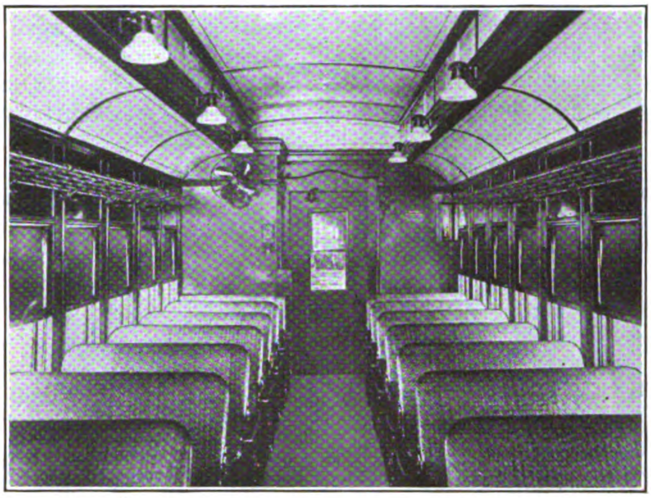
AS A REPRESENTATION of fifteen years' experience with a uniformly successful steam railroad electrification, the New York Central's latest motor cars, just placed in service, attain no ordinary degree of importance. The design, which has been worked out by the engineers of the New York Central Railroad, follows steam railroad standards in so far as the electrical equipment will permit. This is to be expected in view of the fact that the cars are operated on one of the most important of American suburban electrifications, the construction having been based upon the possibility of operation with standard steel passenger coaches as trailers as well as that of operation in trains behind steam locomotives in case of movements beyond the limits of the electric zone. To that end the cross-section dimensions and the external appearance practically coincide with the road's rolling equipment for trunk-line service.

For the new car's trucks, however, there exist the material differences necessitated by the introduction of the electric equipment, and the four-wheeled design, instead of six-wheeled arrangement that is used for the locomotive-drawn coaches has involved particularly heavy construction to conform with the general plan, axles of $8\frac{5}{16}$ in. diameter being used on the motor truck together with $6\frac{1}{4}$ in. x 11 in. journals. In addition, the need for provision for making up trains on the curved yard tracks, due to the space restrictions at the New York terminal, has required a radial draft gear whereby the coupler shank is moved by spring connections to the truck end frame in accordance with the radial movements of the truck on the curved track. A coupler with an extended guard arm has also been provided. The minimum radius of curve around which the cars are required to operate normally is 135 ft., equivalent to a 42-deg. curve.

In the suburban service for which the cars were designed, a maximum speed limit of 55 m.p.h. has been established. This moderate figure, however, gives rather a wrong impression of the severity of the service, which calls for twenty-three stops in 34 miles on the line along the Hudson River to Croton, and for nineteen stops in 22 miles on the line to White Plains, the schedule speeds for local trains on these runs approximating respectively 27 m.p.h. and 24 m.p.h. For local express trains on these two lines the schedule calls for 29 m.p.h. and 30 m.p.h., with 10 and 9 stops respectively. As the weight of the complete car approximates 65 tons empty, or, say, 71 tons with a full passenger load, the work required of the two 190 hp. motors with which each car is equipped may be seen to be by no means light.

STRUCTURAL DETAILS

As may be expected from the foregoing outline of the service, involving the possibility of mixed steam and electric operation, the new cars are notable for their ruggedness of construction. The bodies are built up on the truss-side principle, with the stresses due to the span of 44 ft., 10 in. between center plates carried by



INTERIOR VIEW OF FINISHED CAR, SALOON END

the entire side of the car. The side posts are relatively wide in comparison with the height of windows and their spacing, and rigidity sufficient for the posts to do their share in transmitting longitudinal shearing stresses between the roof and floor of the car is provided for by a wide letterboard and channel at the eaves and a $\frac{1}{8}$-in. sheathing below the windows. Buffing and pulling stresses are largely taken up through an underframe which includes two 8-in., 21.5-lb. channel center sills as well as the side sills which are 4-in. x 3½-in. angles reinforced with Z-bars approximately 9-in. height, 6 in. total flange width and $\frac{1}{4}$-in. thickness.

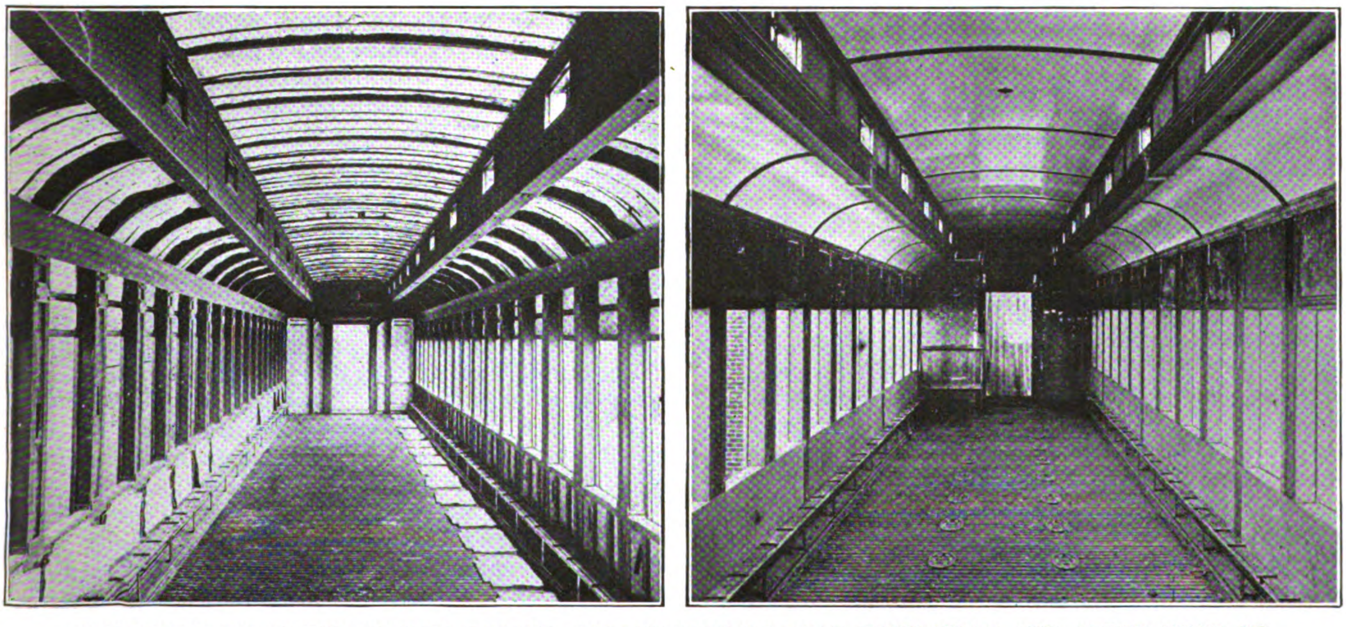
At the bolsters the side and center sills are tied together by a huge steel casting that combines the functions of the body bolster, end sills, and platform sills and also of that part of the center sills ordinarily extending out beyond the body bolster. Support for this casting is provided by framing into it the center sills and the bottom members of the truss that is made up from the construction of the car side; and so long as this heavy casting remains straight it is, therefore, impossible for the platform to sag. At the same time buffing strength is provided by the rigid tying together of all longitudinal members at the bolster.

The floor, which is supported on the usual system of cross-bearers and stringers, is made up of composition resting on $\frac{3}{8}$-in. galvanized steel flooring of No. 22 gage. The total thickness is 1$\frac{1}{8}$ in. Over the platforms there extends a $\frac{3}{8}$-in. floor plate, and this is surfaced with an anti-slip tread. The false flooring to deaden noise and support the hair-felt heat insulation is located 3$\frac{5}{8}$ in. below the main floor between body bolsters and at the car ends, and outward from the body bolsters similar provision is made by riveting $\frac{1}{16}$-in. sheet steel to the under side of the bolster and platform casting. The superstructure, as previously mentioned, begins with a $\frac{1}{8}$-in. side sheathing attached to side posts that are made up from $\frac{5}{32}$-in. channel-shape pressings 4$\frac{3}{16}$ in. wide and 2$\frac{1}{8}$ in. deep, two of these pressings being set up face to face 7½ in. apart and joined with $\frac{1}{8}$-in. plate to form each post. At the top of the posts is a 4-in., 5.25-lb. channel which serves as the side plate, and to this is riveted a $\frac{3}{32}$-in. letterboard 11¾ in. wide. The belt rail is located outside of the side sheathing and is 4½ in. wide by $\frac{3}{8}$ in. thick. Inside the wall, 10 in. from the top of the finished floor, is a $\frac{3}{16}$-in. thick truss angle that extends out 3½ in. to support the wall ends of seats and the heaters, and below this is riveted the heater box of light steel pressed into channel shape.

At the ends of the car the bulkheads are built up on 6-in., 15.7-lb., Z-bar corner posts, and 6-in., 12¼ lb. I-beam end-door posts, with intermediate posts made of $\frac{3}{16}$-in. pressings 7$\frac{3}{16}$ in. deep. Along the vestibule eaves is a body end plate of 6-in., 8-lb. channel framed into the side plate with a pressed gusset, and it is reinforced with a horizontal $\frac{1}{4}$-in. plate 12 in. wide extending for the full length of the end-plate channel.

To take the impact of an over-riding platform in case of collision are vestibule end posts of 6-in., 12¼-lb. I-beams behind $\frac{3}{16}$-in. pressings, as well as vestibule corner posts that are built up with $\frac{1}{8}$-in. plate pressed into the form of a flattened ellipse, these serving on one side for the vestibule door jambs.

A monitor roof has been provided in accordance with

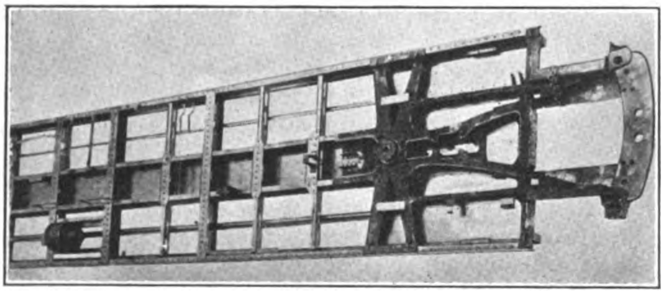


CONSTRUCTION VIEWS TAKEN DURING APPLICATION OF HEAT INSULATION AND AFTER THAT OF WAINSCOTING AND STEEL MOLDINGS the plan of making the new cars similar in appearance to the road's standard passenger coaches. Its supports are the customary pressed steel carlines spaced 2 ft. 8 in. center to center for the upper deck. The roof sheathing for the upper deck is No. 14 gage steel with joints welded, and for the lower deck, generally, of 1/16-in. steel. Copper gutters of No. 18 gage metal are provided over doors and motorman's windows, these being riveted and soldered to the roof sheets.

For the protection of the car interior against temperature differences existing outside there has been used insulation consisting of layers of hair felt stitched with layers of sheet asbestos between them. This insulation has been introduced both above the false flooring and behind the finishing material at the sides of the car, being cut to form, and set in place as shown in one of the accompanying construction views.

CAR BODY

In its general arrangement the car body follows standard practice, except, perhaps, in regard to size. This appears in the comparatively high seating capacity of eighty-two, which figure has been attained with an over-all length of 69 ft., 5 in. by the adoption of a 32-in. seat spacing, the seats being designed with relatively thin backs upholstered in rattan. The side post spacing agrees with the seat spacing. The car length of the car body is 59 ft. Because of the ample clearance prevailing on the trunk line of which the electrified zone is part, a width over side sheathing at the sills of 9 ft., 9 in. is permitted, and this in turn permits a seat width of 3 ft., 5½ in. and a 24-in. center aisle.



UNDERSIDE VIEW OF ONE-HALF OF UNDERFRAME

Freedom from combustible material has been emphasized in the interior construction. In fact, only window sills, sash, arm rests on seats, and toilet hopper seats and covers have been made of wood. In general, Cuban mahogany has been used for these details, and the scheme of interior decoration has been made to match the color in the lower portion of the car, while the headlinings are painted in pearl gray enamel.

For the interior finish steel and waterproof material have been used throughout, including integral window frames which extend from the window stooling to the plate molding. Wainscoating between window stooling and seat-rest angle is of 3/8-in. material in 9-ft. lengths, joints being made with steel battens. The headlining is 3/16 in. and ¼ in. thick and is fastened with steel ceiling battens and screws. All partitions are double and are fastened to the car framing with standard channel fasteners.

All doors, except that for switchboard cabinet, are of built-up steel construction, ranging from, 13/16 in. to 1¼ in. thick, with pressings that conform to the general finish of the car. At the vestibule ends the doors are designed to swing open and cover the control equipment in accordance with the very general practice. All doors, it may be said, are mounted to swing, not to slide. They close against pieces of solid rubber bound with metal, as well as 3/8-in. zinc and gray rubber weather strips at the top and sides of the door openings. Reinforcements of the doors for the application of door locks and hinges are welded to the door frames. Spring balanced trapdoors are provided for use at the Grand Central Terminal in New York, where the station platforms are at the level of the car platform. The upper sides of the trapdoors are covered with 3/16-in. inlaid rubber tiling laid on cement.

All windows are single and in one part. Cuban mahogany sash, 1 in. thick, have been used, and these are made tight with weather stripping all round the outside as well as on the inside at the top. Window sills and drop aprons are also of Cuban mahogany set in paraffin. American polished plate glass ¼ in. thick is used for all sash except for the saloon window, which has pressed prism plate glass.

An ingenious arrangement for the electric heaters provides for their location in a lined box along each side of the car between the floor and the previously-mentioned truss angle. As the heaters have been spaced with regard to the seat spacing, any defective unit may be easily removed without disturbing its seat, while the wide and substantial strip of metal above the heaters protects them from damage by passengers' feet. A perforated front plate provides for the escape of heated air.

Ventilation is provided for by twenty-one exhaust-type ventilators at the clerestory and a fresh air intake at each end of the car. A separate ventilator is used for the saloon.

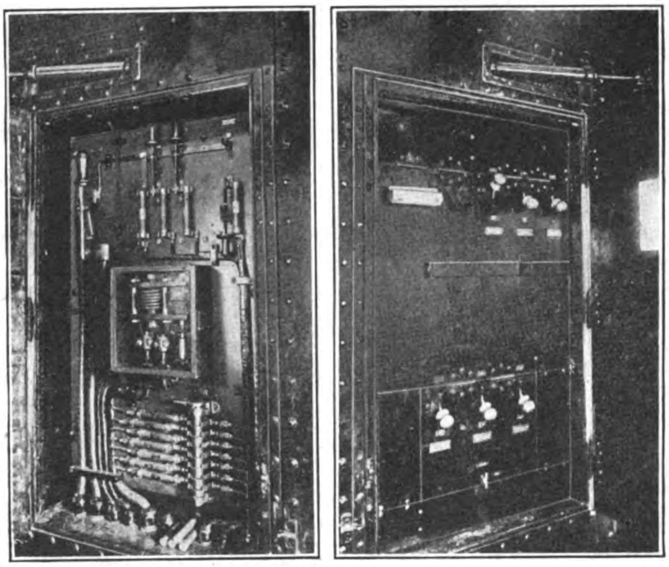
The system of artificial lighting follows the principle of direct illumination that has become practically standard on electric cars in recent years. The location of the lamps is at the bottom of each side of the clerestory, and the translucent shades have a base that flares outward at quite a wide angle. Along the center line of the ceiling are the usual emergency lights with clear globes.

The carbody complete, with all equipment and ready to mount on the trucks, weighs 83,700 lb.; the trucks weigh 45,300 lb., of which 29,400 constitutes the weight of the motor truck with its motors, and the total weight of the complete car ready for operation is 129,000 lb.

MOTORS AND CONTROL

Owing to the fact that the new cars are considerably larger than those originally placed in service on the New York Central electrified zone, the propulsion equipment is proportionately more powerful than that with which the original suburban equipment was provided. In consequence the new motors were specified to perform any service, on cars weighing 75 tons loaded, that is now being performed by the motors on the original 58-ton cars, and it has been required also that they shall operate satisfactorily on trains made up indiscriminately of the old and new types of cars.

The motor is provided with tapped field, commutating poles and self-ventilation. It operates normally at 600 volts direct current but is capable of successful operation at voltage up to 750. Space restrictions have had a marked influence on the design, owing to the use of clasp brakes and the desire to utilize standard electrical construction, and to this end the gear face has been reduced to 4½ in. in place of the 5-in. face that would ordinarily have been used. Above the rail 4¼-in. clearance has been provided, the wheels being 36 in. diameter. The details of construction follow standard practice generally, including provision for brush holders that will give 1 in. brush wear on a commutator 2 in. smaller than the original diameter and an arrangement of brushes that will prevent wearing of ridges on the commutator. A density of 60 amp. per square inch of brush section has been set, this being based on the average accelerating current. The gears are solid and of rolled steel, and the pinions are forged. The gear ratio is 2.83 with 18 pinion teeth and 51 gear teeth.

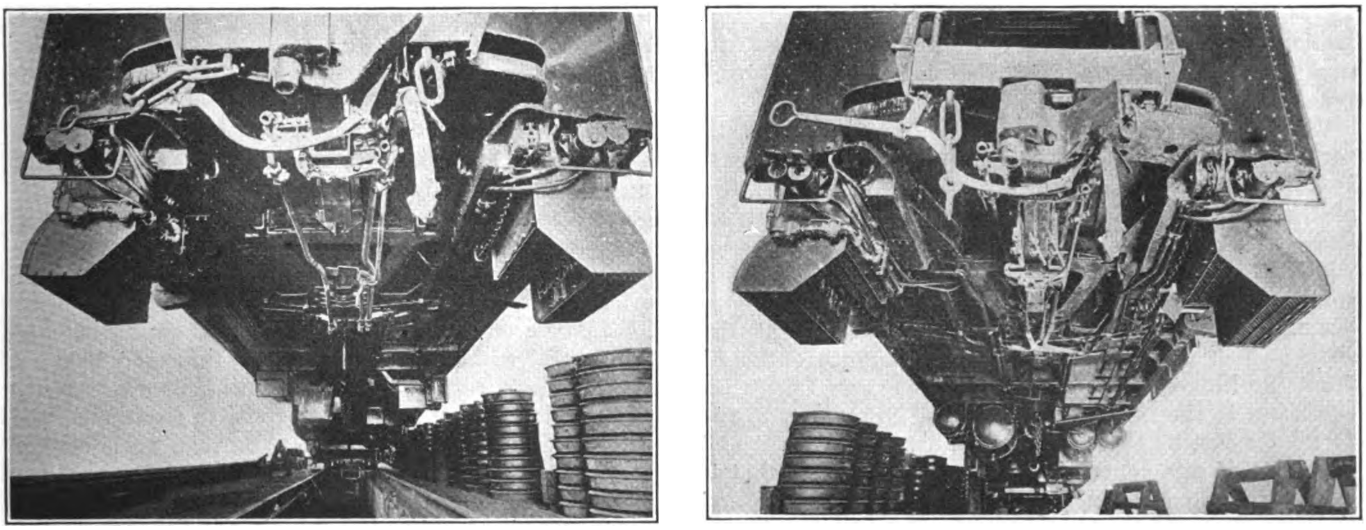

MOTORMAN'S AND TRAINMEN'S SWITCHBOARDS, THE FORMER PROVIDED WITH INTERLOCKED DOORS IN FRONT OF SWITCHES

Spring support for the motor nose has been adopted, the design providing for four compression springs to take the load due to the downward pressure from the motor weight and two compression springs (underneath the lug on which the former four springs rest) having long bolts that extend up through the yoke that holds the motor nose down. The safety lugs are novel in that they carry clips for the motor leads and are provided with holes to allow them to replace the customary bail, which has been eliminated because of interference with the leads. Another feature is the axle bearing lining, the metal being chamfered off to clear altogether the fillet at the collar while a large bearing surface against the collar in a vertical plane is provided to take the horizontal pressures set up under operating conditions.

When tested on the stand the actual one-hour rating of the motor is 190 hp. For acceleration a current averaging 250 amp. has been adopted. Under these conditions the motor gives a tractive effort of about 3500 lb. which in turn provides an acceleration of about 1 m.p.h.p.s. Electro-pneumatic control has been installed. These equipments, like other features of the new cars, have been so designed that they will operate in conjunction with the control system furnished on the original cars. An effort has been made to have a considerable number of the parts entering into the new design interchange with those of the old. In general principle the new control follows the arrangement of having all power circuits made and broken at a pneumatically rotated drum which is mounted beneath the car floor and which is governed in its movements by a master controller in the cab. No reversing handle is provided for the latter, movement of the train in the opposite direction being effected by movement of the main controller handle in the opposite direction from the off position. Under this arrangement only series connections are provided for the reverse, since backward movements are invariably made at low speed.

Acceleration may be accomplished either automatically or by hand, the former being under control of the current-limit relay on each car, and there are ten notches for forward running and six for reverse, these including, of course, the running positions made available by the field control as well as the customary intermediate running points.

Train wires are seven in number exclusive of the bus line, and two of these wires must be energized to close the motor circuit. For full operation with the earlier cars one train wire is arranged to connect with the circuit-breaker trip wire, and energizing this provides for shutting off current from the motors. Further safety provisions include the customary return of the


UNDERSIDE VIEWS OF TRAILER AND MOTOR TRUCK ENDS, SHOWING ARRANGEMENTS OF PNEUMATIC AND ELECTRIC AUXILIARIES GROUPED RESPECTIVELY AT THE TWO ENDS TO SIMPLIFY CONNECTIONS

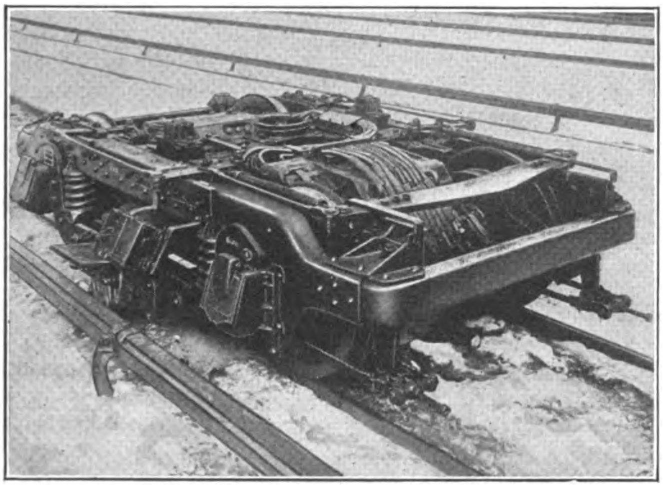
controller handle to off position when released by motorman, as well as interlocks to insure proper sequence of closing contactors.

TRUCKS

Both motors for each car are mounted on one of the trucks the other, or trailer, truck being designed with journal centers of 77 in. instead of 80 in., a maximum axle diameter of 7$\frac{3}{8}$ in. instead of 8$\frac{5}{16}$ in., and 5$\frac{1}{2}$ in. x 10-in. journals instead of the special size of 6$\frac{1}{4}$ in. x 11 in. required by the unusual weight on the motor truck. The wheel base of both trucks, however, is 8 ft., and both are fitted with clasp brakes. The theoretical center plate load for which each truck was designed was 61,000 lb.

Steel pressings have been used for the side frames and end frames and connections are generally made by riveting, but where bolts are used they are tapered $\frac{1}{16}$-in. in 12 in. in all cases. The transoms and bolster are steel castings, and renewable wearing plates have been provided for them as well as for the pedestal jaws. It may be mentioned also that all holes in castings for pins have been bushed to provide for easy repair following wear.

Braking pressures for the clasp brakes are designed to reach 100 per cent of the weight carried on the rail by the motor truck wheels and 90 per cent of that of the trailer truck wheels in a service application, when the car is without passengers. The shoes are steel-back type and the heads malleable iron.



MOTOR TRUCK COMPLETE WITH MOTORS, THIRD-RAIL SHOES, SHOE FUSE BOXES AND BRIDGE FOR MOTOR LEADS

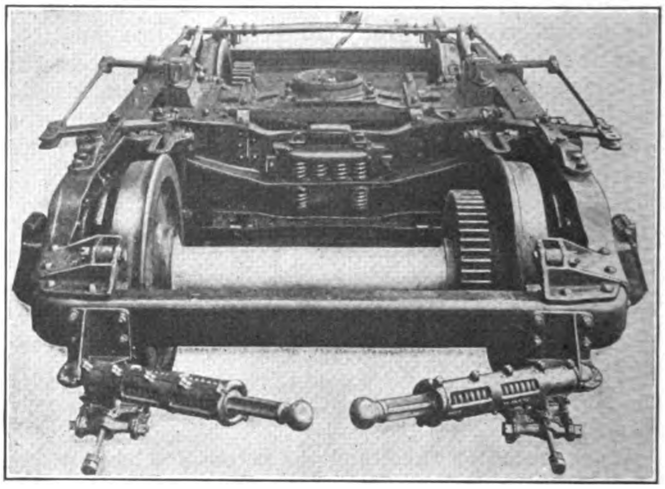
The third-rail shoe beams are bracketed to the equalizer bars on either side of each truck and to each beam is attached the third-rail shoe rigging. A feature of the New York Central standard for this construction is the installation of a spring pressure device which takes the form of a hinge working against a spring in the bracket that is attached to the shoe beam. This hinge permits sufficient motion at the shoe (which extends a considerable distance outboard from the hinge joint) so that the shoe can follow inequalities in the third-rail. The shoe however is in the form of a casting that has notched arms between it and the point of attachment to the hinge casting, so that it is easily broken off in case it strikes an obstacle and thus does no damage to the hinge. Adjustment vertically to provide for the effect of wear at the wheels and journals is effected by corrugating the surface of the hinge and also that of the shoe casting that bolts to it.

The truck wheels, which as mentioned previously are of 36-in. diameter, are of the single-plate, solid-steel type and are of standard passenger coach design for the trailer truck, while for the motor truck they are provided with special hubs for the gear cases and to take the end thrust from the motor.

M. C. B. type journals with collars have been adopted, but the journal brasses have downward extensions to hold the journal firmly in place at all times, even though clasp brakes have been provided, this design being substantially in accordance with the principles of the semicircular journal brass pointed out several years ago as essential to high-speed electric railway car design. Journal boxes are of substantial standard design.

MISCELLANEOUS EQUIPMENT

As the cars may sometimes be hauled, outside the electrified zone, behind steam locomotives equipped with automatic, quick-action, high-speed brakes operating with 110-lb. train-line pressure, it was necessary to provide control equipment to permit the car brakes to operate under this condition or independently. The compressor is mounted on rubber pads to prevent its vibration from being transmitted to the car. Its work is lightened by the use of a slack adjuster of the piston travel regulating type. A pneumatic signal equipment is provided for each car.



VIEW OF MOTOR TRUCK, SHOWING SPRING SUSPENSION FOR MOTOR NOSE AND PUSH RODS FOR CENTERING DRAWBAR

Equipment for heating consists of 34 two-coil, truss-plank electric heaters along the side of the car beneath the truss angle, and two five-coil heaters in the vestibules. The car-body heaters have thermostatic control equipment, and also, provision for hand control has been made for use in case of failure of the automatic devices.

A feature of the auxiliary equipment appears in the trainmen's switch board for lights, fans and heaters, this being separated from the motorman's switchboard and provided with a completely protected front as shown in the accompanying half-tone. In this, each one of the panel doors has a latch so interlocked with the switches that it cannot be opened while any switch in that section is closed. The motorman's switchboard is of the usual type.

Fitting the Electric Locomotive to Its Load*

It Must Be Handled with Due Regard to the Ease with Which It Can Be Overloaded—Its Performance Can Be Predicted with Great Accuracy

BY A. H. BABCOCK
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THE limit of engine capacity is the boiler. Because the electric locomotive boiler is stationary, and therefore may be of any size whatever, the electric locomotive has inherently a greater possibility of development to large sizes than the steam locomotive. It is my purpose to indicate the limiting features in these respects and to show how the safe load of an electric locomotive is determined.

Steam railway men have been too busy doing things to have been able to follow the details of development of an art that only recently has touched their work directly. When they do come into contact with this development they are much surprised by the electrical engineer's claims for precision in his computations and the confidence with which he relies on his results; so surprised, in fact, that often they are in some degree skeptical. They have not been accustomed to methods of measurement of the order of precision of those commonly used by the electrical man; hence they are disposed to apply their own determination of engine rating, often with expensive consequences.

When for example, the electrical man tells the steam man that an electrical locomotive is good for thirty cars, and the steam man tries thirty-five cars with no apparent result other than to discredit his information, he keeps on overloading the machine until it breaks down, and then he blames the electrical man for designing a machine that is so unreliable. For these reasons the fundamental principles of determination of locomotive rating will be stated preliminary to developing the methods used in practice.

The effects of overloads on electric locomotives are very different from those produced on the steam engine. An overload on a steam locomotive is simply a load that it cannot pull. An overload on an electric locomotive does not necessarily stop the train or even slow it down. The locomotive keeps going but the motors are burned out. Safe load, then, is the maximum that can be pulled without excessive heating.

Heat is developed by the resistance of the conductors to the flow of current through them, just as the temperature of air or water is raised by pipe friction, and the heat developed in electrical conductors is proportional to the square of the current. If this heat is not led away, the motors "burn up," *i.e.*, the insulation on the conductors first is charred, which destroys its insulating properties, then the coils short-circuit and become grounded, and finally, if the current is not cut off, the motor itself is melted away or even burned up.

It is interesting and perhaps may be illuminating to consider this a little in detail. One of the best illustrations is the heating of the New York subway. Many persons cannot understand why the subway is so oppressively warm. They do not realize that practically all of the energy transmitted into those tunnels appears there as heat, so that, in reality, a very large proportion of the output of the huge electric generators in the power house is actually heating the subway.

Returning to the motors, let us see how these heat losses are disposed of practically. The conductors in which the heat is developed are either buried in the iron or are otherwise entirely surrounded thereby. In the early designs of railway motors, radiation from the motor surface was the sole means employed for the dissipation of the heat. In later designs, by means of fan blades suitably placed on the revolving armatures, air is forced through ducts left in the iron for this purpose. The determination of the loading for any electric locomotive is seen to be not quite so simple as in the case of a steam locomotive. The simplest case is that of a long, constant-speed run without stops and with a fixed load. Variations in gradient and curvature do not complicate the study; as will be seen later they merely add to the detail. The most complicated case is that of a suburban or interurban railway where there are many stops, not necessarily the same from trip to trip, and with varying train consistency from day to day. The study of a situation less complicated than this, the Oakland, Alameda & Berkeley lines, monopolized the attention of an engineer and several computers for many weeks.

ELECTRICAL MEASUREMENTS YIELD ACCURATE ELECTRIFICATION DATA

In general, the question may be viewed from two standpoints: (1) A given traffic is to be handled over a given line under an assumed or stated set of conditions; required, the locomotive specifications. (2) What will a given locomotive haul over a given line under existing operating conditions?

In Case 1 the first step is to compute roughly the general characteristics of the locomotive required to haul a maximum train over the line. If the sizes indicated thereby are unreasonable, then the train must be considered as made up of units that can be handled by one locomotive unit, and as far as the present figures are concerned this becomes the train to be studied. An alternative method is to divide the locomotive into several units and consider the whole train as a unit. In either case and in any event the problem reduces to a question of tons of train per motor.

Usually in any given installation Case 1 combines with Case 2. The simplest problem is to determine the safe load for an actual locomotive upon an existing line. From the manufacturer's or an assumed horsepower rating and the general characteristics of the line, a tentative loading is assumed, and a train is made up to correspond as closely therewith as may be possible.

The electrical engineer then connects a recording instrument to measure the current taken by the locomotive. A pen attached to the instrument traces a line upon a strip of paper moved by a clock mechanism. This record then shows the current being consumed at every instant during the run, and from the area between the curve and the base line the average current is obtained. But since the heating is proportional to the square of the current, this curve will not give the desired information directly unless it is in circular form. If, however, the current is recorded by motion of the pen along the radius of the circle, since the area of a circle is proportional to the square of the radius, the area between the curve and the center will be proportional to the square of the current, from which by a very simple computation the required measure of the heating may be obtained. If the result so obtained gives a higher value per motor than the root-mean-square current guaranteed by the manufacturer, the locomotive is overloaded. Then by a proper consideration of the "empties" and underloaded equipment in the test train, a loading schedule for that type of locomotive can be specified for that particular run.

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*Abstract of paper read before the Pacific Railway Club, Feb 13, 1919.

PERFORMANCE CAN BE COMPUTED WITH AID OF MANUFACTURER'S CURVES

In cases where the electric service is not yet in operation, and therefore where measurements of the current cannot be made, the currents can be computed with very great accuracy and a similar result reached. The process is as follows: The horizontal effort is determined first. For ordinary freight service reasonable tractive forces per ton of train, including locomotives, are: For acceleration, 10 lb.; for friction, 6 lb.; for grade (for each 1 per cent), 20 lb.; for curvature (for each degree), 0.8 lb.

The engineer's profile is now required, from which to take off the gradients and the curvature. Whenever these change, the horizontal effort per ton of train, derived from the constants given above, is set down against the distance over which the conditions are constant. Reference to the manufacturer's motor curve gives very accurately both the current required over this section and the speed at which the train will run.

It is convenient then to set down these quantities in tabular form, the columns being: (1) Engineer's stations; (2) distance (feet); (3) speed (from curve); (4) time (computed); (5) current squared (from curve).

The sum of the times gives the elapsed time between stations. The values in the "current squared" column plotted, as before, on polar co-ordinate paper, give the heating current. If the value so obtained exceeds that for which the motors are guaranteed a smaller train loading must be assumed and the computations repeated until the safe load is found. The accuracy of these computations is outside the experience of steam railroad men and often strains their credulity.

The worst feature of the whole matter lies in the fact that whereas an overloaded steam locomotive merely fails to get over the line and the crews have many explanations available, an electric locomotive pulls the load and does not lose a great deal of time, but it suffers damage, concealed unfortunately from all but the expert. The damage is real, nevertheless, and the day of reckoning, the day of burned-out motors, is as sure as taxes to follow. Meanwhile when the load has been pulled once, the overloading is continued and the engine failure is brought nearer. In the end the company pays the bill, and as a rule the real culprit escapes.

The difference between a properly supervised system and the other kind is found in the records of the O., A. & B. lines, and another system which shall be nameless. In the one case, not a single motor has been rewound due to overload since the service started in 1911, nearly eight years ago. In the other, three times as many armatures as the system owns are rewound every year, which means, of course, that on the average, every motor lasts only four months.

STEAM ROAD MEN SURPRISED AT ELECTRIC TRAIN PERFORMANCE

When the O., A. & B. installation was being engineered a committee representing the operating construction, maintenance, and motive power officials passed upon all questions of policy. When this committee was asked to consider speeds, station stops, layovers, etc., the members could see little use in spending much time on such details. When they were told that these are essentials in the layout of electric train schedules and that the trains would follow their predicted schedules within a few seconds, they hardly took the statement seriously. Later, the official trial train made the round trip from the Mole to Berkeley, with all the stops as scheduled, the gates not being opened but the train being held at every station for the number of seconds specified in the schedule. It reached the Mole within less than ten seconds of the predicted time, and the general manager congratulated us on the "good guess" we had made. Our reply almost made him laugh. It was to the effect that any other result would have justified him in asking for some resignations. The standard of electric operation in these particulars is so much higher than those of steam that in the early days of that service it was difficult to make the operating officials realize that what had been reasonably good performance before is no longer good enough. The operating standards had to be raised, and they were raised.

ARGUMENTS, PRO AND CON, REGARDING CONSTANT-SPEED MOTIVE POWER

The practical operating official will see at once that any system in which the motive power tends to run at constant speed presents some favorable and some unfavorable operating features. One of the disadvantages is lack of ability to make up lost time. But on the other hand the tendency in such a system is not to lose time but to keep strictly to schedule. On all electric systems the dispatcher's duties are much simplified. No longer is he troubled with individual characteristics of engines or engine crews. If the train moves at all it moves on schedule time. On such a system, with operating conditions very closely approximating those of the Sierra of Tehachapi grades, the principal difficulty the engine crew has is to keep awake. After the train is in motion there is nothing to do but to watch for signals. Everyone in the cab, including visitors, is expected to confirm the signal indications when first reported by either of the engine crew.

When I visited this property a few years ago the dispatchers spoke most enthusiastically of the constant speed of the trains, which permits them to count on the arrival of the train at a given point within a fraction of a minute. As a result, any freight train is sent out on the line ahead of any passenger train whose schedule speed is no greater than the running speed of the freight locomotives, and the passenger train is not held up.

The general superintendent told me that the largest saving was due to a better handling of the traffic, in that lost motion is eliminated. No stops are necessary for water or fuel and to blow up steam; for the trainmen have less grounds for excuses for delays, and there is a general "tuning up" of all hands. And this is what I meant when I said that the operating standards under electric operation are higher than those under steam operation.

The ability to determine with great precision the proper load for the electrical motive power, and its inherent tendency to a constant speed, make for a regularity of operation difficult for a steam official to realize until it come into his experience.

Single-Phase Locomotives for Swiss Federal Railways*

Two Types of Locomotives Supplied by Swiss Manufacturer for Freight and Passenger Haulage Present Some Interesting Details

THE general electrification of the Swiss Federal Railways was decided upon several years ago. In placing orders for the necessary locomotives, it was originally intended to have these delivered in groups with different types so that their suitability for the conditions encountered could be tested under operating conditions and the results taken into account in subsequent construction. It was later found impossible to follow this program due to the war. Four sample locomotives for the St. Gotthard line, however, were ordered early in 1917, and an order for twenty additional locomotives was placed in 1918. Half of this latter order was placed with Brown, Boveri & Company. Some details of the four sample locomotives, together with some other types developed, were given in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 7, 1918, page 411. Of the locomotives now under construction by Brown, Boveri & Company, two types are shown in the accompanying illustrations. One of these is an express locomotive, the other a freight locomotive. As both types have the same general principles of mechanical and electrical construction, a description of the express locomotive will serve for both. The express locomotive has two trucks, each provided with one leading and two driving axles. The two trucks are joined by a spring coupling device which provides for transmitting the reciprocating forces direct from one truck to the other, and so improves the general running by relieving the flange pressures of the inner driving wheels at curves.

For transmitting the power from the motor to the driving axles spur gears and coupling rods have been adopted. Each truck is provided with two motors geared to a common intermediate shaft which is connected to the driving wheels by means of the coupling rods. The latter are arranged one on each side of the locomotive with an angular displacement of 90 deg. The pinions on the motor shaft are fitted with springs to give circumferential flexibility. This arrangement was adopted to equalize the tooth pressures on the two pinions and to compensate for the sudden alterations of torque chiefly due to the coupling rod drive with its changing reciprocating forces.

Two strongly constructed center pins supported from the trucks take the weight of the locomotive body and the electrical equipment. One of these pins is centered in the truck, while the other has sufficient play in a longitudinal direction to insure that the driving forces are taken by the coupling device and cannot be transmitted by the center pin. Two auxiliary supporting points between the truck and frame are arranged just at the inner side of the inmost driving axle. These are necessary to obtain an equal distribution of load on the axles. To insure stability of the frame in the transverse direction, light springs are provided, two placed on the truck frame at the side of each center pin.

The locomotive body is built of sheet iron with suitable heavy stiffening pieces. In order to provide easy access to the driving gear and spur wheels, the lower portion of the body is made in the form of a girder. A driver's cab is provided at each end of the locomotive. All electrical apparatus other than the motors is installed in the body of the locomotive proper. The motors are provided with fans mounted on top and projecting through the floor of the locomotive. This necessitates relatively large openings in the floor, and to prevent the entrance of snow, etc., into the interior of the locomotive these holes are closed by movable cover plates.

Westinghouse brakes of the automatic and regulating type are provided and are arranged so that the brake rod of each truck can be operated by hand. There are four brakeshoes provided for each driving axle, and the leverages are so proportioned that the pressure of all shoes is the same. Compressed air for the brakes, sanding device, whistle, and some of the electrical apparatus, is furnished by two Brown-Boveri air compressors. The total weight of the express locomotive is 237,200 lb., and that of the freight locomotive 266,800 lb. The mechanical portion of the locomotive was designed and constructed by the Swiss Locomotive & Machine Company of Winterthur.

The control switches with their operating apparatus are mounted together with the transformer so that the whole forms a complete unit which can be installed or removed bodily through an opening in the roof. As a result of a thorough investigation into the cooling of transformers under actual running conditions during many years, the manufacturer has installed oil-cooled transformers. The oil is forced by a circulating pump through a system of cooling pipes fitted to the sides of the locomotive. The transformer is designed

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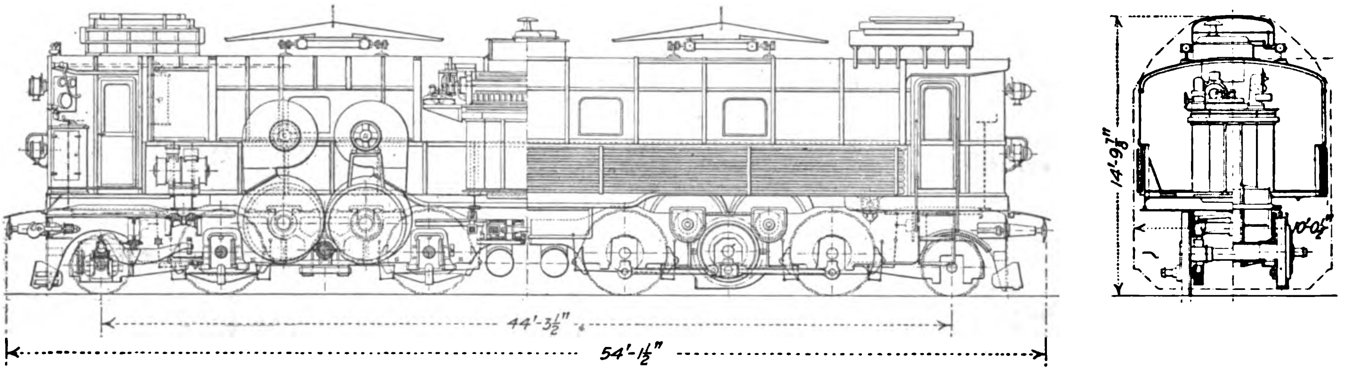
*Further details concerning the construction and equipment of these locomotives will be found in an article by J. Buchli, chief engineer locomotive department, Baden Works, Brown, Boveri & Company, in the issues of *Engineering*, London, for May 2 and 9, 1919, from which the illustrations and information for this article have been taken.



EXPRESS LOCOMOTIVE FOR SWISS FEDERAL RAILWAYS

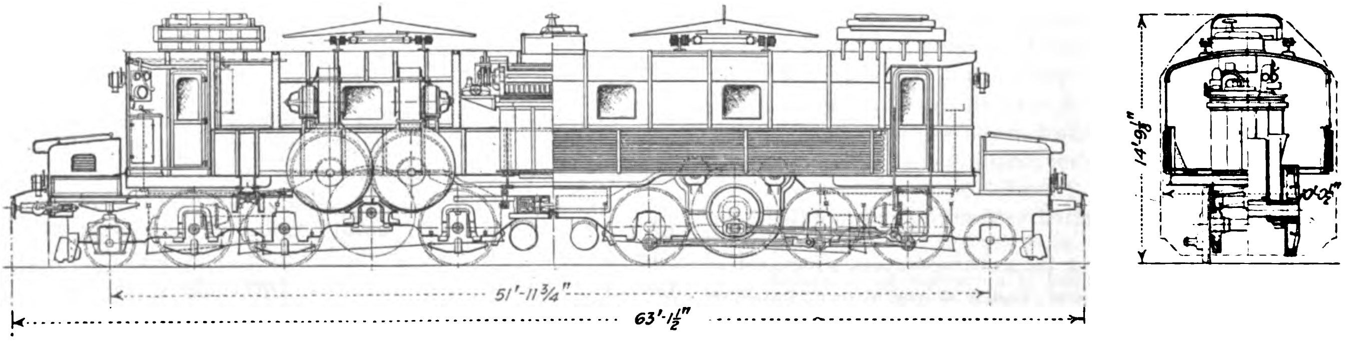
for a continuous output of 1750 kva., the high-tension side being wound for 15,000 volts but adaptable for 7500 volts. The secondary pressure is 1325 volts at no load, and the frequency is 16⅔ cycles per second. The transformer complete with pumps and separate coolers weighs 27,800 lb., and is 7 ft. 1 in. long, 4 ft. 11 in. wide, and 5 ft. 2 in. high to the cover.

The two motors of each pair are connected in series, while the two pairs are in parallel with one another. The series arrangement is allowable as the mechanical coupling of the two motors insures an equal distribution of the voltage. The series connection was preferred on account of the saving in copper for the connecting cables, as well as in the weight and space due to the current being one-half of that with parallel connection. The motors are ventilated, air being drawn in from the interior of the locomotive and blown out underneath. The motors are of the single-phase, series type with compensating winding and commutating fields with phase displacement. There are twelve brushholders to each commutator with a total of twenty-four brushes each, 2½ in. broad and ¾ in. thick. Between the armature conductors and the commutator there are resistance connections. For regulating and altering the voltage supplied to the motor, the low-tension winding of the transformer has nineteen tappings; one of these, however, being a ground connection. The voltage increases per step are not always the same, these being smaller at the middle than at the end tapping. This arrangement of regulation was adopted so that when the limit of adhesion between the wheels and rails was reached, a finer regulation in the tractive effort can be made.

The leads are brought out through the transformer cover direct to the tapping switch. This latter apparatus differs considerably from the type usually adopted for this purpose. It consists of two cell-type switches used in conjunction with storage batteries but combined so as to form a single unit. This tapping switch, as well as the other control apparatus, is operated by direct-current motors. A small motor-generator in conjunction with the storage battery supplies the necessary current. The control is of a multiple-unit type so that two locomotives can be operated from a single cap.

The railway authorities insisted that each locomotive be provided with an electric brake. This was specified to avoid the dust produced at the wheels of the locomotive and to lessen the wear on tires and brakeshoes. The fine iron dust produced in large quantities during braking finds its way into the interior of locomotives, especially when assisted by the suction of the motor fan. Here it is deposited on the windings of the apparatus and in the motors, thus giving rise to trouble and insulation breakdowns. Very steep gradients are encountered on the Bernese Alpine Railway, and the quantity of dust produced from braking amounts to as much as 40 tons per year. On some of the locomotives still on order, it is proposed to use an improved system of electric braking so that power may be returned to the line.

The following service requirements are specified for these locomotives: Express locomotives must be able to haul a net load of 300 tons at a speed of 31 m.p.h. on a gradient of 2.6 per cent, while the freight locomotive, in addition to having a speed of 31 m.p.h. under the same conditions, must reach 21½ m.p.h. with a net load of 430 tons. It is further specified that both trains must be able to be started from rest to full speed in four minutes on the same gradient. The overload demanded is 20 per cent for fifteen minutes at a time. The normal full-load conditions represent an output of 4500 hp. (one-hour rating) per locomotive at the motor shaft, with a tractive effort of 27,500 lb. and 37,500 lb., respectively, at the circumference of the driving wheels. These amounts are increased to 35,500 lb. and 48,500 lb. during starting on an upgrade.



FREIGHT LOCOMOTIVE FOR USE ON SWISS FEDERAL RAILWAYS

Types of Third-Rail Used in Railway Electrification

EVEN ON SHORT RADIUS CURVES THE THIRD-RAIL PROVIDES A RELIABLE POWER CONNECTION

The Leading Types of Third-Rail Construction Now Used Are Discussed, Their Important Features Are Considered and Their Advantages and Disadvantages Are Compared

TO CONNECT the stationary electric power generating and distributing system with a moving car or train which uses this power it is necessary to provide a contact system. Such a system consists of two parts, the stationary or distributing part and the moving collecting device. In order to keep the parts out of the way and for safety early systems used an overhead construction for this distributing device. As cars became heavier and the speeds at which they were operated were increased, heavier duties were placed on the connecting system. This required a continuous conductor of larger section and what is now commonly known as the third-rail construction was resorted to. To the railway man the handiest form of a large section conductor was the ordinary T-rail. At first, attempts were made to use this as a continuous conductor, and a gravity contact device was adopted which slid on the head of the rail.

THIRD RAIL DESIGN FOR ELECTRIFICATION

In considering the design of a steel rail to act as a conductor and at the same time to give a good contact surface for the collection of current by a moving train several important features must be considered. A review of some of the designs which have been used and a comparison of the advantages of the respective types are given in this article.

Third-rail installations may be divided, roughly, into three classifications as to their point of contact with the collecting device, namely, over-running contact, under-running contact, and side contact. The earliest installations were over-running or top contact in which the collecting device passed over and made contact with the open top of the third-rail. The first installation used a form of collector which depended on its own weight for contact with the third-rail, and the installation was exceedingly simple. These first installations were on elevated systems where there was little or no danger of the public coming in contact with the rail. Later, when the use of the third-rail contact system was taken up by interurban roads and for steam road electrification where there were possibilities of accident to the public from coming in contact with a bare conductor, it became necessary to devise some better means for protecting the rail. This led to several types of protected third-rail, and later to the under-running and side-contact construction. In the accompanying illustrations examples of each of these types are given.

In considering the points of merit in the various designs it is advisable to classify the leading features necessary for the development of a sound, practical type of construction. The points to be considered may be classified as follows:

1. Rail section, selected with respect to: (a) Ease of obtaining, (b) ease of handling, (c) danger of damage, (d) conductivity, (e) ease of attaching protec-

tion, bonds, anchors, etc., (f) sufficiency of wearing face.

2. Location, determined by: (a) Small space desirable, (b) special work construction, (c) creepage distance to ground, (d) limitation of trouble from derailment, (e) clearance.

3. Protective covering, designed to: (a) Prevent contact, (b) protect against weather.

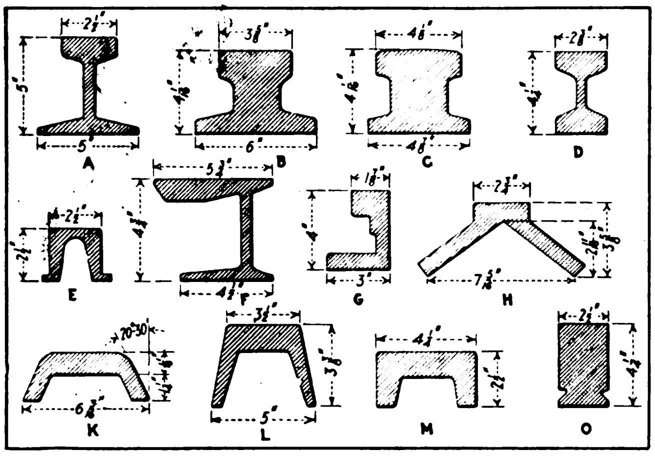


FIG. 1—DIFFERENT THIRD-RAIL SECTIONS

4. Ease of installation and maintenance, with respect to: (a) Necessity for special ties, (b) expensiveness of cable work involved, (c) provision for gaps in third-rail, (d) reballasting and tamping required, (e) interference with signal system.

THIRD-RAIL SECTIONS HAVE INCREASED IN WEIGHT

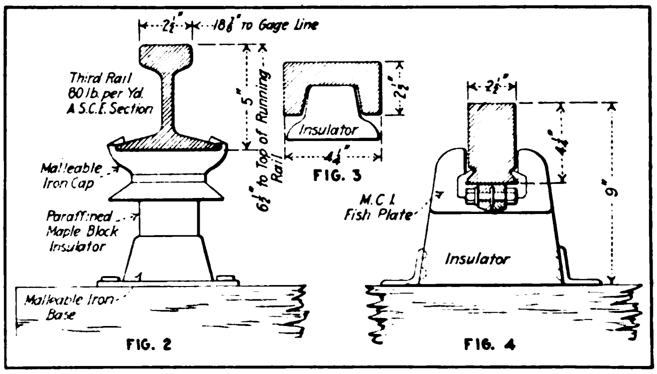
The first type of third-rail used was a standard T-section, adopted principally because it was most readily available at the time. Since then this standard section has been used extensively in various weights from 40 to 150 lb. per yard and probably most of the third-rail lines in operation to-day still use this type. The lighter weights were used extensively in the first installations, but were found to be not as satisfactory as the heavier rail. They have been practically abandoned except for use in yards where high conductance is not necessary.

Conductivity depends on the hardness of the rail, and the importance of conductivity varies with individual ideas of the designers. Generally speaking, the resistivity of third-rail is from six and one-half to eight times that of copper. The third-rail steel is considerably softer than the material used for track rails which has a resistivity of from eleven to twelve times that of copper. The principal reason for the large variation in ideas as to the proper conductivity for third-rails, is due to the question of maintenance economy. The life of the rail decreases as conductivity is increased. Furthermore, it is necessary to use more care in handling a soft rail than a hard one. The advantages and disadvantages of each quality must, therefore, be balanced against each other to determine the best one for a particular case.

From observation of the life and resistance of existing installations it has been found that some rails flake away in large pieces, so that the track is strewn with sheets of rust. This tends to reduce the conductance of the rail and also causes short-circuits on the line. While it would seem that painting or weatherproofing of third-rail would prevent this trouble, it has not been generally resorted to, although trial installations have been made. While it is reported that painting effectively deters corrosion, still it does not appear to be generally favored, due to its increased cost and also to the difficulty in handling painted rail without damaging the paint.

The great advantage of the heavy rails lies in their increased conductance which tends to render unnecessary a paralleling feeder system. The length of rail used affects the labor of handling and the number of bonds necesary to a large extent. The present practice of bonding presents no particular difficulty where third-rails are properly supported and anchored. There has been a great deal of experimental work conducted with new and original sections for use as third-rail. The chief two considerations which led to these were (1) to produce a section which had a greater contact surface in proportion to its weight than the ordinary T-rail, thus giving a greater wearing surface and longer life, and (2) to obtain a section which could be more easily supported and which would provide greater facility for bonding, anchoring, insulating, etc., than the ordinary T-rail.

A number of third-rail sections in use are shown in Fig. 1. The section shown at *A* is the 80-lb. standard T-rail section commonly used. *B* is a special section used by the Long Island Railroad and *C* is a similar section used by the New York Municipal Railway. All of these three are used for over-running contact. Sections *B* and *C* are of the same weight, but *C* has the advantage of greater contact surface. The section shown at *D* is that used by the New York Central Railroad on rails with under-running contact. It was designed to provide a better support for this type of construction than was available with the standard T-section. Section *E* is that of the Philadelphia & Western Railway, which was originally designed as an under-running rail, but has since been inverted, a change which was found necessary to meet local conditions. The section shown was selected by the railway's engineers because of their belief that it would reduce the first cost and maintenance, eliminate leakage losses, increase the clearance and provide for automatic operation of the shoes.



OVER-RUNNING UNPROTECTED THIRD-RAIL CONSTRUCTION

Fig. 2—Standard T-rail type. Fig. 3—Wide-contact design. Fig. 4—Compact construction.

Section *F* is a recent under-running type of rail used by the Central Argentine Railway and *G* is the section used by the Lancashire & Yorkshire Railway with the side contact system. The remaining sections shown are special types for over-running third-rail, and special shapes brought out to provide a more satisfactory means for supporting these sections and also for supporting a protective covering.

INSULATION FROM RAIL TO EARTH

A long insulator leakage path to ground is found necessary to prevent the current leaking across and burning during wet weather. This problem, however, has presented no formidable obstacle. The insulator must allow a longitudinal movement of the rail for expansion and contraction but must hold it securely against lateral motion. The vibration set up by heavy cars in some cases has produced strains sufficient to crack the insulators. Good results have been produced by interposing a shock-absorbing material, such as felt or canvas, between the cap and the insulator and allowing for vertical movement of the third-rail.

For voltages higher than 700, porcelain insulators have proved most satisfactory and these are now being generally used for all third-rail construction. These are provided with a lip or petticoat so that the insulators will be washed by the rain, and all metal parts are reduced to a minimum to obtain as much creepage surface as possible. In practice it has been found quite unnecessary to have heavy caps and bases cemented upon the insulators. These include waste metal and act as an additional element of danger. The first design included lugs on insulators to prevent the conductor rail from moving up and down. This type of construction is shown in Figs. 2 and 5. The lugs were found to be needless and in fact proved disadvantageous, causing breakage of the insulators. They also add to the difficulty of installation of the rail. The latest type of construction includes vertical lugs of such a height that the depression of the ties with passing traffic will still leave the lugs high enough to prevent the dislodgement of the conductor rail.

The several designs of third-rail construction illustrated permit the making of some comparisons of the desirable features as enumerated on page 1142. Without considering the questions of cost of installation and maintenance but having in mind the practical advantages of the various designs presented, it is possible to obtain some idea of the improvements made and their value in actual service. From the illustrations shown it will be seen that there is a considerable variety in use. Very little attention has been given to possible standardization, and the amount and importance of this consideration is bound to vary with individual ideas.

COMPARISON OF TYPES OF THIRD-RAIL CONSTRUCTION

The designs shown in Figs. 2, 3 and 4 are the unprotected over-running types. In the first of these a standard rail section is used which admits of easy bonding and connecting up. The section shown in Fig. 2 presents a wide contact surface and at the same time exposes a large unprotected surface. It has been used unprotected owing to special construction of bridges and track when a shallow rail is necessary to obtain sufficient clearance to earth and to insure the required clearances. It cannot be considered seriously for extensive railway electrification when compared with other designs. It fails in the essentials of the amount of space occupied and the distance from rail to earth, and the section does not permit of the easy attaching of bonds and anchors. The arrangement shown in Fig. 3 is a very compact section and has many advantages, but the drilling of bond holes through 2½ in. of metal, as is necessary with this design, is a decided disadvantage. There is also a tendency for this type of rail to "whip" and become top-heavy. As all of these types are unprotected they are suitable for use only on elevated railroads or on roads with private right-of-way.

The designs shown in Figs. 5, 6 and 7 are for over-running contact and have side protecting boards to afford safety against inadvertent contact.

Fig. 5 shows a type of construction which provides for the use of the standard section of third-rail and has the advantages already enumerated for this type. The disadvantages of this design are the large amount of space occupied and the wide opening through which the conductor rail is exposed. The protection afforded is not so great as would be desired for many installations, especially where there are severe weather conditions of sleet and snow.

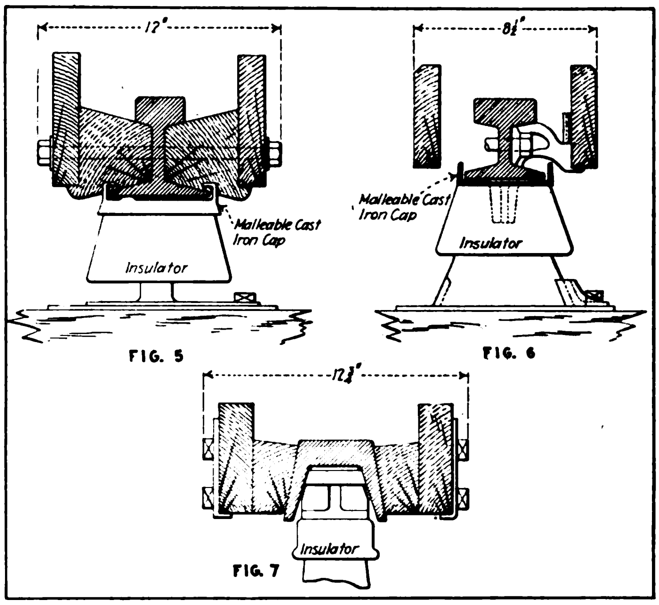


FIG. 5 FIG. 6 FIG. 7

OVER-RUNNING, SIDE-PROTECTED TYPE OF CONSTRUCTION

Fig. 5—Sides bolted to conductor. Fig. 6—Sides supported by brackets. Fig. 7—Inverted "U" section.

The design shown in Fig. 6 is a considerable improvement over the preceding. The space occupied laterally is 3½ in. less and at the same time a good contact surface is provided. It has greater clearance to earth and excellent provision for mechanical attachments. The cap is of light dimensions and the lugs are of the latest design. A disadvantage is that insufficient protection is provided against sleet and snow. In the design shown in Fig. 7 a special section is employed. The space occupied is large and the surface is exposed more than is desirable. In this type also the insulator is covered up, which is a most undesirable feature as it allows the accumulation and baking of dirt which might cause short-circuits.

The types of construction shown in Figs. 8, 9, 10 and 11 have been developed with especial reference to providing an efficient protective covering against severe weather conditions and they also provide protection against contact. That shown in Fig. 8 is the new, protected, over-running T-rail type used on the main lines of the Philadelphia & Western Railway. The clearance provided for this type of construction is well within the clearance lines specified by the American Electric Railway Association and the American Railway Association.

The rail shown in Fig. 9 is that used by the Pennsylvania and Long Island Railroads. The cost of maintenance with this has been found to be exceedingly low and this type has the important virtues of having simple parts, providing flexibility and ease of maintenance and installation. It can easily be repaired in cases of derailment. All clearances conform with the standard of the American Railway Association. The rail section used is extremely heavy, 150 lb. per yard. A special chemical composition is used which is low in carbon and other hardeners, and gives a resistivity about eight times that of copper instead of about twelve times as is the case with the ordinary track rail. This heavy section was adopted on account of the very heavy currents used for individual trains where the traffic is exceedingly dense, which required a large current-carrying capacity and high conductance in the collector system.

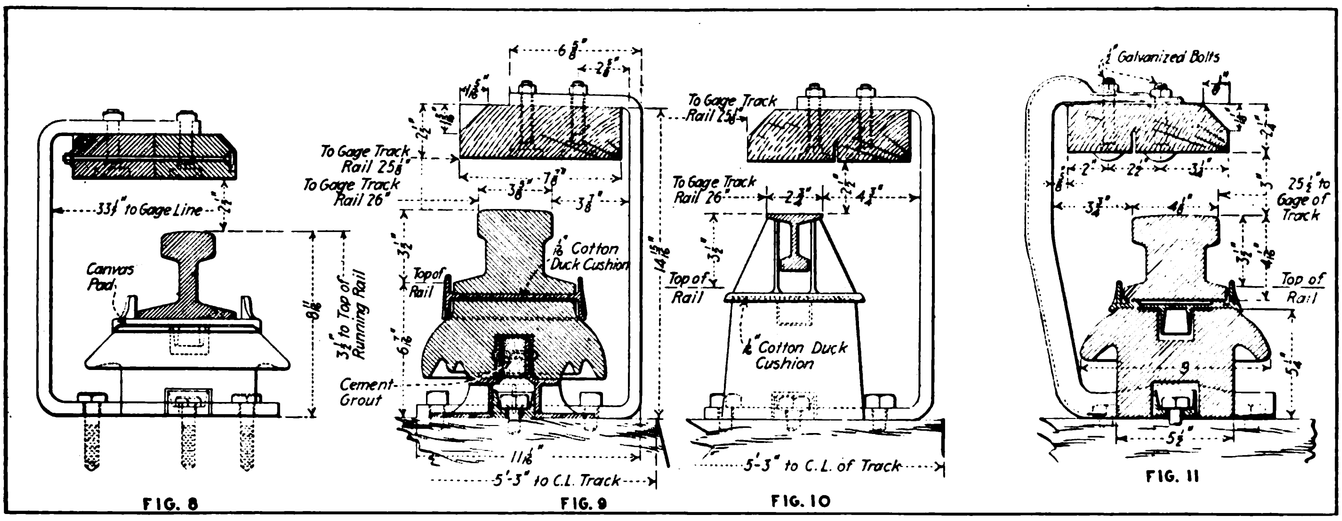


FIG. 8 FIG. 9 FIG. 10 FIG. 11

OVER-RUNNING, TOP-COVERED TYPE OF THIRD-RAIL

Fig. 8—T-rail on main lines of Philadelphia & Western. Fig. 9—Pennsylvania type for tunnel section. Fig. 10—Pennsylvania type for yard track. Fig. 11—New York municipal standard.

In yards where the large section of third-rail is not needed for conductance and where it is necessary to have the maximum of clearance for signal and other apparatus along the track, a standard T-rail section has been adopted. This is shown in Fig. 10 and consists of a section of 25-lb. standard Bessemer T-rail mounted in an inverted position. The base of the rail constitutes the contact surface.

The heavy-section rail is bonded with ribbon type compressed-terminal foot bonds, four to a joint, having a conductance equivalent to 80 per cent of that of the third-rail. The light-section rail for the yards is bonded with the protected-type pin-terminal cable bonds. The protective covering in both cases consists of a continuous plank carried on wrought-iron brackets secured to the third-rail ties, which are longer than the standard ties. On the open line this plank is of yellow pine but in their tunnel construction they use Jarrah wood imported from Australia. This is used on account of its slow-burning qualities.

The type of construction shown in Figs. 11 and 12 is that used by the New York Municipal Railway Corporation for its rapid transit subway service. This is quite similar to the Pennsylvania Railroad construction but employs a different type of supporting bracket and different insulators and third-rail section. The weight of the section is the same as that used by the Pennsylvania Railroad but a larger contact surface has been obtained by reducing the supporting surface somewhat. The construction shown in Fig. 11 is the standard type used on the majority of the New York Municipal lines, and that shown in Fig. 12 is a special type which was made necessary due to small clearances and tunnel construction. In the latter the supporting bracket has been rounded at the base to provide clearance with the lining of the tunnel, and the insulator is 2 in. less in height than the standard insulator.

Another type of construction with the overhead protecting board in which a special third-rail section is used is shown in Fig. 13. This is used on branch lines of the Philadelphia & Western Railway where the original contact rail was reversed. The original type, of under-running construction, is shown in Fig. 15. All clearances are well within that adopted by the American Railway Association.

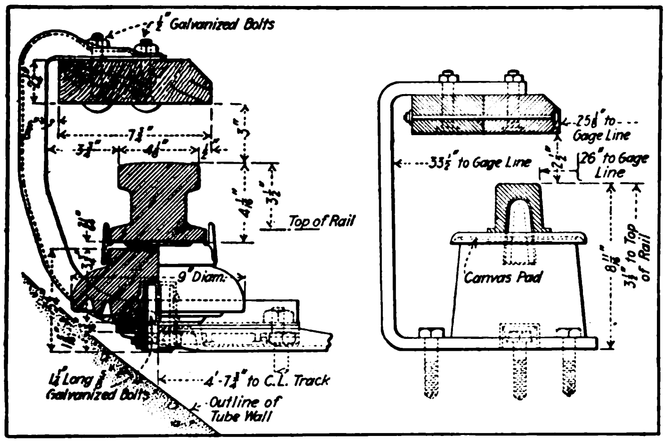
Three types of under-running-contact, protected-type third-rail are shown in Figs. 14, 15 and 16. In Fig. 14 is one used by the New York Central Railroad Company and by the Philadelphia Rapid Transit Company. By inversion of the rail its protection on both top and sides was made a comparatively easy matter and the bottom was left clear for contact with the collecting device. This construction is somewhat more costly than the over-running type on account of the types of insulators which must be used. These are mounted in cast-iron brackets bolted or lagged to long ties, which must be high enough to hold an insulator below which the third-rail is suspended. They must be rigid enough to bear the weight on them without excessive vibration and on account of their shape this requires a somewhat heavy section. The board protection is supported on these brackets or upon the third-rail itself. This under-running type of third-rail has the decided advantage of being self-cleaning in stormy weather and is operated without trouble even when the rail is deeply covered with snow.

The design shown in Fig. 15 is the under-running type formerly used by the Philadelphia & Western Railway, as previously stated. This type of construction was changed to that shown in Fig. 13 as it was found possible to design the top-contact third-rail at a much lower cost. Experience with this type showed that, while it provided for longitudinal movement due to expansion and contraction, no provision had been made for movement in a vertical plane. The vibration set up by the heavy cars brought such enormous strains upon the insulators that in many places the only insulation left was that afforded by the tie. Furthermore, it was found very difficult to locate defective insulators. The clearances did not come within the standard adopted by the American Railway Association and it was desirable that this be changed so as to conform thereto.

The design shown in Fig. 16 is the most recent type of under-running contact rail used by the Central Argentine Railway on its line from Buenos Aires to Tigre. The third-rail voltage is 800. The advantages claimed for this type of construction are compactness, protected surface, good insulation and safety. The practical advantages in the use of this rail have been demonstrated under most severe conditions and have given most satisfactory results. The section of third-rail employed is special for this particular type of construction.

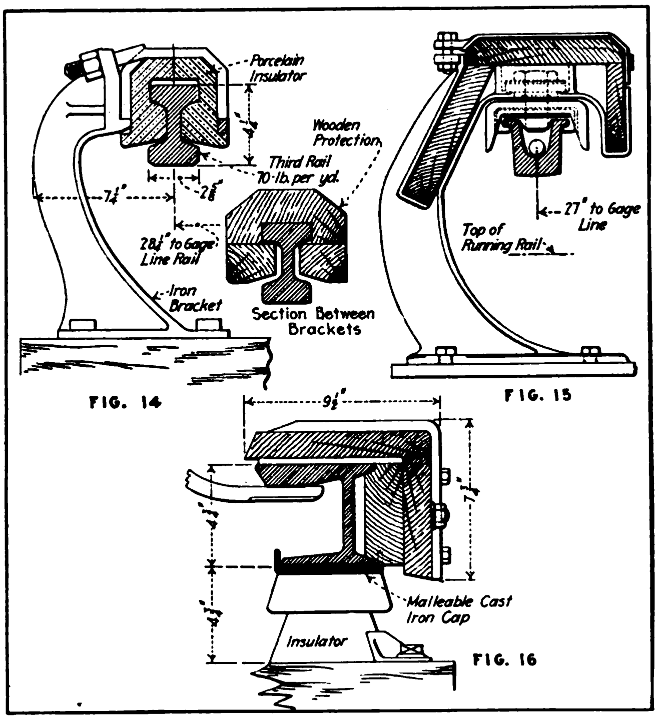
HIGH-VOLTAGE DESIGNS

Before leaving this subject of third-rail installation it is important to examine some of the designs which have been used on systems using a higher voltage than 600. That shown in Fig. 17 is a side-contact type successfully used by the Lancashire & Yorkshire Railway between Manchester and Bury, England. This rail is electrified at 1200 volts and there is complete protection to the conductor rail. There are, furthermore, no metal parts or attachments connected to the conductor rail, all supports for protection being provided by means of clamps. The wooden key shown at *A* is used for clamping up the sides of the protection. A space shown at *B* is left for drainage. This design has a large range of adaptability and is eminently simple in construction.



FIGS. 12 AND 13—BRACKET-SUPPORTED TOP-COVERED TYPES

In speaking of the various types of third-rail construction Alfred Raworth, electrical engineer for the South-Eastern & Chatham Railway of England, who spent considerable time in this country studying American practice, said that he considered the Lancashire & Yorkshire type of third-rail construction to be particularly well adapted for conditions in Great Britain. Various lines there have trestles and tunnels which limit the space available at the side of the track and this type of construction sets in close to the track and can be more readily installed than some other types. It would appear, however, that under such climatic conditions as exist in the northern part of the United States more difficulty would be experienced in the winter months with the collection of snow and ice in this slot than is the case with some of the other types of construction already described.



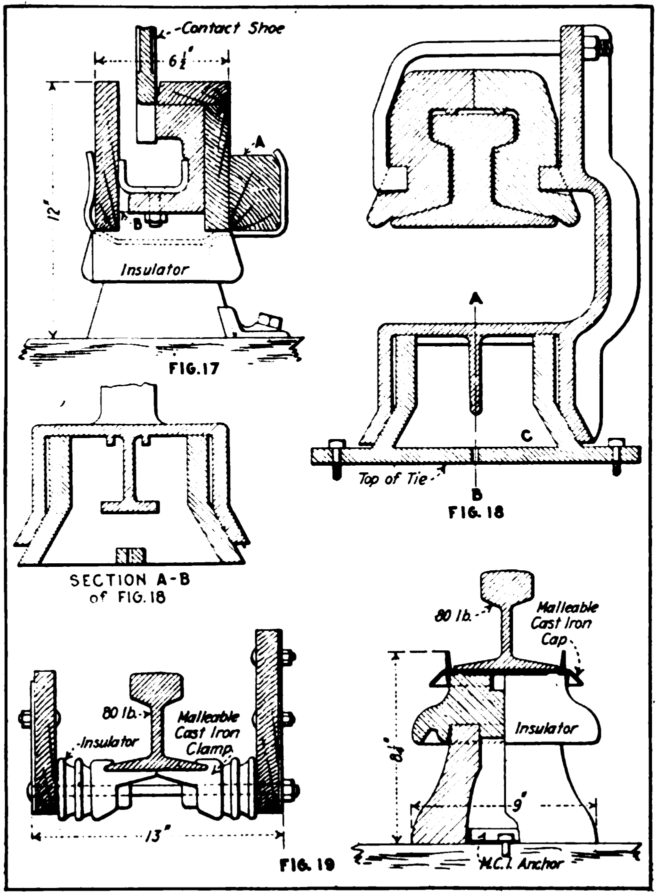
UNDER-RUNNING, PROTECTED TYPE OF THIRD-RAIL CONSTRUCTION

Fig. 14—New York Central type. Fig. 15—Philadelphia & Western old type. Fig. 16—Special type used abroad.

The arrangement shown in Fig. 18 shows a suggested type of third-rail support and protection suitable for high-voltage operation of which a description was published in the March 6, 1915, issue of the ELECTRICAL RAILWAY JOURNAL, page 469. Porcelain insulators held in place by U-shaped pieces of flat strap iron are used. These insulators also serve as the supports for the protection proper, which is simply an inverted trough. The design permits of rapid and cheap erection and at the same time provides high insulating qualities.

Special interest attaches to the third-rail construction of the Michigan Railway shown in Fig. 19, because it was the first to be installed for a voltage of 2400. An 80-lb. T-rail section of low-carbon steel especially rolled for this road is used. The specifications provide for carbon not over 0.14 per cent, manganese not over 0.40 per cent, sulphur not over 0.08 per cent and phosphorous not over 0.11 per cent. The rail is guaranteed to have a conductivity one-eighth that of copper. The contact rail is carried on a three-petticoat insulator, which in turn rests on the 10-ft. track ties. The method of supporting the protection board is unique and well designed. Here again there is a top-running system with a wooden trough 12 in. wide, with the live rail exposed in the center.

On continuous stretches of 1 mile or less in length the Michigan Railway third-rail is laid with expansion joints one and one-half times as wide as those allowed in standard track joints. Where the stretch of the third-rail is more than 1 mile long, twice the standard track expansion is provided at joints. The petticoat type insulators are tested at 5000 volts and are held in place on the ties by square malleable lugs fastened with lag screws and fitted into recesses in the insulator bases. Third-rail joints are bonded with 7-in. 500,000-circ.mil bonds of the copper-ribbon compressed-terminal type.



SOME HIGH-VOLTAGE TYPES OF THIRD-RAIL CONSTRUCTION

Fig. 17—Side contact system. Fig. 18—High-voltage third-rail support. Fig. 19—Michigan 2400-volt line; at right, third-rail mounting; at left, protection board supports.

In deciding upon any particular type of conducting system the cost of maintenance, operation and efficiency must all be taken into consideration. The cost of third-rail construction is considerably below that of overhead construction, yet conditions may be such that the advantages of overhead construction are of sufficient importance more than to justify the additional expenditure. Some roads may present ideal conditions for overhead work and considerably reduce the cost of erection, but at the same time expensive alterations for the safe installation of third rail may be involved, materially minimizing the difference in cost and give the advantage in favor of overhead work. Of course, having the track free from live rail with the line accessible at all times is a great point in favor of overhead work and is much appreciated by those whose business it is to maintain the permanent way. The important item of maintenance of track will be increased owing to the use of third-rail. This is obvious since repairs cannot be carried out with the same facility. Therefore the additional cost of upkeep might justly counterbalance the interest on the extra capital expenditure on overhead construction.

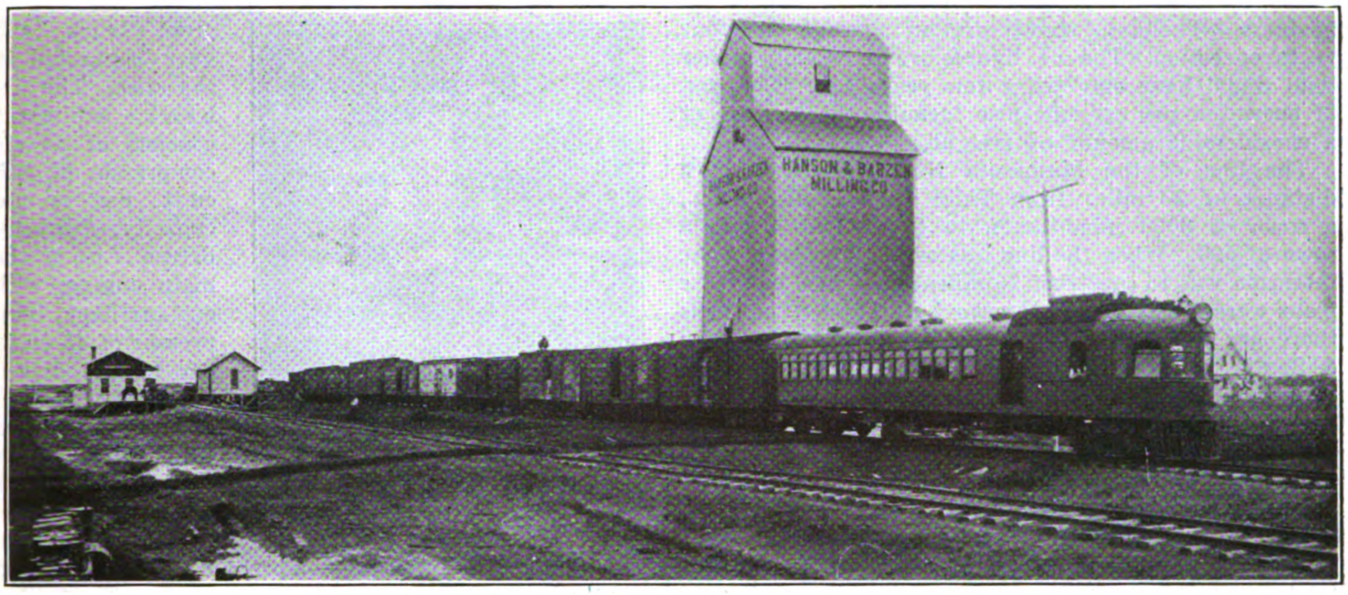
Hardening Rail Joints on Southern Pacific Electrified Division at Oakland

THE usual battering of receiving rail ends at joints on the electrified divisions of the Southern Pacific Railroad at Oakland, Cal., drew attention to the advantage there would be in some means of hardening the heads of the rails at joints. Contract was accordingly made with a San Francisco firm for applying heat treatment to the 1200 joints, approximately, on the Ellsworth line by way of an experiment. The rails on this line are standard 90-lb. A. R. A. It was decided to treat the rail head for a distance of 8 in. from the joint each way. The hardening system used is one which has been employed quite extensively by electric railway companies on the Pacific Coast. It is based on the theory that iron or steel, when brought to a high temperature, will absorb the carbon and other elements necessary to harding if solutions of salt, sulphate of copper, and potassium are applied to the surface in the presence of a hot gas with a high carbon content. The tempering is affected by chilling the rail suddenly with water. An account of the application of the process to track of the United Railroads of San Francisco was published on page 704 of the issue of this paper for Oct. 19, 1918. The Ellsworth line, to which the Southern Pacific engineers decided to apply it has a twenty-minute service all day and the rails had to be treated between the passing cars.

After the work had been in progress for about three weeks the division engineer inspected 565 treated joints. Of these twenty-four were found to be slightly chipped and six badly chipped although not so seriously as to condemn them. It is believed that when properly applied this treatment, will double rail life. The hardening process has the advantage of being applicable to rails or to special work which has been repaired or which had been built up with new metal by means of a welding process.

If further experience with this process bears out the present opinion, a very material saving in first cost and maintenance of track is expected. Its application is attractive on the Pacific Coast particularly because of the freight and delay incidental to the delivery of manganese special work there. During the war the Southern Pacific Company figured it would be cheaper to use common steel crossings built up at the Sacremento shops in place of manganese crossings even if it should be found that the former had to be renewed every year. Common steel crossings hardened by the heat treatment process are reported to have given excellent service.

The Imperial Government Railways, Japan, are reported as about to make a trial of wireless telegraph communication to its railway trains. Accidents on the railway have previously been made known to the locomotive engineer by flags or other signals, and these have sometimes failed to give proper warning. It is thought that the use of wireless communication will add a measure of safety. Certain railway stations will be selected as wireless stations.



FREIGHT HAULAGE WITH A SELF-PROPELLED MOTOR CAR

Branch Line Operation with Self-Propelled Motor Cars

Results Obtained in Operating a Gasoline-Electric Car on the Minnesota Northwestern Railway for the Last Four Years Are Given, Together with an Account of the Service Rendered

BY H. W. PROTZELLER
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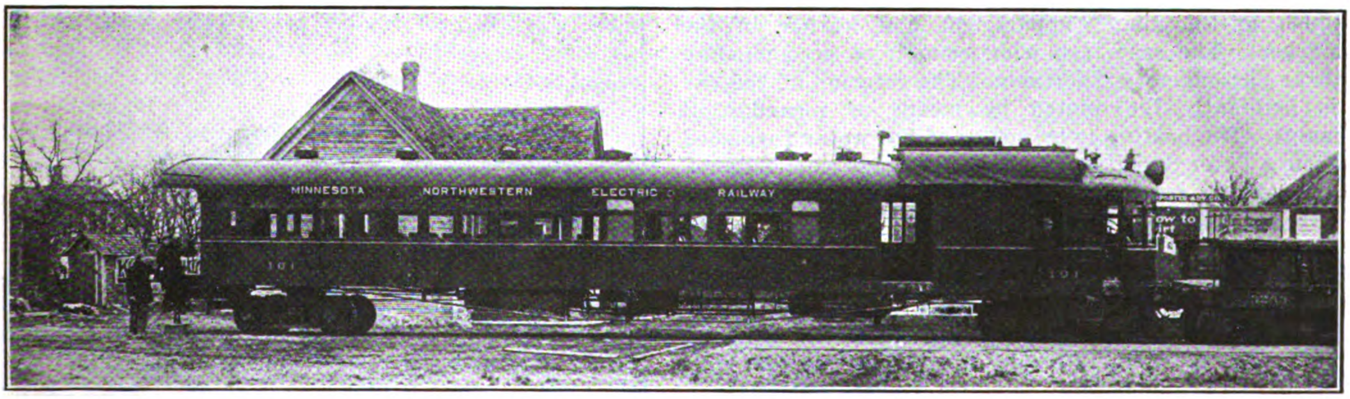
THE economical operation of the large trunk lines of railroads in this country depends to a large extent upon making the branch lines or feeders self-supporting. These branch lines must be made to pay their operating expenses and fixed charges from their own gross revenue, thus relieving the main lines of their burden of support. A very large number of them are now being operated with the cast-off equipment of the main lines, and practically every one of them is daily piling up deficits. To reduce or wipe out these deficits, they should have more economical and efficient equipment.

The need for self-propelled motor cars as adjuncts to the regular equipments of steam railroads has been apparent for many years. These cars provide a clean, quick and attractive service and are capable of being operated by the minimum amount of labor. However, there has always been an impression in the minds of most railroad officials that the self-propelled motor car is a piece of equipment that has to "puff and snort" pretty hard in order to drag its own weight over the rails and that when any real work is to be done it is necessary to rely on steam equipment. Actual results show that the self-propelled car will handle all of the passenger, express and freight business that is usually met with on the branch lines and do it at a cost far below the amount that is now being spent for the operation of steam equipment.

The Minnesota Northwestern Electric Railway has been operated since August, 1914, by means of a gas-electric self-propelled motor car. One car of the type shown and described has successfully handled all of the



GASOLINE-ELECTRIC MOTOR CAR ON MINNESOTA NORTHWESTERN ELECTRIC RAILWAY business. The data shown are an average for four years' operation. The cost figures are necessarily higher than would have obtained a few years ago. The cost of operation per car-mile also includes the haulage of a considerable amount of freight.

The line of the Minnesota Northwestern runs a distance of 20 miles from Thief River Falls, Minn., a town of 6000 inhabitants, to Goodridge, Minn., a town of 500. When the line was originally planned the intention was to construct 20 miles each year, but these plans were frustrated by the war. At Thief River Falls there are connections with the Minneapolis, St. Paul & Sault Ste. Marie Railway and the Great Northern Railway. The passenger and freight depot of the Soo Line is used for the Thief River Falls terminus of this line. The entire territory that the line runs through is a partially developed agricultural section that twelve years ago was Indian reservation. All of the business obtained along the line is from agricultural products or products manufactured for consumption in the district. The line runs through open prairie country, so that the grade was made entirely by means of side borrow work. The borrow pits were made continuous in the form of ditches for thoroughly draining the right-of-way. The roadbed consists of 72 lb. per yard steel rails laid on 6-in. x 8-in. tamarack ties, spaced eighteen to the 30-ft. rail. The line is gravel ballasted practically the entire length. The maximum gradient is 0.3 per cent and the maximum curvature is 6 deg.

EQUIPMENT IS GASOLINE-ELECTRIC

The type of equipment used is a gasoline-electric motor car, manufactured by the General Electric Company, of Erie, Pa., and designated Type RE-70-B-11, of the following general dimensions:

Length over bumpers	70 ft. 1¾ in.
Length of passenger compartment	30 ft. 5¾ in.
Length of smoking compartment	12 ft. 5 in.
Length of baggage compartment	10 ft. 11 in.
Length of engine compartment	11 ft. 11 in.
Distance between bolster centers	53 ft. 7 in.
Total wheelbase	60 ft. 0 in.
Net weight of car	52 tons
Drawbars	Front, ¾ M.C.B.; rear, full M.C.B.
Width over all	10 ft. 6¾ in.
Height above rail	14 ft. 7½ in.
Journals	5½x10 in. and 5x9in.

The frame of the car is constructed entirely of steel, suitably cross-braced with I-beams and channels. The outside sheathing is of steel plates. The floor is made up in three layers of steel, wood and felt. The interior trim is of mahogany with a composite ceiling. The windows are fitted with plate glass and can be opened to a height of 2 ft. The seats are of the bench type with spring backs and seats, heavily upholstered in plush in the main compartment and leather in the smoker. The seats are wide enough to accommodate three passengers comfortably. The interior of the car is brilliantly illuminated by means of incandescent lamps. The heating is by means of hot water furnished from a Peter Smith heater in the baggage compartment. The seating capacity is ninety-one.

Energy is transmitted from the gas engine to the driving wheels by means of electric drive. The power plant consists of an eight-cylinder, 550-r.p.m., 4-cycle gas engine of the "V" type, rated at 200 hp., direct connected to a 600-volt generator of 80-kw. capacity, but which is capable of very large overloads for short periods. The generator supplies power to two Type GE-205 railway motors of 100 hp. each, mounted on the front truck, and gear-connected to the axles. The air-brake equipment consists of an air compressor of 22.5 cu.ft. per minute capacity, directly driven from the main engine, with an auxiliary compressor of 45 cu.ft. per minute driven by a separate engine set of 5 hp., which also drives the generator for supplying electricity for car and headlights. The auxiliary compressor is used for starting the engine by means of compressed air. The brakes are General Electric straight and automatic with a 14-in. brake cylinder.

OPERATING CAB OF THE MOTOR CAR

BOTH PASSENGER AND FREIGHT SERVICE IS MAINTAINED

At the present time two trains daily in each direction are operated, one train in each direction being a passenger train only and one train in each direction a mixed train. The running time of the passenger trains is fifty minutes and the mixed trains sixty minutes. There are three regular stations in the 20 miles, although stops for passengers are made at each mile, on signal. The train crew consists of one engineer and one conductor, who do all of the work necessary to the handling of the mail, express and freight business in addition to the regular work of collecting fares and tickets.

The performance of the motor car in passenger service only, based on operation over track of ordinarily good construction, with the distance between stops as shown and figuring the average duration of stops as thirty seconds, is shown in Table I. This table is based on a motor gearing of a seventeen-tooth pinion

TABLE I—PERFORMANCE OF CAR IN PASSENGER SERVICE

Average distance between stops Per Cent Grade	Schedule Speed in Miles per Hour 1 Mile	 2 Miles	 3 Miles	 5 Miles	 Free Running Speed
Level	20.5	28.0	32.0	37.0	49.0
0.50	19.0	25.0	28.0	31.0	41.0
1.00	17.5	22.0	24.0	26.0	31.5
1.50	15.5	18.0	20.0	21.0	23.5
2.00	13.5	15.0	16.0	17.0	18.5

STATION AT THIEF RIVER FALLS, MINNESOTA

TABLE II—PERFORMANCE OF CAR IN MIXED PASSENGER AND FREIGHT SERVICE

Total Train Tonnage	Schedule Speed, Miles per Hour	Schedule Speed No Stops
52	32.0	49.0
100	26.0	40.0
150	22.0	30.0
200	16.0	20.0
250	14.0	17.0
300	12.0	15.0

For periods not to exceed fifteen minutes this car will pull a maximum trailing load of 500 tons.

TABLE IV—OPERATING RESULTS OF THE MINNESOTA NORTHWESTERN

Year	1915	1916	1917	1918	Total
Motor car-miles	36,363	32,633	26,893	26,612	122,501
Number freight cars hauled	1,610	1,268	1,456	1,864	6,198
Freight-car miles	27,305	21,410	24,605	31,596	104,916
Revenue passengers carried	36,045	31,243	29,176	26,790	123,254
Revenue freight hauled (tons)	17,416	13,608	15,470	19,864	66,358
Fuel consumption (gallons)	22,970	21,832	18 033	18,756	81,591
Lubricants (gallons)	473	356	542	322	1,693
Motor-car miles per gallon of fuel	1.58	1.50	1.49	1.42	......

TABLE III—DATA REGARDING SERVICE AND OPERATING DELAYS OVER A FOUR-YEAR PERIOD

Year	1915	1916	1917	1918	Total
Days in service	311	318	312	314	1,255
Days out of service (overhaul)	6	0	8	0	14
Car-hours in service	3,420	2,994	2,405	2,490	11 309
Delays due to equipment failure	3	2	1	1	7
Duration of above delays in hours (total)	4	3	1	2	10

TABLE V—COST OF OPERATING AND MAINTAINING A GASOLINE-ELECTRIC CAR

Item	Cost Per Year	Cost Per Car-Mile
Maintenance of car body and trucks	$89.50	$0.00292
Maintenance of electric equipment	98.40	.00321
Maintenance of gas engines	45.03	.00147
Other power supplies and expenses	29.99	.00098
Fuel for power	3,386.86	.11059
Lubricants	175.26	.00572
Wages, engineer and trainmen	2,950.00	.09632
Carhouse employees and expenses	1,266.62	.04130
Total	$8,041.66	$0.26251

and fifty-eight-tooth gear. Higher schedule speeds may be obtained by change of gearing. The speeds given in the table are for average gradients of the amount shown.

Table II shows the performance of the motor car in mixed passenger and freight service, as determined from actual conditions on this line. This table is based on service with stops of five minutes each every 5 miles and for continuous runs of not exceeding 50 miles. Where the runs are longer, stops must be longer, when heavy trains are pulled, in order to prevent overheating of motors and generator. The table is also based on the same gearing as shown in Table I and on level track.

Reliability is one of the prime requisites for railroad operation. The gas-electric motor car possesses this in marked degree. With ordinary care during layover periods, and the chances provided for making minor repairs by the fact that the majority of the branch lines do not operate on Sunday, we have found it is necessary to overhaul this type of equipment only every two years. Table III shows the service rendered during the past four years.

Table IV shows that this type of motor car can be relied upon to handle all of the business (both passenger and freight) that usually is found upon branch lines.

The data shown in Table V on cost of operation are based on gasoline at 17 cents per gallon, lubricating oil at 42 cents per gallon, wages of engineer at $160 per month, wages of conductor at $85 per month and carhouse employees at $75 per month. All of these figures are the average paid by this company during the past four years of operation. The costs given embrace all of the expenses directly chargeable to motor car operation, but do not include any depreciation or interest. The figures are for operation of both passenger and freight service. Where the motor car is used for passenger service only the cost is considerably less. Or if the mileage operated is greater the figures per car-mile are less. This is based on an average of 90 miles per day.

For branch lines of approximately 100 miles, the ideal equipment for economical operation is light-weight motor cars of not exceeding 25 tons, with baggage compartment, capable of seating at least sixty passengers and of making a schedule speed of 35 m.p.h. Such cars would take care of all of the passenger requirements usually met with, especially if the power provided was sufficient to haul one light-weight trailer. These motor cars could be operated at a maximum of 15 cents per train-mile.

For the freight service the ideal equipment would be crude oil locomotives capable of hauling trains of 500 to 800 tons at a speed of 20 to 25 m.p.h. The cost of operating this type of equipment would be less than half of that required for steam operation, as all expenses for fuel, etc., cease as soon as the engine stops. Also they are capable of storing fuel for runs of 250 to 500 miles without replenishing. They need no water or fuel stations along the line.

Kilowatt-hours in February

The United States Geological Survey has been conducting a census of energy production on returns received from 3150 electric power plants engaged in public service, including central stations, electric railways and certain other plants, the output of which contributes to the public supply. The returns received represent about 85 per cent of the total generating capacity. For plants which did not make returns or which were unable to furnish the data requested, estimates of output were made from available information. The output for the month of February average 110,000,000 kw.-hr. per day, of which 39 per cent was produced by water power.

THOUSANDS OF KILOWATT-HOURS PRODUCED IN FEBRUARY

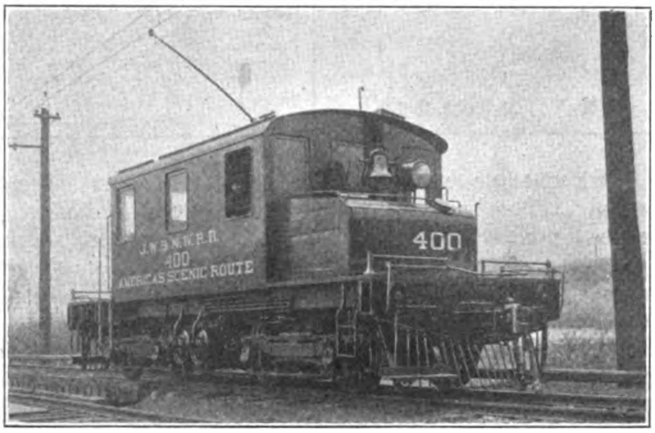
State	By Water-Power	By Fuels	State	By Water-Power	By Fuels
Alabama	39,372	12,939	Montana	69,220	1,552
Arizona	3,967	16,395	Nebraska	810	16,022
Arkansas	77	6,275	Nevada	2,913	137
California	190,462	38,295	New Hampshire	4,660	2,188
Colorado	13,161	17,271	New Jersey	165	79,153
Connecticut	12,419	38,643	New Mexico	59	1,272
Delaware	0	5,549	New York	204,590	288,986
			North Carolina	43,234	2,820
District of Columbia	0	18,094	North Dakota	0	2,308
Florida	678	11,257	Ohio	2,309	181,766
Georgia	35,497	7,236	Oklahoma	223	12,092
Idaho	42,050	259	Oregon	27,034	3,259
Illinois	13,701	241,930	Pennsylvania	55,066	243,098
Indiana	3,761	56,151	Rhode Island	383	28,767
Iowa	44,214	23,110	South Carolina	64,745	3,235
Kansas	1,267	29,203	South Dakota	4,624	3,751
Kentucky	4	18,900	Tennessee	43,780	8,368
Louisiana	0	14,034	Texas	165	43,151
Maine	16,611	132	Utah	48,906	0
Maryland	278	18,448	Vermont	13,777	209
Massachusetts	19,147	102,844	Virginia	17,693	17,685
Michigan	49,980	97,187	Washington	71,160	5,667
Minnesota	24,525	28,708	West Virginia	1,453	51,584
Mississippi	0	5,789	Wisconsin	28,284	32,709
Missouri	4,297	37,212	Wyoming	251	3,542
Total				1,220,972	1,879,182
Combined total					3,100,154

Electric Locomotives of Moderate Weight and Power

With Particular Reference to Freight Handling Requirements on Electrified Steam Road Branch Lines and Interurban Electric Railway Lines

By A. B. COLE
Westinghouse Electric & Manufacturing Company

ELECTRIC locomotives can generally be considered in two groups, regardless of system of current supply, namely, the powerful machines which are used in heavy electrifications on the main lines of important steam roads, and the lighter locomotives which find their field of application in less conspicuous duty in the electrified zones of steam roads and in handling freight cars on interurban lines. The former locomotives are of special designs, each railroad system having its own requirements and its own ideas as to how these are to be met. The design of the lighter machines tends more to standardization.

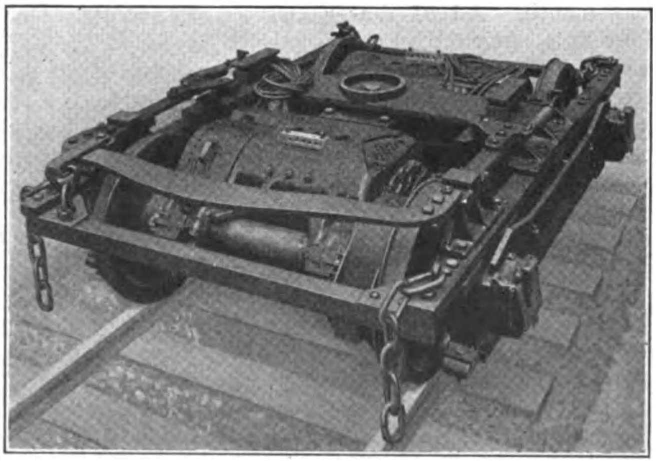


A 50-TON INTERURBAN TYPE LOCOMOTIVE

The purpose of this article is to point out some of the design features of the second type of locomotives and to show what one of the large manufacturers of these machines has developed as a satisfactory arrangement of control and other equipment on the basis of its experience. For convenience these machines will be referred to as interurban locomotives.

SOME GENERAL CHARACTERISTICS OF THE LOCOMOTIVES UNDER DISCUSSION

Standard interurban freight locomotives are usually of the "steeple" type. To many this is preferable to the box type in appearance, and it is free from compressor noise. The cab proper is built of steel with rolled steel channels for the underframe. A hardwood floor is provided in the cab, and a checker-plate walking platform is used outside the cab. All-metal bumpers are used and the splintering so often found in wood bumpers with steel plates is thus avoided. M. C. B. couplers mounted in bumper pocket castings are standard, but where trailing loads must be hauled around short-radius curves, these couplers may be mounted on radial draw-bars. Friction draft gear, or spring draft gear can be used to meet severe conditions. When the weight of a given type of locomotive of a sufficient electrical capacity is less than the weight required from the standpoint of adhesion, additional weight is provided, principally in strengthening the various members rather than loading with ballast. The trucks are of the rigid bolster equalized pedestal type. This type of truck has a minimum number of wearing parts and no projecting springs and provides a substantial means of transmitting the high tractive efforts required in freight service. The various members of the trucks are held together by tapered bolts in reamed holes. Swivel trucks with brakes actuated through a radius bar are standard, due to the ease with which they negotiate short-radius curves.



TRUCK OF INTERURBAN FREIGHT LOCOMOTIVE WITH MOTORS MOUNTED

RELIABILITY IS THE PRIME CONSIDERATION

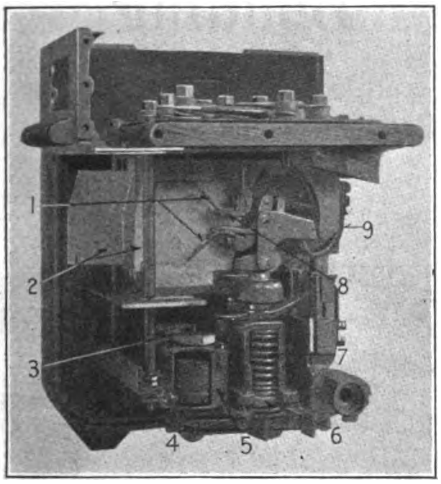
Two of the most important factors to be considered in handling freight are reliable operation of equipment and continuity of service. The first is of prime importance in that on many roads there are but one or two electric locomotives and these must be available for service at all times, irrespective of the fact that they must be kept in operation as much of the time as possible.

In designing a locomotive equipment five essential features must be considered: (1) The weight, type, capacity and mechanical design should be suitable for the service requirements. (2) The motive power apparatus should be selected to meet the service conditions. (3) The apparatus on the locomotive should be mounted in such a way that each part will be permitted to operate to the best advantage, with the chance of trouble reduced to a minimum. (4) All apparatus should be accessible for inspection. maintenance and overhauling. (5) There should be no danger of the operator being thrown in contact with the live parts.

Centralization of control equipment is very important and one arrangement of this is shown herewith. This has a number of advantages, some of which are summed up briefly as follows:

In the first place, all control apparatus is assembled compactly in one part of the locomotive, and the switch groups are located in such a manner that they are readily accessible from all sides and at such a height that a man can get at them freely.

Another feature is the location of grid resistors above the switch groups which are placed under the roof, reducing the length of connections between these two pieces of apparatus to a minimum. All heat from resistors passes directly through the roof ventilators and practically none reaches the switch groups. The reversers and series parallel switches also are readily accessible, and at the same time are centrally located relative to the propelling motors, thus requiring a minimum amount of cable. Again, the air-brake distributing valve is located inside the cab, protected against freezing and easily accessible. Objectionable noise and drafts inside the cab are eliminated by placing the compressors and blower motor in the hoods, which location makes it easy to lift them out by merely taking off the hoods without disturbing any other apparatus. Finally, all control parts are visible and at the same time protected from accidental contact by grounded expanded metal screens which are made up in sufficiently small sections to permit ready removal for inspection of apparatus.



DETAILS OF UNIT SWITCH
1, Arcing horns; 2, arc chute; 3, magnet valve stem; 4, air valve; 5, operating magnet; 6, air cylinder; 7, operating spring; 8, contact tips; 9, contact shunt.

RUGGEDNESS OF EQUIPMENT IS AN ELEMENT IN RELIABILITY

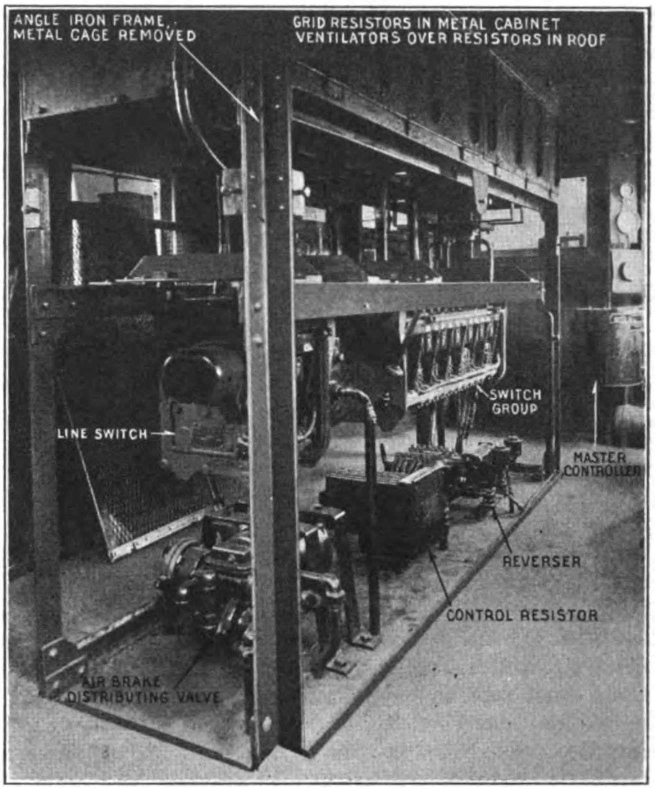
The demands of freight service require motive power equipment of rugged construction, and in locomotives of moderate size the features that have proved successful in city and interurban cars have been incorporated. The motor characteristics, however, had to be changed to furnish low-speed freight service at good efficiency, hence a low-speed locomotive motor was brought out. This produces high tractive effort at low power demand (the locomotive speed being low), making possible the hauling of freight on roads of limited substation and feeder capacity.

Design features introduced to insure reliability and low maintenance cost include particularly the following: (1) Form-wound armature coils, with special insulation in the ends of the slots. (2) Strap-wound field coils securely fastened and held against vibration. (3) Substantial brush-holder design and construction. (4) Mica insulated, undercut commutators. (5) Bearings of ample size with oil-gaging pockets, lubricated by oil drawn up and filtered through waste. (6) Two-point gear case suspension.

UNIT SWITCH PLAN SOLVES THE CONTROL PROBLEM

The unit switch control is used on locomotives, the Westinghouse Company having adopted the air-operated, "HL" type for this purpose. This has proved itself capable of handling the heavy currents encountered and also to withstand the bumps to which the locomotives are subjected, particularly in switching work, low-speed drag-freight service or main-line service.

The designers of this control have had in mind the following requirements: (1) Ample protection against too heavy overloads, grounds, short-circuits, surges in the contact line and lightning. (2) Simplicity of apparatus and circuits. (3) Powerful forces at the contacts. (4) Contact pressure independent of line voltage. (5) Small number of wearing parts. (6) Ease with which contacts and arc chutes may be renewed. (7) Small number of simple, rugged interlocks. (8) Ease of operation of two or more locomotives from the same master controller.


ANGLE IRON FRAME, METAL CAGE REMOVED
GRID RESISTORS IN METAL CABINET VENTILATORS OVER RESISTORS IN ROOF
LINE SWITCH
SWITCH GROUP
MASTER CONTROLLER
REVERSER
CONTROL RESISTOR
AIR BRAKE DISTRIBUTING VALVE

CONTROL EQUIPMENT AFTER REMOVAL OF SCREEN

In this control the various main circuit connections are made by unit switches, actuated by compressed air taken from the air-brake system; the admission of air to the switch cylinders being controlled by magnet valves. These magnet valves are operated by current from a control circuit through a train line from the master controller. Current from this control circuit is tapped from points on the control resistor which is connected between trolley and ground, or may be supplied by a storage battery. One of the illustrations shows a cross-section of an HL-control switch group.

Some of the distinguishing features of the construction of the switch group are brought out by the numbered arrows on the illustration of the unit switch reproduced on page 1153, as follows:

(1) Bronze arcing tips carry the arc out from the butt contacts under the impetus of a magnetic blowout flux. The arc traveling outward on the tips is cooled so that little burning takes place. (2) Reversible asbestos lumber arc chute sides, removable by pressing aside a small spring retainer, confine the arc to limited space. (3) Pins which when depressed admit air to the cylinder and operate the switch mechanism, permit inspectors to test the movement of each switch without any current on the locomotive. (4) The valve mechanism, under the action of an electromagnet energized from the master controller, permits the entrance or exit of the compressed air which operates the switch. (5) The valve actuating magnets are inclosed within weatherproof cast-iron shells. The coils are impregnated with "bakelite." (6) The piston, which forces the movable contact upward is made of triple-ply treated leathers reinforced with metal expanders. (7) The heavy coiled spring exerts 100 lb. pressure against the piston. Upon release of air from the cylinder the switch jaws are quickly separated. (8) Heavy copper butt contacts comprise the switch jaws. They are self-cleaning by virtue of a "wiping" action which takes place during opening or closing of the switch. Their current carrying capacity is made positive by the contact pressure secured by the use of compressed air. (9) Heavy flexible shunts of braided copper relieve all bearings and pins of duty.

Methods Used in Third-Rail Bonding

High Conductivity Is the First Essential, and Ease of Installation and Maintenance Are Important Consideraitons

By G. H. McKELWAY
Engineer of Distribution, Brooklyn Rapid Transit System

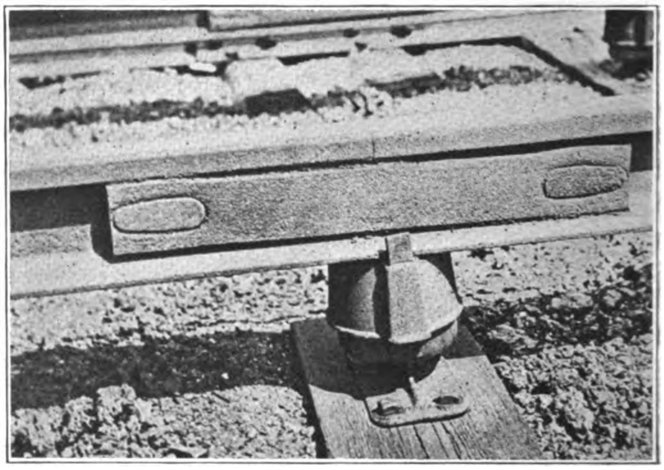
THE methods used in the bonding of conductor rails of third-rail systems are similar in many respects to those used in bonding running rails, but they are generally simpler. The reason for this is that the third rail is considered solely in regard to its use as a conductor of electricity while the running rails have a double function to perform. The carrying of current by them is the less important function, always subordinated to their use as part of the track over which the cars must operate. The running rails themselves and the joint plates connecting them must first be considered from a mechanical standpoint and designed to withstand the stresses to be imposed upon them by the rolling stock. The bonding must be installed so as not to weaken the rails or joints, or in any way to interfere with maintenance or repair.

The conductor rails, on the other hand, are not exposed to the loads which the track rails must continually support and the blows which they must receive. The joints can thus be designed to give ample clearance for the bonds, with only so much of strength as is needed to withstand the comparatively light wear and the light blows from the third-rail shoes.

At first the usual practice was to install, as third rail, old running rail that had outlived its usefulness in the track but which answered quite well as a heavy conductor. If a rail heavier than the light track rails was wanted, or one on which there would not be so much maintenance as on the old rails, new ones were bought, but nearly always they were of the same section and composition as those used in the tracks.

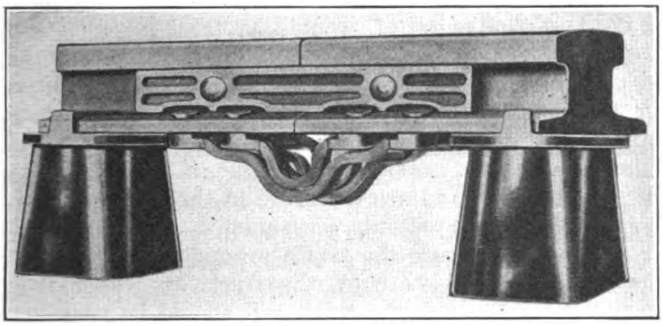
PREVIOUS TYPE OF BONDING USED WITH OLD RUNNING RAILS

With such rails it was only natural that the old type of joint plates should be used and that the rail, when set up on insulators at the side of the track, should be bonded in the same manner as was done when it was part of the track. As the bonding most generally used with T-rail is the expanded-terminal type, either under or around the joint plate, that type was usually used when the old track rail was used for the third rail. In nearly all cases the old bond holes were used for the new bonds which were installed in the usual manner.

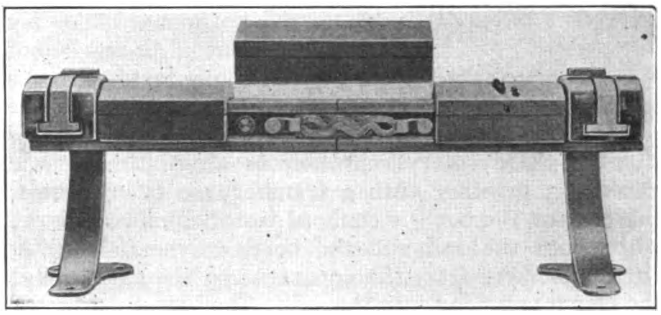

WELD ON THIRD RAIL JOINT

While protected bonds compressed into the web of the rail made a very satisfactory job and one that would last for a very long time if the bonds had been well installed, yet, as the bonds were placed under the plates, their condition could not be told by inspection alone and repairs to defective bonds were rendered more difficult and expensive than would have been the case if the bonds had been exposed. Furthermore, there was almost no reason for putting the bond under the plate, except that by so doing a shorter bond could be used than if it had been installed around the joint, as the liability of persons stealing the bonds from live third rail is very very slight.

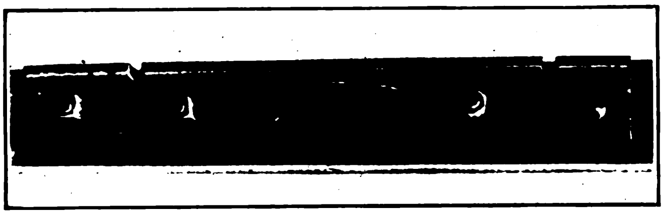
But the installation of bonds outside of the plates and compressed into the web of the rail required the use of bonds that are quite long and, therefore, both expensive and inefficient, hence attempts were made to use either the head or base of the rail as the place for installing the bonds. Bonds so installed have proved very satisfactory and have been widely used, especially on roads where the third rail is made of a soft steel of special composition and section. The thick webs of such rails necessitate the use of bonds with very long terminal studs if the studs are to go entirely through the web of the rail. Such bonds have been used, even when the web of the rail has been as thick as 2¾ in., but the more usual practice has been to use other types of bonds even where rails with thinner, but still comparatively thick, webs are placed on the insulators. The application of bonds to the base of the third rail was tried out comparatively early and that location has been a favorite one for the installation ever since. The splice bars may be merely flat plates bolted up tight against the webs of the rails, as there is no necessity for supporting the head as would be the case with a running rail. This arrangement leaves plenty of room on the base of the rail outside of the plates into which the foot bonds can be compressed and where they neither interfere or are interfered with, by the splice bars. If for any reason it is desired to use the ordinary type of angle bar extending down over the base of the rail, sufficient portions of them can be cut away at the points where the bond terminals will come to permit of the easy installation of the latter.



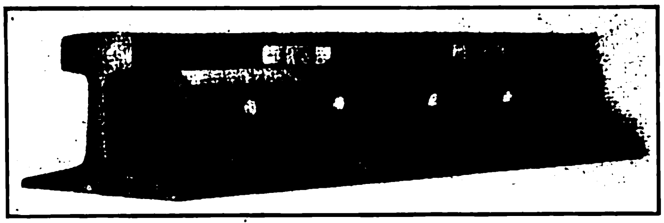
FOOT BONDS USED IN PENNSYLVANIA RAILROAD TUNNELS



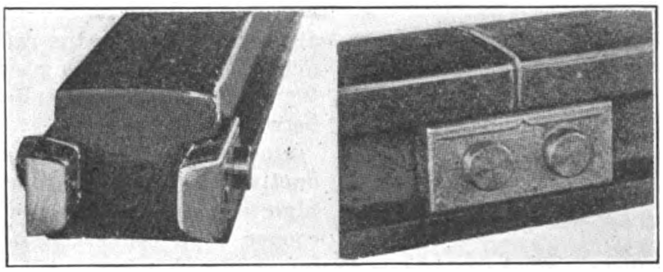
PROTECTED TYPE BOND APPLIED TO DOUBLE HEAD PROTECTED THIRD RAIL



SOLDERED TYPE OF RIBBON BOND FOR HEAD OF RAIL



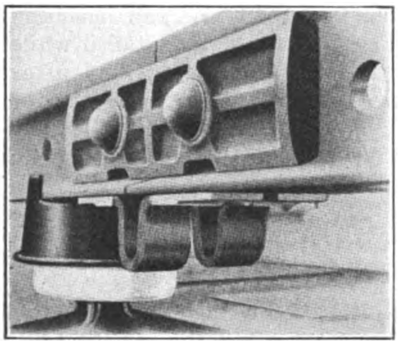
TWIN TERMINAL BONDS ON HEAD OF RAIL



BOLTED AND SOLDERED SPLICE BARS

Another type of foot bond, with which angle bars can be used and the installation of which will not necessitate any cutting, is one composed of flexible copper ribbons formed into a U-shaped loop and soldered under the base of the rail. By the use of this the rail can be heavily bonded and it will be unnecessary to install more than one or two of these bonds. If well put on, the bonds will "stay put" much better than soldered bonds placed at any other point on the rail and will give satisfactory service. The bonds, however, cannot be put on to advantage after the rail has been placed on the insulators so they must be installed while the rail is turned over on its side or head and after the joints have been bolted up. Then a long section of the rail is set in place at one time. It is obviously impossible to renew bonds of this type satisfactorily after the rail has been placed in commission. On the head of the rail the bonds are installed by either riveting, soldering or welding. The twin-terminal bond has been used to a large extent for this work. This bond, as shown in an accompanying illustration, consists of two short loops of stranded wire having at their ends terminals at right angles to the loops made by the wire and lying against the head of the rail. From each of these terminals two studs project. The bond is applied by first drilling two holes into each end of the abutting rails at the proper distance apart, the holes being ½ in. deep and ½ in. in diameter. An annular groove is cut near the top of each of the holes by a swinging milling cutter rotated in the hole. Then the studs are inserted and driven in with a hammer, the soft copper of the studs flowing into the rings and holding the terminals firmly in place.

The soldered bonds are generally made up of ribbons of copper instead of wire, and are soldered to the head of the rail with the loop either hanging down or projecting horizontally. Bonds soldered to the head of the rail have, however, been given up by nearly all railways as they are too easily knocked off, either by thieves or by something hanging from the car above and dragging along the head of the rail. Again, soldered bonds, although they may seem to be firmly connected to the rail at the time that they are installed, very often loosen up under vibration and then one or both ends of the bond comes away from the rail. The welded bonds are made of either ribbons or wires, and the finished job appears much like a soldered bond but the terminals are held to the rail by bracing or welding instead of soldering. They are put on in any one of three ways. In one plan, a car on which has been mounted a single-phase rotary converter or alternating-current generator, together with a transformer, is brought to the job and the bond is clamped tightly against the rail while both the rail and the bond are heated by the current flowing from the apparatus on the car through the clamp and bond into the rail. They are then brazed together, the operator holding a strip of brass and melting it down at the bond terminal. If electric current can be obtained the rotary converter is nearly always used, but if it is not available the current is obtained from the small generator driven by a gasoline engine.

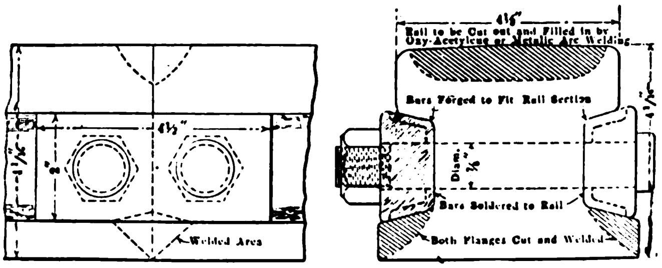


SOLDERED TYPE OF FOOT BOND

NORMAL POWER SUPPLY CAN BE USED BY INSERTING RESISTANCE IN THE CIRCUIT

Another plan, which can only be used when current is available, is to reduce the voltage by the use of resistance in the circuit. The bond and rail are then heated by an electric arc and the molten welding material, either copper or iron, is flowed around and under the terminal, welding it to the rail.

In the third plan, the heat applied is received from an oxy-hydrogen, oxy-acetylene, or similar flame and the bond is attached to the rail in the same manner as is done when the electric arc is used.


4½"
3½"
1⅞"
Welded Area
4⅛"
Rail to be Cut out and Filled in by Oxy-Acetylene or Metallic Arc Welding
Bars Forged to Fit Rail Section
Diam. ⅞"
Bars Soldered to Rail
Both Flanges Cut and Welded
4⅞"

DETAILS OF THIRD RAIL WELDS AND BOND

Carrying still farther the idea that the third rail should be treated as a conductor and not like the running rails, a few companies have combined the bond and splice plate into one piece by welding the ends of the rails together or by some other method by which a single short piece of metal on each side of the web of the rail will do duty both as bond and splice bar.

There have been attempts to do away with the use of bonds by merely bolting the plates up tightly to the rails and depending upon them to carry the current. This, however, has proven even more of a failure when tried with third rail than with the running rails. The reason for trying it with third rails has generally been that the work has been of only a temporary nature and it was believed that the bolts in the third rail joints would remain tight much longer than those in the track. The results, however, have always proved that rust will work in between the rails and the plates, making a high resistance joint, and that the bolts will soon become badly burned.

The ordinary welded joint, similar to the welded joints in the tracks, has been used and has given great satisfaction, the only objections being the high first cost and the difficulty of opening the joints later if that should be necessary on account of an accident, when it may be desired to have the rail alive up to the wreck so as to permit bringing up the wrecker, but to have it dead at the point of trouble so that the men can work without danger. Another objection, when the welding is done according to the scheme largely used on track rails, is the cumbersome train of welding cars needed and the inability later to use that type of joint in scattered work as the cars are owned by an outside company and are therefore in the section where they might be wanted only occasionally. Then it would be necessary to route the traffic around the cars while they work, as they occupy the track on which they work. Again, unless the third rail should be very low and close to the running rail, it would be impossible to weld the joints in place, the usual plan being to weld long sections at one time while the rail is on the ground and later to place it on the insulators.

Thermit joints can be made with the rail in place on the insulators and scattered joints can be welded by that method without the interference to traffic necessitated when cars are used. The price of the completed joint is, however, quite high and that is the principal reason why it has not been used more extensively.

Still another welded joint which has been brought to a high standard of perfection is one where the plates are used and are not only bolted up but their two edges are seam-welded to the rail by means of an electric arc and then the abutting ends of the rails are joined together by means of molten tin poured into the opening between them.

One other method of obtaining joints of high conductivity and current carrying capacity, yet of not too high first cost, has been by the casting of a short heavy copper bond connecting the ends of the rail, a mold being placed on each side of the joint and the molten copper being poured in as with the ordinary cast weld. When the copper has cooled the excess is cut away, leaving a very short joint of high conductivity. This joint must be very carefully made or there will be trouble on account of its breaking as a result of vibration or the expansion and contraction of the rails.

Still another joint which has given good satisfaction is made by bolting and soldering a short piece of copper to each side of the joint, only one bolt passing through the end of each rail. These bolts are made of special steel so as to give sufficient strength to withstand the pull of contraction that may be placed upon them and in addition a portion of the top of the head of each rail is cut away at the end and then the ends of the rails welded together by this space being filled in with molten metal deposited by arc welding. This not only strengthens the joint but adds to its conductance.

Solving the Traction Problem*

Electric Railways Are Faced with Permanently High Operating Costs and Aid Through Increased Receipts Is Urgently Needed

BY THOMAS CONWAY, JR.
Professor of Finance, University of Pennsylvania

WHILE a considerable proportion of the electric railways in this country have secured some relief, yet many properties have been unable to increase revenues sufficiently to offset the largely increased cost of operation. Various reasons have been cited for the failure to secure relief in such cases. In some states, as for example, in New York, the courts have denied to the commission power to increase rates beyond the maxima specified in the franchises. In a very few states, the public service commissions do not exercise jurisdiction over electric railways. Under both conditions the appeal for relief, therefore, must 'be directed to the city authorities.

I know that you will all agree with me that the average city official does not possess the technical training necessary to enable him quickly to analyze and weigh the merits of such an appeal, nor do the cities have an organized staff of trained experts, engineers and accountants versed in the intricacies of traffic, engineering and accounting matters, on whose analyses the city authorities can reply. Therefore a longer period of time has been required to secure a proper adjustment of fares in those cases in which the city itself had to decide upon the merits of the case.

There has been, moreover, a feeling of distrust in certain quarters concerning the genuineness of the need of the electric railways for relief, and much confusion of mind has arisen as to the proper course to be pursued in granting such relief where the necessity therefor was established. In such cases, the companies have suffered because of the delay which has occurred, but the disadvantages have been almost as great to the patrons of the electric railways and to the municipalities in which they operate. Many persons have felt that good progress could be made in the wise solution of the question by the appointment of some board or commission whose membership would be such as to command the confidence of the public at large, to which would be delegated the task of making an investigation of the general status of the industry and suggesting the way in which needed relief should be granted.

It is the announced intention of the Federal Electric Railways Commission, just appointed by President Wilson to avoid passing upon local questions; that is to say, attempting to adjudicate the merits of any particular application for an increase in fares. It is the intention of the commission, as I understand it, to make a general study of the position of the industry and a critical analysis of the various methods of relief which may be suggested, the purpose being to place at the disposal of state and local authorities a fund of information upon which they can act intelligently in solving particular problems.

Under present conditions, the solution of the electric railway problem can be accomplished by a possible combination of two methods. The first involves a decrease in expenditures, the possibilities of which are comparatively limited. Wherever inefficient operation prevails, the cities should insist that the companies adopt the most approved methods of operation, or at least that the loss occasioned by inefficient methods be borne by the railway and not passed along to the car rider as a part of an increase in fares. The greatest opportunity for decreased expenditures lies in a reduction of state and municipal taxation, the elimination of local paving requirements, and other relief of a similar nature. Unfortunately, many municipalities do not feel that they can, at this time, spare the revenue heretofore derived from the taxation of railways or assume the paving burdens which have been placed upon these corporations. Municipalities, like the electric railways themselves, find that the cost of doing business has largely increased, with the result that the cities are casting about for a way to secure larger revenues rather than to reduce the sources from which revenues have been heretofore derived.

From the standpoint of the equities of the case, no good reason can be advanced why the car rider should be required to pay higher fares in order to maintain street paving which he in no way wears out while taking his car journey. The tremendous increase in the use of the automobile, especially the growing number and size of auto trucks, has brought about very rapid deterioration in street pavements and has required a much more expensive type of pavement than has heretofore been deemed necessary. Under present conditions, there is no reason why the railways should be required to maintain pavement, except in so far as they themselves destroy the pavement while making repairs to their tracks. The paving burden should in equity, be shifted to the shoulders of those who use and wear out the pavements. The registration fees required of both passenger and commercial automobiles are very moderate, and I believe a much fairer solution of the problem could be secured by passing the burden of maintaining road pavements of all kinds along to the owners of automobiles and other vehicles, the tax being graded in proportion to the destructive effect of the various classes of cars.

OPERATING COSTS WILL NOT DECLINE

One of the important functions which the new national commission can perform will be to inform the public at large of the continuing character of the electric railway cost problem. In so far as the next few years are concerned, there is no prospect of a material reduction. The cost of labor will tend to increase rather than diminish. It is true that a decline has occurred in some places in the rates paid common labor, but offsetting this are the demands for higher wages and shorter hours of the organized skilled and semi-skilled labor, of which the most important class is the trainmen. There are now pending before the National War Labor Board a large number of cases in which the employees are seeking higher wages than heretofore allowed by the board. Employees of the Detroit, Pittsburgh, Public Service, Bay State and numerous other companies are now asking for higher wages and shorter hours.

The outcome of these demands is, of course, uncertain, but it should be remembered that the electric railway industry is face to face with a world-wide demand for an eight-hour day. The granting of this demand would mean a very material increase in operating costs, because of the peculiar conditions surrounding the electric railway business. Unlike other businesses, it is impossible to offset the reduction in the working day by a speeding-up process. The motorman and conductor cannot increase their productive power in this fashion, for the speed of the car is determined by practical considerations, such as matters of safety and the convenience of the public. To what extent the labor cost will increase is problematical, but in view of all of the factors which are involved, I am certain that there is no prospect of any material reduction in labor costs.

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*Abstract of address before the New York State Conference of Mayors at Schenectady, N. Y., June 11, 1919.

With no chance for a reduction in two-thirds to three-quarters of the operating expenses representing payments to labor, the possibilities for economies are therefore largely reduced. What is the situation concerning material costs? It is probable that with the passage of time, some reduction will occur in the prices of steel rails, copper wire, motor parts and the thousands of other articles purchased by electric railways, but so long as the labor costs in the industries producing these articles remain high, it is impossible to expect a reduction in the prices of these commodities to anything approaching pre-war levels. The electric railways are face to face with the necessity of permanently paying high prices for materials and supplies.

Moreover, in so far as the total operating expenses are concerned, any possible reduction in the cost of the various materials purchased will be more than offset by the larger quantities which must be purchased. In response to a national policy, the electric railways, like other industries, confined their expenditures for the repair and renewal of track and other portions of their properties to a minimum during the war period. But this policy cannot be indefinitely continued. Indeed, the industry at this moment is face to face with the necessity for very large expenditures to make up, by degrees, for the failure to do a normal amount of work during the war. The cost of a normal amount of renewals and replacements is materially larger than the expenditures for such purposes made during 1918. When the increased expenditures for renewals are carried into the results for the year, it will be found, in practically every case, that the total expenses of the electric railways are materially greater than they have ever been in any preceding twelve months period.

THE SO-CALLED "EMERGENCY" IS A PERMANENT CONDITION

The "emergency," as it is termed by the public, has therefore not passed and will probably never pass, in the sense in which the term is used by the average man. The cost of operation of the electric railway has been permanently placed upon a higher level, and it is idle to evade the consequences which are entailed. To meet largely increased expenses requires materially increased revenues, and this is true no matter who owns the electric railway or who operates it. The service-at-cost plan does not enable the community to escape the necessity for meeting increased expenses.

If the municipalities themselves owned and operated the electric railways, sound business policy would demand that revenues be increased sufficiently to meet increased expenses. It is now a well settled policy of municipal finance that water works should be made self-supporting and, indeed, there is no rational stopping place under municipal operation between service without charge, as in the case of sewers, and service at what it costs the city. The sooner we realize that no matter what form the solution may take, it must be placed upon the firm foundation of collecting sufficient revenue to defray the cost of service, the more quickly can we take up the question as to exactly what form the solution should take.

There is no doubt that certain companies have been heavily over-capitalized in past years and that men have gotten rich by putting together consolidations and selling securities to the public aggregating much in excess of the fair value of the properties. I stand here to hold no brief for such financial methods. They were iniquitous and have resulted in irreparable damage to the industry as a whole. I do not believe, however, that, taking the electric railways as a group, there has been anything like the overcapitalization which the public at large has been taught to believe exists.

The first step in the solution of the present problem is a frank understanding by both the companies and the public of the necessity for the determination of fair value, in order that the public may know whether the return which they are asked to pay to bond and stockholders is more than a reasonable return. If the public and the company are both agreed that no more should be asked or allowed than a fair return upon the fair value of the property, the matter of capitalization becomes of minor importance, and it is then possible to demonstrate to the people of any city that it is to their selfish interest to see that this return is paid, rather than to grind the railway ino bankruptcy by insistence upon a franchise stipulation concerning fares.

ONLY ALTERNATIVE IS INCREASED FARES

If it is granted that the companies are entitled to increased revenue sufficient to offset increased operating expenses and taxes, the problem of how this increase is to be secured arises for solution. The necessity is so great that the only alternative in most cases is an increase in fares. The evidence at hand shows clearly that increased fares do not bring a mathematically equivalent increase in revenue. Increased fares discourage short-distance travel and to some extent decrease the volume of long-haul business. The average man believes that the electric railway enjoys a complete monopoly, and indeed the theory of our law sustains this belief; but as a practical matter, the electric railway in most cities does not by any means enjoy a complete monopoly. In the smaller cities, an increase in fares beyond a certain point will defeat the desired end by driving people to the sidewalks. In the smaller cities, one may walk from the business center to any residential district in twenty minutes or one-half hour. Higher fares encourage the walking habit, on the part both of those taking short journeys in the business district and of those traveling between their places of employment and their homes.

The electric railway, moreover, encounters a most serious competitor in the automobile. The people of New York are to be congratulated upon the good sense which was displayed by their Legislature and commissions in outlawing the unfair competition by jitneys. The privately owned automobile, however, has exercised a most serious effect upon the electric railway business. In 1914, 1,574,431 pleasure cars were licensed for operation in the United States. In 1918 the number of pleasure cars licensed was 5,352,350. It is hard to believe that such an enormous increase in the use of the automobile could have occurred in such a short period. The automobile has not only decreased riding upon the trolley cars during business hours, but it has deprived the railway of practically all of its pleasure riding. The entire economic basis of the industry has been undermined, and it requires no prophet to see that if the business is to survive it must be a radically different business ten years from today than it is at the present time. It must, in the first place, secure prompt and adequate relief by a sufficient increase in revenues to enable it to function as a public utility; for a rejuvenation of credit is essential to carrying through the radical readjustment in operating methods which, in my opinion, will be necessary. In many of our smaller cities, the companies must turn to one-man cars, permitting more frequent service with reduced operating costs.

In our larger cities, I believe the time has come when the companies and the public must face the necessity of abandoning the theory of a flat 5-cent fare covering the entire city area, and of charging the passenger according to the distance which he rides. It is inequitable and, as a business matter, unjustifiable to expect the short rider to pay 7, 8, 9 or 10-cent fares in order to defray part of the cost of carrying the long distance rider. The next few years will witness important experiments in the attempt to base fares upon the service rendered, charging the short distance rider a fare not in excess of 5 cents and providing increments above that amount as the length of the journey increases.

The solution of business questions of a public nature is the acid test of a democracy. I believe every fair-minded municipal official will agree with me that nothing is to be gained by dodging the solution of the traction problem. Every day of delay makes the solution more difficult. I think the American public is convinced, especially in view of recent experience with federal operation of railroads and telephone and telegraph lines, that greater efficiency is to be secured under private operation. Exceedingly few of our municipalities are in a position to finance the purchase of their electric railway systems, and, as a prominent municipal official of New York City has recently put it, "it would be bad policy to buy a losing business." If private operation is the most satisfactory, and the municipalities are not in a position to purchase their electric railways and lease them to private operators (the advantages of which are very debatable), then the only course which remains is to make it possible for the present owners to give good service and to meet the demands of the community, which entails a just and reasonable increase in revenue sufficient to offset the increased cost of service.

There is no more important question before the municipal officials of the State of New York than the solution of the electric railway problem. It is to be hoped that the question will be dealt with in a broad-gaged spirit by both sides, for the electric railway is a necessity of city life, and as such deserves unbiased and enlightened treatment on the part of those who have it in their power to grant such relief as may be necessary under the circumstances of each case.

Vacation Days Among the Pines

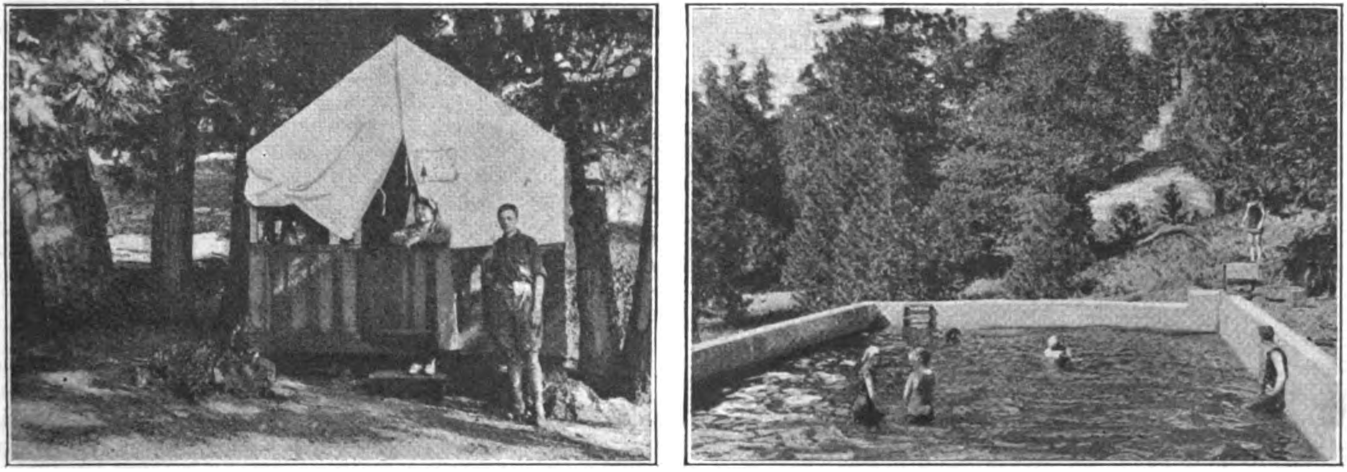
NOT many electric railways in the United States are able to provide such a vacation camp for employees as the Pacific Electric Railway has done in California, but this company's example may encourage others to do the best they can with the natural means at their disposal.

The Pacific Electric Railway "Vacation Home," which last year entertained more than 800 employees and their families for varying periods, is on a wooded 15-acre tract in the San Bernardino Mountains, 22 miles from San Bernardino and 1½ miles from Little Bear Lake. The principal buildings are the Social Hall and the delicatessen store, with lunch counter. There is also a fine swimming pool, 30 ft. x 60 ft.

The residents are housed in tent cottages, 9 ft. x 12 ft., furnished with bed and springs, mattress, washstand, bowl, pitcher, mirror and chairs. Each tent has a kitchen equipped with an oil stove and other necessary housekeeping equipment. Where employees have their own camp outfits, space for camping is furnished free.

Upon the basis of present food prices it is calculated that supplies for a family of two cost $8 to $12 a week and for a family of four $15 to $18 a week. The tent cost for single persons, who must combine in groups, is $2.50 apiece a week, and for a family of two or more (all dependent except the head) the cost is $3.50 a week. Non-dependent relatives or friends may be included if spare equipment happens to be available at the time of arrival. The company furnishes free round-trip transportation to employees and their dependents from any point, and the San Bernardino Mountain Auto Line gives reduced rates to these.

Two weeks is the maximum stay permitted unless the camper has his own outfit. Camp periods begin and end with Sunday. Reservations cannot be made for split weeks. The season begins on June 15 and extends to Sept. 15.



HOW THE PACIFIC ELECTRIC RAILWAY MAKES VACATION PLEASANT FOR ITS EMPLOYEES

Philip Dawson on Future Electrification

Ministry of Ways and Communications Will Temporarily Retard But Eventually Accelerate Electrification on a Large Scale—Plans Made by Individual Railways Would Be Altered in Some Particulars—A Wider Choice of Systems Now Possible—Success of the Brighton Electrification Leads to More Ambitious Plans for Early Development

PHILIP DAWSON needs no introduction to the American electric railway engineer nor to other readers of the ELECTRIC RAILWAY JOURNAL. In his early days, Dawson's "Electric Traction" quickly became the handbook of the street and interurban railway.

In the last decade, Mr. Dawson has achieved fame through his pioneer work in heavy electrification, notably that of the London, Brighton & South Coast Railway's suburban lines. Full of irrepressible vim and energy, he is the type of man whose interest in life extends far beyond the field of his profession. Consequently, it is not astonishing to learn that he has recently been elected on the municipal reform ticket to represent West Lewisham on the London County Council; nor that he was promptly made a member of the highways and electric supply committees. The function of the latter is explained by its title, but the scope of the highways committee work includes not merely highways, bridges and ferries, but also the large tramway system operated by the London County Council. As election to the council brings no salary, it is obvious that the L. C. C. stands to get some high-class engineering for nothing.

Mr. Dawson is also a member of the commission appointed by the Belgian government during the war to investigate the future of Belgian State Railways, rendering valuable service for which the King of the Belgians has created him Chevalier de l'Ordre de Leopold.

Since the Belgian government has returned to its capital, Brussels, a very important commission has been created by the Belgian Minister of Railways under royal decree, to report to the government on the advisability or otherwise of electrifying a portion or the whole of the railways and to investigate and report on the problem of co-ordinating the electric power generation and distribution of the country.

PHILIP DAWSON

The commission comprises all the heads of departments of the Belgian State Railways and the post and telegraph service, the professors of electrical engineering of the Belgian universities, and a number of representative business men, manufacturers and bankers nominated by the Crown, as well as the electrical and mechanical engineers of the French State Railways, the Chemins de fer du Midi and the Chemins de fer d'Orleans. Mr. Dawson has been appointed one of the two vice-presidents of the commission, which is presided over by Baron Ancion, a well-known Belgian senator, who is connected with large coal, iron and steel and banking interests.

Mr. Dawson is also a member of the committee set up in England by Sir Albert Stanley, president of the Board of Trade, to investigate the water-power resources of the United Kingdom, having been appointed to this position by the president.

The accompanying portrait of Mr. Dawson shows him in another and more readily recognized form of patriotism, namely, as a military man. Although his fifty-two years barred acceptance of his services in the field, he promptly offered his services as a volunteer and became major in command of the Third Volunteer Battalion, Royal West Kents.

In discussing electrification possibilities with Mr. Dawson it was natural to ask him first what the effect, favorable or otherwise, would be of the formation of a Ministry of Ways and Communications as proposed with such far-reach-powers of co-ordination. He replied that in principle this would be an excellent thing for the advancement of electrification. To be sure it might retard the early electrification of certain individual systems, but in the long run it would accelerate electrification. What he feared was that electrical enthusiasts would lead the public to expect too much of electricity. People were already talking about a farthing a unit ($\frac{1}{2}$ cent per kilowatt-hour) for electric energy for lighting, power and heating, and of main-line electrification over night. The old dangerous magic associated with that mysterious "electricity" threatened to come into action again.

As a man of business, as well as an electrical engineer, Mr. Dawson said that he had only one test to propound concerning electrification, and that was "Will it pay?" Countries like Italy, Sweden, Norway and Switzerland were undoubtedly right in considering the electrification of practically all their lines, because they have no coal of their own but have plenty of water power. In such cases strategic reasons and national economies were ruling factors. Great Britain, however, could look at the problem of electrification in a different light. It has plenty of coal and little water power. Electrification, therefore, is chiefly a proposition of getting back the interest on the investment. Subjected to this test it would be found that immediate electrification of the majority of long main lines would be unprofitable. On the other hand, there were ample reasons for the electrification of such districts as Birmingham, Manchester, Liverpool, Glasgow and Newcastle, and certain heavy freight lines.

The territory served by the Brighton Railway is especially suited for one of the auxiliary advantages or by-products of electrification, namely, the sale of power to industries along the line. In Great Britain there is much talk of a universal development of power supply for the so-called cottage and agricultural (particularly dairying) industries, but there is also the possibility of serving other members of the population within short tapping distance of the railway's right-of-way. As a transmission line would have to be put up in any event, the railway is in a position to supply current cheaper than if independent supply lines were built.

GREAT INCREASE IN CAPACITY OF ELECTRIFIED BRIGHTON TERMINAL

In discussing the results of the Brighton electrification completed under his direction, Mr. Dawson said that electric motor-car operation had already permitted the Victoria Terminal in London to handle 150 per cent more traffic than before, and another 150 per cent could be borne with ease. Since the electrification in 1909 a still more significant phenomenon showing the value of electrifying suburban lines has occurred. This was the increase in suburban traffic. The number of single-ticket riders has more than doubled and, what is still better, the number of season-ticket riders (commuters) has nearly quadrupled. He felt confident that the electrification to Brighton, Worthing and Eastbourne which is being clamored for by the population would be equally successful. It must be remembered, he said, that when the Brighton Railway first took up the matter of electrification, the choice lay between low-tension 600-volt direct-current and high-tension

Federal Commission Ready to Begin

Personnel of the Commission Appointed to Study the Electric Railway Problems Promises Valuable Results—Chairman Elmquist Outlines the Task Before the Commission—Other Comments Given

RAILWAY men interviewed during the past week have expressed great satisfaction at the appointment by the President of a federal commission to investigate the electric railway situation. These expressions were both individual and collective. Among the latter was the American Electric Railway Association, whose Washington office issued a statement which was widely quoted in the daily press. This said, in part:

"This commission is destined to be a constructive agency of the greatest importance, not only to the public, but to the electric railway industry, to collateral industries, to the nation's financial institutions and to labor. In fact, it was the reflex effect upon industry, finance and labor of the bankrupt transportation companies that played a leading part in the minds of Secretary Redfield and Secretary Wilson, the members of the President's Cabinet, who recommended the establishment of this federal commission."

WHO THE MEMBERS ARE

The names of the members of the commission were published last week, but further information about them may be of interest.

The chairman of the commission, Charles E. Elmquist, has served in various legal and advisory capacities to public utility organizations. During the war emergency he was secretary of a special war committee, created by the National Association of Railway and Utilities Commissioners, to consider the vital problems affecting gas, electric, electric railway and other utilities and the communities served. Mr. Elmquist was born in Osceola, Wis., forty-six years ago. After attending the common schools of Saint Croix Falls, he became an apprentice in a printing shop and was in the newspaper business a number of years. He was graduated from the law school of the University of Minnesota in 1898 and began the practice of the law in Rush City, Minn. In 1900 he was elected county attorney and held this position eight years. In 1909 Mr. Elmquist became a member of the Minnesota Railroad and Warehouse Commission, at a time when the Minnesota rate case was pending in the federal court. The legal and economic questions involved in this case led him to become thoroughly conversant with the facts and the law regarding valuation, rates and other problems common to railroads and other utilities. For a number of years he was chairman of the valuation committee of the National Association of Railway and Utilities Commissioners, which was created to give the state authorities adequate representation before the Interstate Commerce Commission in connection with the valuation of railroads. Since November, 1918, Mr. Elmquist has been president of the National Association of Railway and Utilities Commissioners, as well as its general counsel.

The vice-chairman of the commission, Hon. Edwin F. Sweet, is Assistant Secretary of the Department of Commerce and was formerly Mayor of Grand Rapids, Mich. He also represented the Fifth Michigan District in Congress from 1911 to 1913. While mayor he devised a plan for non-partisan city government which has since been adopted by most commission-governed cities. Mr. Sweet is a man of long experience in public affairs and equipped with special knowledge of commercial conditions through daily contact with them, and brings to the commission not only a broad personal training, but the invaluable records of the Department of Commerce, which are at his disposal.

Louis B. Wehle, who represents the Treasury Department on the commission, is counsel of the War Finance Corporation and consequently has an unusual opportunity to be come acquainted with the financial condition of the electric railways of the country. He is a lawyer and has practiced before the Interstate Commerce Commission since 1910, generally representing the shippers and the public. In addition to his connection with the War Finance Corporation he is a

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single-phase, and the instructions he received were that a system had to be adopted for the local services which could be indefinitely extended to include the whole system, including long-distance passenger and goods traffic. This was the reason why he had decided to recommend the use of the high-tension single-phase system, which he did in 1906.

There is every reason to feel gratified with the reliability of the single-phase equipment in use. The overhead system which had been put up according to his design and under his supervision has never given the least trouble or anxiety and has proved eminently satisfactory from every point of view.

In the meantime high-tension direct-current equipment has been developed to a high standard of reliability. Mr. Dawson said that he is not wedded to any one system and, therefore, in considering extensions to the Brighton Railway or in taking up problems for other lines, he would certainly take advantage of every improvement that would help to make electrification pay regardless of system. The Brighton Railway now has 70 miles of single-track electrified line in operation and is prepared to electrify another 120 miles to Cheam and Coulsden, a project which was interrupted by the war. Another 150 miles of development would bring the electrification to the South Coast terminus at Brighton, a stretch of 52 miles, which would be covered in forty-five minutes. There is nothing slow about British electrification! A following electrification would take in Hastings, 75 miles distant, on a section over which trains weighing 300 to 350 long tons would be run at 60 m.p.h.

It is interesting to note that Edward Manville, who is Mr. Dawson's partner, is a member of Parliament for Coventry and is one of the vice-presidents of the Federation of British Industries; a member of the Board of Trade and many other Parliamentary committees. Mr. Manville is a pioneer both in electric lighting and traction, having been responsible for the electric lighting of Victoria Embankment in the early eighties and also having installed some of the earliest examples of electric tramways, namely those at Northfleet and Newcastle.

member of the legal committee of the General Munitions Board and of the War Industries Board and is one of the counsel of the U. S. Shipping Board, Emergency Fleet Corporation. In June, 1917, he was appointed counsel of the Cantonment Labor Adjustment Commission, and in September of the same year counsel of the Federal Shipbuilding Labor Adjustment Board.

Dr. Royal Meeker, who will be the representative on the commission of the Department of Labor is statistician of that department and Commissioner of the Bureau of Labor Statistics. For five years before his appointment to this position by President Wilson in 1913 he was assistant professor of political economy at Princeton University. Dr. Meeker is an independent thinker and an expert in the investigation and presentation of facts. He has recently had occasion to give particular attention to the electric railway situation because of the publication by the Bureau of Labor Statistics, of which he is commissioner, about a year ago, of an extended report on "Street Railway Employment in the United States." This report contained more than 1100 pages.

Hon. George L. Baker, Mayor of Portland, Ore., whose name was mentioned in the Washington reports as the representative of the cities on this commission, is the chairman of the Organization Committee of the American Cities' League of Mayors and a man of long experience in public service and familiar with conditions on the Pacific Coast.

P. H. Gadsden, the electric railway member, is chairman of the Committee on Readjustment of the American Electric Railway Association, a practical operator of public utility plants for more than twenty years and a close student of the problems of the electric railways.

Charles W. Beall, the representative on the commission of the Investment Bankers' Association of America, is a member of Harris, Forbes & Company, of New York City. He has long been active in the work of the Investment Bankers' Association of America, and is qualified as a financial adviser through many years of experience in investment fields.

W. D. Mahon, the representative on the board of organized railway labor, has been president of the Amalgamated Association of Street and Electric Railway Employees, Detroit, Mich., ever since its organization in 1892. He is a member of the executive committee of the National Civic Federation and also of the American Federation of Labor. In 1914 he made a trip to Europe to investigate electric railway labor conditions but was unable to complete this study because of the outbreak of the war. He has devoted his attention for years to the interests of organized labor.

COMMENTS ON COMMISSION'S WORK

Chairman Elmquist on June 12 issued the following statement in regard to the work of the commission:

"It is the duty of the commission to consider fundamental principles involved in the electric railway situation. Necessarily, the investigation should be upon broad and impartial lines, and it will take some little time to organize the work.

"Perhaps the problem can best be stated in this way —Are the utilities suffering from a disease? What is it? Is it curable? What is the best remedy? How can the public secure the best service at the lowest cost?

"The members of the commission realize that the task before them is not a small one. A sub-committee is at work on the plan of the organization, and its report will be considered by the commission at an early date."

In reply to a request from this paper to other members of the commission to make some statement on the proposed investigation, Vice-Chairman Sweet said:

"The newly appointed Federal Electric Railways Commission is undertaking the difficult task of ascertaining the causes of the present bankrupt condition of many electric railways in the United States at this time.

"While doubtless there are differences in the details of the problems in different cities, there must be some general reasons for a condition that so universal.

"What the procedure of the commission will be has not yet been determined, but its members are convinced that there is some way of discovering the principal causes of the unhealthy condition of these properties and this clearly is the first step toward the discovery and application of a remedy.

"That a suitable remedy will be found is well nigh certain. Whether the electric railways themselves and the urban and suburban communities served by them will be willing to take the remedies that may be prescribed is another question.

"If a commission made up of representatives of associations of bankers, electric railway companies, electric railway employees and representatives of the public, with all their divergent interests, can come to an agreement as to both cause and remedy, it would seem as if the organizations represented by these several members ought to be like minded, and that would mean a very general, practically universal, acceptance of the conclusions that may be reached by the commission.

"Final action, whatever it may be, must be taken by the various state and municipal governments and the electric railway companies. All the commission can do is to ascertain facts, draw conclusions and make recommendations as a basis for municipal and corporate action later on."

Mr. Meeker stated that he was not prepared to say anything in regard to his plans for work with the commission. "I should be very pleased to give a statement to the ELECTRIC RAILWAY JOURNAL," he said, "but anything I might have to say would better come out in the public hearings, which are about to begin."

Don't Talk to the Motorman

ONLY ONE
Motorman
is needed to run a car. His individual attention to duty is needed to operate the car with
SAFETY
When we, his fellow workers, are riding with him we should set an example to passengers
Let's Keep Still
National Safety Council ✚ Electric Railway Section

THE accompanying poster, just put out by the electric railway section of the National Safety Council, carries a message that may well be heeded by every employee. It ought to be obvious that distraction of attention from duty is a sure provocative of danger, but nevertheless the fact is not fully realized. The message should be carried also to well-intentioned, friendly passengers who occupy the front platform of cars.

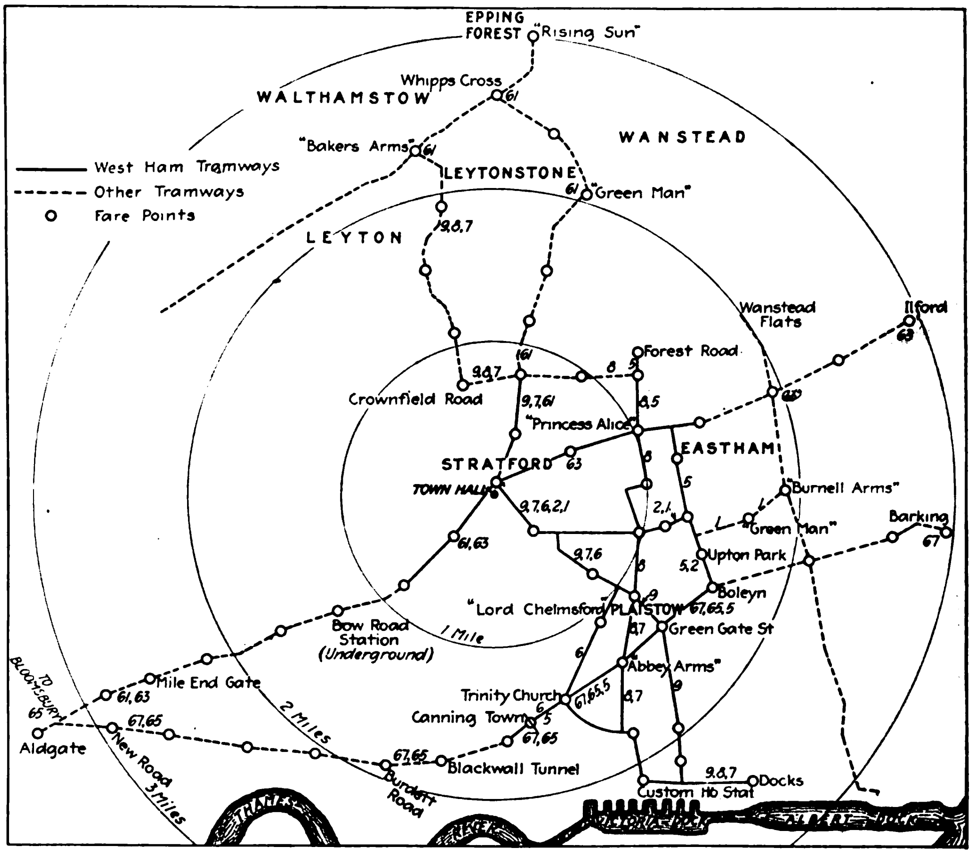
The Zone Fare in Practice

WEST HAM

Universal Fare Tried for a Brief Period but Abandoned—Present Differential Rates Include No Half-Penny Fares for General Use—Although West Ham Is Located in the Most Typical Labor Borough of London, the Average Earnings Per Car-Mile Exceed 30 Cents with Some Lines Earning 40 Cents or More Per Car-Mile, Despite Low-Rate Workmen's and Children's Tickets

BY WALTER JACKSON

THE County Borough of West Ham, which occupies approximately 7½ square miles, lies in the eastern part of London. West Ham is the great dockyards section of London, and naturally it has been a busy center since the opening of the war. With the exception of some detached houses in the northern part, near Epping Forest, West Ham has no suburban areas. Hence the overwhelming majority of its travel comes from working people, a fact well worth bearing in mind in view of the density of short-haul travel.


EPPING FOREST
"Rising Sun"
Whipps Cross
61
WALTHAMSTOW
WANSTEAD
"Bakers Arms"
61
LEYTONSTONE
61
"Green Man"
West Ham Tramways
Other Tramways
Fare Points
LEYTON
9,8,7
Wanstead Flats
Ilford
63
Forest Road
9,9,7
161
8
5
Crownfield Road
9,7,61
8,5
"Princess Alice"
STRATFORD
63
EASTHAM
TOWN HALL
9,7,6,2,1
5
"Burnell Arms"
2,1
"Green Man"
Barking
67
61,63
9,7,6
8
5,2
Upton Park
Boleyn
"Lord Chelmsford
PLAISTOW
67,65,5
Bow Road Station (Underground)
1 Mile
8,7
Green Gate St
6
"Abbey Arms"
TO BLOOMSBURY
Mile End Gate
61,63
Trinity Church
67,65,5
9
8,7
65
67,65
2 Miles
Canning Town
6
5
67,65
Aldgate
New Road
3 Miles
67,65
Blackwall Tunnel
Burdett Road
9,8,7
Docks
Custom Ho Stat
THAMES
RIVER
VICTORIA DOCK
ALBERT DOCK

MAP OF THE WEST HAM TRAMWAYS SYSTEM, SHOWING NUMBERED ROUTES AND THE LOCATION OF FARE POINTS

In accordance with English characteristics, the big tenement house is absent even in this out-and-out laboring community. Two-story houses are the usual thing with nearly always one family to the house. The vital statistics of the borough show a population of approximately 300,000, with 48,207 houses and a density of sixty-two persons per acre. Like every other community in the United Kingdom, West Ham has its housing plans. Up to the present, however, it has built only eleven one-family houses and 390 dwellings suitable for more than one family. Part of these structures have been erected on sites of condemned property, as at High Street, and part on open ground, as at Plaistow. The real difficulty here as elsewhere is not too much population but too many antiquated dwellings which are not provided with the conveniences essential to decent, comfortable living in the twentieth century.

The trackage owned by the borough tramways within West Ham equals 16.75 miles of route or 30 miles of single track. This does not convey a true idea of the available service, however, as the West Ham Corporation Tramways have through-running arrangements with the London County Council Tramways on the west, the East Ham Corporation Tramways on the east and the Leyton, Walthamstow, Barking and Ilford Urban District Councils Tramways on the north. The routes now operated by the West Ham Corporation Tramways, shown on the accompanying map, comprise the following (the miles indicated are route-miles):

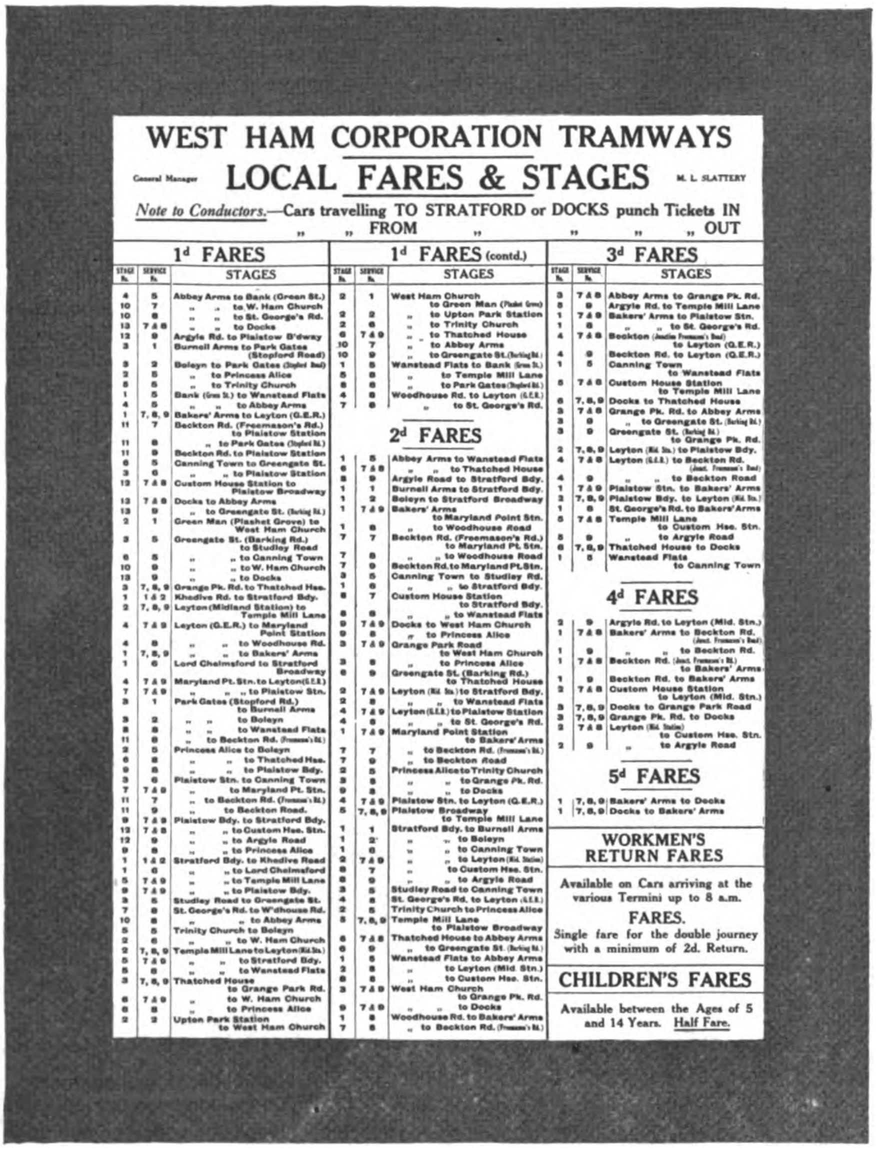
Aldgate and Barking, Route 67, 7.2 miles long, is operated through a purely working-class district. Before the coal shortage crisis, this line had a two and one-half-minute headway. The present service has a headway of three minutes morning and evening and four minutes at other times. Aside from this liberal service, it will be seen from the route map that about 5 miles of Route 67 is overlapped by Route 65 and about 2 miles by Route 5, as described below.

Aldgate and Ilford, Route 63, runs through the business section and also serves the best residential district. It is 7.06 miles long. Like Route 67, the two and one-half-minute service has been changed temporarily to three minutes and four minutes for rush and off-rush hours respectively. On this line, too, 5 miles of the route enjoy an overlapping service.

Aldgate and Leytonstone, Route 61, 7.9 miles long, has a minimum headway of three minutes and a maximum headway of four minutes. Although part of the cars on this line are turned back, the four-minute service is maintained all the way to "Bakers' Arms." This, like several other destinations in West Ham and vicinity, is the name of an inn of non-prohibition character. An attempt some years ago to change such stage terminal designations for the names of churches did not meet with much public approbation.

Docks and Bakers' Arms via Stratford, Route 7, 6.6 miles long, is the great south-north route terminating in a good residential section. The shortest headways are five minutes, and the longest six minutes. The overlaps on this route are also shown on the route map.

Docks and Bakers' Arms via Wanstead Flats, Route 8, 2.8 miles long, serves a better-grade residential section. For three-fourths of its length this route runs in common with Route 7, simply making a detour as indicated on the map. The usual headway is ten minutes, with a headway of slightly less than three minutes (eighteen cars an hour) during the rush.



WEST HAM CORPORATION TRAMWAYS

General Manager LOCAL FARES & STAGES M. L. SLATTERY

Note to Conductors.—Cars travelling TO STRATFORD or DOCKS punch Tickets IN
" " FROM " " " " OUT

1d FARES

Stage No.	Service No.	STAGES
4	5	Abbey Arms to Bank (Green St.)
10	7	" " to W. Ham Church
10	8	" " to St. George's Rd.
13	7 & 8	" " to Docks
12	9	Argyle Rd. to Plaistow B'dway
3	1	Burnell Arms to Park Gates (Stopford Road)
3	2	Boleyn to Park Gates (Stopford Road)
2	5	" to Princess Alice
5	5	" to Trinity Church
1	5	Bank (Green St.) to Wanstead Flats
4	5	" " to Abbey Arms
1	7, 8, 9	Bakers' Arms to Leyton (G.E.R.)
11	7	Beckton Rd. (Freemason's Rd.) to Plaistow Station
11	8	" to Park Gates (Stopford Rd.)
11	9	Beckton Rd. to Plaistow Station
6	5	Canning Town to Greengate St.
3	6	" " to Plaistow Station
12	7 & 8	Custom House Station to Plaistow Broadway
13	7 & 8	Docks to Abbey Arms
13	9	" to Greengate St. (Barking Rd.)
2	1	Green Man (Plashet Grove) to West Ham Church
3	5	Greengate St. (Barking Rd.) to Studley Road
6	5	" " to Canning Town
10	9	" " to W. Ham Church
13	9	" " to Docks
3	7, 8, 9	Grange Pk. Rd. to Thatched Hse.
1	1 & 2	Khedive Rd. to Stratford Bdy.
2	7, 8, 9	Leyton (Midland Station) to Temple Mill Lane
4	7 & 9	Leyton (G.E.R.) to Maryland Point Station
4	8	" " to Woodhouse Rd.
1	7, 8, 9	" " to Bakers' Arms
1	6	Lord Chelmsford to Stratford Broadway
4	7 & 9	Maryland Pt. Stn. to Leyton (G.E.R.)
7	7 & 9	" " " to Plaistow Stn.
3	1	Park Gates (Stopford Rd.) to Burnell Arms
3	2	" " to Boleyn
8	8	" " to Wanstead Flats
11	8	" to Beckton Rd. (Freemason's Rd.)
2	5	Princess Alice to Boleyn
6	8	" " to Thatched Hse.
9	8	" " to Plaistow Bdy.
3	6	Plaistow Stn. to Canning Town
7	7 & 9	" to Maryland Pt. Stn.
11	7	" to Beckton Rd. (Freemason's Rd.)
11	9	" to Beckton Road.
9	7 & 9	Plaistow Bdy. to Stratford Bdy.
12	7 & 8	" " to Custom Hse. Stn.
12	9	" " to Argyle Road
9	8	" " to Princess Alice
1	1 & 2	Stratford Bdy. to Khedive Road
1	6	" " to Lord Chelmsford
5	7 & 9	" " to Temple Mill Lane
9	7 & 9	" " to Plaistow Bdy.
3	5	Studley Road to Greengate St.
7	8	St. George's Rd. to W'dhouse Rd.
10	8	" " to Abbey Arms
5	5	Trinity Church to Boleyn
2	6	" " to W. Ham Church
2	7, 8, 9	Temple Mill Lane to Leyton (Mid. Stn.)
5	7 & 9	" " to Stratford Bdy.
5	8	" " to Wanstead Flats
3	7, 8, 9	Thatched House to Grange Park Rd.
6	7 & 9	" to W. Ham Church
6	8	" to Princess Alice
2	2	Upton Park Station to West Ham Church

1d FARES (contd.)

Stage No.	Service No.	STAGES
2	1	West Ham Church to Green Man (Plashet Grove)
2	2	" to Upton Park Station
2	6	" to Trinity Church
6	7 & 9	" to Thatched House
10	7	" to Abbey Arms
10	9	" to Greengate St. (Barking Rd.)
1	5	Wanstead Flats to Bank (Green St.)
5	8	" to Temple Mill Lane
8	8	" to Park Gates (Stopford Rd.)
4	8	Woodhouse Rd. to Leyton (G.E.R.)
7	8	" to St. George's Rd.

2d FARES

Stage No.	Service No.	STAGES
1	5	Abbey Arms to Wanstead Flats
6	7 & 8	" " to Thatched House
8	9	Argyle Road to Stratford Bdy.
1	1	Burnell Arms to Stratford Bdy.
1	2	Boleyn to Stratford Broadway
1	7 & 9	Bakers' Arms to Maryland Point Stn.
1	8	" to Woodhouse Road
7	7	Beckton Rd. (Freemason's Rd.) to Maryland Pt. Stn.
7	8	" " to Woodhouse Road
7	9	Beckton Rd. to Maryland Pt. Stn.
3	5	Canning Town to Studley Rd.
1	6	" " to Stratford Bdy.
8	7	Custom House Station to Stratford Bdy.
8	8	" " to Wanstead Flats
9	7 & 9	Docks to West Ham Church
9	8	" to Princess Alice
3	7 & 9	Grange Park Road to West Ham Church
3	8	" to Princess Alice
6	9	Greengate St. (Barking Rd.) to Thatched House
2	7 & 9	Leyton (Mid. Stn.) to Stratford Bdy.
2	8	" " to Wanstead Flats
4	7 & 9	Leyton (G.E.R.) to Plaistow Station
4	8	" " to St. George's Rd.
1	7 & 9	Maryland Point Station to Bakers' Arms
7	7	" to Beckton Rd. (Freemason's Rd.)
7	9	" to Beckton Road
2	5	Princess Alice to Trinity Church
3	8	" " to Grange Pk. Rd.
9	8	" " to Docks
4	7 & 9	Plaistow Stn. to Leyton (G.E.R.)
5	7, 8, 9	Plaistow Broadway to Temple Mill Lane
1	1	Stratford Bdy. to Burnell Arms
1	2	" " to Boleyn
1	6	" " to Canning Town
2	7 & 9	" " to Leyton (Mid. Station)
8	7	" to Custom Hse. Stn.
8	9	" " to Argyle Road
3	5	Studley Road to Canning Town
4	8	St. George's Rd. to Leyton (G.E.R.)
2	5	Trinity Church to Princess Alice
5	7, 8, 9	Temple Mill Lane to Plaistow Broadway
6	7 & 8	Thatched House to Abbey Arms
6	9	" to Greengate St. (Barking Rd.)
1	5	Wanstead Flats to Abbey Arms
2	8	" to Leyton (Mid. Stn.)
8	8	" to Custom Hse. Stn.
3	7 & 9	West Ham Church to Grange Pk. Rd.
9	7 & 9	" " to Docks
1	8	Woodhouse Rd. to Bakers' Arms
7	8	" to Beckton Rd. (Freemason's Rd.)

3d FARES

Stage No.	Service No.	STAGES
3	7 & 8	Abbey Arms to Grange Pk. Rd.
5	9	Argyle Rd. to Temple Mill Lane
1	7 & 9	Bakers' Arms to Plaistow Stn.
1	8	" " to St. George's Rd.
4	7 & 8	Beckton (Junction Freemason's Road) to Leyton (G.E.R.)
4	9	Beckton Rd. to Leyton (G.E.R.)
1	5	Canning Town to Wanstead Flats
5	7 & 8	Custom House Station to Temple Mill Lane
6	7, 8, 9	Docks to Thatched House
3	7 & 8	Grange Pk. Rd. to Abbey Arms
3	9	" to Greengate St. (Barking Rd.)
3	9	Greengate St. (Barking Rd.) to Grange Pk. Rd.
2	7, 8, 9	Leyton (Mid. Stn.) to Plaistow Bdy.
4	7 & 8	Leyton (G.E.R.) to Beckton Rd. (Junct. Freemason's Road)
4	9	" " to Beckton Road
1	7 & 9	Plaistow Stn. to Bakers' Arms
3	7, 8, 9	Plaistow Bdy. to Leyton (Mid. Stn.)
1	8	St. George's Rd. to Bakers' Arms
5	7 & 8	Temple Mill Lane to Custom Hse. Stn.
5	9	" to Argyle Road
6	7, 8, 9	Thatched House to Docks
1	5	Wanstead Flats to Canning Town

4d FARES

Stage No.	Service No.	STAGES
2	9	Argyle Rd. to Leyton (Mid. Stn.)
1	7 & 8	Bakers' Arms to Beckton Rd. (Junct. Freemason's Road)
1	9	" " to Beckton Rd.
1	7 & 8	Beckton Rd. (Junct. Freemason's Rd.) to Bakers' Arms
1	9	Beckton Rd. to Bakers' Arms
2	7 & 8	Custom House Station to Leyton (Mid. Stn.)
3	7, 8, 9	Docks to Grange Park Road
3	7, 8, 9	Grange Pk. Rd. to Docks
2	7 & 8	Leyton (Mid. Station) to Custom Hse. Stn.
2	9	" to Argyle Road

5d FARES

Stage No.	Service No.	STAGES
1	7, 8, 9	Bakers' Arms to Docks
1	7, 8, 9	Docks to Bakers' Arms

WORKMEN'S RETURN FARES

Available on Cars arriving at the various Termini up to 8 a.m.

FARES.

Single fare for the double journey with a minimum of 2d. Return.

CHILDREN'S FARES

Available between the Ages of 5 and 14 Years. Half Fare.

POSTER, COVERING ORDINARY FARES, AS POSTED ON THE CAR BULKHEAD

Stratford and Canning Town, Route 6, 2.5 miles long, formerly extended another 1½ miles to Burdett Road. Ordinary service has a twelve-minute headway, and rush-hour service a ten-minute headway.

Stratford and East Ham, Route 1, 2.45 miles long, has a ten-minute all-day service from 7.30 a.m., supplemented by service on the Stratford-Upton Park line, which also has a ten-minute service and overlaps Route 1 for 1.6 miles.

Stratford and Upton Park, Route 2, 1.23 miles long, has a ten-minute all-day service supplemented by Route 1.

Docks and Green Gate, Route 9, 1.35 miles long (shortened from Bakers' Arms because of fuel shortage) now has no all-day service, as Route 7 is available. It has a special service three times a day, however, for the convenience of dock workmen, as follows: Three-minute service from 5 a.m. to 9 a.m., five-minute service from 12 noon to 2 p.m. and three-minute service from 5 p.m. to 8.30 p.m. In short, this route is simply an extra traffic artery for rush-hour conditions.

Wanstead Flats and Canning Town, Route 5, 3.64 miles long, has a ten-minute service with special cars as required. This line is an excellent example of the way West Ham routes overlap. Between Canning Town and Boleyn it runs in common with Routes 65 and 67, and between Canning Town and Trinity Church with Routes 65, 67 and 6. Between Boleyn and the Bank, Green Street, it runs with Route 2. After dropping Route 2, it picks up Route 63 for a few hundred feet and then keeps company with Route 8 up to the Wanstead Flats terminus.

Bloomsbury, Route 65, belongs to the London County Council Tramways. It runs over West Ham tracks via Aldgate, supplementing the service of Route 67 for the 5 miles from Aldgate to Boleyn with a four-minute morning and evening service of its own.

In addition to the foregoing, a special service is given between the Docks and Abbey Arms, a distance of 1.6 miles.

From the foregoing detail of services, overlaps, etc., it is plain that West Ham enjoys the short headways that are so essential for the development of short riding. Because of the highly industrial character of the population, the spread of hours of service is greater than on many other British tramways. Even now the first car is out at 3.45 a.m., and the last car is in at 12.05 a.m. The special workmen's cars are run chiefly from 5 a.m. to 8 p.m. The heaviest peaks are from 7 a.m. to 9 a.m. and from 5 p.m. to 7.30 p.m. The lunch riding factor is not so important as in other communities.

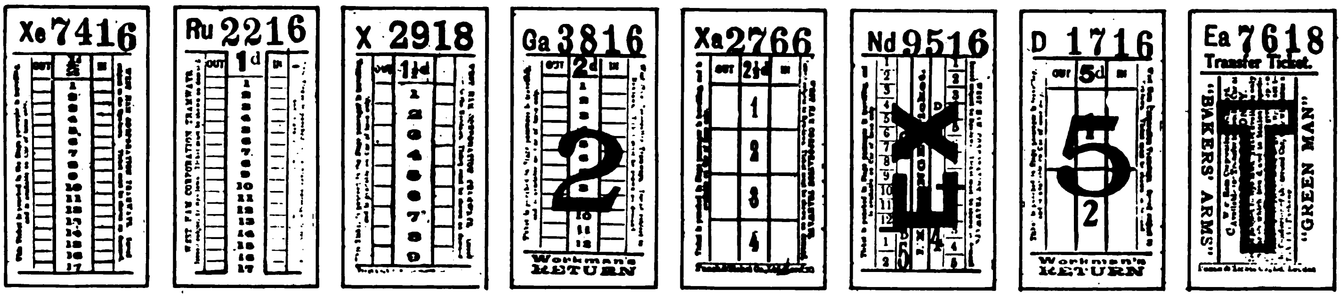
The variety of rolling stock (much of it old), the greatly augmented travel, the narrow streets and the extraordinary amount of trucking on some of the routes do not permit a better average schedule speed than 7.66 m.p.h. Cars on some of the longer routes, however, attain 9 m.p.h. with a free running speed of 16 m.p.h.

Up to June 27, 1917, the fares in use on the lines of the West Ham Corporation Tramways were:

½d. for stages up to 1.18 miles
1d. from 1.32 up to 2.54 miles
1½d. from 2.2 up to 3.78 miles
2d. from 3.16 up to 5.33 miles
2½d. from 3.98 up to 7.22 miles
3d. from 5.04 up to 7.82 miles
3'd. from 6.02 up to 7.01 miles
4d. for 6.57 miles

From the foregoing figures it will be seen that the average fare was about ½d. a mile. This was not the worst, as children were getting the penny rides for ½d. and other rides up to 2½d. inclusive for 1d., while workmen who bought return (round-trip) tickets, taking the first ride before 8 a.m., also enjoyed approximately one-half the regular rates. As a result, the average fare per passenger for the fiscal years ended March 31 was: 0.828d. in 1914, 0.852d. in 1915, 0.824d. in 1916, and 0.840d. in 1917. Only Glasgow, with 0.76d. per passenger (in 1915), was giving lower fares than West Ham.

Although the West Ham system was obtaining greatly



WEST HAM TRAMWAYS TICKETS, INCLUDING TRANSFER AND UNIVERSAL EXCHANGE TYPE

increased traffic on account of war activities, the net was going down. As early as January, 1916, the management submitted to the Tramways Committee a report covering three possible ways of increasing the returns from traffic. The first plan, for a universal fare of 1d. throughout the borough for all classes of traffic, was adopted but did not go into effect before June 27, 1917.

Under this plan, familiar enough in the United States, the average ride for 1d. was estimated at 2¼ miles and the longest ride at 3½ miles.

Year Ended March 31	Passengers Per Car-Mile	Car-Miles	Passengers Carried	—Gross Receipts— £ Total	Pence Per Car-Mile
1914	10.95	3,756,354	41,152,502	142,635	9.11
1915	11.35	3,760,361	42,667,561	151,490	9.66
1916	12.82	3,645,165	46,734,440	163,858	10.78
1917	12.96	3,650,855	47,326,816	165,821	10.90
*1918	12.18	3,592,258	43,764,149	188,432	12.58

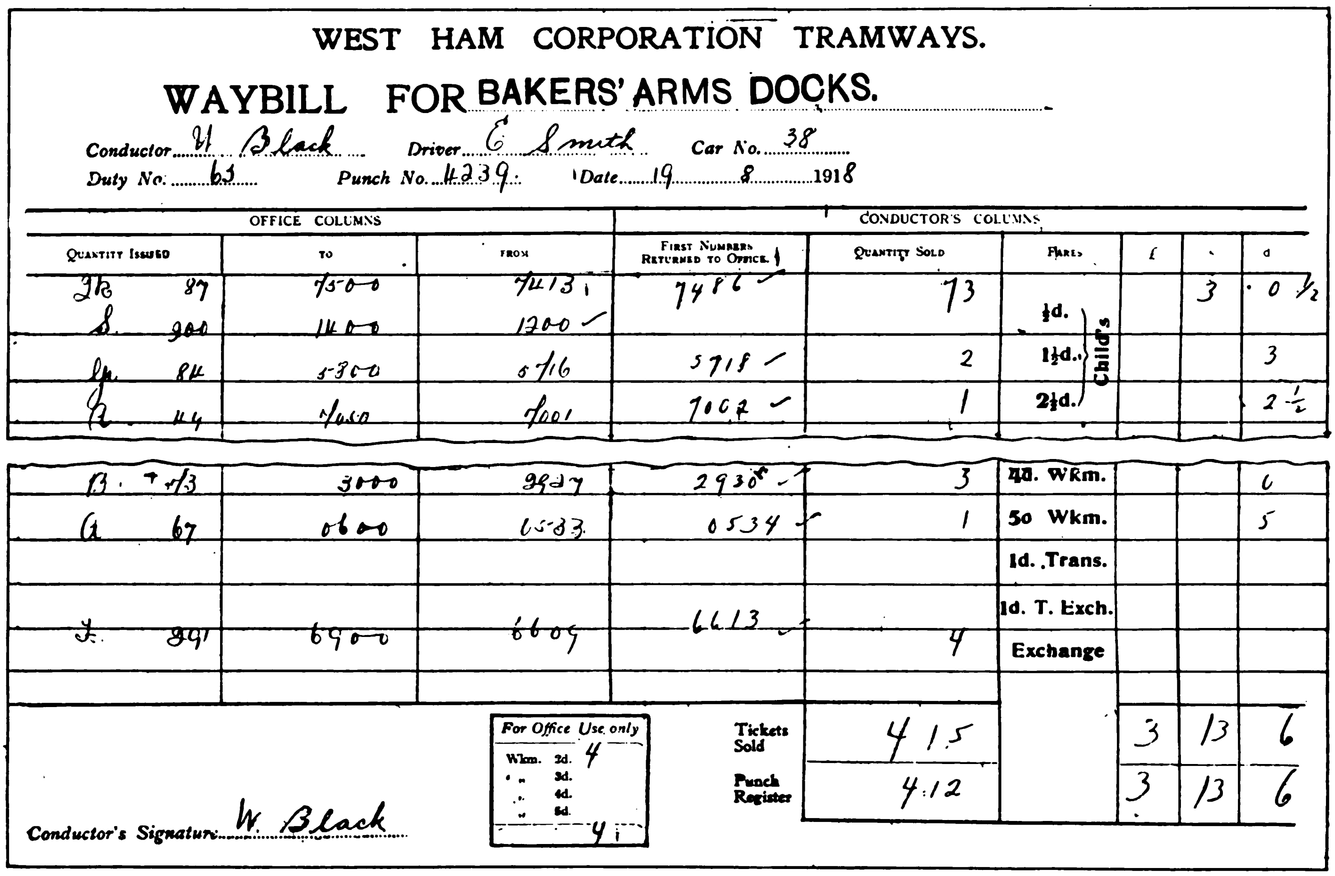
*Nine months and four days of universal penny fare.

While the universal penny fare naturally raised the return per passenger (to 1.056d.), it discouraged the old half-penny riders to such a degree that the traffic actually fell off 7½ per cent during a period of constantly increasing activity. This is succinctly shown in the preceding table.

It would not be fair to blame the principle of the universal fare altogether, as there would surely have been some drop in traffic following any scheme that obliterated the half-penny fare. Yet it is a curious fact that the return to a graded fare, with ½d. tickets and other fractional fares for children only, has been followed by most gratifying increases in traffic and revenue.

Although the nine months to Jan. 2, 1919, include the period from April 1-June 30, which saw the end of the universal fare, they show such increases over the corresponding nine months to Jan. 2, 1918, that banner returns are forecast for the year ended March 31, 1919:

Nine Months Ended	Passengers Per Car-Mile	Car-Miles	Passengers	—Gross Receipts— £ Total	Pence Per Car-Mile
Jan. 2, 1918	12.12	2,754,794	33,398,492	145,974	12.79
Jan. 2, 1919	14.26	2,612,867	37,376,966	181,848	16.70


WEST HAM CORPORATION TRAMWAYS.

WAYBILL FOR BAKERS' ARMS DOCKS.

Conductor W. Black Driver E. Smith Car No. 38
Duty No. 63 Punch No. 4239 Date 19 8 1918

OFFICE COLUMNS			CONDUCTOR'S COLUMNS					
QUANTITY ISSUED	TO	FROM	FIRST NUMBERS RETURNED TO OFFICE.	QUANTITY SOLD	FARES	£	s	d
3k 87	7500	7413	7486	73			3	0½
S. 900	1400	1300			½d. Child's			
lp. 84	5300	5216	5718	2	1½d. Child's			3
h 44	7050	7001	7002	1	2½d. Child's			2½
13 · 7 13	3000	2927	2930	3	4d. Wkm.			6
G 67	0600	0533	0534	1	5d. Wkm.			5
					1d. Trans.			
J. 391	6900	6609	6613		1d. T. Exch.			
				4	Exchange			
			Tickets Sold	415		3	13	6
			Punch Register	412		3	13	6

For Office Use only
Wkm. 2d. 4
" 3d.
" 4d.
" 5d.
4

Conductor's Signature W. Black

CONDUCTOR'S WAYBILL COVERING A FULL DAY'S WORK

The average fare per passenger thus increased from 1.049d. to 1.168d. While a portion of the increase in receipts per car-mile was the result of an enforced cut in mileage, the increases in the number of passengers and the gross receipts speak for themselves. It is estimated by Lewis Slattery, general manager, that the total travel for the year ended March 31, 1919, will be approximately 50,000,000 passengers despite a reduction of 250,000 car-miles. For the five weeks ending Jan. 2–Jan. 30, 1919, the total traffic was 4,567,980, of which approximately 69 per cent was in 1d. fares, 15 per cent in 2d. fares, 6 per cent in ½d. fares and 3 per cent in 3d. fares. The armistice has had no perceptible influence on traffic, and as West Ham is a shipping center *par excellence* there is no reason to expect a decline.

Greengate Street, Plaistow　Glasgow Road, Plaistow　Neville Road

THESE HOMES OF WEST HAM WORKERS ARE VISUAL ANSWERS TO "THE ZONE FARE IN ENGLAND CAUSES CONGESTION"

At this time, the rates on both tramways and buses in West Ham are practically the same. Although the buses seat but one-half as many passengers as the average West Ham car, they are faster only where exceptionally heavy drayage delays the cars. On Sundays the buses are not in it for speed.

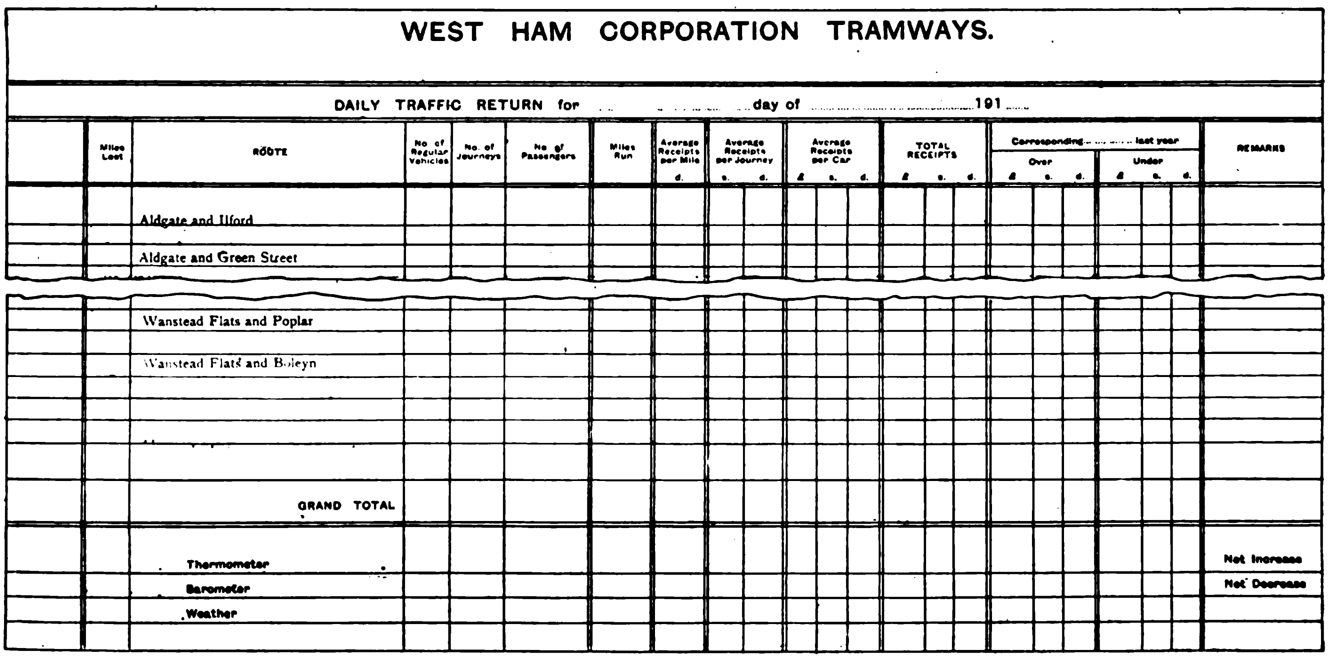
To conclude the data on revenue, the following figures are presented in the solemn hope that they will forever dispel the idea that the differential fare system is applicable only to small cars and non-congested traffic. The *seating* capacity of the 118 double-deck cars used (106 of which are single-truck) ranges from sixty to seventy-eight, and the number of passengers per car-mile often exceeds twenty! Here are the figures:

During Christmas week, earnings per car-mile were 24.9d. on Route 2, 22.85d. on Route 67, 22.43d. on Route 63, 19.89d. on Route 7, 18.75d. on Route 61 and 24.86d. on Route 67. These routes furnished 13,215 car-miles for 268,927 passengers, and therefore carried twenty passengers per car-mile.

For the week ended Jan. 2, 1919, the car-mile earnings were 22.7d. on Route 2, 20.2d. on Route 67, 20.2d. on Route 63, 17d. on Route 7 and 19.07d. on Route 61. These figures indicate traffic conditions now.

Present Fares and Numbered Stage Tickets

Under the revised system of differential fares following the discarding of the universal fare on June 30, 1918, the lowest fare, except for children, remains 1d. All fractional fares such as ½d., 1½d. and 2½d. apply only to children, who are entitled to ride at half rates if between the ages of five and fourteen years. Workmen cannot buy anything less than a 2d. return ticket. The abolition of the half-penny intervals is in



WEST HAM CORPORATION TRAMWAYS.

DAILY TRAFFIC RETURN for ....day of ....191....

	Miles Lost	ROUTE	No. of Regular Vehicles	No. of Journeys	No. of Passengers	Miles Run	Average Receipts per Mile	Average Receipts per Journey		Average Receipts per Car			TOTAL RECEIPTS			Corresponding ...... last year						REMARKS
																Over			Under			
							d.	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	
		Aldgate and Ilford																				
		Aldgate and Green Street																				
		Wanstead Flats and Poplar																				
		Wanstead Flats and Boleyn																				
		GRAND TOTAL																				
		Thermometer																				Net Increase
		Barometer																				Net Decrease
		Weather																				

HEADINGS OF DAILY (AND WEEKLY) TRAFFIC RETURN FILLED OUT BY THE TICKET DEPARTMENT ROUTE FOR ROUTE AND TOTALIZED consonance with the action of the tramways and the bus companies in the east end of London.

As arranged now, the general plan is to give three half-mile stages for 1d., each stage forming a starting point so that the conductor is expected to collect the fare within the first half-mile after the passenger has boarded the car. Of course, the arrangement of stage lengths and numbers is not absolutely hard and fast. There are cases where the passenger gets two stages for a penny and other instances where he gets four. Full-rate fares are 1d., 2d., 3d., 4d., 5d.; and workmen's fares, 1d. for a single trip (in area of London County Council only) and 2d., 3d., 4d. and 5d. for a return (round) trip. On the whole, the increase in fare to the lowest-rate rider was 100 per cent and to the others about 50 per cent.

A feature which contributes greatly to the simplification of the tickets is the numbered designation of the stages for each rate of fare as the illustration on page 1165 shows. This makes it possible to use one size of ticket for every rate of fare, the differences being prominently indicated partly by color and partly by surprinting the workmen's return tickets, which have the same color as regular single tickets of like denomination. The stages or zones are indicated by a single row of figures down the center of the ticket, the conductor punching the space opposite the number on the "in" or "out" side as the direction of travel demands. Any uncertainty as to what stages the zone numbers represent can be settled at once by reference to the "Fares and Stages" placards which are posted in every car, separate red-bordered placards being used for workmen's, local and through rates. A specimen local placard is reproduced herewith. Only the fractional fare children's tickets are issued and canceled as such; on others the conductor is permitted to advance the number of stages by punching.

When the holder of a workmen's ticket presents it for the return journey, he receives an "exchange ticket" therefor. In order to avoid the issuance of too many special tickets, the West Ham Corporation Tramways uses a single type, devised by William Hopkins, principal assistant, with which one punching serves for the stage designation and another punching for the price of the original ticket. A ticket inspector by comparing price and stage numbers can tell at once whether the passenger is over-riding. In accounting for tickets, the workmen's return tickets collected must equal the number of exchange tickets issued for them.

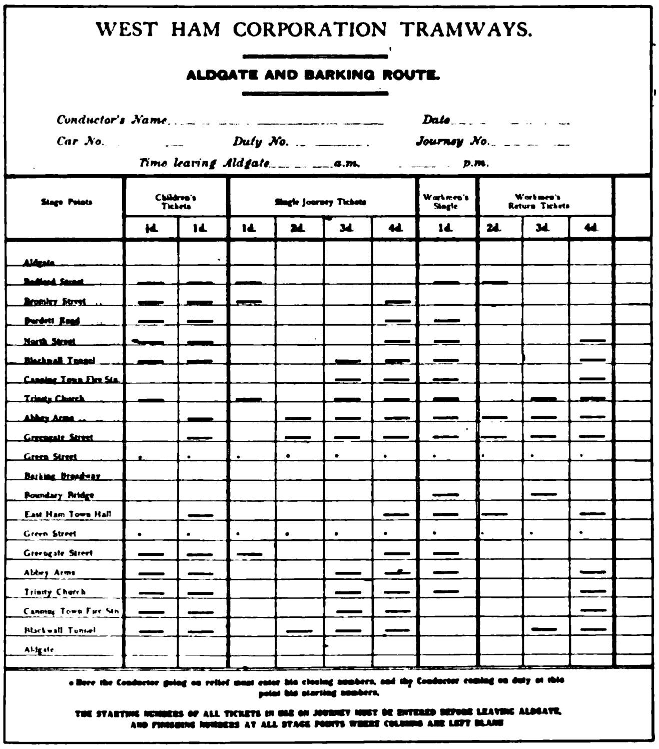
A transfer ticket is also used to a limited extent on one line, Route 61, where some of the cars do not go through on Sundays and holidays from Whipps Cross Junction to either the "Baker's Arms" or the "Rising Sun," two of the gratuitously advertised inns. The passenger who knows no better would have to buy a second ticket for a penny in order to complete his journey on the second car, but nearly every passenger names his destination and, if necessary, he gets a transfer ticket in addition to the usual ticket covering the ride to Whipps Cross. This ticket carries the customary identifying letters and serial numbers but no date or other time marking. The slight extent of this transfer traffic, however, makes no elaborate checking necessary.

Forest Gate Romford Road, East Ham Green Street

NEITHER BUSINESS NOR RESIDENTIAL STRUCTURES ARE BUILT HIGH ENOUGH TO SCRAPE THE SKY OVER WEST HAM

Because of the compactness of the territory of the West Ham Corporation Tramways, only one operating carhouse is used—a circumstance which helps greatly to simplify the handling of tickets and cash. In fact, the receiving department where the tickets are made up and the returns checked is in the office building adjacent to the depot.

Conductors, therefore, obtain their supplies without the formality of making out personal requisitions which



WEST HAM CORPORATION TRAMWAYS.

ALDGATE AND BARKING ROUTE.

Conductor's Name .... *Date* ....
Car No. .... *Duty No.* .... *Journey No.* ....
Time leaving Aldgate .... *a.m.* .... *p.m.*

Stage Points	Children's Tickets		Single Journey Tickets				Workmen's Single	Workmen's Return Tickets			
	½d.	1d.	1d.	2d.	3d.	4d.	1d.	2d.	3d.	4d.	
Aldgate											
Bedford Street	—	—	—				—	—			
Bromley Street	—	—	—			—					
Burdett Road	—	—				—	—				
North Street	—	—				—	—			—	
Blackwall Tunnel	—	—			—	—	—			—	
Canning Town Fire Sta.					—	—	—			—	
Trinity Church	—		—		—	—	—		—	—	
Abbey Arms		—		—	—	—	—	—	—	—	
Greengate Street		—		—	—	—	—	—	—	—	
Green Street	•	•	•	•	•	•	•	•	•	•	
Barking Broadway											
Boundary Bridge							—		—		
East Ham Town Hall		—				—	—	—		—	
Green Street	•	•	•	•	•	•	•	•	•	•	
Greengate Street	—	—	—			—	—				
Abbey Arms	—	—			—	—	—			—	
Trinity Church	—	—			—	—	—			—	
Canning Town Fire Stn.	—	—			—	—				—	
Blackwall Tunnel	—	—		—	—	—			—	—	
Aldgate											

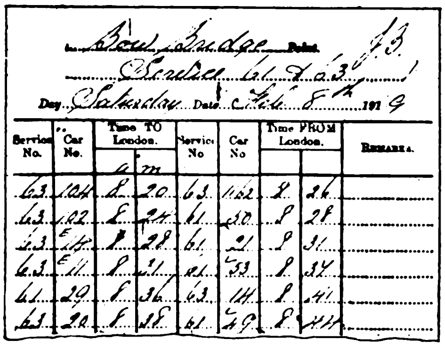
• Here the Conductor going on relief must enter his closing numbers, and the Conductor coming on duty at this point his starting numbers.

THE STARTING NUMBERS OF ALL TICKETS IN USE ON JOURNEY MUST BE ENTERED BEFORE LEAVING ALDGATE, AND FINISHING NUMBERS AT ALL STAGE POINTS WHERE COLUMNS ARE LEFT BLANK

FORM FILLED IN BY CONDUCTORS IN SEMI-ANNUAL SURVEY OF TRAFFIC ON JOINTLY-OPERATED ROUTES must be filled from auxiliary stockrooms. Instead, they turn over to depot inspectors boxes containing their cash, tickets, punch and waybill. The depot inspector counts the money in their presence and gives them receipts. Duplicates of these remain in the receipt book, which is sent to the receiving department at the end of the day. The conductors are supposed to make blind returns, but most of them are known to see pretty clearly! On beginning the next day's work, each conductor receives a second box containing another punch, a waybill and a complete supply of tickets in accordance with his probable requirements.

If, perchance, the conductor does run short in the course of the day, he is at liberty to borrow a pad of tickets from some other conductor. This is easy enough as the tickets of one denomination are always alike no matter where used. The West Ham Corporation Tramways does not print its own tickets and so does not feel like going to the further refinement of printing route or service numbers on the tickets. This would mean ordering and storing a much greater supply of tickets and involve too much dependence upon the printer sending stock in exactly as wanted. Incidentally, it may be remarked that the universal, numbered ticket has justified itself as a war measure in the saving of paper.

The all-day waybill is another feature that has been adopted to reduce the labor in connection with fare accounting from the car to the cashier. Individual trip waybills have been discarded as involving too much detail for all concerned. The present waybill, reproduced on page 1165 carries on its face the identification of the crew, the duty (run) number corresponding to the box number, the car number and the date. In the first three columns the girl who fills the ticket box writes in the letters, quantities and serial numbers of the tickets issued. In the remaining columns, the conductor records the top numbers of the tickets returned, the number and the value of each denomination sold and also the total tickets sold. The back of the waybill shows the commencing number of the tickets on each trip and the time the car left, both written in by the conductor. In practice, cash is not turned in every trip but on the completion of duty.



Bow Bridge Point 43

Service 61 & 63

Day Saturday Date Feb 8th 1919

Service No.	Car No.	Time TO London.		Service No	Car No	Time FROM London.		REMARKS.
		a	m					
63	104	8	20	63	1162	8	26	
63	102	8	24	61	30	8	28	
63	E14	8	28	61	21	8	31	
63	E11	8	31	61	53	8	34	
61	29	8	36	63	114	8	41	
63	20	8	38	61	49	8	44	

INSPECTOR'S REPORT ON ADHERENCE OF WEST HAM AND FOREIGN CARS TO SCHEDULE

The receiving department is in charge of tickets, punches, waybills, cash, etc., its functions extending from the reception of new tickets to the making out of the daily (and weekly) traffic returns by routes for the several items reproduced in the form on page 1166. All cash goes to the bank, but the borough treasurer is responsible for such audits as are made from time to time. The cash as turned in to the receiving department by the depot inspectors does not come with the boxes of the individual conductors but is already made up into half-penny bags containing 2s. 6d., penny bags containing 5s. and bags of silver coins containing £5.

The total cash received from each depot inspector must, of course, tally with the total of the individual receipts turned in by him. It need not tally with the totals on the waybills themselves, as the latter are sure to have some shorts and overs for which the conductors are responsible. Shorts are made up out of wages instead of on the spot, since the inspector merely receipts for money deposited and does not check either the waybill or the tickets. Overs are retained.

For each duty number three boxes are used, namely, one for Mondays, Wednesdays and Fridays; a second for Tuesdays, Thursdays and Saturdays, and a third for Sundays. As far as practicable, the tickets for each duty number are issued in rotation. There are 180 regular duty numbers, making 540 boxes. A punch does not go necessarily with all the boxes in reserve, as the number of punches is 430 in comparison with 230 conductors and 540 boxes. The punches are rented from the Bell Punch & Ticket Company at a figure which includes maintenance and transportation of repaired punches back and forth.

The receiving system described demands eight girls for filling boxes, making out and checking waybills, handling cash, preparing traffic records, etc.; one girl for emptying punches and making counts occasionally, resetting the punches and resealing them, and the executive—or ten in all. The head of the receiving department states, however, that three girls could be dispensed with if no record were kept in a detail stock book of the duty numbers to which the tickets are assigned. This information appears on the waybills in any event, and its transfer to the tally book is in accordance with a requirement of the borough authorities. Two calculating machines are used in this department.

The depot inspectors, who hand out and receive boxes and count cash as described, number only six, four of whom are on duty throughout the day, five during rush hours and two at night. These men are really depot clerks or dispatchers, as they serve also as timekeepers, check signing on and off, etc. It is stated that not one of these men could be spared in case the universal fare were used. In fact, during the period that the West Ham Corporation Tramways operated on a universal fare, fare receipts were given exactly as under the differential fare system, as it was felt that the conductor ought to have an interest in seeing that the passenger paid his fare and the passenger ought to have evidence that he had paid it.

For checking conductors and examining passengers' tickets, ten men are employed. They are not used exclusively in ticket-inspection service, since traffic regulation along the line is also part of their duty. These

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LEWIS SLATTERY, general manager West Ham Corporation Tramways, has had the benefit of experience in almost every kind of tramway operation from horses and compressed gas to electric conduits and overhead trolley. During his eight years as general manager of the Blackpool, St. Anne's & Lytham Tramways he did considerable pioneering with compressed gas cars, being the first operator to try them. On leaving Blackpool, he became general manager of the Oldham Corporation Tramways, and still later he was traffic manager of the London County Council Tramways for five and one-half years. Mr. Slattery has been general manager at West Ham since October, 1916, during a period replete with problems of man and equipment shortage in a district where the war made great demands for service under peculiarly arduous conditions.

men board about six cars an hour or sixty a day, the number of checks per conductor running up to four or five a day. The conductor attests the inspector's visit by his signature.

As previously mentioned, the average schedule speed of the West Ham Corporation Tramways is 7.66 m.p.h. The heavy drayage in the West Ham district is a serious factor—serious enough, in fact, to warrant prosecution of vehicle owners when their wagons break down because of defective equipment! This is a view of the situation that ought to interest the American operator.

The distances between stops are considered to be unnecessarily short, the spacing in West Ham being five poles or 600 ft. The only compulsory stops are those established by the Board of Trade, and these do not include fire station or school stops but simply places where the physical conditions are unfavorable. Optional stops are shown by blue signs, and compulsory stops by red ones. By order of the Metropolitan District police, who control the area 12 miles from the center of London, car stops are made on the far side to avoid danger to intending tram passengers from the buses, which stop on the near side.

In addition to the ten inspectors, who inspect tickets and regulate traffic along the line, the West Ham system employs eighteen traffic regulators who are stationed at the more important traffic control points. These men order cars to start while the conductors are already collecting fares, and they help to maintain orderly loading at the dockyards and other heavy traffic centers. No space is available for prepayment areas. All entrance and exit on cars is via the rear platform except at terminals.

An illustration on page 1168 shows the style of report made by traffic regulators on the adherence of cars to schedule. In this report the letter "E" designates East Ham cars, "L" the Leyton cars and the four-numbered cars the rolling stock of the London County Council Tramways. The remaining numbers are understood to refer to West Ham cars.

SEMI-ANNUAL TRAFFIC SURVEY DETERMINE DIVISION OF EARNINGS

Semi-annually a detailed seven-day traffic survey is made on the joint Route 67 in order to make a fair division of earnings. For this purpose, the conductor is asked to enter the finishing numbers of his tickets at all stage points left open for that purpose on a form of the sort reproduced. The traffic regulators check this tally by boarding the cars and examining the waybills at the points specified. Joint Routes 61 and 63 are deemed to be of equal earning power throughout their length.

The telephone control system of the West Ham Corporation Tramways is one of its most important factors in traffic control. It will be discussed in a separate article.

Like other British tramways, the West Ham system has a large proportion of women conductors. Conductresses are paid at the rate of $11\frac{13}{20}$d. an hour, which averages £2 18s. 3d. (approximately $13.98) a week. Motormen and conductors who received 7¼d. an hour or £1 16s. 3d. for six-day periods before the war are now paid £3 6s. 3d. ($15.90). Time at one and one-quarter is paid to employees who work on their rest day, Sundays or overtime. After six months service a platform employee is entitled to three days vacation with pay, and after twelve months service to six days in addition to one day off as an equivalent for each of the public holidays such as Christmas, Boxing Day, Easter, Good Friday, Whit-Monday and August Bank Holiday.

Regulars have the same run for a week at a time, taking an early run one week, as from 3.45 a.m .to 1 p.m., and the next week from 1 p.m. to 11 p.m. Out of ten hours, about nine hours are actual platform time. Substitutes take over the duty of the men replaced, but reliefs are on a different run every day in rotation.

W. H. Taft on Higher Fares

In Newspaper Article He Gives Reasons for Their Advance—Remedy for Existing Conditions Must Be Found

IN A COPYRIGHTED article in the Philadelphia *Public Ledger* for the morning of June 12 Ex-President William H. Taft contributes an article entitled "Higher Street Car Fares Seem to Be Inevitable." He begins by saying that while the financial situation of the general steam railroad system of the country is bad enough, it is far better than that of the electric street and suburban railway systems. After pointing out that the long use of the nickel fare has trained the public to regard anything more as an infringement upon its rights and privileges, he points out that "5 cents under present conditions is generally not reasonable compensation for the service rendered in any city." Even before the war, materials were increasing in price, and labor had been kept down simply through the necessity of circumstances of the street railways.

Ex-President Taft then gave the reasons for the organization of the National War Labor Board whose position was that wages were not a subject which could be affected by the question of profit of operation, but must be governed by the range of wages for similar service in the same community and by minimum limitation as to the cost of living. While the increases in wages awarded by the board added to the necessary expenditures of the railway companies, the board recommended in every case that an increase in fares was only just to the owners of the street railway companies. Mr. Taft then discusses the question of municipal ownership with and without losses made up by taxation, but does not recommend either plan. In conclusion he says:

"But whatever the remedy to be undertaken, the condition of investments now reaching at least $5,000,000,000 in the country is so serious that public attention should be aroused to the necessity of devising ways and means to meet the crisis."

Reduction of Ash Content in Screenings

In a paper presented by the general fuel inspector of the Illinois Central Railroad at the 1919 convention of the International Railway Fuel Association, the statement is made that the ash content of screenings can be reduced nearly to that of the screened lump by the use of a jig gravity washer with an ample water supply and located in a place convenient for depositing the refuse. For example, in the case of a coal from one mine in the Central West the dry or unwashed screenings contained 22.6 per cent ash and 8895 B.t.u. per pound. By washing, the ash was reduced to 14.1 per cent and the B.t.u. content increased to 10,085. The lump coal contained 12.4 per cent ash and 10,499 B.t.u.

Safety Car Is a Live Proposition[*]

This Type of Equipment in Both Large and Small Cities Will Give Better and More Frequent Service

By P. J. KEALY
President Kansas City (Mo.) Railways

THE safety car is a subject which is now occupying the attention of operators of both small and large properties and which merits all the study being given to it. While not thinking it is the solution of all our difficulties, I do believe it is destined to be the largest single factor from the operating standpoint in meeting the present transportation problem.

In Kansas City we are not yet prepared to say from our own actual experience that the car, as we now know it and as it is being standardized by its makers, is all that it should be. It is still subject to refinements and changes, which it is hoped will be developed and worked out by the car builders. But the idea is right and it has come to stay, and in many cases will save the situation.

2500 Safety Cars Now in Use

A report of the American Electric Railway Association, issued as of April, 1919, shows that there are at present eighty companies, serving a population of four million, operating more than 2500 safety cars. More than half of the companies reporting are 100 per cent one-man operated. This report is very instructive as showing the economies and the increase in net which result from safety-car installation. The average reduction in power consumption was over 50 per cent, this figure covering many cars using old-style motors. For the safety-car alone this reduction is 60 per cent. Practically all of the companies report reduction of headway and increased service. Forty-one companies, including those operating in the larger cities, show increases in revenue—in some cases running as high as 35 per cent. Practically all of the companies show a decrease in accidents, especially boarding, alighting and platform. Most of the companies reporting are satisfied with the results obtained and advocate the extension of the safety-car service.

There is a factor, however, which may have an adverse effect on the general introduction of the safety car. That is the introduction of the zone system. There seems to be a tendency on the part of commissions in many states to favor a zone system of fare collection. If generally introduced throughout the country, it may make difficult the use the one-man car, especially in the larger cities having a number of zones. The operator of the safety car now has his hands full with the collection of a single fare, and I doubt very much if he would be able to attend in addition to the collection of zone fares. Nevertheless a number of the companies reporting use this car in connection with the zone system and collect fares by means of inspectors, the pay-as-you-leave plan or by stoppage of the car and collection at the zone limit. The fact, however, that any system of zone collection by the operator of a safety car would tend to slow up the speed to a great extent might make its operation under this system impracticable on heavy lines.

Safety Cars Satisfactory in Kansas City

Safety cars have been used in Kansas City since April 27 with very satisfactory results. Twenty-five cars were bought with the idea of using them on a light-traffic crosstown line. It was later decided to put them in regular service through the congested district and give them a thorough trial so as to demonstrate once and for all whether or not this type of equipment would meet the extremely difficult operating conditions prevailing in Kansas City. Naturally the results are not entirely comprehensive, owing to the fact that the line could not be completely equipped with safety cars. The results obtained to date, however, are so gratifying that their extension to other lines in Kansas City may to some extent help solve present operating and financial problems.

The cars in Kansas City are being given a thorough trial on the Sunset Hill line. This line is 7 miles in length, serving the downtown district, the thickly populated residence district south to Forty-eighth Street, and from there on private right-of-way through the most exclusive residence portion of the city. In the downtown district the route is over Grand Avenue, which carries exceedingly heavy traffic with a headway on portions of it during the rush hour of from thirty to forty-five seconds. This line has the usual heavy grades to be found on all lines in Kansas City, and it was felt that if the safety cars could operate successfully over this line and maintain schedules headway in connection with the heavy equipment through the congested district, they could be placed anywhere.

Formerly on the Sunset Hill line during the rush hour twenty of the large cars were used, which gave approximately a four and a half minute headway. During the non-rush hours it was served by fifteen of the large cars, giving approximately an eight-minute headway. Beginning April 27 a rush-hour service was begun with fifteen of the safety cars and ten of the large ones, with between two and one-half and three minutes headway. During the non-rush hours fifteen safety cars give between a four and one-half and five-minute headway. Here are the results of this operation for the first two weeks as compared with the two weeks prior to the introduction of the safety cars:

Car miles were increased	47 per cent
Car hours were increased	54 per cent
Gross receipts increased	19 per cent
Expenses increased (only power and platform being considered)	11 per cent
Net revenue gained	25 per cent

This revenue gain is at the rate of about $2,000 per year per car

Actual power-saving, running-time and stop tests were made on one of the safety cars on this line as compared with one of the large type. These tests gave the following results: The running time of the large car was forty-three minutes as compared to forty-four for the safety car. The time per stop in seconds for the large type was seven and seven-tenths as compared to ten seconds for the safety car. Stops per mile were seven, the same for both cars. The coasting percentage of the large car was 15.4 as against 24.1 for the safety car. The kilowatt-hour consumption per car-mile was 3.45 for the old type equipment and 1.39 for the safety car, showing a saving of 60 per cent. It will be seen from the foregoing that although the time consumed per stop for the safety car was 2.3 seconds longer, its running time was practically the same.

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[*] Abstract of paper before meeting of Missouri Association of Public Utilities, Excelsior Springs, June 6, 1919.

Twenty-five safety cars are now in operation in Kansas City, and five more are being built. When the line is completely equipped with safety cars, even should there be no further gain in gross receipts, the further reduction in operating expense will show a gain of $2,000 per car per annum, or a yearly net revenue gain for this one line of approximately $60,000. At this rate the cars would pay for themselves in less than three years.

Owing to the more frequent service it is interesting to note the gain in gross receipts on the Sunset Hill line as compared with the entire system. As compared with the same day of the preceding week, the first week's operation of the safety cars showed a 12 to 32 per cent gain in gross receipts for this line as compared to a 2 to 12 per cent gain in gross receipts on the entire system.

On the Messanie Street line in St. Joseph, where safety cars have been operated entirely since November, 1918, March of this year showed an increase of 26 per cent in gross revenue over March, 1918, and April of this year an increase of 23 per cent over the preceding year. The increase in car-hours and car-miles was approximately 10 per cent. Platform expense with two-man operation was $98 a day as compared to $65 per day with safety cars. The power saving would be anywhere from 50 to 60 per cent. These are very hopeful evidences of what may be expected by the general introduction of safety-car operation. Similar statistics might be quoted from every city in which these cars have been placed in service.

As for the car rider, there is not only rapid service with short headways but another feature which should please him. The cars will carry with a fair degree of comfort a load of sixty, thirty-five seated and twenty-five standing. In Kansas City we have adopted this as a maximum load, and when capacity is reached a "Car Full" sign is displayed. Therefore a passenger knows beforehand what will be the maximum crowd limit. He knows that after the car has been filled it will not stop to squeeze in a few more people, greatly to his discomfort.

FURTHER IMPROVEMENTS POSSIBLE

From the standpoint of construction there is a feeling on the part of some that the safety cars have been built up to date with standardization too strongly in the minds of the builders. The car is still subject to a number of changes and refinements. It may have to be strengthened in some of the essential particulars, which may necessitate the addition of slightly more weight, or the use of better material.

It is likely that in increasing safety-car operation in Kansas City, future cars will follow to some extent J. M. Bosenbury's compromise cars in Wichita, especially in regard to weight and slightly heavier construction throughout. These cars weigh 16,000 lb. and seat forty-one passengers. They are slightly larger than the present type, and in many essential points are built of heavier material.

The makers have also standardized on a width of 8 ft. In Kansas City the track centers will allow for the operation of more than a 9-ft. car. The reason advanced by the makers for adopting 8 ft. as standard is that there are many smaller cities in the United States which cannot take anything wider. This being the case, there is no reason why Kansas City and other cities should be penalized by the limitations of other places. Some additional width would greatly increase the riding qualities of the car, allow a wider seat and a wider aisle. It may be, therefore, that it will be necessary in the future to standardize on at least two widths of cars.

It will also be necessary to line the cars and put in a double floor in order to make it possible to heat them in the latitude of Kansas City. As now turned out without lining, it will be very difficult to heat the cars with any degree of comfort.

Owing to the light construction of safety cars, rigid inspection and proper maintenance will have to be insisted upon in order to keep them in good operating condition. Otherwise it will not take long under severe conditions to have the cars in the shops too great a proportion of the time.

In connection with these matters, I wish to quote from a letter by W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, which has just placed an order for 200 safety cars. In writing him I made some of the foregoing suggestions, and he replied as follows:

> I think all of your comments as to the light construction of the car, difficulty in heating and fear as to possible future heavy maintenance costs are well taken. We are making an effort to anticipate these features by strengthening and adding to the weight of the car, believing that some additional weight will be money well-expended in the long run. Yet it is my frank opinion that the use of a safety-car will more or less revolutionize the prevalent notions as to the method to pursue in building and repairing cars, and perhaps in the long run it will be found desirable to make them more like a Ford car, and in case of serious accident scrap the body or the complete unit if necessary.

Mr. Bosenbury, who designed the first cars, seems to think on the contrary that the present car is heavy enough and that the objections mentioned can be met by the use of better material. He says:

> With regard to the fear entertained that the extremely light construction of the car will result in an extraordinarily high maintenance cost after two or three years of operation, it is my belief that such fears are groundless. Instead of any weight being added to the car, the proposition resolves itself into an engineering problem of maintaining the present extreme light weight and even going to a lighter weight. If any greater strength is needed than that in the present car, it can easily be secured by using higher grade material for the main members of the car, such as dropper bars, sill angles and various other members of the frame. These can be made of pressings from vanadium steel, which will increase the strength of the car and also reduce the weight.
>
> The next thing to be considered in connection with reducing maintenance cost would be to use side girder plates made of American ingot iron instead of the ordinary tank steel now employed. This would result in preventing rust spots, which may possibly weaken the present sheets if not kept thoroughly painted.

Our engineers have made a number of minor criticisms. These are, it is true, but trifling. On the other hand, they have an important bearing from the standpoint of introducing a new type of equipment to the public. In viewing a radical departure from the ordinary type the public is naturally hypercritical, and little details, such as poor painting, etc., lead to adverse opinion.

The criticisms and suggestions above mentioned, however, are matters of construction detail which can and doubtless will be worked out as operators generally begin to dig into specifications for their own requirements. The fact remains that safety-car operation offers a financial solution for many of our problems. It provides the means for giving the public a better and more frequent service. It allows us to meet peak-load conditions and adjust non-rush service to non-rush income without penalizing the rider. It cuts down the expense of power and track maintenance. The general introduction of the little cars will practically solve the ever-present wage problem in that the wages of the operator can be increased to a point that will fairly well satisfy him without throwing the road into the hands of a receiver.

Everything points to the fact that this is to-day one of the livest propositions before electric railway operators of this country, and it merits earnest attention and thorough study. In addition to saving our "financial bacon," this type of equipment will allow us in both small and large cities to adapt transportation facilities to the public demand under all conditions. It gives us the means to provide the public with frequent service, which, after all, is the answer to the urban transportation question in every community.

Short-Line Railroads Confer

Resolution Adopted in Regard to Freight Contracts of Interurbans—Important Conference with Railroad Administration

MORE than 400 delegates of the American Short-Line Railroad Association, representing 600 short-line railroads throughout the United States, held a convention in Washington, D. C., on June 3, 4 and 5. Representatives of electric railways were present in connection with freight traffic matters.

The following resolution was presented to the committee on resolutions and adopted:

Resolved, That the following proviso of Section 1 of the act of March 21, 1918, providing for the federal control of railroads, should be repealed in the bill that will soon be considered by Congress making appropriations for the railroads under federal control, to-wit:

"*Provided*, however, that nothing in this paragraph shall be construed as including any street or interurban electric railway which has as its principal source of operating revenue urban, suburban or interurban passenger traffic, or sale of power, heat and light, or both."

Resolved, further, that any short-line railroad doing a general transportation business and connecting with or competing for traffic with a railroad under federal control shall be eligible to make a contract with the Director General of Railroads irrespective of the motive power used by said short-line railroad.

BETTER TREATMENT FOR INTERURBANS

At a conference held on June 4 with Messrs. Thelen and Niles of the United States Railroad Administration, a request was made in behalf of electric lines for the same consideration from the steam railroad lines under government control as is being accorded the short-line steam railroads, through contracts being executed between the short lines and the lines under control. The members of the presentation committee present were Charles L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.; Dana Stevens, vice-president Ohio Electric Railway, Springfield, Ohio, representing W. K. Schoepf; Edwin C. Faber, vice-president and general manager Aurora, Elgin & Chicago Railroad, Aurora, Ill.; and C. E. Thompson, assistant to president Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., who represented Britton I. Budd.

Other electric railway men present were George Theis, Jr., president, and Chester I. Long, general attorney, and Fred C. Mayer, traffic manager, Arkansas Valley Interurban Railway, Wichita, Kan.

Among the subjects considered at the conference were the following:

1. Proper divisions of traffic.
2. Reimbursement on account of freight and express business diverted because of government control of trunk lines and express companies.
3. Physical connections of electric lines with steam lines where proper.
4. Exchange of transportation as per I. C. C. regulations.
5. Two days free allowance to electric lines receiving steam line cars for loading or unloading.
6. Through rates and traffic relations, and a general co-ordination of electric and steam line facilities for the benefit of the companies and the public, the latter being entitled to improved transportation service, wherever possible, by such co-ordination. Whether formal contracts with the Railroad Administration should be entered into is a question to be considered. The Arkansas Valley Interurban Railway has already made application for such a contract and has joined the American Short Line Railroad Association.

The fact that some of the steam roads under government control have shown a disposition to co-operate with the electric lines, while others have not, would seem, it was said, to indicate the desirability of a uniform policy of co-operation. This it might be possible to establish under a general order of the Director of Public Service of the United States Railroad Administration.

The establishment of the principle of recognition of the interurban railways by the steam railroads, it was felt, is a matter of importance to all such electric carriers. It might be possible now, while the steam railroads are within government control, to have a principle adopted that would be of value to the interurbans generally in the future, for passenger as well as freight traffic.

New Patents Granted for Catenary Suspensions

Several new patents relating to overhead line material are referred to in *Elektrotechnik und Maschinenbau* of Jan. 5. A patent granted to the Allgemeine Elektrizitäts Gesellschaft provides methods of suspending two catenaries over a track when heavy current renders two wires desirable. These are hung in such a manner that the wires can be independently moved sideways. An Austrian patent granted to the Siemens-Schuckert Works provides for automatically adjusting the tension in the overhead conductor caused by variations of temperature.

Other patents referred to provide methods of suspending the overhead catenaries for two parallel tracks, method of hanging wires and special section insulators and a method of taking current from fixed overhead points by means of a wire stretched along the length of the train above the roof.

New York Association Gets Down to Fundamentals

At Annual Meeting, Held at Lake George, the Local Fare Situation Was Considered in Detail—E. A. Maher, Jr., Was Elected President

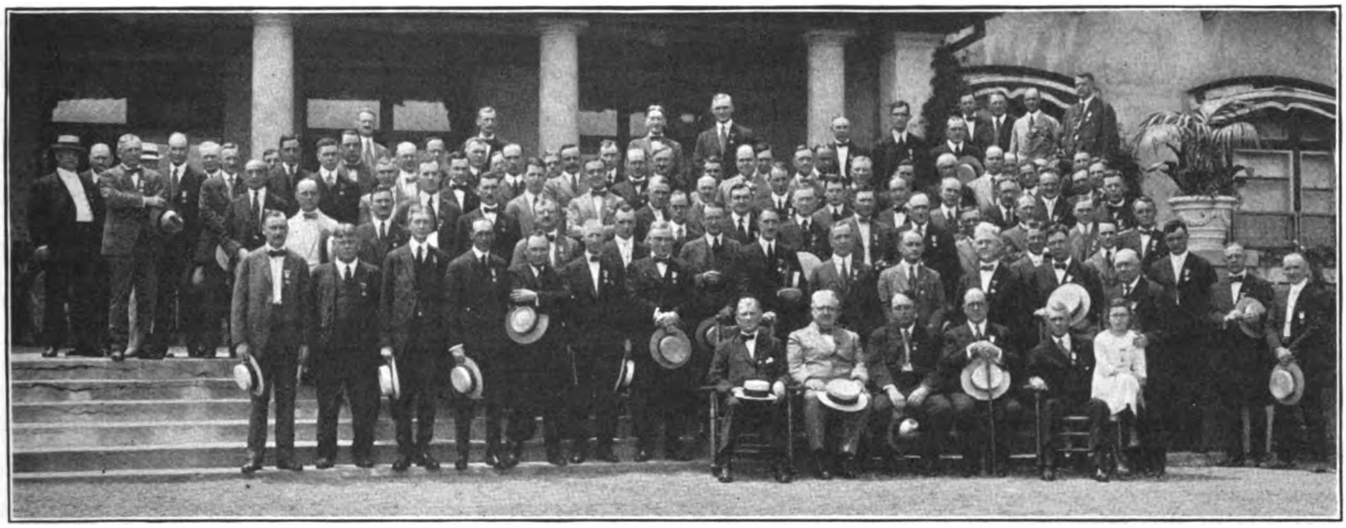
THE thirty-seventh annual meeting of the New York Electric Railway Association was held at the Fort William Henry Hotel, Lake George, on June 7, with 150 or more persons in atendance. The morning was devoted to the president's address, reports of committees, discussion of the fare situation and the presentation of a paper on "Workmen's Compensation from the Self-Insurer's Standpoint" by O. G. Brown. In the afternoon there were various sports and other entertainment, and in the evening a very successful banquet.

A SHEAF OF INTERESTING COMMITTEE REPORTS

After the reading by President H. B. Weatherwax, Schenectady Railway, of his presidential address (abstracted elsewhere in this issue), the secretary-treasurer, William F. Stanton, New York State Railways, Rochester, read the report of the executive committee and his own report. These showed that the activities of the association for the past year had been directed largely to the bettering of the financial condition of the companies throughout the State. The usual quarterly meetings were omitted in the interest of economy. The receipts during the year have been $6,064.39 and the expenses $5,719.48, the surplus increasing the balance from $6,612.33 to $6,957.24 during the year. Of the assets $3,000 is invested in Liberty Bonds.

The committee on ways and means to produce additional revenue, reported that a meeting of the association had been called on April 29, 1918, to present the then fare situation in the State. The Court of Appeals had denied the jurisdiction of the Public Service Commissions over rates named in franchises, and the Legislature had failed to enact legislation prepared by the committee looking toward the correction of the condition thus brought about. It was decided therefore that the effort to secure relief should be continued.

The bill known as the Carson-Martin bill was introduced in the 1919 Legislature, giving the Public Service Commissions the jurisdiction in fare cases which the Court of Appeals in the Quinby decision had declared to be lacking. This measure received considerable support and passed the Assembly but failed of passage in the Senate. Shortly after the adjournment of the Legislature the committee requested the Governor to appoint a commission of citizens to make a study of the traction situation and report to him its recommendations for remedial measures. To this the Governor replied that the public service commissions are already organized to make such recommendations and suggested that the committee appeal to them. This has since been done.



MEMBERS AND GUESTS OF NEW YORK ELECTRIC RAILWAY ASSOCIATION ASSEMBLED IN CONVENTION AT FORT WILLIAM HENRY HOTEL, LAKE GEORGE

Among other matters the committee reported that the publicity campaign directed by Ivy L. Lee has been continued in curtailed form; that it had recommended through the association the intervention in the Buffalo case before the Court of Appeals of companies in other cities situated like the International Traction Company; that all electric railways in the State should join in a motion for the rehearing of the Quinby case; and that the efforts of the committee to co-operate with the Conference of Mayors and Other City Officials of New York State in recommending legislation concerning utilities had not been fruitful, due to the decision of the committee of the conference appointed to draft a bill to permit municipal ownership of utilities not to broaden its scope to include other legislation.

The committee summarized the fare situation by stating that six cities in the State are now collecting a

7-cent fare and twenty-one cities a 6-cent fare. It was necessary that sixteen cities waive franchise grant restrictions to permit fare increases.

In conclusion the committee recorded its sorrow and sense of loss in the death of Horace E. Andrews and stated that T. C. Cherry, Syracuse, had been appointed to succeed him.

For the committee on military operations, James P. Barnes, Schenectady Railway, reported that up to the time of the armistice no call had come from the adjutant-general in response to the association's offer of its services. The plans for the use of electric lines in the mobilization of troops had been deferred until the adjutant-general worked out a detailed arrangement, and consequently the year 1918 was simply one of watchful waiting for the committee. Mr. Barnes recommended that the committee now be discharged.

The committee on classification of accounts reported by J. C. Collins, chairman, that a conference was held in Albany on June 25, 1918, and a plan was adopted for presenting to the Public Service Commission the views of the association regarding the proposed classification. At a subsequent hearing papers were read and verbal arguments were presented in support of these views. As a result the commission so modified the classification as practically to meet the wishes of the association.

STANDARDIZATION OF SMALL AND LARGE CARS

The report of the committee on standards, submitted by W. G. Gove, Brooklyn, suggested the possibility of embodying standardization principles in car construction with special reference to the so-called "safety car." And aside from the application and use of the safety car it would seem that the principles laid down by the committee of the Electric Railway War Board could be applied in establishing a relation between the safety car and a larger type of prepayment car that would make possible the use of many parts in common. These could include axles, motors and truck parts. With safety cars two motors could be used and with the larger cars, four motors.

The committee advocated the use of the safety car wherever possible and stated that there are inquiries outstanding from electric railways within the State for 750 cars of this type, much of which business will be closed within a month.

The committee on membership, James F. Hamilton, chairman, reported three new members and four withdrawals, the latter including an enemy concern whose business was discontinued by our government. There are now thirty-four active, nine associate and eighty-eight allied members.

A SYMPOSIUM ON THE FARE SITUATION

Two main topics were set for discussion, the fare situation in New York and self-insurance. In the absence of the scheduled speaker on the first topic, Morris Cohn, Jr., Niagara Falls, N. Y., various phases of the fare situation were covered by Harlow C. Clark, editor *Aera;* Mr. Barnes; A. W. Loasby, president First Trust & Deposit Company, Syracuse, N. Y., and J. E. MacLean, attorney United Traction Company, Albany, N. Y.

Mr. Clark stated that fifty-five of New York's fifty-six cities have local electric railway service, but that in thirty-three cases franchise restrictions prevented an increase in fare without the consent of the municipal authorities. Nevertheless sixteen fare increases have been made with city consent, and eighteen in cases where such consent was not required, or a total of thirty-four increases. The commissions have not refused increases where they had jurisdiction, but four cities have refused their consent. Seven applications for higher fares are still pending, and in nine cases no application has been made.

Among the thirty-four cities now having increased fares, there are six where a 7-cent fare is in effect; twenty-one, a 6-cent fare, and one a 6-cent fare on all but one line. Three companies now have zones outside of city limits; one has a suburban fare increase and two have secured the abolition of reduced-rate tickets.

Mr. Clark said that the authorities in New York lack a real understanding of the proper theory of rate control. The Carson-Martin bill to give the commissions control over franchise rates aroused opposition among high officials favoring city home-rule, but the service-at-cost plan recently proposed for Buffalo was vetoed by the Governor on the ground that it constituted an undesirable abridgement of state control over rates. The State of New York has either gone too far with commission regulation or not far enough, and the situation must be remedied. The first step to be taken is to make the people understand utility conditions, and to this end all investigations, such as those of the Chamber of Commerce of the United States, the Federal Electric Railways Commission and other bodies, will be helpful. In closing, Mr. Clark strongly urged that the car rider be informed as to what are proper charges against him in the cost of service, so that he will become the ally of the railway and thus insure public co-operation in the settlement of railway problems.

Mr. Barnes described the rate case of the Schnectady Railway, involving one city and three interurban divisions. In his opinion, the theory should be definitely established that the earnings and expenses of interurban cars within city limits should not be included in the accounts of the city lines but, because of the different type of operation, be carried into the interurban accounts.

In its case before the commission the Schenectady Railway urged that the three interurban lines be considered as one system, but the commission decided to consider them separately. It found the rate on the Albany division compensatory, but it increased the zone rates on the Troy and Saratoga divisions from 5 to 6 cents, at the same time permitting a 6-cent city fare in Schenectady. The interurban increases involved a novel point in that the charge for one zone was put at 7 cents with 6 cents a zone for rides of more than one zone so as not to burden the passenger who rides a short distance past a zone limit.

A glimpse at former days, when electric railway securities were regarded as safe investments because "people must ride," was given by Mr. Loasby, who said that his interest in the traction situation began twelve years ago with the organization of an investment department in his company. The investment situation today is different, he remarked, because it is almost impossible for an electric railway even to get bank support for current loans unless the bank is already involved.

Mr. Loasby declared, however, that he is an optimist. In his opinion the industry has passed through the worst of its troubles. Nevertheless he suggested that the industry drop its policy of secrecy and fight through persistent publicity for just treatment. Less talk should be had about a specific 6-cent, 7-cent or any other fare, and more about an equitable agreement between each company and city. It would even be well to allow the public to be represented on company directorates. Mr. Loasby said that the bankers in New York are planning to aid the industry by enlisting the support of electric railway security holders.

Mr. MacLean, in connection with the Buffalo situation, explained that the Milburn agreement with its 5-cent fare restriction contained a clause stating that the contract between the city and the company was not effective until ratified by an act of the Legislature. In 1892 the agreement was submitted to the Legislature and ratified by a special act. It is now asserted by the International Railway that the stipulated 5-cent rate is not a franchise rate but a statutory rate and that the Public Service Commission for the Second District of New York can increase it.

The question whether the commission has jurisdiction and power, under the facts shown, to regulate fares in Buffalo is now before the Court of Appeals for final decision.

[The case is of more than local interest, for it involves the Quinby case in Rochester, whereby it was held that the Legislature had not clearly given to the commission any power it possessed over franchise rates, and the later South Glens Falls decision, in which it was held that under the regulatory law the commission has power to increase gas rates over those stipulated in grants of location. The inter-relationship of these cases was noted in the ELECTRIC RAILWAY JOURNAL of May 24, 1919, page 1027—EDITORS.]

At a hearing in the Buffalo case on June 6 before the Court of Appeals, the Schenectady Railway, the United Traction Company and the New York Railways intervened, said Mr. MacLean, in an endeavor to rectify what many considered was a mistaken decision in the Quinby case. A motion for the reargument of this case had been seriously considered, and it had been agreed that an application would be made, the New York Railways having prepared a comprehensive brief and motion papers. When the Buffalo case, however, reached the Court of Appeals, it was decided that the brief would be used in intervention. The brief is now before the court, and it is hoped that the Buffalo decision may constitute a reversal of the Quinby case without reargument. The International Railway attorneys have asked that the court, if it does not hold the Buffalo and Quinby cases to be different, reconsider the decision made in the Quinby case.

Mr. MacLean stated that he had no sympathy with the idea of going to municipalities for relief, because years of experience in coaxing, wheedling and forcing had shown that more than half-relief could not be secured from city authorities. He firmly believed that more power should be placed in the hands of the commissions in New York, and also that the law should be changed so as to enable them to clear up the matter of transfer charges.

COLLATERAL FOR SELF-INSURANCE

The paper on self-insurance in connection with workmen's compensation laws, by O. G. Brown, assistant secretary of the Self-Insurers' Association, is abstracted elsewhere. Supplementing his remarks, Mr. Brown said that under plans now under consideration by the State Industrial Commission every self-insurer in New York State will probably be asked to readjust upward the securities deposited as collateral against compensation awards. The first proposal of the commission (which, for example, would raise the self-insurer's security deposit from an amount equal to a six months' premium in the state fund to a three-years' premium) would prove a great and unnecessary hardship to many companies and prevent them from becoming self-insurers and thus carrying insurance at actual cost. A compromise plan was recently presented to the commission whereby a self-insurer would furnish as a guarantee securities equaling a six-months' premium in the state fund and at every six-month or yearly period thereafter readjust the deposit according to the liabilities incurred, the deposit being increased when the liabilities amounted to one-half of it.

The committee on resolutions then presented the following, which was unanimously adopted:

> The New York Electric Railway Association records with the deepest sorrow and regret the death of Horace Ellsworth Andrews.
>
> Mr. Andrews was a pioneer in the electric railway industry. His contributions to its development were of the greatest permanent value, and largely to him central New York owes the conception and fulfillment of its largest traction system.
>
> His qualities of integrity, courtesy and kindliness endeared him to all with whom he was brought in contact, and especially to his fellow members in this organization.
>
> *Be it Resolved*, that this memorial be adopted by the association, to be spread upon its minutes and that the secretary be instructed to transmit a copy thereof to Mr. Andrews' family.

Upon the report of the nominating committee, the following officers were elected for the ensuing year: President, E. A. Maher, Jr., vice-president and general manager Third Avenue Railway, New York; first vice-president, T. C. Cherry, vice-president Peck, Shannahan & Cherry, Inc., Syracuse; second vice-president, W. O. Wood, president New York & Queens County Railway, New York; and secretary-treasurer, W. F. Stanton, assistant to president New York State Railways, Rochester. The new executive committee consists of B. E. Tilton, general manager New York State Railway, Syracuse; W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, New York; J. E. Hewes, general manager Albany Southern Railroad, Albany, and George Keegan, assistant to vice-president and general manager Interborough Rapid Transit Company, New York.

Mr. Maher, upon taking the chair, expressed the thanks of the association for the work accomplished by Mr. Weatherwax during the past year. Continuing, he said that he did not look for improved conditions in connnection with labor and material prices. The impossibility of increasing production by the introduction of such improved methods and means as followed the Civil War, the large demands for goods in many lines and the unprecedented expansion of credit all point to the certainty that there should be no present hope of decreased costs.

In regard to labor, Mr. Maher said that he did not think wages ought to be reduced, and he hoped that they would never have to be. The cost of living has gone up, and the men are entitled to a living wage. Increased receipts, however, must come to the railways if this hope of continued wages is to be realized.

In Mr. Maher's opinion, two remedies for the present critical situation of electric railways should be sought

—(1) a decrease of expenses through the adoption of every practicable means for operating economy and the abolition of unnecessary mileage, and (2) an increase in receipts. The railways should get away from the idea of a fixed fare of any amount and endeavor by every honest means to bring to rate-fixing bodies a true realization of the condition of the industry and the necessity for an open and unprejudiced consideration of an equitable system of rate-making.

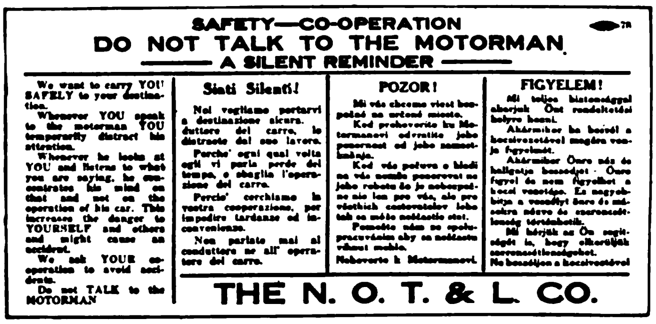
The Social Side of the Convention

THE day of the convention was an ideal one to be spent at a lake resort. It was warm but there was a pleasant breeze from the lake, and all of the outdoor sports which had been planned could be carried out. The chief events of the afternoon were a baseball game between the railway men and the supply men in the first part of the afternoon, and a golf tournament at the links of the Glens Falls Country Club. During these athletic events the ladies had an opportunity to participate in an auction bridge contest. Others among the delegates took trips on the lake or explored the historic points around Fort William Henry, of which there are many.

In the evening the annual banquet was held. President Weatherwax acted as toastmaster. The speakers were Brig-Gen. Frank T. Hines, chief of Transportation Service, War Department, Washington, D. C., Frank Buffington Vrooman, Ph.D. and Hon. Job Hedges, receiver New York Railways. General Hines gave an account of the methods employed by the government in collecting its army of 2,000,000 and shipping them to France, a work of great magnitude. Doctor Vrooman discussed the Bolshevik movement, the League of Nations and other topics. Mr. Hedges introduced his remarks with the statement that he had now learned that the duty of a receiver of a railway company was to stand at the end of a line and receive anything which all the others in the line let pass by. He then took up many topics of the day in an address which brought great applause.

Keep Mum

THE Northern Ohio Traction & Light Company supplies its motormen with cards similar to that reproduced. On one side is an injunction to silence, in four languages. On the other side is a cartoon, illustrating the evil effects of collision which occurred because a passenger talked with a motorman.



SAFETY—CO-OPERATION

DO NOT TALK TO THE MOTORMAN

A SILENT REMINDER

We want to carry YOU SAFELY to your destination.

Whenever YOU speak to the motorman YOU temporarily distract his attention.

Whenever he looks at YOU and listens to what you are saying, he concentrates his mind on that and not on the operation of his car. This increases the danger to YOURSELF and others and might cause an accident.

We ask YOUR co-operation to avoid accidents.

Do not TALK to the MOTORMAN

Siati Silenti!

Noi vogliamo portarvi a destinazione sicura. duttore del carro, lo distraete dal suo lavoro.

Perche' ogni qual volta egli vi parla perde del tempo, e sbaglia l'operazione del carro.

Percio' cerchiamo la vostra cooperazione, per impedire tardanze ed inconvenienze.

Non parlate mai al conduttore ne all' operatore del carro.

POZOR!

FIGYELEM!

THE N. O. T. & L. CO.

THIS CARD SAYS "DON'T TALK," IN FOUR LANGUAGES

Copies of this card are being issued to railway members of the National Safety Council by H. B. Adams, chairman of the Electric Railway Section, together with other suggestions for safety.

Self-Insurance for Workmen's Compensation*

Self-Insurance Is Valuable to Both Employer and Employee and Should Not Be Prevented by Requirement of Excessive Guarantees

BY O. G. BROWNE
Assistant Secretary of Self-Insurers' Association, New York, N. Y.

WHEN compensation laws were established, the principle of negligence was abolished and compensation was predicated on the disability itself, and, for the most part, periodical payments. Inasmuch as these payments necessarily were spread over a long term of years, especially in the cases of serious injury or death, a new principle was brought into being—that of security for the payments. It has been argued that there was no guarantee given other creditors for the protection of their accounts and therefore there was no justification for exacting such a guarantee in the case of obligations to pay compensation to injured workmen and their dependents. This is answered by the statement that the very object of compensation laws is to prevent workmen from becoming wards of the state, and this purpose would in many cases be defeated if these payments were not secured.

This has been and still is the most troublesome question in the administration of compensation laws. It is mainly responsible for the absolute state monopoly existing now in five states, and it is the cause of the frequent attempts to create a monopolistic state fund in other states. While this menace to the right of employers has existed for some time, it has been accentuated by the spirit of unrest which has followed the war. It was one of the policies adopted by the American Federation of Labor a year or so ago and serious efforts were made to put the program through in a number of the states during the past winter. Whether or not workmen and their dependents will be any happier and have any greater security under a state monopoly is doubtful.

SELF-INSURANCE GENERALLY PERMITTED

Of the forty-one states and four territories having compensation laws, self-insurance in some form is permitted in all but eight. Of these as heretofore stated, five have a state monopoly, and some of those have elective laws so that one may carry his risk and not operate under the law if he chooses.

But New York State and all the states contiguous to it, except Massachusetts, permit self-insurance in one form or another. In Massachusetts one may operate under the schedule of the compensation act and fail to comply with its administrative requirements, which is the plan followed by a large number of employers. The question of security by self-insured employers is not a serious one in Pennsylvania, New Jersey, Connecticut or Vermont. Usually the authorities will accept the annual statement of a solvent employer and grant him the right to carry his own risk. The theory underlying this is that the employer's good will, prospective earnings and valuable plant are sufficient security to guarantee the payments he may be called on to make.

In New York, however, there is an entirely different problem. The law says the State Industrial Commission "may" exact the furnishing of securities as a guarantee. The commission has interpreted this to mean that it "must" exact them. And there is justice in this contention. The law is compulsory to the extent of its coverage. Payments must be made, even in the case of specific injuries, for years, and in death cases for the life of the widow. A widow twenty-one years of age has an expectancy of forty-one years. An extreme case, such as a widow thirty-six years of age with six children, aged twelve, ten, seven, four, and twins two years, respectively, where decedent earned $100 a month or better, would mean that payments might aggregate the sum of $18,000 and be spread over a long term of years, although commuted this would amount to but about $11,000. As these liabilities grow they would in a few years amount to very large obligations, and on however sound a financial basis an industry may be now, no one can say what its condition might be five years hence. The commission is charged with the duty of exercising a wise discretion is exacting security for these payments, and it manifestly would not do its full duty if it did not require something tangible as a guarantee.

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*Abstract of paper read before the New York Electric Railway Association, Lake George, June 7, 1919.

New York provides four distinct methods of providing security for these payments—liability insurance, mutual insurance, state-fund insurance and self-insurance. The laws respecting the first three forms of coverage are specific enough so that they are not a problem, and it is self-insurance which has recently concerned the commission. This concern has not been brought about by any failure on the part of self-insurers to meet their obligations. Even those concerns which are in receivers' hands have all met their obligations and have security provided for their outstanding liabilities. This is more than can be said for the liability insurance companies, of which one has not met its liabilities and another, I understand, raised considerable doubt. Rather has the concern felt by the commission been brought about by the unrest and some political philandering.

GUARANTEES TO BE READJUSTED UPWARD

For a long time the commission has used as a basis for determining the amount of securities it would require deposited as a guarantee, an amount equal to what would be required to purchase six months' insurance in the state fund. While as to small risks, this was not in the main unreasonable, it was as to large risks, for this premium, it must be borne in mind, is based on payroll expenditures in the risk considered but has a rather heavy loading for administration expense. It has been the contention of self-insurers that the amount of securities exacted should nearer approximate the actual hazard of the risk covered, by taking the experience as a basis, adding a reasonable amount for risk of catastrophe, increasing the amount as the liabilities grow, and receiving credit for the liabilities that terminate. It has been variously estimated that this would bring the peak in the amount of securities furnished in from eight to twenty years, although the best thought is that because of remarriages, deaths and continued payments, the average peak will be reached in ten years.

Moreover it has been urged that in determining the amount of securities, the commission should consider two very important things, one the value of the plant of the industry to be secured and the other the fact that under Section 34 of the law compensation payments are entitled to the same preference over other creditors, in the case of a bankrupt industry, as are unpaid wages. Where there is no great hazard in the industry, such that the plant may be wiped out, which we know as the catastrophe hazard, there should be little apprehension that compensation would not be paid even if no securities were required. This latter proposition should and does appeal particularly to electric railways. It has been stated that it is impossible for such a company to kill more than three employees at one time. One of the largest electric railway organizations in New York recently surveyed its activities to get an idea of what, if any, catastrophe hazard it had and found that the largest number of men exposed to a single hazard was the operation of a work car containing eleven men.

This problem is still under discussion with the State Industrial Commission. It is disposed to be reasonable, but apparently it is determined that all self-insurers shall readjust upward the amount of securities they have to deposit. The chief concern of electric railways is to obtain recognition of the principles outlined above.

Electric Railways Hard Hit by War*

The Author Quotes Data to Show That This Industry Has Maintained Service Under Conditions Far from Equitable

BY HARRY B. WEATHERWAX

Vice-President United Traction Company, Albany, N. Y.

THE plight of the electric railway industry, hitherto a purely local question, has become a national problem of the gravest character. Of all the nation's industries, ours has emerged from the war in the least satisfactory condition. To-day electric railways representing more than one-tenth of the total mileage of the country are in the hands of receivers, with an additional mileage threatened with bankruptcy unless speedy relief is obtained. During the past year more than 750 miles of track have actually been abandoned. No other industry during the war period has sacrificed so much for the public service.

The whole situation is of such a nature that it is actually the personal concern of every man, woman and child in the country who rides on a street car. For many years the public has been educated more in the sins than the virtues of the greatest public service corporations. One has had only to cry "Watered Stock!" to defeat the most honest and businesslike attempts on the part of electric railway managers to relieve an ailing corporation of its burdens and improve its service. The problem of the public utility corporations to-day has nothing to do with watered stock or any other financial or managerial sin of the past. The task of the hour is an extremely simple one, lending itself to no prejudice or demagogism; it is primarily to secure enough revenue to enable us to meet our operating expenses. We can hardly even think in terms of a return upon the capital invested.

SOME HIGHLY CONVINCING DATA

The following concrete facts should convince anyone whose mind is open on the subject of the almost hopeless condition in which we find ourselves, and the situation is daily growing more alarming: During 1913, tax payments averaged about 5.8 cents on each dollar collected in street car fares, while during the year 1918, the companies returned to the public in taxes about 9 cents out of each dollar collected, an increase of about 55 per cent. In 1913, about 51 cents out of each dollar collected in trolley fares was paid out by the companies in wages to their employees, while during 1918 the companies so paid out about 70 cents out of each dollar, an increase of about 37 per cent. In 1913 there was expended in the settlement of accident and injury claims about 5 cents out of each dollar, and the companies have been successful in holding this fairly well to that figure in 1918.

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*Abstract of presidential address delivered at Thirty-seventh Annual Meeting, New York Electric Railway Association, Lake George, June 7, 1919.

We find, then, about 16 cents left out of each dollar collected in street car fares with which to buy materials and supplies for the operation of the properties for the public needs, and last year there was spent about 19 cents, or 3 cents more than was earned.

In the last report of the Public Service Commission, Second District, State of New York, some startling comments on the subject appeared, a few of which were as follows: During 1917 six roads were sold under foreclosure; the funded debt of the companies coming within the jurisdiction of that commission increased in 1917 about 59 per cent over 1910; there was an increase of about 19 per cent in 1917 over 1910 in the money outlay invested in construction and equipment; the corporate surplus decreased from $3,334,310 in 1910 to a deficit in 1917 of $6,717,517, a reduction of over $10,000,000, or 301.4 per cent; maintenance of way expenses increased about 52 per cent; maintenance of equipment, 71.4 per cent; power expenses, 41 per cent. Then we come to the increase in the wages paid to conductors, motormen and other trainmen, which amounted to nearly $2,500,000, or about 53 per cent, and this figure covers only the increase in 1917 over 1910. We all know what the War Labor Board did with this item in 1918.

Then the commission makes this significant comment on the situation as a whole:

> A wave of business depression struck this country during the latter part of the year 1914 and extended far into the year 1915. The foregoing statements show a healthy and continuous increase in the operating revenue of these railroad companies with the exception of the year 1915, when there was a decrease compared with the preceding year. The revenue under this classification for the year 1917 was $36,155,000. Notwithstanding the decrease in the year 1915, this was an increase over the year 1910 of $11,238,000, or 45.1 per cent. As far as operating revenue alone is concerned, these figures show a prosperous condition which continued through 1918 up to October, after which it was unfavorably affected by the influenza epidemic. . . . While the financial condition of electric railroad corporations Dec. 31, 1917, was serious, it has become more so during the year 1918 by reason of conditions growing out of the war. The causes of a rapid and serious impairment of the net incomes of these companies were not to any great extent attributable to falling off in number of passengers carried except in the latter part of the year 1918, when it was adversely affected by the prevailing epidemic of influenza, but were due almost entirely to increased operating expenses. The above statements do not show all of the increases in operating expenses which during the year 1918 far exceeded those of any other year in the history of these companies. In addition to the advanced cost of materials, wages were substantially increased by order of the National War Labor Board. The conditions outlined above show that the public as well as the companies are facing a serious condition in the matter of electric railroad transportation. The well-being of the different communities is to a great extent dependent upon proper street-car service. The first step necessary to relief for all interested, which includes the public as well as the companies, is a thorough understanding of existing conditions on the part of all concerned. It is a case where criticism, agitation, or legislation directed only to censure will not avail, nor will it relieve the situation. Whether the net income should be increased by a reduction in fixed charges, decreased operating expenses, increased rate of fare, charge for transfer, or limitations of service, can be determined only after full and careful examination of all the conditions affecting each individual corporation.

The above is a well-placed and directly pointed warning, coming as it does from one of the branches of our State government, and, unfortunately, it was but lightly received by the public.

"QUINBY CASE" DECISION A BIG SET-BACK

During the war the traction companies were ground between the millstones of the War Industries Board and the War Labor Board. It was the necessary duty of the former, for many reasons, to maintain stable prices, and as a consequence everything entering into street railway construction and operation went up at the rate of which you are all familiar. The War Labor Board increased the wages of street railway employees at the rate of $125,000,000 a year. The companies in the meantime were chained down by franchises, municipal governments and local commissions, and were unable, as a class, to increase their fares to meet their expenses. The assistance afforded the companies by the government was meager. The terms of the law creating the War Finance Corporation were such that but a comparatively few railways were able to avail themselves of its provisions, since ample security such as few of the companies possessed, was required as a condition of loans.

It was obvious that the recourse of electric railways, so confronted with enormously increased expenses, was either an increase in the price of their service or a reduction in the amount of the service furnished for the prevailing price. This was the policy of every other industry affected by like conditions, as is evidenced by the increased price of practically everything that is sold on the market. It was, however, impossible for the electric railway companies to solve their problem in this simple manner in this State, due to the attitude of local and State politicians, who, since the decision in the Quinby case, have repeatedly failed in their duty to both the companies and the public. Some of the very communities to-day who are most bitterly opposing and assailing those properties, have been established and given their very existence by the accommodations afforded by those properties. The great Empire State is practically the last state to take action toward restoring the lost credit of its street railways.

POLITICS IS A LARGE FACTOR IN RAILWAY TROUBLE

The national government, which assumed the right to increase the cost of operations, absolved itself of any responsibility as to the furnishing of revenue with which to meet the increase. The companies were themselves without power, which lay either with State regulating commissions or with the local authorities in the communities in which the companies operated. The commissions, where they have had full authority to deal with the situation, have tried to do their duty, but in cases where jurisdiction has rested with the city authorities alone the situation has been very discouraging. As a matter of fact, fare regulation by local authorities is usually a matter of politics. Street car service and street car fares form a favorite and convenient issue for the politician, and this has been thoroughly illustrated in Schenectady, where a year ago this month the employees of the Schenectady Railway went out on strike for higher wages, demanding an increase of 10 cents per hour, a sum which the financial condition of the company would not permit it to grant. However, the matter was finally settled and one of the conditions of the settlement was that the case was to go to the National War Labor Board and at the same time the city officials agreed in writing that if the National War Labor Board increased the wages of the men, the Common Council of the city would change the conditions of the franchise containing a limitation in the fare to five cents, so as to permit the company to take the case to the Public Service Commission to have it adjudicated upon its merits, provided that a firm of accountants hired by the city, after looking into the company's financial condition, decided that it could not pay the wages based on the award at the then existing rates of fare. The National War Labor Board two months later made an award, increasing the rate of pay to the employees by 15 cents per hour. It was not until eleven months later, however, that the Common Council was prevailed upon to carry out its obligation, although the firm of public accountants hired by the city reported that an increase in the fare was necessary. The delay cost this comparatively small company more than $200,000 in gross revenue. New York City is another shining example of how politics can ruin these properties.

Government or municipal ownership is being urged by many as a panacea, but it should be borne in mind that this will not remove the real problem, which is one of more revenue. Municipal ownership would only transfer the burden to other shoulders, not remove it. The whole situation could have been very much clarified if the scheme of regulation by commission in this State, which has been as we all supposed for the last decade fully in the commissions' hands, had been completed by the passage by the Legislature of a bill known as the Carson-Martin Bill, which was introduced early during the term of the last session of our Legislature. The passage of this bill would have taken the rate question out of the hands of local politicians and placed it where it belongs.

Good Advice to Men Who Must Constantly Be On Their Feet

ELECTRIC railway men, both on the platform and in the shop or power house, are almost constantly on their feet. A poster from the health service section of the National Safety Council on the subject of "Flat Feet" should be helpful to many of them. The poster states that so-called "rheumatism" in the ankles or the arch of the foot, or pains in any part of the leg below the knee may be due to this cause. Such symptoms should cause a man to consult his physician early.

As mitigative measures the following are recommended: (a) Walking with the feet parallel to each other and standing with the toes turned in, to throw the weight on the outer edge of the foot and relieve the tendency to flat-footedness; (b) wearing heavy-soled shoes with stiff insteps to protect relaxed arches, or adjustable leather arch supports for fallen arches; (c) bathing, sleeping and avoiding excessive fatigue, to impart tone to the muscles and strength to the tendons that support the arches.

Safety Car Discussed

Conclusions of Westinghouse Representatives, Car Builders and Operators Summarized Under Twelve Heads

THE annual meeting of Westinghouse electric railway representatives was held this year at the home of the Birney Safety Car, St. Louis, Mo. The purpose of these meetings is to discuss and exchange ideas in the matter of rendering greater assistance to the electric railway industry and the development and improvement of apparatus and service to the railway operators—its customers.

There were forty-one Westinghouse electric railway representatives at the meeting. The majority of these were from district offices in all parts of the country. The Safety Car Devices Company had ten representatives. With the car builders and railway operators who were present there was a total of approximately sixty attending the meetings.

The first two days, June 2 and 3, were devoted to "talks" and discussions on the safety car. On account of the limited time, evening meetings were also held. F. A. Richards, sales manager American Car Company, and his assistants described the detail design of their standard Birney Safety Car and outlined the plans of the J. G. Brill Company for expanding its already large facilities to meet the rapidly growing demand for Birney Safety Cars.

George Tontrup, president National Safety Car & Equipment Company, and his assistants explained what his company was doing; also their plans for the future safety cars.

E. B. Meissner, vice president St. Louis Car Company, gave a similar talk. All the car builders were pronounced in their optimism on the future of the safety car in electric railway service.

J. M. Bosenbury, superintendent of Equipment Illinois Traction System, gave a very instructive talk on the results secured up to date on the Illinois Traction System with safety cars. This company recently ordered a large number of additional cars from the American Car Company.

C. O. Birney, Stone & Webster, held the attention and interest of the meeting with a very clear survey of the street railway situation and demonstrated that the safety cars had solved the problems wherever they were operated and properly equipped as the designers have planned.

F. G. Buffe, Kansas City Railways, gave a most optimistic and inspiring talk on the railway operating situation in general. According to Mr. Buffe, the safety car is the solution of most operating problems. His company is planning for its general use.

W. S. Rugg, manager railway department Westinghouse Electric & Manufacturing Company, Mr. Cass, manager Safety Car Devices Company, Carl Beck of the same company and several others gave brief talks on the safety car and its application.

A summary of the points brought out by all of the speakers are as follows:

1. The Birney safety car, as built to-day, is suitable for some service in practically any town in the United States regardless of size. In many towns at least 75 per cent of the total service can be handled by the safety car.

2. The importance of employing the existing standard construction for universal application was impressed upon everybody. "Old man local conditions" was discussed pro

and con, it being the consensus of opinion of those present that in every locality where the situation had been carefully analyzed it has been possible to modify the conditions slightly without any great handicap so that the present standard car could be used.

3. Practically every installation of safety cars has resulted in increased revenue due, in most cases, to increase in the number of fares collected and decreased operating expenses.

4. If properly handled, it seems possible to combat every argument that has ever been raised by the commissions, the public, existing ordinances and the labor organizations. The reason for the advocates of the safety car being able to overcome any objections raised is due to the ultimate result of better service and increased income to the operating company.

5. Past installations of the safety car indicate that safety cars pay for themselves in three years.

6. In order to get the best possible operation of the safety car, it is logical so to modify the auditing system that the operator is not called upon to do any unnecessary clerical work.

7. The public traveling on the safety car unconsciously acts as a watchdog for the railway company. Numerous operating companies report that receipts materially increased since the one-man safety car has been adopted. In other words, the conductor-motorman gets all the fares and turns them in.

8. The changing over of old cars without adopting the accepted safety features should be discouraged, as it throws discredit on the up-to-date safety car, and often there has resulted in undeserved criticism of a system of transportation which has never been tried out.

9. Many operating men have felt that the present standard safety car is light and flimsy. General opinion, however, indicates that with a reasonable maintenance the car will most likely have a life in excess of its logical economical life, due to obsolescence in an ever developing art.

10. There seems to be a feeling that it is possible materially to decrease weight of the safety car. Possibly the car should carry less people, should be designed so as to use high-grade automobile materials, possibly be equipped with hollow axles, tapered fit wheels, etc.

11. Sixty passengers represent a full practical load for a safety car.

12. Mr. Bosenbury pointed out that electric railways indulge in a most expensive game when they attempt to use passenger cars to buck snow. They are not designed for it and will not do it. Regulation snow fighting equipment should be used.

Preventing Condenser Tube Corrosion

A REPORT of the corrosion committee of the Institute of Metals of Great Britain, presented on March 25, contains among a wealth of valuable data, analysis and recommendations the following conditions under which a 70:30 brass condenser tube should have a minimum life of twenty years:

1. Only clear water to enter the tube, or water which will not deposit suspended matter.

2. The water must be free from gases in suspension, and must not contain more than the normal amount of air in solution.

3. The water must be neutral or not more than very slightly alkaline. It must be free from ammonia and certain other specially harmful substances which are, however, of comparatively rare occurrence in waters used in power plants.

4. The temperature of the cooling water in the hottest part of the condenser should not exceed 35 deg C. (95 deg. Fahr.).

5. The speed of the water should be about 5 or 6 ft. per second.

6. The steam should be properly distributed in the condenser, according to the best modern design practice in this field.

AMERICAN ASSOCIATION NEWS

Executive Committee Will Appoint Committee of One Hundred

THERE was a good attendance at the meeting of the executive committee of the American Electric Railway Association in New York on June 10. President Pardee presided. Others present were T. S. Williams, P. J. Kealy, F. R. Phillips, R. E. McDougall, James H. McGraw, S. M. Curwen, Guy E. Tripp, W. Caryl Ely, John J. Stanley, B. E. Cobb, S. E. Wolff, J. G. Barry, P. H. Gadsden, E. K. Hall, E. B. Burritt, W. O. Wood, J. K. Choate, H. C. Clark and H. W. Blake.

The most important subject considered was the appointment by President Wilson of a federal commission to investigate the electric railway problem. The executive committee decided that the industry should be in a position to assist the commission in the supply of data or in any other way which might be requested, and that a committee of one hundred should be appointed to take charge of the matter. By unanimous vote of the other members of the executive committee Mr. Tripp was elected chairman of this committee and Mr. Kealy volunteered to give the next two weeks of his time to assisting in the details of the organization. It is hoped that the personnel of this committee can be announced next week.

The executive committee also voted in favor of recording its approval of the present daylight-saving act, and the following telegram was sent to Senator Calder of New York:

> The executive committee of the American Electric Railway Association desires to record with you and your associates in the Senate its disapproval of any measure looking to the repeal of the present daylight-saving law.

Secretary Burritt also reported on the reservations for space at the October convention. The latest figures on this subject will be found elsewhere in this department under the report of the meeting of the exhibit committee.

Mail Hearing in Washington

THE first of the series of hearings to be conducted by the Interstate Commerce Commission to determine the rates which are to be paid by the United States Government for the transportation of mail on the electric railway lines of the country was held in Washington, D. C., on June 9. Seventeen other hearings will be held in different cities before July 28 at which time it is hoped all the testimony required will be gathered. The full schedule of these hearings was published on page 926 of the issue of this paper for May 10.

Those in attendance at Washington representing the government included: Examiner Brown, and M. O. Lorenz, chief statistician, Interstate Commerce Commission; J. Stewart, assistant to the attorney general, and J. B. Corriden, Superintendent Division Railway Adjustment, Post Office Department. The electric railway representatives included: S. S. Ashbaugh, the attorney who will represent the American Electric Railway Association at all the hearings; J. H. Hanna, Capital Traction Company; L. H. Palmer, and R. L.

Chamberlaine, United Railways & Electric Company of Baltimore; W. L. Clark, Washington Railway & Electric Company; J. H. Alexander, Cleveland Railway; F. W. Coen, Lake Shore Electric Railway; W. D. Witt, Philadelphia Rapid Transit Company, and James W. Welsh, American Electric Railway Association.

Commissioner Brown presided, and the examination of the railway witnesses was conducted for the Post Office Department by Mr. Stewart, who it is expected, will act in this capacity at all of the hearings in the series.

The first witness for the railways was Mr. Welsh who presented a number of exhibits including a circular describing the method of computing cost of mail service recommended by the association and issued by it. Mr. Hanna, who was chairman for the Washington meeting of the railways there, then presented the exhibit for his companies and explained various operating conditions which existed when the Washington companies were carrying the mail, a practice now practically discontinued. Mr. Palmer then presented a detailed statement for his company of the cost of conducting an independent car service. The Charleston Consolidated Railway & Lighting Company, the Charleston Isle-of-Palms Traction Company and the Hagerstown & Frederick Railway Company, also presented briefs. In general the testimony of the railway officials was that the compensation for carrying mail should be at least three times what it is at present. This was borne out by the exhibits presented.

At the close of the hearing Commissioner Brown requested, hereafter, that five copies of all exhibits be presented as follows: Two for the Commission, two for the Post Office Department and one for the railway attorney.

Applications for 10,000 Square Feet

A MEETING of the exhibit committee of the American Electric Railway Association was held in New York on June 12. Those in attendance were C. R. Ellicott, chairman; Fred C. J. Dell, F. H. Gale, J. C. McQuiston, A. M. Robinson and E. D. Smith.

The committee decided to appoint two sub-committees. One on decorations and space assignments will be composed of Messrs. Dell, McQuiston, Gale and Senter. The other on publicity in connection with the Convention daily consists of Messrs. Gale, Dempsey and Robinson. It was also decided to employ a director of exhibits.

Secretary Burritt announced that although the application blank for exhibit space did not go out until June 1, already about 10,000 sq.ft. of space had been applied for. After a discussion of the finances, the committee adjourned.

Valuation Principles Analyzed

THE valuation committee of the American Association met in New York on June 11 to continue its discussion of basic principles. The members in attendance were P. J. Kealy, Kansas City, Mo., chairman; W. H. Sawyer, Columbus, Ohio; Martin Schreiber, Newark, N. J.; George Weston, Philadelphia, Pa., and B. E. Tilton, Syracuse, N. Y. E. B. Burritt was also present.

As arranged at the preceding meeting of the committee, Mr. Weston had formulated a statement of cardinal valuation principles and the various elements to be included in an appraisal. The discussion centered around this statement, each section being carefully examined as to its phraseology, intent and probable effect.

The executive committee of the Claims Association met in New York on June 11 for the purpose of discussing the work of the association and outlining the program for the coming convention. Those in attendance were R. E. McDougall, Rochester, N. Y., chairman; S. B. Hare, Altoona, Pa.; H. D. Briggs, Newark, N. J., and George Carson, New York, N. Y.

LETTERS TO THE EDITORS

Increasing the Earning Capacity of Electric Railway Lines

NEW YORK CITY, June 4, 1919.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for May 31, there are two very interesting articles concerning the economies in electric railway operation which must be striven for in order to meet the entirely new conditions which have been brought about by the period of readjustment. I refer to the editorial entitled "There Is a Better Outlook in Railway Power," and the abstract of the paper by Alexander Jackson printed under the heading "Plain Words on Transportation Service." These articles give a comprehensive summary of the details of operation in which great improvement is possible in the direction of scientific management.

As a long-time advocate of higher efficiency and scientific investigations in the operation of electric railway cars, I would suggest that there is another great field that more than ever assumes practical importance in these days of enforced thrift, namely, the careful analysis of the power requirements of the car under different service conditions and modes of operation.

There are people in the electric railway field who can never abandon rule-of-thumb methods of operation, and they must be left to their fate. There are, however, many up-to-date operators who have kept close watch of the car operation end of the business, where most of the company's expenses are incurred, and they realize that there is a close relation of efficiency in car operation and net earnings. In the mind of a man of this type such questions as the following are arising during these days:

> Is the kind of service formerly found to be efficient necessarily to be revised to meet the unexpected and sweeping changes that have recently taken place? Are the schedule speeds formerly used the most economical in view of the very heavy increases in platform expense?
>
> In order to meet increased traffic demands, is it better to raise schedule speed or to provide increased seating capacity at lower speeds with the aid of trailers?
>
> Is it wise to run with an abnormally high percentage of coasting when it is possible by speeding up schedules to get in some extra runs without increase of wages?

These questions merely hint at the many-sided character of the problem of efficient operation. Never was careful investigation more fully justified by conditions than it is at the present time.

Another matter in the same general field is that of adapting cars to satisfactory methods of fare collection. We have the prevalent heavy, doubly-manned single-fare car that has suddenly become a money-eater; also the safety car that cannot take care of the ordinary heavy traffic, and finally the highly complicated car for the automatic collection of zone fares. There ought to be some kind of an intermediate solution of this problem in which the several requirements can be met, the car being provided with devices to insure safe service and permit a semi-automatic system of fare collection.

F. CASTIGLIONI.

Way Engineer Wants Car Weights Reduced

BROOKLYN RAPID TRANSIT COMPANY
BROOKLYN, N. Y., June 10, 1919.

To the Editors:

Anent your editorial in the issue for June 7 on "City Track Not an Energy Saver," I note that in comparing automobiles with street cars you say that it is the cost of rubber tires rather than energy economy which dictates the use of track. This is probably true as it affects the comparison between street cars on rails and autobuses out on the pavement, but there are some other factors which have even more weight in rendering desirable the use of tracks made of rails.

Historically, transportation by rails had its beginning in the need for some means of hauling heavy loads over bad roads by other means than the easily mired wagon wheels. We still have the heavy loads, even though we have better roads, and the most modern pavement as ordinarily put down will not long withstand the destructive effect of carrying 30 to 40 tons steadily and continuously in one path as the rails are still required to do in many of our city railway systems.

The track man has been forced to build track for the heaviest loads which the car builders for a long time seemed to think had no limit. This has been true in both steam and electric railway service. While you are pleading for the rails please make a plea for the continuation of the efforts now being made to relieve the track of its unjust burdens by lessening the car weights. The ultimate savings in operating costs of all kinds to be gained by so doing are obvious.

R. C. CRAM,
Assistant Engineer,
Department of Way and Structure.

The Seatless Car Idea Will Not Down

NEW YORK CITY, June 9, 1919.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for June 7 a news item was published to the effect that Tokyo has been added to the list of foreign cities where the seatless car is being tried out. In August of last year it was noted in your columns that the scheme was under test in Rome. As one of the contributors to the paper puts it, under rush-hour conditions the public must generally ride standing and has become inured to doing so. Since the first duty of the car seems to be that of carrying passengers, the matter of how much comfort is provided is to a certain extent secondary. If more people can be carried standing, without indecent overcrowding, it certainly is the part of wisdom for transportation engineers to give the seatless car scheme more serious consideration. Such cars should load and unload faster, and consequently get over the road more quickly. This is a desideratum in rush-hour service.

The gain in service thus provided is augumented by the ability to carry more passengers in a given time with the same amount of equipment. The cars also would be doing more effective work in carrying passenger weight instead of dead seat weight.

In earlier editorial comment the JOURNAL stated that it did not wish to be understood as recommending the plan except in an emergency and where the run was short. While the paper has presumably not changed its position in this regard, would it not be well to suggest that some enterprising company in this country should try the scheme out? In order to put it over right it would obviously be necessary to advertise the plan properly before doing so, and to point out the advantages carefully, not forgetting "to beat the objector to it" by showing that most of his objections have been foreseen and that the trial is being made solely to get at the true situation in regard to the question of how far the people are willing to stand provided they can get a chance to do even that. I am inclined to the view that a well-planned advertising job would have every chance of making a success of a scheme which operators now hesitate to give a serious trial.

"OBSERVER."

Maps Carried on French Subway Cars Also

60 WALL STREET
NEW YORK CITY, June 10, 1919.

To the Editors:

The article in your last issue on "Why London Subway Riders Do Not Go Astray" shows that the rapid transit management is alive to the importance of merchandising transportation, but the fact is equally true of the Paris subway managers. In Paris the cars carry an outline map of the route, very similar to that described in connection with the London underground roads. Each station is indicated by a black circle, and the stations connecting with other lines are indicated by a double black circle with an intersecting line. At a connecting point a short description is given of where the other line goes.

The whole map takes up a space of 4 in. x 18 in. and is usually mounted on the door in an up and down position. In some cases, however, it is mounted by the side of the door, and on one line it is placed on the ceiling of the car in the form of a "V" and can be seen from any point in the car. All that a person has to do to determine his location is to note the name of the station at which the train is stopped, and then by looking at the map his position is at once apparent. It is thus possible for a total stranger to get around the city with very little trouble.

This system of maps in the car would be a distinct advantage in American practice and would be applicable to subways, elevated trains, suburban electric and steam trains and to surface cars. For use on the surface cars only the principal streets and transfer points would need to be indicated.

K. B. HUMPHREY.

The London Underground Railways and London General Omnibus Company are having good success with their group operating department efficiency meetings. The purpose of these is to give the members of the administrative and control staffs some knowledge of the equipment and its operation. Recent programs included an illustrated lecture on bus maintenance and a number of papers presented by members of different grades of the control staff on "Problems in My Official Life."

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Settlement Plan for Denver

Manager Hild Staggered by Proposal of Citizens' Committee—Mayor Threatens Reprisals

The adjustment committee of fifty-five citizens appointed in January by the Mayor of Denver, Col., has recommended a special election to adopt the service-at-cost plan for the Denver Tramway under a board of control, two members to be appointed by city and one by the tramway, to take over the management of the system. The committee has also recommended the abolition of the $60,000 yearly franchise payments, paving between rails and free riding by city employees. If the plan works the city may purchase the system upon the basis of the Public Utilities Commission valuation of $23,674,100.

The company now operates with a 6-cent fare. The new Mayor, Dewey C. Bailey, who took office on June 1, has advocated the restoration of the 5-cent fare. F. W. Hild, general manager, states that a 5-cent fare now would mean a receivership for the company. In this connection Mr. Hild is quoted as follows:

> The 5-cent fare would make it impossible to meet these charges, so that receivership must inevitably follow and you, as a business man, well know that a receiver, who is an officer of the court, must, under the law, seek to protect the investment in the property.

Regarding the proposal of the committee of fifty-five for a board of control of three members to take over the management of the tramway on a service-at-cost plan, Mr. Hild said in part:

> I can only reiterate that the proposal is so revolutionary that we have not yet recovered from the first shock. It is such a radical departure from any plan ever proposed before that we have not been able to formulate an opinion.
>
> Two things stand out very clearly, however. The valuation is obviously too low. We thought we had introduced evidence enough to convince anybody that the investment in the tramway far exceeds the valuation accepted by the committee of fifty-five.
>
> Furthermore, the limit of return set in the report is too low to attract capital to the traction business. We cannot hope to compete for capital with other legitimate businesses with a limit of 7 per cent on our returns.

It is not expected that the directors of the company will consider the plan formally until their meeting on June 23.

Wants Philadelphia Plan Changed

William S. Twining, transit director of Philadelphia, Pa., has come out openly against the plan of rapid transit for Philadelphia formulated by A. Merritt Taylor, who formerly was director. Using the changed conditions brought about by the war and holding up the menace of a higher fare resulting from an increased construction cost of $6,000,000, Mr. Twining concludes that the transit plans must be changed. He says:

> It is now generally recognized by the public that the conditions under which the city entered the transit field in 1915 no longer obtain. While possibly the plans as then adopted might have been considered perfect, it is now evident, that, as a result of the unexpected developments of the last three years, the city's transit plans must be modified if the city expects to escape with a reasonable fare under the contract which has been signed with the Philadelphia Rapid Transit Company. The city's system as now authorized will probably cost upward of $60,000,000 more than was originally contemplated when the fare was expected to be 5 cents and the resulting increase of interest and operating cost of the system must appear in the fare.

To get away from the Taylor plan, Mr. Twining recommends a referendum by which the people may reconsider their former decision.

Mr. Lilienthal Died Helping Others

Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., whose death was announced in the ELECTRIC RAILWAY JOURNAL for June 7, succumbed suddenly as he reached the climax of a speech at a luncheon at the Hotel St. Francis in that city on June 3, inaugurating the loan drive for St. Ignacious College.

To those who were in attendance, Mr. Lilienthal seemed in good health. The tenor of his address was a high-minded appeal to the city to make the drive a success. He said that Protestant, Catholic and Jew had been working hand in hand across the seas, and that he could think of no organization that was better prepared to oppose the forces of the agitators and malcontents than the Roman Catholic Church. In this connection he said:

> In times like these we know no creeds. For the American of to-day there should be only one thought—one country, one flag and one God.

As he uttered these words, Mr. Lilienthal staggered, reached out a hand for a chair in which he had been sitting before being called to speak, and then collapsed. His wife and son were immediately notified.

William von Phul, general manager of the United Railroads, paid the following tribute to Mr. Lilienthal:

> In the death of Mr. Lilienthal San Francisco has lost one of her foremost citizens. and the United Railroads a president whose influence was always for the good of the community, a man in whom everyone had implicit confidence. Every employee of the company feels his death as that of a personal friend. During the three years in which I have been closely associated with Mr. Lilienthal, there is no one whom I have admired more, and of whom I have greater knowledge of his high ideals and thoughts for others. He has practically sacrificed his life in service to the community.

Suit Follows Strike

Pittsburgh Attorney Seeks to Establish Point that Public Service Employees May Not Strike

In one of the most unusual actions ever brought in a Pennsylvania court, a Pittsburgh attorney has sued the Amalgamated Association of Street & Electric Railway Employees for $2,038,000.78, which sum he estimates as the amount of the damages that were inflicted by the employees of the Pittsburgh Railways in their recent four-day strike.

The complainant is A. E. Anderson, of the Allegheny County bar. In his petition for a hearing in equity in the matter he submits a tabulated bill of damages resultant from the strike. His own share of this bill is the 78 cents, the difference between his railroad fare during the strike, and car fare. The other $2,038,000 is what he figures as the loss sustained by the riding public in paying for transportation during the strike at rates higher than carfare, by the receivership of the company in loss of revenue, and by the strikers themselves in loss of wages. Attorney Anderson has entered his suit in behalf of all of them.

SUIT IS TEST CASE

The suit is meant, of course, not as an effort to recover damages, but as a test case. The complainant raises the point that public service employees may not lawfully strike and he wants a court to hear his arguments and rule on the question.

Mr. Anderson contends that courts have held that the right of persons to quit work and induce others to do so is "necessarily subject to limitation when employment is accepted in a business charged with public interest." His huge bill of damages is made part of his suit to show the extent to which the public interest was involved in the strike.

After setting forth the circumstances of the strike Attorney Anderson concludes with a petition to the court that it decree that the actions, rules and regulations of the defendant association, its officers and members are illegal, null and void and that the association, its officers and members have become liable to "your orator and other citizens for the loss and damages above set forth."

The strike of the employees of the Pittsburgh Railways was declared on May 14 and came to an end on May 18. The issues involved were reviewed in the ELECTRIC RAILWAY JOURNAL for May 17, page 977, and May 24, page 1020.

Detroit Men Strike

While Council and Railway Talk and Juggle Figures Men Tie Up Entire City System

Service on the lines of the Detroit (Mich.) United Railway ended 4 a.m., on June 8, the motormen and conductors having voted in favor of a strike at their meeting on June 7. On the recommendation of their officers, the strikers agreed to continue to carry milk and perishable freight into the city, but to turn back interurban cars at the city limits. The interurban employees will not be called upon to join the strikers unless it is evident that the increased wages will not be granted within the next few days.

COMPROMISE OFFER FAILS

Up to June 6 hope was expressed by all parties concerned that a strike would be averted. Mayor Couzens called a special session of the Council that day. Although one of the Councilmen voiced his opinion that the situation, serious as it was, was not a matter to be decided by the Council, but rather by the men and the company, a majority vote was obtained favoring a compromise offer as follows:

Stright 5-cent fares on all lines, with universal free transfer, abrogating the Pingree 3-cent franchise and workingmen's eight-for-a-quarter tickets.

F. W. Brooks, president of the company, stated that it had been agreed to grant the men a compromise increase of 10 cents an hour, subject to confirmation by the union. In order to meet this increase he contended that the company would have to demand a 5-cent fare on all lines with 1 cent for each transfer issued.

It was brought out in the discussion that the city's audit of the company's revenues and expenses varied from the company's audit by about $139,000 for the three months ended March 31. the city showing a gain instead of loss. The main difference resulted from an item of $100,000 which Comptroller Engel deducted from the depreciation charges claimed by the company.

President Brooks stated that the company could not surrender any franchises except those of the Pingree and Milwaukee Avenue lines, because they were the only ones granted by the city. Other stub-end franchises were granted by townships (since absorbed by the city) and are affected by mortgages which have to do with other property, he set forth.

FARE CHANGES SUGGESTED

In the final discussions it was contended by the city officials that the abrogations of the Pingree franchises would be a concession to the company since the company is losing money on the 3-cent lines. The elimination of workingmen's tickets and raising of fares on all lines to 5 cents would increase the company's revenue $1,190,000, sufficient to pay the 10-cent wage increase. This new rate of fare was to be tried for three months and at the end of that time a readjustment would be made if found necessary. These suggestions were turned down by Mr. Brooks.

To the demand of the men President Brooks replied that he was obliged to notify them that the company could not undertake to carry out their proposition until the City Council granted the necessary relief. The offer of the city he stated was entirely inadequate to care for the situation.

Mayor Couzens in his statement of June 7 said in part:

> On June 3 figures were presented to the Common Council, together with estimates of what certain increases in fare based on estimated passenger traffic, would mean to the company.
>
> Basing the passenger traffic income on the experience of the three months under review, it was estimated that the company would carry 305,000,000 passengers in 1919, which at the present rate of fares, would bring in an income from passenger traffic of $14,060,500, and that the railway had an income from other sources aggregating $215,000, making the total estimated income for 1919 $14,275,500; and that if the Common Council would grant the company a straight 5-cent fare, which the Council has now promised to grant, the gross income would be $15,465,000, or an increase of $1,189,500 for the year.
>
> In view of the fact that all the records show that the company was not actually losing money at the present rate, it seemed that what the city should do would be to grant the company a sufficient increase to permit it to pay the increase to the men, which the honorable Common Council, by resolution, agreed to.

At eight o'clock on the night of June 9 Circuit Judge Adolph Marschner issued an injunction restraining the railway from suspending service on the 3-cent lines. Under section E of the appeal for the injunction, which is signed by Mayor James Couzens and Corporation Counsel Wilcox, the court is asked to appoint a receiver for the company if it fails to operate cars.

COMPANY WITHIN ITS RIGHTS

The city leaves the wage settlement entirely up to the railway and its conductors and motormen. It is pointed out that the company is solvent, has upwards of 800 miles of railway in the city and State and has a large surplus, and is able to pay the advance required by its employees.

The city's action is based principally on sections of the old Detroit Railway franchise granted on Dec. 4, 1894. In Section 11 the franchise is designated as a "contract," while Section 18 provides for court proceedings to settle any dispute.

Councilman John C. Nagel filed notice of a reconsideration at Tuesday's Council meeting of the resolution passed last week allowing the railway a straight 5-cent fare. This action was taken prior to the city's court action to force the railway to resume service on the 3-cent lines, and will limit the amount of fare collected on these lines to the former rate of eight tickets for 25 cents during the day and six for 25 cents at night.

President Brooks mailed a statement to the Common Council, offering to arbitrate the differences between the city and the railway and declaring that the legal position of his company was unassailable. He suggested the Public Utility Commission as arbitrator.

The legal attack on the railway followed a series of conferences on June 9 between Attorney General Alex. J. Groesbeck, Corporation Counsel Wilcox and Attorney Otto F. Kirchner.

Service of the writ of injunction on Harry V. Catlin, cashier of the railway, at noon on June 10, ordering the company to operate cars at once on the 3-cent lines, made the injunction effective immediately, according to opinion of Judge Marschner, who issued the writ. After a reasonable time has been allowed Mr. Catlin to get in touch with his superiors, whom the officers were unable to find, the company's officials will be adjudged in contempt of court.

The city officials of Detroit and the officers of the Detroit United Railway reached a compromise agreement on June 13 providing for a straight 5-cent fare. There will be a board of three members to decide after trial whether a charge for transfers is necessary. The settlement agreement made the court order binding on both parties. One member of the arbitration board is to be chosen by the city, one by the company and the third by the first two. If the board is unable to decide the fare charge the case will go to the Circuit Court as a rate case. The employees are still protesting a 9 to 12 per cent increase. They ask an increase of 17 per cent.

Windsor Wage Audit Arranged

The special street railway committee of the Council of Windsor, Ont., first recommended that the Council repeal or withdraw the by-law to grant the Sandwich, Windsor & Amherstburg Railway increased fares. As this was not in accord with the opinion of all members of the Council, amendments and amendments to amendments were submitted and in turn voted down.

The Councilmen finally decided that the railway board could best settle the question relative to the demands of the men, after City Solicitor Frank Davis had introduced a resolution, asking the railway board to step in and investigate the company's accounts by an audit of its books. It was accordingly decided to ask the Ontario Railway Board to determine if higher fares are necessary to meet the wage demands.

Some members of the City Council upheld the by-law and fought for its amendment, leaving out Sandwich, where the company can charge a 5-cent fare without the referendum.

The transportation committee set forth that the Ontario Railway Board is in position to say what wages the company shall pay the men and what rate of fare will be charged, and also have absolute power in investigating the books of the company. It was also stated that municipal intervention was logical only if city cars were tied up.

Paving Controversy in Pittsburgh

City officials of Pittsburgh, Pa., resorted to vigorous action in their controversy with the receivers of the Pittsburgh Railways over the street paving during the week ended June 7, when a gang of city workmen was sent out to remove the tracks from a section of Warrington Avenue. Within six hours an injunction to restrain the city had been granted and dissolved. The tracks were then removed.

The basis of the dispute between the city and the receivers is an ordinance of long standing requiring the company to repave between its tracks wherever the city improves a street. Ever since the financial difficulties of the railway reached a crisis with the appointment of receivers the city has complained of failure on the part of the company to obey this ordinance.

Extensive improvements are under way in Warrington Avenue and the expense to the company of its share would be about $100,000. It has been one of the contentions of the receivers, during disputes with its employees over wage matters and with the public over proposals for higher fares, that the present income and expenses of the company do not allow money even for such essential expenditures as this.

The section of track the city has torn up is not in use. Cars are running on other portions of the street for which improvements are contemplated, but an agreement on division of expenses is expected to be reached before there is occasion for the city to tear up any more track. The proceedings were the first open clash between the city administration and the present receivership.

Talk of Separate Commission for Washington

The House of Representatives district committee may report a bill to create a public utilities commission separate from the District Commission. This belief is based largely upon a discussion that took place among members of the appropriations committee when the payment by the utilities commission of money for expert service was under consideration. It was contended by Representative Gard that a separate commission that could give all its time to consideration of utilities matters in the District of Columbia would not have to spend money for expert services. The suggestion was made that the matter could be looked into profitably by the District committee.

If a measure creating a separate commission is framed and sent to the commissioners for an expression of their opinion it will meet with the disapproval of at least two members of the board of commissioners, according to present indications.

The commissioners of the District of Columbia are ex officio members of the Public Utility Commission of the District of Columbia. Two of them are not engineers and they have very little knowledge of transportation, finance or other matters coming up in the operation of public utilities. Worst of all, their duties as commissioners of the District of Columbia in handling matters of police, opening of streets, fire insurance regulations. building ordinances, etc., are so varied and taxing with respect to calls upon their time, they have very little time left to devote to their duties as public utility commissioners.

Buses Planned for Detroit

The Detroit Motor Bus Company has been organized under the laws of Michigan with an authorized capital stock of $1,500,000 to "give new and better transportation and make Detroit a better place to live in." The company is headed by Richard W. Meade, formerly president and general manager of the Fifth Avenue Coach Company, New York City, operating the buses on Fifth Avenue in that city.

The Detroit Motor Bus Company proposes to operate under the general ordinance approved by the City Council of Detroit on Dec. 26, 1917, as amended on March 26, 1918, licensing the operation of motor buses on specified streets. It is proposed to provide for initial service 100 motor buses of forty-seven-passenger double-deck type, similar to those in New York but lower in height. Three principal routes have been selected for initial operation as supplying relief where most needed and most readily given—one on each of the nearest available streets on either side of Woodward Avenue, running to the Ford plant and the city limits respectively, and the third on Jefferson Avenue, running to the city limits or some intermediate point. All of the routes will have terminals at the Campus Martius and will reach the principal points of attraction in the central district of the city.

In a circular describing the proposal, the gross annual operating revenue when the lines are in full operation is estimated at $1,235,160, with operating expenses, taxes and deductions of every character at $946,080, leaving a net income of $289,080. The stock of the company has a par value of $10 per share and is being offered for popular subscription in Detroit.

No Changes in Illinois Commission

The efforts have failed which were made at the recent session of the Legislature of Illinois to curtail the functions of the Public Service Commission or to put that body out of business. The "home rule" element, mostly mayors of smaller cities, was particularly active in the fight. A test vote of eighty-four to fifty-four on June 5 saved the commission.

Only one more bill regarding regulation is pending. This proposes to increase the membership of the commission from five to seven, thereby providing a continuous reviewing court for Chicago and upstate cases. This is said to be favored by a majority of the lawmakers because it will enable the commission to act more promptly on the many appeals which are now pending.

Chicago's traction bills are said to be dead. These included four proposals for enabling legislation which will be needed before effective changes can be made in the existing franchises. The bills were presented late in the session. While they appeared to have the indorsement of all interests, there was little hope for them from the start because the Legislature will adjourn in a few weeks. The bills were referred to in the ELECTRIC RAILWAY JOURNAL for May 17.

Warns of Labor Unrest

Addressing the annual convention of the National Conference of Social Workers at Atlantic City, N. J., on June 2, Basil Manly, joint chairman of the National War Labor Board, warned that a period of unrest and strikes, which would overshadow all previous disturbances, was about due in the United States. He is quoted as follows:

> We are about to enter a period of the most acute industrial unrest and the most bitter industrial controversy that the American nation has ever known. Unless effective and radical steps are taken to bring about a better understanding between labor and capital and to establish an equitable basis for orderly industrial progress, we are certain to see within the next year strikes and mass movements of labor beside which all previous American strikes will pale into insignificance. Since the signing of the armistice we have had a large number of small strikes and a few great spectacular strikes. But these have been so limited in comparison with the labor upheavals in other countries that there has been a public disposition to regard the industrial situation with complacency and to assume that, having passed through the first part of the period of transition without serious industrial disturbance, we were about to enter an era of industrial peace.

American Ideals Taught

Classes in citizenship organized last November by the Minneapolis (Minn.) Street Railway received diplomas on the night of June 3 at graduating exercises in the carhouse at Washington and Twenty-fourth Avenues, N., to which 500 members of the families of the 125 conductors and motormen were carried by special cars. The diplomas were signed by the Secretary of Labor of the United States and officials of the Minneapolis public schools. A similar graduation will be conducted soon in St. Paul.

Horace Lowry, president of the Twin City Rapid Transit Company; Prof. A. E. Jenks, of the University of Minnesota; Mayor J. E. Meyers; W. D. Dyer, W. A. Anderson and Supervisor of Americanization W. R. Ball spoke. The audience recited together:

> I pledge allegiance to my flag and the republic for which it stands; one nation, indivisible, with liberty and justice for all.

The classes have been conducted in four carhouses once or twice a week. Similar classes will be instituted next fall.

St. Paul Inquires Into Traction Affairs

The St. Paul Association has made public an analysis of the survey of electric railway conditions in the United States conducted for the association by C. Whit Pfeiffer, secretary of public affairs of that body. No recommendations are made in regard to terms for a settlement of transit problems with the Twin City Rapid Transit Company, but it is pointed out that the service-at-cost plan appears to be more satisfactory than the old time franchise.

The association will not go on record favoring any plan of solution of the local railway problem, until a thorough study of the entire situation has been made. Preliminary consideration of Mr. Pfeiffer's report will be begun at once. Special sessions of the City Council also will be held to consider the proposed franchise and citizens are asked to attend these meetings that they may hear the discussions and keep intimately informed of the progress of the negotiations.

News Notes

Boston Strike Averted.—Union employees of the Boston (Mass.) Elevated Railway have voted by a large majority to refer to the War Labor Board the wage and hour demands recently served upon the company.

Cambridge Subway Purchase Bill Reported.—A bill favoring the purchase of the Cambridge subway from the Boston Elevated Railway at a price of $8,000,000 by the State of Massachusetts has been advanced to a third reading in the House of Representatives.

Negotiating for Windsor Road.—Negotiations are reported to be under way by the Hydro-Electric Power Commission of Canada for the purchase of the 28 miles of electric railway owned by the Detroit (Mich.) United Railway in the Windsor-Sarnia-Ford City district. The properties are included in the system of the Sandwich, Windsor & Amherstburg Railway.

Muskogee Strike Settled.—The strike on the lines of the Muskogee (Okla.) Electric Traction Company has been settled. An increase of 30 per cent has been made in the wages of the men, all of whom have been reinstated to their former places with seniority rights. The strike was in progress more than a week. During that time no cars were operated.

Toronto Mayor Planning Ahead.—Mayor Church of Toronto, Ont., at a recent meeting moved that a recommendation be made to the City Council favoring the submission of a by-law to the people at the next municipal election providing for the expenditure of $5,000,000 on track extension, rolling stock and other equipment, preparatory to the taking over of the Toronto Railway in 1921.

Wage Increase on Evansville Interurban.—Following a conference on June 4 between officials and trainmen of the Evansville-Princeton line of the Public Utilities Company, Evansville, Ind., the company granted the motormen and conductors an increase in wages amounting to 5 cents an hour. The men on the interurban line have been receiving from 34 to 38 cents an hour on a sliding scale. Under the new agreement the men will work nine hours where they have been working ten and ten and one-half hours. It is reported that motormen and conductors of the Evansville & Newburg Suburban Company and the Evansville & Ohio Valley Railroad will make demands upon these companies for the same scale of wages granted on the Princeton line.

City May Act in Paving Case.—A resolution calling on the Birmingham Railway, Light & Power Company, Birmingham, Ala., to pave Tuscaloosa Avenue from Sixth to Poplar Streets, a distance of about 2 miles has been adopted by the City Commission. The commission has set June 15 as the date by which the company must start work. Lee C. Bradley, receiver for the company, informed the commission that the company's portion of the paving on Tuscaloosa Avenue will amount to $157,000 and that other paving is demanded in other parts of the city, which amounts to $750,000. He stated that no date on which work can be begun can be stated at this time. The city is ready to proceed with the paving, which was held up on account of the war. Legal steps will probably be taken by the city in the Federal Court in an effort to enforce the work if it is not started by June 15.

Increase for Hull Men.—The employees of the Hull (Que.) Electric Railway, including shopmen, conductors and motormen, are granted an all round increase of 3 cents per hour, by the terms of the award of the board of arbitration, which was appointed by the Minister of Labor to adjudicate the dispute between the company and its employees. If the award is accepted by the men, it will mean that third-year motormen and conductors, who were receiving 36 cents an hour will get 39 cents; second-year men who formerly received 34 cents will get 37 cents, and first-year men will jump from 31 and 29 cents to 34 and 32 cents. All shopmen and other employees will get a straight increase of 3 cents an hour, and in addition are granted the nine-hour day, with a provision, that in view of their reduction in hours, they shall not be paid less than they are receiving at present. All overtime is to be paid at the rate of time and a half, and the agreement is to be effective for a period of one year.

Programs of Meetings

American Railroad Association

The annual convention of Section 3, Mechanical, of the American Railroad Association will be held at Atlantic City, N. J., June 18-25. This includes the former Master Car Builders' and Master Mechanics' Associations. Some of the reports and papers of special interest to electric railway officials are at the morning session on Wednesday, June 18, reports and discussions on standards and recommended practice, train brake and signal equipment, brakeshoe and brakebeam equipment.

The Thursday morning session includes a report and discussion on car wheels, specifications and tests for materials, welding truck side-frames, bolsters and arch-bars, couplers and draft gear. At the morning session for Friday there will be a discussion of reports on safety appliances, car construction, car trucks, train lighting and equipment.

On Monday, June 23, there will be a discussion of reports on standards and recommended practice and mechanical stokers. The Tuesday program includes a discussion of the reports on fuel economy, smoke prevention and specifications and tests for materials. Wednesday, the last day of the convention, reports will be presented on design, maintenance and operation of electric rolling stock. There will also be a discussion on that day of reports on train resistance.

Iowa Electric Railway Association

The program was announced on June 5 for the joint session of the Iowa Electric Railway Association with the Iowa section of the National Electric Light Association at the Hotel Colfax, Colfax, Iowa, on June 18 and 19. The papers planned to be presented on the afternoon of June 18 follow:

"Rate Litigation in Iowa," by William Chamberlain, general counsel of the United Light & Railways Company.

"Iowa State Board of Conciliation, Its Work and Possibilities," by W. G. Raymond, dean of the Engineering Department of the State University of Iowa.

The session on the morning of June 19 will be devoted almost wholly to business matters. There will, however, be a general discussion of the best pavings to be used in connection with street car tracks, with special reference to the advantages of cement, creosote blocks, brick and asphalt.

The papers to be presented at the session on the afternoon of June 19 are as follows:

"The Safety Car," by T. C. Roderick of the Tri-City Railway.

"Automatic Control of Substations," by C. W. Place, of the General Electric Company.

Following the discussion of these two papers there will be a general discussion of the subject of reclaiming of track and special work by welding and grinding.

Financial and Corporate

Seattle Lines in April

Municipal Railway, Economizing, Hopes to Continue to Operate at a Five-Cent Fare

According to a statement issued by Thomas F. Murphine, superintendent of public utilities, the Seattle (Wash.) Municipal Railway system in April, 1919, had revenues from all sources of $421,252 and operating expenses of $331,242, leaving a gross profit of $90,009. From this amount was deducted $66,260 for interest on outstanding bonds; $6,911 for industrial insurance and $7,000 for accruing damage claims. Depreciation, it is said, was more than offset by extraordinary expenditures in the way of maintenance.

$9,838 Profit in April

The net profit for the month, therefore, amounted to $9,838. This sum, it is felt, will be increased in a large amount as soon as the railway is able to put into effect operating economies from time to time submitted to the Council. The only operating economies during April were the elimination of the greater portion of "dead-head" passengers and the discontinuance of operation of the Twelfth Avenue and Ray Street lines.

In April, 1919, the municipal lines operated a total of 27,582 more car hours than were operated in April, 1918, by the combined lines of the Puget Sound Traction, Light & Power Company and the Municipal Railway, Divisions "A" and "C." The municipal lines also operated 274,036 more car miles in April, 1919, than in the corresponding month of last year for both railway systems.

The transportation revenues increased over the corresponding month of last year in the sum of $60,383 or 17.0 per cent. This was due, in part, to a natural increase in traffic but in a greater part to the increase in the service.

Owing to the increased service and to an approximate 50 per cent increase of wages, trainmen were paid in April, 1919, the sum of $168,683 and in the corresponding month of last year $94,375, an increase of $74,308. The wages paid in the maintenance departments were correspondingly increased.

Economies Introduced and Planned

On June 1 the municipal lines began to install skip stops and will continue this work until all lines will operate under the plan. It is expected that this will show a saving of approximately $8,000 per month.

The municipal railway management believes that by putting into effect the operating economies recommended and discontinuing non-revenue producing lines that give practically no service to the public and not being compelled to operate non-profitable extensions of the system and various experimental transportation schemes it will be able on a 5-cent fare to pay all operating expenses, all interest on the bonds and set aside an amount sufficient to retire the bonds.

Monongahela Earnings Fall

Net Surplus for 1918 Dropped 37 Per Cent Because of Higher Operating Costs

The financial results of the operation of the Monongahela Valley Traction Company, Fairmont, W. Va., for 1918 were not flattering, in the company's opinion, for notwithstanding normal increases in the volume of patronage the net surplus for the year decreased $361,588, or more than 37 per cent, as compared with the previous year. The net earnings decreased $194,576 during the year, due principally to the great increase in operating expenses growing out of the raises in wages and the greatly increased cost of materials and supplies. The detailed figures for 1918 are given in the accompanying statement.

INCOME STATEMENT OF MONONGAHELA VALLEY TRACTION COMPANY FOR 1918

Gross earnings from operation	$3,787,328
Operating expenses, taxes, insurance and depreciation	2,613,659
Net earnings from operations	$1,178,669
Fixed charges	586,866
Net surplus for the year	$591,803
Surplus balance on Dec. 31, 1917	320,965
Total	$912,768
Less adjustment of accounts for previous years	769
Balance to credit of profit and loss before dividends	$904,999
Dividends paid during 1918	616,657
Surplus balance on Dec. 31, 1918	$288,342

Fully realizing that the maintenance of dividends is wise, in order to maintain the high standards of credit which the company has always enjoyed, the officers regret that, because of the effects of high operating costs and large construction expenditures upon the company earnings, they found it necessary to discontinue the common stock dividend.

It is, however, the belief of the officers of the company that the Public Service Commission will grant relief by allowing increases of rates for certain classes of service, in answer to the petition which is now before it, as these increases are requisite to the further financing which the company must do at once because of the rapidly growing communities in its territory.

St. Louis Suit Dragging

Testimony Shows Probable Errors of Business Judgment Rather Than Deliberate Waste

The power contracts of the United Railways, St. Louis, Mo., from 1903 through 1918 constituted the principal bone of contention at the hearings during the week ended June 7, before Special Master Lamm at St. Louis in the receivership suit of John W. Seaman, New York, a stockholder of the United Railways.

Power Contracts Criticised

One of the allegation of the Seaman petition is that the letting of power contracts in 1913 and 1914 by the United Railway directors, several of whom were also directors of the North American Company, which controls the power distributing concern, constituted a waste of the railway's funds in that excessive rates were paid and huge profits made by the sellers of the power.

The testimony of W. E. Bryan, superintendent of power stations for the United Railways, developed the statement that the company in 1913 paid for 49,688,913 kilowatts though it used only 40,012,696 kilowatts and that in 1914 it paid for 107,418,815 kilowatts though it used only 98,483,900 kilowatts. The value of the difference between the power used and the power paid for in these two years was referred to as $140,000.

In answer to a question from the attorney for Mr. Seaman for an explanation of the difference between the amounts of power used and the amounts paid for, the witness explained that the higher figures represented the amounts of power contracted for and the lower figures the amounts that the company was able to use.

On the following day Mr. Bryan testified that for six years prior to 1908, when the contract was made. the load of the company had increased 51,743,576 kilowatts. If the load had increased for the next six years at the same rate, the company would have been using 220,000,000 kilowatts in 1914. Instead the load fell below the average of the previous six years, and the company found itself with more power than it could use.

Long-Term Contract Necessary

The special master inquired whether the railway could not have contracted for power on a sliding scale to fit its needs. To this the witness replied that the successful promotion of the Keokuk hydro-electric power project depended upon the ability of the promoters to sell an amount of electricity sufficient to carry the fixed charges on their investment. For that reason the railway was required to contract for a stated amount.

To refute previous testimony Attorney Rassieur, for the defendant, brought out testimony showing that the railway could not have operated its own plants for the production of power as cheaply as it was able to buy both steam and water power from outside sources. There followed a long, bitter and complicated argument between the opposing attorneys concerning the methods used by various witnesses for calculating the cost of the current involved. The controversy was settled by the special master allowing the testimony to stand with the comment that he would rather err on the side of admission of testimony than of excluding it.

The salaries of attorneys and other employees of the United Railways before the receivership and of those appointed and retained by the receiver also consumed a good deal of time and developed considerable acrimony.

Abandoned Road Is Sold

The entire property of the Parkersburg & Ohio Valley Electric Railway, Fairmont, W. Va., has been sold at public auction. The successful bidder was the Wilkoff Company, dealers in scrap iron at Pittsburgh, Pa., and Youngstown, Ohio. That company's bid was $16,000. It is understood that the purchasers will scrap the property, which consists of 4.6 miles of track and several bridges and trestles. The company never owned any rolling stock, the single car which was operated over it for a time being borrowed from the Union Traction Company, Sistersville, which also furnished the power. The road had not been operated for the last five years, during which time it has been in the hands of C. L. Williams, Parkersburg, as receiver.

The sale was made under an agreed order of the United States District Court. It was conducted by Judge M. H. Willis, New Martinsville, a special commissioner. It was cried by John Mitchell and by Judge Willis, himself. The bidding started off at $7,500, the road being first sold in sections. It was then put up as a whole and the bid of the Wilkoff Company for the entire property was the highest and best.

$41,183,112 Bay State Valuation

The Public Service Commission of Massachusetts has issued an order in which it finds that the present amount of capitalization of the Eastern Massachusetts Street Railway, which is the reorganized Bay State Street Railway, as required under provision of the Bay State reorganization act, is $41,183,112. This was determined as follows:

Computation of investment value as of Nov. 1, 1914, $40,282,340; additions and improvements submitted to the commission, minus the value of property sold or otherwise disposed of, $1,866,516, making a total of $42,148,856.

From this total the commission deducted the amount of adjustment to represent the value on a 6 per cent basis of the rentals payable on account of properties of the railways leased by the Bay State within Massachusetts, amounting to $965,744. This leaves a net valuation of $41,183,112.

Brighter Returns in February

Railway Net Income Improves, but Increased Labor Costs Are Reflected in Transportation Expenditures

Operating reports of electric railways for the month of February, 1919, compiled by the information bureau of the American Electric Railway Association and presented herewith would seem to indicate when compared with the same figures for February, 1918, that for the first time in many months the increase in the operating revenues is beginning to approach within hailing distance of the increase in operating expenses. Or perhaps it would be more proper to say that the increase in operating expenses has been retarded enough to enable the increase in operating revenues to creep up a bit on it.

DIFFICULT TO INTERPRET RESULTS

Whether this showing is due to an actual improvement in operating conditions, a belated realization of the fruits of the numerous fare increases, or whether it is entirely due to the bad weather conditions prevailing in 1918, especially in the East, it is difficult to say, However, a few months will tell the story without doubt, for then the returns for the late spring and early summer months will be in and a comparison can be made that will not be rendered valueless by different weather conditions. At that time it will be possible to tell with some degree of accuracy the tendency of operating conditions.

As it is, there appear to be some encouraging signs, but the outlook is still far from bright. For the country as a whole the net income per car-mile decreased 6.50 per cent. This is the smallest decrease that has been recorded for many months. This good showing, however, is probably due entirely to conditions in the East where the heavy winter storms of 1918 brought operation almost to a standstill and made possible the apparent increase in net income in 1919. In the South and West, which were not so hard hit by the 1918 storms, the net income decreased 52.89 and 76.29 per cent respectively.

OPERATING REVENUES INCREASE

Operating revenues per car-mile for the country as a whole increased 14.20 per cent while the expenses increased 19.89 per cent. This showing is, comparatively speaking, not so bad, but again the apparent improvement is largely due to the weather conditions in 1918. In the East, where the storms were severest, the revenues actually increased more than the expenses, the amounts being 16.93 and 14.14 per cent respectively. This accounts for the favorable showing in this respect for the country as a whole, for in the South the increase in revenues per car-mile was 15.35 per cent and in expenses 33.92 per cent, while in the West the increase in revenues was 11.85 per cent and in expenses 22.16 per cent.

The operating ratio for the month also reflects the same situation. For the country as a whole it increased from 74.40 in February, 1918, to 77.20 in February, 1919. In the East it dropped from 82.00 to 80.05 during the same period, while in the South it rose from 60.09 to 70.70 and in the West it jumped from 68.75 to 75.00.

In Table IV the operating expenses per car-mile are shown in detail. An examination of them reveals some interesting facts. No single item in any section of the country shows a decrease except power in the East. This of course is due to the weather conditions in this district referred to again and again in the discussion of these tables. The amount of power produced was reduced and the overhead going on as before the cost of production per unit increased.

The high cost of materials is reflected in the equipment account. The cost per car-mile for this department increased 18.03 per cent for the country, rising from 3.16 cents per car-mile to 3.73 cents per car-mile. The greatest increase in this account is shown in the South, 55.31 per cent, while the greatest actual amount paid occurs in the East, 4.42 cents per car-mile for February, 1919, compared with 2.78 cents in the South and 3.25 cents in the West.

POWER COSTS INCREASE MODERATE

The increase in the cost of power per car-mile is moderate, being 6.18 per cent for the country and 9.45 per cent in the West, the East showing a decrease of 0.78 per cent, as before mentioned. In the South it is impossible to calculate the actual increase because many of the companies do not separate their power costs from the cost of conducting transportation.

The increase in the cost of conducting transportation is more uniform throughout the country than the increase in the other accounts, reflecting the general increase in the cost of labor. For the country the increase was 17.40 per cent per car-mile, while in the East the increase was 14.78 per cent, in the South 25.77 per cent and in the West 18.25 per cent. The figures for the South are complicated by the fact before mentioned that a number of companies include the cost of power in their transportation costs.

In Table V the combined income statement for February, 1919, of 139 companies is shown and the same statement is shown in cents per car-mile in Table VI. In the same way Table VII gives in detail the combined operating expenses of 161 companies for the same month, while in Table VIII these expenses are shown in cents per car-mile.

If reference is made to the similar tables for January, published in the issue of April 26, it will be seen that

TABLE I—INCOME STATEMENT FOR FORTY-FOUR ELECTRIC RAILWAYS, FEBRUARY, 1919, COMPARED WITH FEBRUARY, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Operating revenue	$8,620,117	$7,192,497	$4,206,094	$3,437,856	$666,715	$579,736	$3,747,308	$3,174,905
Operating expenses	6,645,641	5,354,115	3,367,478	2,820,804	471,674	353,040	2,806,489	2,180,271
Net operating revenue	1,974,476	1,838,382	838,616	617,052	195,041	226,696	940,819	994,634
Net revenue from auxiliary operations	79,188	723	54,447	....	11,148	....	13,593	723
Taxes	589,557	479,332	252,716	192,064	78,954	66,701	257,887	220,567
Operating income	1,464,107	1,359,773	640,347	424,988	127,235	159,995	696,525	774,790
Non-operating income	432,725	455,875	234,214	222,243	160,974	199,765	37,537	33,867
Gross income	1,896,832	1,815,648	874,561	647,231	288,209	359,760	734,062	808,657
Deductions from gross income	1,727,228	1,644,423	805,949	747,592	223,667	220,372	697,612	676,459
Net income	169,604	171,225	68,612	*100,361	64,542	139,388	36,450	132,198
Operating ratio (per cent)	77.20	74.40	80.05	82.00	70.70	60.09	75.00	68.75
Car-miles operated	23,199,807	22,224,749	10,609,843	10,140,818	2,062,528	2,073,288	10,527,436	10,010,643

TABLE II—INCOME STATEMENT IN CENTS PER CAR-MILE FOR THE FORTY-FOUR ELECTRIC RAILWAYS SHOWN IN TABLE I, FOR FEBRUARY, 1919, COMPARED WITH FEBRUARY, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase
Operating revenue	37.15	32.40	14.20	39.64	33.90	16.93	32.32	28.02	15.35	35.48	31.75	11.85
Operating expenses	28.65	24.10	19.89	31.73	27.80	14.14	22.82	17.04	33.92	26.63	21.80	22.16
Net operating revenue	8.50	8.30	2.40	7.91	6.10	29.67	9.50	10.98	*13.47*	8.85	9.95	*11.06*
Net revenue from auxiliary operations	0.34	.....	.....	0.51	.....	.....	0.54	.....	.....	0.13	.....	.....
Taxes	2.54	2.16	17.60	2.38	1.89	25.93	3.85	3.23	19.19	2.44	2.21	10.41
Operating income	6.30	6.14	2.65	6.04	4.21	43.47	6.19	7.75	*20.13*	6.54	7.75	*15.61*
Non-operating income	1.87	2.03	*9.03*	2.21	2.19	0.91	7.81	9.65	*19.07*	0.36	0.34	5.88
Gross income	8.17	8.17	.....	8.25	6.40	28.91	14.00	17.40	*19.54*	6.90	8.09	*14.71*
Deductions from gross income	7.45	7.40	0.80	7.59	7.37	2.98	10.82	10.65	1.60	6.59	6.76	*2.52*
Net income	0.72	0.77	*6.50*	0.66	*0.97	.....	3.18	6.75	*52.89*	0.31	1.33	*76.29*
Operating ratio (per cent)	77.20	74.40	3.76	80.05	82.00	*2.38*	70.70	60.09	17.66	75.00	68.75	9.09
Car-miles operated	23,199,807	22,224,749	4.39	10,609,843	10,140,818	4.62	2,062,528	2,073,288	*0.52*	10,527,436	10,010,643	5.16

TABLE III—OPERATING EXPENSES OF SIXTY COMPANIES FOR FEBRUARY, 1919, COMPARED WITH FEBRUARY, 1918

	United States		East		South		West	
	1919	1918	1919	1918	1919	1918	1919	1918
Operating expenses	[1]$7,282,803	[2]$6,076,555	[3]$3,695,082	[4]$3,295,669	$650,021	$482,441	[5]$2,937,700	[6]$2,298,445
Way and structures	740,318	613,141	389,820	350,242	65,629	43,821	284,869	219,078
Equipment	980,610	792,904	534,802	479,739	81,986	52,778	363,822	260,387
Power	1,308,135	1,178,188	773,087	739,970	42,932	8,511	492,116	429,707
Conducting transportation	3,081,010	2,512,877	1,475,444	1,220,887	359,547	285,996	1,246,019	1,005,994
Traffic	34,480	28,024	16,673	11,944	1,325	2,453	16,482	13,627
General and miscellaneous	1,004,187	927,509	484,722	473,278	98,602	88,882	420,863	365,349
Transportation for investment—Cr.	*5,283*	*513*	....	....	....	....	*5,283*	*513*
Car-miles operated	26,238,736	25,115,356	12,105,077	11,491,650	2,945,945	2,947,035	11,187,714	10,676,671

[1] Includes $139,346 for depreciation and other expenses not divided among sub-accounts. [2] Includes $24,425 for depreciation and other expenses not divided among sub-accounts. [3] Includes $20,534 for express department not divided among sub-accounts. [4] Includes $19,609 for express department not divided among sub-accounts. [5] Includes $118,812 depreciation not divided among sub-accounts. [6] Includes $4,816 depreciation not divided among sub-accounts.

TABLE IV—OPERATING EXPENSES IN CENTS PER CAR-MILE FOR THE SIXTY COMPANIES SHOWN IN TABLE III, FOR FEBRUARY, 1919, COMPARED WITH FEBRUARY, 1918

	United States			East			South			West		
	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase	1919	1918	Per Cent Increase
Operating expenses	[1] 27.74	[2] 24.19	14.67	[3] 30.53	[4] 28.67	6.48	22.05	16.36	34.77	[5] 26.25	[6] 21.52	21.97
Way and structures	2.82	2.44	15.57	3.22	3.05	5.57	2.23	1.49	49.66	2.54	2.05	23.90
Equipment	3.73	3.16	18.03	4.42	4.17	5.99	2.78	1.79	55.31	3.25	2.43	33.74
Power	4.98	4.69	6.18	6.39	6.44	0.78	[7] 1.46	0.29	403.44	4.40	4.02	9.45
Conducting transportation	11.74	10.00	17.40	12.19	10.62	14.78	12.20	9.70	25.77	11.14	9.42	18.25
Traffic	0.13	0.11	18.18	0.14	0.10	0.40	0.04	0.08	*50 00*	0.15	0.13	15.38
General and miscellaneous	3.83	3.69	3.79	4.00	4.12	*2.92*	3.34	3.01	10.96	3.76	3.42	9.94
Transportation for investment—Cr.	*0.02*	*0.002*	.....	....	....	.....	....	....	......	*0.05*	*0.005*	.....
Car-miles operated	26,238,736	25,115,356	4.47	12,105,077	11,491,650	5.34	2,945,945	2,947,035	0.04	11,187,714	10,676,671	4.79

[1] Includes 0.53 cent per car-mile for depreciation and other expenses not divided among sub-accounts. [2] Includes 0.10 cent per car-mile for depreciation and other expenses not divided among sub-accounts. [3] Includes 0.17 cent per car-mile for express department not divided among sub-accounts. [4] Includes 0.17 cent per car-mile for express department not divided among sub-accounts. [5] Includes 1.06 cents per car-mile for depreciation not divided among sub-accounts. [6] Includes 0.045 cent per car-mile for depreciation not divided among sub-accounts. [7] A number of companies in the South include the cost of power under conducting transportation which accounts for the apparent disparity in these figures.

TABLE V—INCOME STATEMENT OF 139 COMPANIES FOR FEBRUARY, 1919

	United States	East	South	West
Operating revenue	$22,147,896	$15,419,533	$1,620,154	$5,108,209
Operating expenses	17,158,055	12,121,570	1,156,843	3,879,642
Net operating revenue	4,989,841	3,297,963	463,311	1,228,567
Net revenue from auxiliary operations	642,321	231,992	346,810	63,519
Taxes	1,560,884	1,047,919	182,339	330,626
Operating income	4,071,278	2,482,036	627,782	961,460
Non-operating income	785,533	521,583	173,928	90,022
Gross income	4,856,811	3,003,619	801,710	1,051,482
Deductions from gross income	5,116,063	3,526,954	570,494	1,018,615
Net income	*259,252	*523,335	231,216	32,867
Operating ratio (per cent)	77.47	78.61	71.40	75.95
Car-miles operated	56,777,307	37,093,849	4,895,502	14,787,956

TABLE VI.—AMOUNTS PER CAR-MILE OF THE INCOME STATEMENT FOR THE 139 COMPANIES SHOWN IN TABLE V.

	United States	East	South	West
Operating revenue	39.01	41.57	33.09	34.54
Operating expenses	30.22	32.68	23.63	26.24
Net operating revenue	8.79	8.89	9.46	8.30
Net revenue from auxiliary operations	1.13	0.63	7.08	0.43
Taxes	2.75	2.83	3.72	2.24
Operating income	7.17	6.69	12.82	6.49
Non-operating income	1.38	1.41	3.55	0.61
Gross income	8.55	8.10	16.37	7.10
Deductions from gross income.	9.01	9.51	11.65	6.89
Net income	*0.46	*1.41	4.72	0.21
Operating ratio (per cent)	77.47	78.61	71.40	75.95
Car-miles operated	56,777,307	37,093,849	4,895,502	14,787,956

NOTE.—* Indicates deficit. Figures in *italics* indicate decrease.

TABLE VII—OPERATING EXPENSES OF 161 COMPANIES FOR FEBRUARY, 1919

	United States	East	South	West
Operating expenses	[1]$18,096,936	[2]$12,671,656	$1,380,385	[3]$4,044,895
Way and structures	1,873,395	1,281,194	155,909	436,292
Equipment	2,426,159	1,711,820	192,975	521,364
Power	2,897,474	2,115,692	118,570	663,212
Conducting transportation	7,952,987	5,534,126	705,948	1,712,913
Traffic	162,633	135,158	4,826	22,649
General and miscellaneous	2,448,681	1,670,854	202,157	575,670
Transportation for investment—Cr.	*6,533*	*516*	....	*6,017*
Car-miles operated	60,480,181	38,886,285	5,919,114	15,674,782

[1] Includes $342,140 depreciation not divided among sub-accounts. [2] Includes $223,328 depreciation not divided among sub-accounts. [3] Includes $118,812 depreciation not divided among sub-accounts.

TABLE VIII—AMOUNTS IN CENTS PER CAR-MILE OF THE OPERATING EXPENSES OF THE 161 COMPANIES SHOWN IN TABLE VII, FOR FEBRUARY, 1919

	United States	East	South	West
Operating expenses	[1]29.93	[2]32.58	23.32	[3]25.80
Way and structures	3.10	3.29	2.63	2.78
Equipment	4.01	4.40	3.26	3.33
Power	4.79	5.44	2.00	4.23
Conducting transportation	13.15	14.23	11.93	10.93
Traffic	0.27	0.35	0.08	0.14
General and miscellaneous	4.05	4.30	3.42	3.67
Transportation for investment—Cr.	*0.01*	....	....	0.04
Car-miles operated	60,480,181	38,886,285	5,919,114	15,674,782

[1] Includes 0.57 cent per car-mile for depreciation not divided among sub-accounts. [2] Includes 0.57 cent per car-mile for depreciation not divided among sub-accounts. [3] Includes 0.76 cent per car-mile for depreciation not divided among sub-accounts.

there is apparently a slight improvement shown in the figures for February. The revenue per car-mile increased, while the net loss per car-mile is considerably less.

CLASSIFICATION UNCHANGED

As in the past the returns from city and interurban electric railways have been classified according to the following geographical grouping: Eastern district—East of the Mississippi River and north of the Ohio River. Southern district—South of the Ohio River and east of the Mississippi River. Western district—West of the Mississippi River. The tables showing the figures in detail are on page 1189.

Company Accepts Valuation

Minneapolis Street Railway Agrees to Council Figure of $24,000,000 with 7 Per Cent Return

The Minneapolis, (Minn.) Street Railway, included in the system of the Twin City Rapid Transit Company, on June 6 accepted the proposed $24,000,000 valuation of its property as a basis for a cost-of-service franchise with a 7 per cent annual return.

The Council has appropriated $1,500 for expenses in franchise draft and voted to employ B. J. Arnold, Chicago, Ill., to check over an item of $1,125,938 addition to the capital value of the company between Jan. 1, 1916, and Jan. 1, 1919, as stated by the directors of the company.

This amount was included in the company's offer of a valuation of $24,500,000 as subject to being verified, and is still subject to verification, although the compromise of $24,000,000 has been accepted. If this verification is not made the figure of $24,000,000 will be lowered. Otherwise it will remain as the franchise basis.

PRESIDENT LOWRY'S LETTER

The letter of acceptance of the valuation by the company, signed by Horace Lowry, president of the railway, read in part:

> The report of your special committee on street railway matters and extensions adopted May 29, offering this company a valuation of $24,000,000 for its property for a franchise, rate making and purchase purposes, with a maximum rate of return thereon of 7 per cent per annum and providing for compensating this company for procuring new money required for future extensions has been duly submitted to and considered by the board of directors of this company.
>
> I am authorized to state that in the opinion of the board of directors said valuation is less than the fair value of the property as of Jan. 1, 1919, and that the return to the company therein provided will not sufficiently compensate the stockholders whose money has been invested in the development of the property.
>
> Fully appreciating, however, the great value to the community of having the franchise negotiations completed without further delay and railway service restored to its former high standard, and believing that under a modern cost-of-service franchise there will be close co-operation between the city and this company, the board of directors have authorized me to accept the offer of your honorable body as set forth in the report of your special committee on railway matters and extensions and the same is hereby accepted.

City Attorney C. D. Gould expects to be able to present a franchise draft to the City Council by July 1. He has been working on it several months. Changing conditions have required practically an entirely new draft and the attorney will devote his entire time to the work. One of the features that makes the work more difficult is the relationship between the Minneapolis Street Railway and the St. Paul Street Railway, both controlled by the Twin City Rapid Transit Company. There are now four interurban lines with 10-cent fares between the cities, and the spread of the halves of the fare is an intricate question under two franchises and two different Councils. The St. Paul franchise permits no increase in the 5-cent fare locally without vote of the people. It is said by Minneapolis officials that the Minneapolis end is carrying an unequal burden of the cost of the service as related to revenue.

Protest Against Abandonment

The application of the Union Savings Bank & Trust Company, Cincinnati, Ohio, as trustee for the holders of the first mortgage bonds of the Cincinnati & Columbus Traction Company to discontinue the service and operation of the company, was heard recently by the Public Utilities commission. W. S. Little, attorney, representing the bank, declared the road was operating at an approximate loss of $2,300 a month, and consequently could not be expected to continue in operation indefinitely.

Citizens who reside along the road maintained that discontinuance would abrogate certain contract rights and would work great damage and inconvenience to citizens who have been accustomed to use the road for passenger and freight purposes.

Kansas Assessments Announced

Samuel T. Howe, chairman of the State Tax Commission of Kansas, is one of the officials of that State who is fully aware of the plight of the electric railways. He has seen a decrease in utility values for the year of $1,645,370, of which the street and interurban railway loss is $622,611. Of these properties he said recently:

> One company, the property of which was assessed by the state board in 1918 at $147,740, was assessed this year at $75,000. This company is bankrupt. A mortgage was foreclosed and the property was bid in at the master's sale at the amount at which it is assessed, and at the sale were proprietors of other companies who were bidding on the property of this company for junk purposes.
>
> The railway in Fort Scott has been abandoned. The rails remain in the streets because they are not worth removing.
>
> Practically the same is true as to the city of Parsons. The street railway there has been trying to give its property to the city. The investment is practically lost, and so of others which might be mentioned.
>
> The Kansas City Railways shows a loss of $188.336, chiefly on the lessened value of its rolling stock used in the state.
>
> In only a few instances—and these exceptional as to traffic conditions—have the properties remained as valuable as they were a year ago.

Subsidy for Summer Resort Railway

Following a conference between city officials of Ocean City, N. J., and representatives of the Ocean City Electric Railroad it was decided by the former to make application to the Court of Chancery for the appointment of a trustee to operate the road during the present summer. It is expected that cars will be running over the line again in a short time. The company's representatives has previously declared that it was not the purpose of the corporation to operate the line this season.

The city will accordingly run the road during the summer and if there is a deficit when the summer season is closed the sum will have to be made up by the city. The average loss to the company in operating the road during the past two or three years has been about $175 a year. When the railway announced that it could no longer operate the road the city authorities decided that the suspension of service would injure business during the summer and adopted the plan of guaranteeing the company against loss.

The conference at which arrangements were made for operating the road was held in Philadelphia and was attended by Mayor Champion and the city commissioners of Ocean City, City Solicitor Boswell, for the city, and Daniel Steelman and William G. Moore, a committee representing bondholders of the company, William D. Sherrerd, secretary of the company, and J. Fithian Tatem, solicitor for the corporation.

Chancellor Edwin Robert Walker at Trenton has appointed William E. Massey, Ocean City, as trustee to operate the Ocean City Railway, until October 1, next. Mr. Massey is to serve without compensation and is allowed to spend $5,000 on repairs and improvements. He is under $10,000 bonds and must turn the road back to the company in as good a condition as it was when it was turned over to him.

Eastern Massachusetts Street Railway Succeeds Bay State

The Eastern Massachusetts Street Railway succeeded the Bay State Street Railway at Boston on June 1 and the system is now being operated by public trustees in accordance with recent legislation. Homer Loring, Boston, a pioneer in service-at-cost legislation, is chairman of the trustees, hte others being Arthur G. Wadleigh, Frederick J. Crowley, Isaac Sprague and Earle P. Charlton. Under the public control act fares must be established on a service-at-cost basis within sixty days. The trustees gave an open hearing upon the road's problems at Boston on June 6, at which Chairman Loring stated that the estimated deficit for the first year of public operation under present fares is $2,083,700. The trustees plan hearings in the communities served by the road in advance of the fare determination.

Financial News Notes

West End Will Refund Notes.—The West End Street Railway, Boston, Mass., operated under lease by the Boston Elevated Railway, has petitioned the Massachusetts Public Service Commission for permission to issue refunding bonds to the amount of $1,581,000 to take the place of three-year notes issued on Aug. 1, 1916.

Connecticut Line Leased. — The Hartford & Springfield Street Railway, Warehouse Point, Conn., has completed arrangements whereby it will operate the Suffield Street Railway, which extends from Spencer's Corner, Suffield to the State line. The road will be operated under a lease from the Connecticut Company.

Additional Monongahela Notes.—A banking syndicate headed by the Fidelity Trust Company, Baltimore, Md., is offering at 99 and interest, to yield 7⅛ per cent, $2,000,000 one-year 6 per cent notse of the Monongahela Valley Traction Company, Fairmont, W. Va., proceeds to be applied to the completion of payments on a power plant costing $3,000,000, extensions, etc.

Car Trust Certificates Authorized.—The Tennessee Railroad & Public Utilities Commission has authorized the Nashville Railway & Light Company to purchase ten new cars, estimated to cost about $57,980. The company will issue car trust certificates for $33,425 of this amount. The cars, it is stated, will be purchased from the American Car Company, St. Louis, Mo.

Protests Against Receiver's Certificates.—An appeal from the order of Federal Judge Julius M. Mayer authorizing the issuance of $20,000,000 of receiver's certificates by the Brooklyn (N. Y.) Rapid Transit Company has been filed by the Central Union Trust Company, New York. The appeal has been set for argument before the United States Circuit Court of Appeals on June 18.

Offers Northern Ohio Bonds.—The National City Company, New York, N. Y., is offering for subscription at 96 and interest to yield about 6¾ per cent $4,600,000 of seven-year 6 per cent secured gold bonds of the Northern Ohio Traction & Light Company, Akron, Ohio, dated June 1, 1919, and due June 1, 1926. The interest on these bonds is payable on June 1 and Dec. 1. The bonds are in denominations of $1,000, $500 and $100.

Sale of Illinois Road Postponed.—The sale of the assets of the Southern Traction Company, East St. Louis, Ill., announced for June 10, has been postponed until July, the exact date not having been determined yet, on an order entered in the United States District Court at Urbana by Federal Judge English. The order stipulates that the entire purchase price shall be paid in cash. The road was promoted by the Lorimer interests and was built in part, but it was never operated.

Interest Unpaid on Washington Utilities Notes.—The interest due on June 1, on the 5 per cent collateral trust notes of the Washington (D. C.) Utilities Company remains unpaid. The holders of the notes are asked to deposit them with the American Security & Trust Company, or the Metropolitan Trust Company, New York, N. Y. The notes are secured by $2,750,000 of stock of the Washington Railway & Electric Company, which company passed the May 1, 1919, dividend.

Authorized New Orleans Interest Payment.—Judge Foster in the United States District Court at New Orleans, La., on May 29, ordered J. D. O'Keefe, receiver of the New Orleans Railway & Light Company, New Orleans, La., to pay $28,482 interest due on June 1 on the $1,000,000 loan by the War Finance Board. The principal of the loan was also due on June 1, but the War Finance Board has expressed its willingness not to press the payment of the principal at this time. The total of the debt has been reduced to $940,000, bonds to the extent of $60,000 having been retired.

Suggests Successor as Receiver.—Former Judge Clarence L. Cole, appointed receiver of the Atlantic Shore Railway, Atlantic City, N. J., three years ago, has asked to be relieved of the office, and suggests that A. J. Purinton, superintendent of the system, be named as his successor. The company was forced into the hands of a receiver by the keen competition of the jitneys. The city came to the rescue of the railway by passing an ordinance prohibiting jitneys from operating along Atlantic Avenue, the principal thoroughfare of the city. The prospects are said to be good for lifting the receivership soon.

Abandonment Approved.—By a vote of five to three, the City Council of Seattle, Wash., sustained Thomas F. Murphine, superintendent of public utilities, in suspension of operation on the two-block shuttle line on Queen Anne Hill, known as the Ray Street line. The service was discontinued when Mr. Murphine adopted the policy of cutting out the nonpaying railway lines, especially where only a few patrons were served. It is proposed to discontinue other service that does not produce revenue, and the Council's action is regarded as an indication that Mr. Murphine is to be given practically a free hand in managing the Municipal Railway.

Short Bond Extension Planned.—An effort is being made to extend for fourteen months the $95,000 of first mortgage 5 per cent bonds of the Ohio Central Traction Company, assumed in the consolidation with the Cleveland, Southwestern & Columbus Railway, Cleveland. This would make the bonds mature on Aug. 1, 1920, at which time the company has other maturing issues. As consideration, the company proposes to make an immediate cash payment of $23.33 on each $1,000 bond and to attach three new coupons at the rate of 5 per cent, said coupons maturing on Dec. 1, 1919, June 1, 1920, and Aug. 1, 1920. Thus, the bonds will net the holders 7 per cent during the period of the extension. The priority of the lien will be preserved in every respect. Of the original issue of $200,000, all but $95,000 have been paid or exchanged for other bonds maturing in 1923. Those holders who assent to the plan are asked to deposit with the New Haven Trust Company, trustee, New Haven, Conn. With the war financing out of the way, the company believes it will have no difficulty in paying the bonds on Aug. 1, 1920.

Electric Railway Monthly Earnings

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$1,807,255	$63,076	$1,744,179	$172,745	1,571,434
1m., Apr., '18	1,885,750	37,254	1,848,496	212	1,848,284
12m., Apr., '19	21,913,980	628,793	21,285,187	872,653	20,412,534
12m., Apr., '18	20,127,716	380,001	19,747,715	2,635	19,745,080

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$49,158	*$34,224	$14,934	$14,245	$688
1m., Mar., '18	42,252	*27,210	15,042	11,421	3,621
3m., Mar., '19	140,960	*99,848	41,112	46,625	†5,513
3m., Mar., '18	118,422	*81,683	36,739	34,062	2,677

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$4,015,036	†$2,576,126	$1,438,910	$1,608,375	†$120,707
1m., Apr., '18	3,539,667	*2,043,570	1,326,097	1,160,311	386.551
10m., Apr., '19	35,375,195	*24,231,933	11,043,262	14,992,651	†3,457,801
10m., Apr., '18	33,683,685	*30,577,207	3,106,478	11,179,186	4,043,285

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '19	$185,807	*$142,176	$43,631	$35,988	$7,643
1m., Mar., '18	164,940	*121,542	43,398	36,228	7,170
3m., Mar., '19	551,677	*435,383	116,294	107,833	8,461
3m., Mar., '18	447,657	*348,220	99,437	108,650	†9,213

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	493,363	*$349,797	*143,566	$114,036	‡$35,515
1m., Apr,, '18	463,194	*331,863	131,330	102,783	‡34,238
4m., Apr., '19	2,046,030	*1,480,041	566,090	455,306	‡134,774
4m., Apr., '18	1,889,226	*1,385,342	503,884	401,355	‡138,872

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$882,220	$619,380	$262,840	$157,420	$105,420
1m., Apr., '18	776,967	555,212	221,755	155,561	66,194
1m., Apr., '19	3,500,724	2,595,773	904,951	628,921	276,030
4m., Apr., '18	3,234,357	2,436,302	798,055	6 1,690	176,365

*Includes taxes. †Deficit ‡Includes non-operating income.

Traffic and Transportation

Protests Fare Reduction

Galveston Company Contends There Has Been No Change from War Conditions

Luke C. Bradley, district manager of Stone & Webster, and formerly manager of the Galveston (Tex.) Electric Company, presented to the Mayor and City Commissioners on June 4 a statement giving the reasons of the company for combatting the proposal to reduce fares in Galveston from 6 to 5 cents.

Mr. Bradley showed that 291 American cities had come to the rescue of the electric railways by permitting increases in fare and declared that in not a single instance have these rates been reduced, as the conditions which rendered them necessary still obtain.

He showed that the increase of 1 cent in the Galveston fare had resulted in an increase of $80,500 a year in revenue and that the increase in wages of motormen and conductors, based on the 6-cent fare. amounted to $82,545, or $2,045 more than the increase produced, demonstrating that every cent of the increase was applied to local wages.

PLATFORM EXPENSE HAS DOUBLED

Before the days of the high cost of living, Mr. Bradley said, the company paid conductors and motormen $93,625 a year, while now they are paid $176,170. In addition, wages to other employees have been raised $33,400 a year.

A statement was submitted, showing the cash actually invested in the property to be $2,083,331. The earnings of the company, after taxes and depreciation, under a 6-cent fare, yield only 4 per cent return on this money.

Mr. Bradley deprecated any effort to inject prejudice into the discussion and warned that unfair treatment of the company would be a bad way to attract capital, which is essential to the upbuilding of a great city, and asserted that it was an established fact that the electric railway problem is the greatest facing American cities to-day, and that these problems are only to be solved by co-operation on the part of the cities, their people and the electric railways in a co-ordination of effort to reach a right and fair solution. In this connection he said:

> If this fare is reduced in Galveston, it will be the first step toward destroying this property. If an ordinance is passed repealing the 6-cent fare under the conditions which exist to-day, it will stand as the most unfair ordinance ever passed in the history of the city of Galveston since its incorporation. It cannot from any viewpoint be based upon even the suggestion of fairness, and if you commissioners believe in fair play, as I know you do, if you believe in rendering a service to Galveston, if you do not wish to destroy one of the best citizens that Galveston ever had, you cannot, in fairness, reduce this fare.

In closing his communication Mr. Bradley said:

> As the newly elected officials of this city it is your duty to investigate fully the affairs of the city. It is your duty to know the truth. If further investigation of facts in connection with this matter is necessary, it is your duty to make it. and we will give you every facility for doing so.
>
> We stand ready to go hand in hand with Galveston to the greatest destiny the most optimistic of you can hope for. We stand ready to do our full share. We have always done this and we do not now shirk our duty. All we ask is that the employees of this company be protected, and the money which we have invested here safeguarded and a fair return on that investment assured. No thoughtful man can deny the justice of this position, and certainly no money can be obtained to do our part without such assurances.
>
> We have full confidence in the justice and fairness of the people of Galveston and I am glad of this opportunity to present to you the truth and the facts in the case.

Express Rates in Indiana

Ten interurban properties in Indiana were authorized on June 3 by the Public Service Commission to establish local and interline express rates, the new rates to be filed after five days' notice. These express service rates are established on the basis of 150 per cent of first class rates for local traffic and 120 per cent of the local rate for interline traffic, and are computed on the disque scale. The minimum charge for local express, as established by the order of the commission, is 25 cents, and the minimum charge for interline 35 cents.

The order of the commission was made on petition of the various electric railways for merchants' dispatch rates, on account of the fact that the contracts between these companies and the old line express companies were canceled after the express companies were taken over by the federal authorities. The order of the commission also authorized the interurban lines to establish commodity rates on such articles as ice-cream packers and bread baskets.

The express rates, as prescribed by the order, are to be the maximum and will apply to all articles rated in official classification at higher than first class as well as articles of first class and lower. It is also provided in the order that express shipments shall be routed by the shortest and cheapest route.

The companies authorized to establish the express rates are the Fort Wayne & Decatur Traction Company, Fort Wayne & Northern Indiana Traction Company, Indianapolis & Cincinnati Traction Company, Terre Haute, Indianapolis & Eastern Traction Company, Union Traction Company of Indiana, Interstate Public Service Commission, Marion & Bluffton Traction Company, Fort Wayne & Northwestern Railway, Winona Interurban Railway and the Indiana Railways & Light Company.

Jersey Case Near Close

Witness for State Commission Develops Difference of Opinion from Plan Proposed by Railway

The Board of Public Utility Commissioners of New Jersey concluded on June 9 the examination of its own witnesses in connection with the application of the Public Service Railway for permission to establish zone fares. It was decided then to put the hearings over until June 23, when the League of Municipalities will begin the presentation of its case.

Dugald C. Jackson continued his testimony before the commission on June 6. He suggested that the first 5-cent fare cover two zones instead of one as proposed by the company. Unnecessary antagonism of the company's patrons would be worse for the company than the loss of a few hundred thousand dollars by a modification of the zone plan as submitted. Thomas N. McCarter, president of the railway, asked whether it wouldn't be better to get the revenue and antagonize the public than to let the company die. Mr. Jackson didn't think that the company would die. It was his opinion that at the end of six months' trial people would readily consent to a readjustment if they had been convinced in the meantime that the company was doing its best to give all it could for the money and make a reasonable profit.

It was Mr. Jackson's opinion that the fare matter could not be settled once and for all, as conditions were changing constantly. He said that so long as the business continued to grow it would be necessary to experiment with changes in fare. Mr. Jackson said that the shorter zones would be preferable to the 5-cent charge for the first two zones because the relatively short riders would get their rides for a nickel and this would benefit the company by competing directly with the jitneys. The more people who used the cars the more it was to the public's advantage as well as the company's. The two went hand in hand.

Mr. Jackson said his views on the so-called standby and movement charges were somewhat different from those of the company. It would be for the benefit of the passengers if all cars were through cars. The fact that the company did not have to supply through cars on all lines and could not do so showed that transfers were a distinct benefit to the company. He did not think that this should be a charge against the passenger.

According to Mr. Jackson, no electric railway could relieve itself of serious competition from jitneys unless people felt that they were getting as much for their money on the cars as they did on the jitneys. It was important for the company to see the problem from the point of view of its customers. Mr. Jackson agreed with Mr. McCarter that it would be serious to take $750,000 prospective revenue out of the company's plan. but even that would not be without its advantages.

The examination of Mr. Jackson on June 9 had to do very largely with the effect of fare changes on community development. Mr. Jackson said that where a low fare had been established to encourage suburban development there should be a careful review and study before fares were changed, so as to learn whether circumstances had changed.

He explained that there was a time when the flat rate of fare had been urged in favor of the development of suburban sections and for the prevention of traffic and living congestion, but that conditions in American cities had proved that the flat fare had not eliminated congestion. In reviewing changed suburban conditions, he thought that three factors should be taken into consideration, namely, the citizens' investment in real estate, the citizens' investment in the electric railway and the general and special interests of the entire community.

Wants Municipal Fare Increased

Seattle Councilman Sees Need Now, but Railway Official Wants Present Fare Continued Six Months

Councilman R. H. Thomson of Seattle, Wash., has expressed the belief that the fare on the Seattle Municipal Railway should be increased to 6 cents. Thomas F. Murphine, superintendent of public utilities, asserts that it will be time enough to talk increased fares when it has been demonstrated that the city cannot operate the railway on a 5-cent fare. One reason for Councilman Thomson's proposal to increase the fare is the recent advance allowed by the Public Service Commission on the Seattle & Rainier Valley lines.

Mr. Murphine says that the statement of expenses and revenues in April referred to in detail on page 1187 shows that the city made money on a 5-cent fare. When certain proposed changes are put into effect, he asserts that operating costs will be reduced, and that earnings will show an excess of at least $50,000 monthly over expenses. Mr. Murphine believes that operation on a 5-cent basis should be continued at least six months before any move toward increased fare is made.

Beginning on June 1, passengers on the Seattle & Rainier Valley Railway and the Greenwood Avenue lines (operated by the Washington Water Power Company), both in Seattle, began to pay increased fares.

As explained elsewhere in this issue, the Rainier Valley lines charge 6 cents for a straight ride in the city limits as far south as Seventy-fifth Street, with 1 cent additional for every transfer issued, and 2 cents for transfers received from other lines.

The Greenwood Avenue fare is advanced by the discontinuance of the city custom of accepting transfers from that line to the city cars. The transfers have been ordered discontinued because Mr. Murphine found that the city was carrying the big end of the load on a 50-50 division of the receipts.

Fares Up in 388 Cities

More Than Fifty-five Per Cent of the Urban Population of United States Paying Increase

Since the publication by the American Electric Railway Association in March of the fare increases in the cities of the United States, several additions and changes have become effective. The fare in New Jersey cities served by the Public Service Railway has been reduced to 6 cents and again advanced to its former level, 7 cents, plus 1 cent for a transfer. Three hundred eighty-nine cities having more than 55 per cent of the urban population of the country are now paying increased rates. Of this total, twenty-nine cities are paying a 10-cent fare; nineteen an 8-cent fare; 100 a 7-cent fare, seventeen of which pay in additional 1 cent for each transfer; and 164 are paying a 6-cent fare. Fares in the remainder have been increased either by a reduction in the length of zones, the adoption of a zone system, the abolition of reduced rate tickets, or a charge for a transfer. The situation throughout the country is summarized in the accompanying table:

	No. of Cities	Per Cent of Urban Pop. of U. S.	Average Population
Total number of cities in which increases were granted. (Population for four citiesmissing)..	388	54.75	60,366
Granted since Jan. 1, 1918. (Population for four cities missing)....	347	50.82	62,653
Granted prior to Jan. 1, 1918.................	41	3.93	41,015

Note—The population figures used in this summary are the U. S. Census figures for July 1, 1917; the estimated urban population is 42,778,287. The total number of cities given (389) is the sum of cities in which fare increases were granted and excludes four duplications.

The nature of the increases in fare is shown in the following table:

	No. of Cities	Average Population
Cities in which the fare was increased to 10 cents cash; ticket fare, 7 cents for city zone; 5 cents in each two-mile suburban and interurban zone; minimum fare, 10 cents..................	23	44,464
**Cities in which the fare was increased to 8 cents..............	19	75,600
Cities in which the fare is 7 cents and 1 cent charge for each transfer......................	17	91,958
Cities in which the fare was increased to 7 cents (population for two cities missing)..........	83	21,815
Cities in which the fare was increased to 6 cents..............	164	67,653
*Cities in which the reduced-rate tickets have been abolished (population for two cities missing)........................	52	53,839
Cities in which a straight 5-cent fare is being charged with an additional charge for transfers...	6	100,442
Cities having a 5-cent two-mile zone—next zone 5 cents for 1¾ miles, 5 cents for each 1¾ miles thereafter—1 cent transfer charge........................	5	83,760
Cities in which the fare was increased to 10 cents............	6	11,293
Cities having a 5-cent central zone, 2-cent outside zone............	4	126,143
Cities having 6-cent zones........	3	52,462
Cities in which a 5-cent fare is being charged, with an additional charge of 5 cents for each zone outside city................		21,561
Cities having a 6-cent central zone, 2 cents outside...............	1	64,720
Cities having a 7-cent inner zone, 5-cent outer zone and 10 cents between......................	1	66,503
Cities having a 5-cent central zone, 7-cent outside zone, overlapping central zone.................	1	586,196
Cities having a 5-cent central zone, 3 cents per mile outside.........	1	535,485
Cities in which a 5-cent fare is being charged, with an additional charge of 1 cent for rides outside of city......................	1	38,272
Cities in which a 10-cent fare is charged for Owl Service, day fare 5 cents.......................	1	58,716
Cities in which the price of reduced rate tickets were increased from 8 for 25 cents to 6 for 25 cents, cash fare 5 cents.............	1	220,135
Cities in which the fare was increased by adding a 5-cent charge for rides outside of city limits.........................	2	70,528

**Three cities, total population 140,808, served also by Bay State Street Railway, included in fourth group.

* One city also included in six-cent group.

Detroit Decision Basis for Toledo Fare Ruling

The Federal Court of Appeals at Cincinnati, Ohio, has handed down an opinion in the appeal of the city of Toledo vs. the Toledo Railways & Light Company affirming the injunction decree of District Federal Judge Killits, of Toledo, restraining the city of Toledo from interfering with the company's operation of its lines in Toledo and the collection of fare at the rate of 5 cents for adults and 1 cent additional for a transfer.

In passing upon the case, the court says the injunction decree appealed does not operate to interfere with the right of the city to pass proper legislation to regulate the fares, nor does it prohibit the city from passing ordinances directing the railway to vacate the streets, remove its rails and prescribe regulations for such removal. Neither does the court prevent the city from fixing fares and provide for exclusion of the company from the use of Toledo streets in the event the rates so fixed are not accepted.

In the opinion handed down, Judge Dennison wrote as follows:

> Upon this record, and in this court, the city does not undertake to dispute the claim of the company that any rates or fare less than the proposed new schedule would have been confiscatory, and, if enforced against the company, would have been a taking of its property without justification, and would violate its constitutional rights.
>
> By the line of decisions of the Supreme Court, culminating in the Denver Water Company and the Detroit United Railway cases, it now is clearly settled that when the franchise rights of a public service corporation to use the streets of a city expire, the city has the absolute right to order the discontinuance of the service and the removal of property from the streets; that the company has a corresponding right to make such discontinuance and removal, but that if neither party exercises this right and if the company, at the city's request, continues to occupy the streets and

> to give service, the public regulating power can be exercised only subject to the condition that it must not bring about confiscation.

The decision in the Detroit case, to which reference is made, was reviewed at length in the ELECTRIC RAILWAY JOURNAL for Jan. 18, page 149. In the Detroit decision the Supreme Court said that the city could have ordered the tracks from the street after the franchise expired, but that the city can not compel the company to continue business at a loss.

Increase for Seattle Line

The Public Service Commission of the State of Washington has ruled that the Seattle & Rainier Valley Railway may charge 6 cents for a straight ride, 1 cent additional for every transfer issued, and 2 cents for every transfer accepted from other lines.

The city opposed the increase. It was represented at the hearing by Thomas J. L. Kennedy, assistant corporation counsel, and E. E. O'Brien, assistant superintendent of utilities.

The company introduced evidence to show that in 1918 it earned considerably less than 1 per cent on a valuation of $1,437,271; that wage increases of $30,000 a year to its employees will be required at once to put them on the same basis as the employees of the Seattle Municipal Railway.

The straight 6-cent fare applies only as far south at Seventy-fifth Street, South. The rate to Benton is 15 cents, or 25 cents for the round trip. Five cents is charged from Seventy-fifth Street to Bryn Mawr. School tickets are increased from 2½ cents to 3 cents. The new rates were scheduled to go into effect on June 1.

New York City Commissioner Sees the Need

Lewis Nixon, making his first public address since his appointment to the Public Service Commission for the First District of New York, told the Brooklyn Chamber of Commerce, on May 28, that he was going to prevent any more receiverships in Greater New York if possible. He is reported to have said:

> Neither this state nor this country can afford many more receiverships. If we have many more of them there is no doubt but that it will mean countrywide disaster. I will do everything in my power to prevent any trouble which might lead to disaster. We must face at once a fair discussion and follow that up with a fair adjustment.
>
> The situation has been forced upon us entirely by the war. We are carrying people, now in New York City at a rate of actual cost. I want to meet every one and try to arrive at a fair decision concerning this matter.
>
> There was a day when every one that drew a contract for transit thought that a 5-cent fare was a gold mine, and it was. If we had not had war we would not now face the situation which we are facing, but in the face of things as they are one side must give up something and so must the other side.

Mr. Nixon said that he thought the peak of high cost in operation had been reached in the last quarter of 1918 and that an improvement is now taking place.

Transportation News Notes

Ten-Cent Owl Fare.—The Johnstown (Pa.) Traction Company will raise its fare from 5 cents to 6 cents and start a 10-cent night fare on June 15. It has filed notice of the increase with the Public Service Commission of Pennsylvania.

Publicity for Fare Appeal.—The Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has undertaken a campaign of publicity in connection with its appeal for an increase in its city fares in Terre Haute.

Protest Johnstown Increase.—The special committee of citizens of Johnstown, Pa., organized to protest against the Johnstown Traction Company's increase of fare from 5 cents to 6 cents, will carry their case to the Public Service Commission. The new rate is effective on June 15.

Fare Application Denied.—Representatives of the United Railways & Electric Company, Baltimore, Md., personally appealed to the Public Service Commission to permit the new fare increase—four tickets for 25 cents, or 7 cents for a cash fare—to go into immediate effect. The present fare is 6 cents. The appeal was refused. The action of the commission was unanimous.

Campaign Against Trading in Transfers.—Arrests are being made by detectives in the employ of the Minneapolis (Minn.) Street Railway in an attempt to curb trading in transfers. In several large buildings transfers are left on window ledges where they are overhauled and used illegitimately by other persons. Fines are being assessed by the city judge. This has tended to break up these clearing houses for transfers.

Weekly Bulletin for Atlanta Patrons.—Plans are being worked out for the publication by the Georgia Railway & Power Company, Atlanta, Ga., beginning at an early date, of a weekly four-page bulletin for distribution among its passengers. The bulletin will be distributed among racks in the cars, the passengers being invited to help themselves. According to preliminary estimates, between 50,000 and 100,000 copies weekly will be required.

Service and Fare Matters Still Unsettled.—The Council of Louisville, Ky., has voted against the ordinance permitting the Louisville Railway to curtail service on certain lines, proposed by Mayor Smith in lieu of an increase in fares from 5 to 6 cents. The Mayor declined to consider a request for increased fares and following action of the Council said that having done all he could, he had "washed his hands of the whole matter." This matter has been referred to at length previously in the ELECTRIC RAILWAY JOURNAL.

Number of Zones Increased.—In an effort to prevent further operating deficits, the Milford, Attleboro & Woonsocket Street Railway, Milford, Mass., has, with the consent of the Public Service Commission, reduced its unit fare rate from 7 cents to 5 cents, but has increased the number of fare zones from seven to eleven. Under the old system, the zones averaged approximately 3 miles each; under the new arrangement they will approximate about 2 miles each. The road last year failed by more than $8,000 to earn operating expenses.

Six Cents in Peoria.—The Public Utilities Commision of Illinois has entered an order allowing the Peoria Railway to charge a 6-cent fare in the city of Peoria and suburbs, effective on June 7, to continue one year. At that time the fare will automatically revert to 5 cents a ride and twelve rides for 50 cents unless otherwise ordered by the commission. Immediately following receipt of the order the company signed an agreement with its employees granting them an increase of 8 cents an hour, dating from May 1, 1919. The City Council had recently gone on record against the increase in fare from 5 cents to 6 cents.

Staggered Hours Abandoned.—Following ineffectual attempts on the part of the commissioners of the District of Columbia as members of the Public Utilities Commission, to persuade the various other government departments to "stagger" the hours of opening, employees of the District government have resumed the old 9 o'clock opening hour. Ever since the influenza epidemic of last fall they have been reporting at 9:30 o'clock and working half an hour later in the afternoon. The District government was the last of the government departments to abandon the "staggered" hours schedule and did so reluctantly.

Jitney Competition Very Serious.—The Public Service Railway, Newark, N. J., has served notice on the Board of Public Utility Commissioners of a plan to abandon the Bay Avenue portion of its Bloomfield line, the change to become effective on June 17. Should the commission object to the proposal, a hearing to test the necessity for the move probably will result. According to the company, the revenue return does not justify the continuation of the service. It is said that nearly all the traffic of the Bay Avenue line has been taken by the jitneys, except during rush hours. The railway proposes an alternative service for those who would be affected by the abandonment. This alternative service provides for change of cars. Court action will be resorted to by the Bloomfield Town Council in an effort to compel the railway to continue the Bay Avenue service if the company withdraws service by June 17.

Personal Mention

Mr. Maher Chosen

Vice-President and Manager of Third Avenue Railway Will Head New York Association

At the annual meeting of the New York Electric Railway Association, held at Lake George on June 7, Edward A. Maher, Jr., vice-president and general manager of the Third Avenue Railway, New York, was elected president. Mr. Maher has been vice-president of the association during the past year, which has been a strenuous one for the railways in the State. During this time Mr. Maher has given a great deal of his time to the association and has helped greatly to advance its interest.

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E. A. MAHER, JR.

The history of the Maher family has been very closely identified with the railway interests of New York for the past twenty-seven years. In 1892, Edward A. Maher, Sr., who had recently retired as Mayor of Albany and then had served a short time as president of the Albany Electric Illuminating Company, was invited to come to New York to become president of the Union Railway. Soon after it was electrified under his administration, and on the consolidation of the railway with the Third Avenue Railroad he became vice-president and general manager and later president of that company.

Edward A. Maher, Jr., his son and the subject of this sketch, was born in Albany in 1873, and after graduation from the Albany High School in 1890 entered the employ of the Edison Electric Light Company of that city. In 1892 he resigned to accept the position of treasurer of the North River Electric Light & Power Company in New York and in the following year was made general manager of the company, but later resigned to take up the practice of law. For a number of years he practiced as attorney in trial term of the Third Avenue Railway System, but in 1913 the needs of the company in the operating department led to his appointment as assistant general manager. On the retirement of his father as general manager of the system in 1917, Mr. Maher, Jr., succeeded to that position. Through its control of the Union Railway and Yonkers Railroad the Third Avenue Railway operates a large part of the surface electric lines in Bronx Borough and Westchester County besides its extensive system on Manhattan Island.

Mr. Maher was married in 1897 to Miss Frances E. Gilroy, daughter of Thomas F. Gilroy, a former Mayor of New York City.

Sir Albert Stanley Here

Sir Albert Stanley arrived in the United States on June 7, on the *Mauretania.* Sir Albert, who has just been appointed chairman of the London underground undertakings in succession of Lord George Hamilton, outlined a plan for the improved transit of Londoners by subway and omnibus before he sailed from London. According to Sir Albert, the companies, of which he formerly was managing director, are in process of carrying out the following program:

To acquire as quickly as possible a large number of additional railway cars.

To reconstruct the City & South London Railway so as to provide a new route north and south through the city.

To redesign the cars on the tube railways to make loading and unloading more rapid and convenient and to construct and place on the streets a new and improved type of omnibus.

These improvements will cost several million pounds sterling.

Early in 1917 Sir Albert was made president of the Board of Trade in the British Cabinet, one of the most important official posts in the Kingdom, but some time ago he relinquished these duties at his doctor's suggestion. The *Board of Trade Journal* recently stated that there was every hope and expectation that Sir Albert would shortly be fully restored to health and be able to resume his duties as president of the Board of Trade, but it was reported that Sir Albert desired to retire from the House of Commons at the end of the present session.

It is understood that while Sir Albert has come primarily to America in order to recruit his health he will take advantage of his sojourn to transact a considerable amount of business with the Administration at Washington in connection with the interests of the great department of the British Government of which he has been the chief.

Mr. Katte President

Chief Engineer of Electric Traction of New York Central Heads New York Electrical Society

E. B. Katte, chief engineer of electric traction of the New York Central Railroad, has been elected president of the **New York Electrical Society.** As chief engineer of electric traction, Mr. Katte has for many years been in direct charge of all the railroad's electric traction work. He was previously, in December, 1902, appointed electrical engineer and secretary of the electric traction commission of the New York Central Railroad, and in this capacity under direction of the commission he had immediate charge of the electrical and mechanical engineering corps engaged upon the work of electrification of the various lines of the New York Central in New York City and vicinity, this undertaking including the construction of two 20,000-kw. central power stations, nine substations, batteries and electric locomotives, car equipment and the third-rail and transmission system.

E. B. KATTE

Mr. Katte was born in St. Louis, Mo., on Oct. 16, 1871, and is the son of the late Col. Walter Katte, a distinguished civil engineer. He entered the Cutler School in New York City in 1881 and eight years later passed the entrance examination for Sibley College, Cornell University. There he took the regulation four-year course in mechanical and electrical engineering, and upon the acceptance of his thesis, which consisted of a commercial test of one of the first interurban electric railroads, he was graduated in June, 1893, with the degree of Mechanical Engineer. He then traveled through Switzerland and Germany, studying electro-hydraulic plants. Returning to Cornell he took up special work in the design of vertical marine type engines and in mechanical and electrical testing. Upon the completion of this course, in 1894, he received the post-graduate degree of Master of Mechanical Engineering.

After a short term of service with H.

R. Worthington, Mr. Katte became assistant engineer in charge of the direction of the superstructure of the Park Avenue viaduct of the New York Central & Hudson River Railroad in New York City.

In 1898 Mr. Katte was appointed mechanical engineer in the engineering department of the company. In addition to much general work for the company his duties as mechanical engineer embraced the design and installation of mechanical and electrical appliances for numerous coaling stations, water supply stations, electric light and power plants for small passenger and freight stations, offices, yards, shops, transfer tables, cranes, drawbridges, etc. His appointment as chief engineer of electric traction dated from November, 1906. In that capacity he has had charge of the design, construction and operation of the electric traction installation of the company in and about the city of New York.

Mr. Katte was vice-president of the Society of Mechanical Engineers in 1913-1914; he is a Fellow of the American Institute of Electrical Engineers and served on the railroad committee of that body; a member of the American Electric Railway Association, serving on the heavy traction committee, committee on standards and the committee on electrolysis; a member of the American Railway Engineering Association, serving as chairman of the committee on electricity; a member of the New York Railroad Club, serving as chairman of the electrical committee of that association; a member of the American Railway Association, serving on its committee on electrical working, and a member of the American Railway Guild.

New Public Service Commissioners in Indiana

Fred Baes Johnson and Glen Van Auken have been appointed by Governor Goodrich as members of the Public Service Commission of Indiana to succeed Edwin Corr and Charles A. Edwards, whose four-year terms expired on May 1, 1919. Both Mr. Johnson and Mr. Van Auken are attorneys and served as officers in the late world war.

Mr. Van Auken was State Senator from Allen and DeKalb Counties in the 1917 and 1919 sessions of the Indiana Legislature, and a short time ago was appointed a member of the State Industrial Board, from which he resigned upon his appointment as Public Service Commissioner.

Mr. Johnson has had a varied career as school teacher, newspaper man, professor of journalism and as an attorney at law.

Both of the new members of the commission are Democrats, but were appointed by the republican state administration under the terms of the act creating the commission which provides that both political parties shall be represented on the board.

Britishers Coming to United States

At the meeting of the City Council of Liverpool, England, on April 2, it was decided that a deputation of members of the Council be appointed to visit American and Canadian cities to study tramways and electric supply, equipment and improvements. At a meeting of the tramways and electric lighting committee, held on April 4, it was decided that the deputation should consist of the following: Alderman Russell Taylor, chairman of the committee; F. C. Wilson, chairman of the subextension electrical committee; W. A. Robinson, leader of the labor party in the Council, and David Jackson.

The deputation will be accompanied by J. A. Brodie, city engineer; Harold Dickinson, city electrical engineer; C. W. Mallins, tramways manager, and A. G. Smith, city lighting engineer, with the committee clerk.

Several members of the committee expressed their intention of accompanying the deputation at their own expense.

It was announced that the deputation would leave for America on May 27.

William H. Murray, formerly connected with the traffic department of the Santa Fe Railroad at San Francisco, has been made traffic manager and auditor of the Modesto & Empire Traction Company, operating between Modesto and Empire, Cal., and connecting with the Santa Fe system.

Leslie R. Coffin, manager at Bellingham, Wash., for several years for Stone & Webster who was called by the company to help at the Hog Island shipyard, Philadelphia, more than a year ago, will be located in San Francisco, where he will cover the Coast states in the interest of construction work for Stone & Webster.

John W. Raisch has been appointed a member of the State Board of Railway Commissioners by Governor Norbeck of North Dakota, to fill the vacancy caused by the resignation of P. W. Daugherty. Mr. Raisch is a native of North Dakota, a graduate of the State university, general course as well as the law department, and has been a newspaper man and practicing lawyer in the State for a number of years.

Richard W Meade formerly president of the Fifth Avenue Coach Company, New York, has been elected president of the Detroit Motorbus Company, organized to put a line of motor buses on several streets in Detroit. An initial service with 100 double-deck buses is proposed and the fare is to be 10 cents. Before becoming an officer of the Fifth Avenue Coach Company, Mr. Meade was connected with the Metropolitan Street Railway, New York. N. Y., under President Herbert H. Vreeland.

Edmond S. Gillette, mechanical and electrical engineer of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., for the past six years, has resigned to become associated with the Lyon-Metallic Company at Montgomery as service engineer. Mr. Gillette served as a member of the power distribution committee of the American Electric Railway Association and chairman of the electrical engineering committee of the Illinois Electric Railways Association. He is a member of the Master Car Builders' Association.

Fred A. Cummings, formerly reporter for the Lynn (Mass.) *Item* and lately special writer on the Boston *Globe*, has selected by the trustees of the Bay State Street Railway, Boston, Mass., to be public relations representative of that system under the public trustees. The duties of this office will be to encourage the most amicable relations between the management and the patrons. All complaints will be investigated, all suggestions heeded and the utmost endeavor will be used by Mr. Cummings to have the railroad serve the best interests of the people who pay the fares, and the people co-operate with the trustees.

Clyde Taylor has resigned as vice-president, director and general counselor of the Kansas City (Mo.) Railways to resume the practice of law. Prior to 1912, Mr. Taylor was engaged in corporation work and was called by the receivers of the Metropolitan Street Railway, as assistant counsellor, handling practically all of the legal phases of the valuation work, and assisting in the preparation of the franchise. He became general counsel for the company in 1916, and during the absence of Col. Philip J. Kealy, acted as president of the company. Under Mr. Taylor, new problems confronting the company were successfully worked out. These included the 6-cent fare and Kansas bridge matters. Upon his retirement, the board of directors of the Kansas City Railways adopted a resolution praising him for his work, saying that "any lawyer should be proud of the record made."

Daniel L. Ryan, recently secretary to Borough President Frank L. Dowling, has been appointed by Transit Construction Commissioner John H. Delaney as deputy transit construction commissioner. In the law separating the functions of the public service commissioner and the transit construction commissioner, provision was made that the latter should have one deputy, at a salary of $7,500. Mr Ryan is a former newspaper man with wide experience in municipal affairs and has been familiar with rapid transit matters for many years. He is particularly well fitted for his new post as deputy in the work of transit construction. In that he has made a special study of the dual system contracts and followed every stage of their preparation previous to their execution in 1913. Mr Ryan served as secretary to the New York State Commission to the Panama-Pacific Exposition. He is vice-president of the Taxpayers Alliance of the borough of the Bronx.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Fibre Conduit Market Opening Up

Power House and Line Developments Are Light at Present—Prices All Off Slightly

The market for fibre conduit, in its relation to electric railway work, presents only a fair condition. In the fields where it is generally used for that work—power house building and additions, underground feeder line extensions and ducts for communication and signal wires—there has been little business offered in the past two years, but of late the market has begun to open up.

This resumption of trade is more noticeable in the larger cities of the middle west where recent orders placed show returning activity. The foreign field is also buying fibre conduit, according to recent shipments to Europe, and more orders would be booked to South American countries were the boat bottoms available. However, the export trade is liable to suffer because of the excessive freight charges. Where freight is charged on volume rather than weight this product is greatly handicapped, for these charges have been twice the value of the product.

There has been found a recent easing off in price of about 8 per cent, but this has not been traced to any easier costs of labor or materials. Factory stocks of raw materials are satisfactory and deliveries of the conduit can be made practically immediately. It is expected that by next year the fibre conduit business will be in excellent shape.

Rails Bonds and Wire Higher

Discounts on Former Drop 2½ Points—Copper at 17⅝ Cents

Rail bond discounts have dropped from 25 to 22½ per cent making a higher net price on bonds of 3½ per cent. While not very great, the advance shows quite clearly the tendency of bonds to follow the price of copper upward. It developed upon inquiry among manufacturers' representatives that there has been no marked improvement in the demand for bonds. Shipment, it is learned, can be made immediately.

Copper quotation now stands at 17.62½ cents, which is 1¼ cents above the quotation of two weeks ago. Copper wire base net prices at the mill are recorded at 19½ to 20 cents. Bare wire manufacturers' bases in the last two weeks have advanced about 1 cent and are quoted at 19½ and 20 cents. Weatherproof wire bases have increased 1 to 2 cents and vary from 20 to 22 cents. Rubber-covered wire base has changed only in the respect that one or two manufacturers have increased a cent or two, but the predominating base holds at 21 cents.

Brooklyn Buys Two Hundred Safety Cars

Cars to Be Furnished Complete by Manufacturer Except for Fare Boxes and Registers

An order for 200 safety cars was placed with the J. G. Brill Company, Philadelphia, by the Brooklyn Rapid Transit Company this week. As described in the ELECTRIC RAILWAY JOURNAL of March 1 of this year, trial operation with safety cars was begun in Brooklyn on Feb. 23. Altogether, twelve cars were placed in this test service. Six of these were furnished by the American Car & Equipment Company of St. Louis, Mo., and six by the J. G. Brill Company. As a result of this trial the Public Service Commission for the First District, New York, granted permission for the purchase of 200 safety cars as described in this paper for May 3.

SPECIFICATIONS REQUIRE FULL EQUIPMENT

After this permission was granted the company sent out inquiries with complete specifications for the cars and equipment to be furnished. With the tenders submitted by the various manufacturers, drawings were required so that the railway company's engineers could form a definite idea as to the car construction and equipment to be furnished. The cars now ordered are to be furnished complete by the manufacturer with all equipment except fare registers and fare boxes which will be furnished by the railway company. The fare registers will be of the company's standard electrically operated type and for this equipment registers now on hand will be used.

The details of construction and equipment have not been definitely decided on as yet other than they will be required to meet the railway company's specifications. These require a practically standard safety car with a few modifications which have appeared advisable as a result of the test operation. The truck construction will be modified somewhat so as to provide not only for a different journal box arrangement but also for easier removal of the journal boxes. The truck frame will be spring suspended. Standard type of friction bearings will be furnished throughout.

Increasing Demand for Veneers for Repairs

May Replace Shaped Iron Boxes and Covers—Warping Difficulties Overcome

Traction companies are using more and more for repair work veneer products which can be readily moulded to take any simple curve. This class of material is also coming more into use in new cars. Former difficulties in the manufacture of the cement used in this product have been overcome so that now the material is impervious to heat and moisture.

It is particularly adaptable for use as headlining, for seats and for outside panels both on the front and along the sides of the car, where changes in temperature and mositure conditions would produce warping.

The lightness and strength of the material is appealing to one prominent manufacturer of electric railway equipment to the extent that he is experimenting with it to replace iron boxes and covers. The cost of it also is a feature in this respect as it is less than that of cast iron for these covers. The wood may be impregnated to be made fire resisting or lined with asbestos when used in the proximity of arc-breaking contacts.

One manufacturer of this material was working up to capacity on war work, but is now down to about one-third capacity since the cancellation of war contracts. He is just getting back to commercial business and reports daily orders from traction companies for materials for car repairs. Deliveries are practically immediate.

Steel Pole Market in Better Shape

Orders Are Coming in in Increasing Volume and No Evidences of Price Changes Seen

A better market for steel poles has arisen, probably because buyers have come to the conclusion that no additional reduction in steel prices is in sight. The last reduction in steel took effect on April 21, and tubular and open-work steel poles were reduced at that time. Prices of poles have been holding steady since then, and the steel market has experienced little change. There has been considerable business done in steel, however, so it hardly seems necessary to reduce prices to stimulate business any further. Besides, there is no evidence that of their own accord steel prices will undergo much reduction for some time to come.

Still there is found no intention of guaranteeing pole prices with the present unsettled steel market.

With the utilities it seems to be a lack of buying power rather than a belief that prices are too high, that keeps them out of the equipment market. Production has been so curtailed that lower prices due to quantity production cannot be reached. However, some utilities have gone ahead with their plans and pole orders have increased. Besides, the number of inquiries has greatly increased and only a short time is anticipated before many of these will be turned into orders. Much of this is for the domestic market, but there is also considerable activity contemplated in Canada, the Southern Republics, Europe and even Africa.

Illinois Steel Company Reorganization

The Illinois Steel Company has announced a reorganization of its general sales department, effective June 1, 1919, pursuant to which there have been created three divisions of the department, the structural and plate division, the bar division, and the rail, billet and pig-iron division; each division to be in charge of an assistant general manager of sales, who will report to the general manager of sales. The following appointments have been made to fill the new positions created: J. B. Arnold, assistant general manager of sales, in charge of the structural and plate division. B. E. Hamilton, assistant general manager of sales, in charge of the bar division. P. W. O'Brien, assistant general manager of sales, in charge of the rail, billet and pig-iron division.

A new department has been formed to be known as the Chicago district sales office, through which will be cleared sales originating in the territory comprising the northern half of Indiana and Illinois, Iowa, Nebraska, southern Wisconsin and the southern end of the Michigan peninsula. J. G. Carruthers, manager of sales of the Illinois Steel Company at Cincinnati, Ohio, has been transferred to the Chicago office and appointed manager of the Chicago district sales office. All of the new appointees have been connected with the Illinois Steel Company for a number of years, and, with the exception of Mr. Carruthers, have been located in the general sales offices in Chicago.

Oil Market Quiet

The market for oils for lubricating and other electric railway purposes has undergone little change this year. Prices are steady with no apparent indication of a rise. In order to protect the traction companies in case of a drop, it is quite general to insert a clause in the contracts to allow them the advantage of this.

There has been found no evidence that railways are seeking different terms in their contracts because of post-war conditions.

Rolling Stock

Quebec Railway, Light & Power Company has asked for prices for the supply of ten double-truck pay-as-you-enter type of cars, 41 ft. long, for its city service.

Quincy (Ill.) Railway is expecting delivery of twenty-five new cars. A second snow sweeper, an electric welder, a trolley guard and other equipment will, according to reports, come with the new cars.

Hydro-Electric Power Commission of Ontario, Canada, has ordered an additional 50-ton electric locomotive similar to the six ordered previously. This will also come from Canadian Car and Foundry Company.

Capital Traction Company, Washington, D. C., announces the placing of an order for twenty additional cars. The contract was given J. G. Brill Company of Philadelphia and delivery will be made in the fall. The cost of this new equipment will be in the neighborhood of $250,000.

Washington Railway & Electric Company, Washington, D. C., plans placing fifteen new cars in service by fall, according to president William F. Ham. The additional rolling stock will be paid for out of insurance received from the destruction by fire of the Eckington barn. There will be available about $100,000 for the purchase of new car bodies, which will be equipped with repaired motors and trucks salvaged from the fire. This is the only additional equipment the Washington Railway & Electric Company proposes to acquire at this time, as the relief given through the 2-cent transfer charge, it is stated, will not be sufficient to enable it to finance further purchases of rolling stock.

Recent Incorporations

Sikeston & Southeastern Railway, Sikeston, Mo.—Incorporated to construct a line from Sikeston, Mo., to Hickman, Ky., via East Prairie, 30 miles. The construction of the line includes twelve wooden bridges from 20 ft. to 50 ft. long. The company would like to receive prices on second-hand rails. Incorporators: M. G. Gresham, Citizens' Bank Building, Sikeston, Mo.; T. A. Wilson, E. A. Matthews, L. M. Stallcup and others.

Franchises

Montgomery, Ala.—The Montgomery Light & Traction Company has received a franchise from the City Council to construct an extension on Bell Street to the city limits.

Newport, Ky.—The Andrews Steel Company has asked the City Commissioners of Newport for a franchise to construct an electric railway on Licking Pike from Eleventh and Brighton Streets to Twelfth Street, west to Lowell and south to the corporation line. The line is to be known as the Licking Valley Railway.

Track and Roadway

Calgary (Alta.) Municipal Railway.—The City Council of Calgary contemplates electric railway extensions estimated to cost in the neighborhood of $50,000.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—It is reported that an extension will be built by the San Francisco-Oakland Terminal Railways of its Twenty-third Street line in Richmond. It is stated that the company intends to build through to Giant and Hercules this year and to Martinez ultimately.

Pasadena, Cal.—The City Commission of Pasadena will begin at once a preliminary survey of a right-of-way for the construction of a municipal railway to connect Pasadena and Los Angeles. The survey will be made by the engineering department of the city under direction of R. V. Orbison, city engineer.

Iowa Southern Utilities Company, Centerville, Iowa.—The Iowa Southern Utilities Company will ballast 7 miles of interurban track.

New Orleans, La.—A committee representing the cities and towns between New Orleans, La., and Mobile, Ala., inclusive, met recently at Biloxi and awarded a contract to James W. Billingsley, New Orleans, for a preliminary survey for the proposed municipally-owned line between those two cities and along the Gulf Coast. [April 5, '19.]

Fenton, Mich.—W. E. Martin, Flint, is interested in the construction of an electric railway between Flint and Owosso.

Public Service Railway, Newark, N. J.—New track is being laid by the Public Service Railway on Elizabeth Avenue, Elizabeth, N. J., for a distance of about 1 mile.

New Jersey & Pennsylvania Traction Corporation, Trenton, N. J.—The city Commission of Trenton has granted permission to the New Jersey & Pennsylvania Traction Company for double-tracking its line on Calhoun Street as far as the Delaware River.

Long Island Railroad, New York, N. Y.—Plans are being considered by the Long Island Railroad for the complete electrification of its Montauk division to extend to Babylon. The line is electrified at present as far as Lynnbrook, the remaining distance to Babylon being about 19 miles.

Capitol Car Line, Bismarck, N. D.—An extension will be built by the Capitol Car Line to connect with the Soo Line and thence to the capitol, forming a loop.

Cincinnati (Ohio) Traction Company.—At a recent conference between city officials of Cincinnati and Walter Draper, vice-president of the Cincinnati Traction company, a large number of improvements of car tracks of the Cincinnati Traction Company were agreed upon. Chief among these are the double-tracking of Central Avenue from Liberty to Mohawk Bridge, laying of new tracks on Harrison Avenue and the probable elimination of the Mohawk bridge over the canal.

Cobourg, Ont.—It is reported that the construction of an electric railway from Central Ontario Junction in Rawdon township, through Campbellford and Seymour, Percy, Haldimand and Hamilton townships to Cobourg is under consideration. J. A. Humphries, Campbellford, is interested.

Toronto, Ont.—The Ontario Hydro-Electric Commission of Canada has been asked by boards of trade in towns along the north shore of Lake Erie between Bridgeburg and Port Colbourne, Ont., to start immediate construction of the hydro-radial line between these two points, a distance of about 30 miles. Before the outbreak of war the towns along the proposed route voted to guarantee the bonds incident to the construction but the war stopped work on the proposed line. The towns now contend that there should be no delay in starting the line because it is considered an urgent necessity and would give work to returning Canadian soldiers.

Toronto & Eastern Radial Railway, Toronto, Ont.—It is reported that the Toronto & Eastern Radial Railway will be completed in the near future. Track has been laid from the eastern limits of Bowmanville to the western limits of Whitby, a distance of 15 miles. From Whitby to Pickering the roadway is ready for track laying. W. E. Oliver, superintendent of electric lines. [May 15, '15.]

Toronto (Ont.) Street Railway.—It is reported that the Toronto Street Railway contemplates the reconstruction of 6.324 miles of track.

Reading Transit & Light Company, Reading Pa.—The City Council of Reading, Pa., has passed an ordinance amending existing legislation to the extent of permitting the Reading Transit & Light Company to use T-rail where tracks are being renewed on streets that are being re-paved by the city. Substitution of T-rail in place of girder rail heretofore specified will enable the transit company to do a larger amount of new track work with the money that is available for the purpose this year.

Levis (Que.) County Railway.—A report from the Levis County Railway states that it is rebuilding the remaining portion of 12 miles of single track not completed last year.

Montreal, Que.—The harbor commissioners of Montreal have decided to proceed with the electrification of the harbor railway tracks, held up by the war, and plans are now being prepared. This year the electrification will be pushed as far as possible; in fact it is expected that that part of the system between Victoria pier and Montreal east will be in operation by September.

Dallas, Tex.—Surveys have been begun by the Fred A. Jones Construction Company of Dallas for the proposed interurban line from Dallas to Wichita Falls, 125 miles. Several tentative routes will be surveyed and estimates of cost made for each. Wiley Blair, Dallas, is chairman of the committee of citizens that is promoting this line. The estimated cost of the line is about $6,000,000. [Mar. 22, '19.]

Dallas (Tex.) Railway.—The Dallas Railway, in requisitions filed and approved by Lynn B. Milam, supervisor of public utilities, has asked permission to spend $650,000 for the purpose of improving the company's present lines and building extensions. Supervisor Milan says a total of $525,000 will be spent immediately on the improvements of tracks on Elm Street, McKinney Avenue, and Main Street and for passing curves and the installation of new equipment. The improvements will also include tracks on Preston Street. The extension of car lines, which includes the Seventh Street line in Oak Cliff, the line to Oak Lawn and to the City Hospital and one to Oakland Cemetery, will be held up pending the laying of storm sewers and the opening of necessary streets by the city. An extension to Mount Auburn district, though not officially announced, is contemplated and will be ordered built by the supervisor if the extensions as proposed are delayed.

Dallas (Tex.) Southwestern Traction Company—A. P. Turner, president of the Dallas Southwestern Traction Company, which proposes to build and operate an interurban line from Dallas to Irving, a distance of about fifteen miles, and thence southwestward through Grand Prairie, Mansfield, Cleburne to Glen Rose, announces that construction work is expected to begin at once on the Dallas-Irving line. About one-half of the grading has been done and ties and rails have been purchased for a large part of the line. [May 4, '18.]

El Paso (Tex.) Traction Company.—An extension will be built by the El Paso Traction Company to serve the El Paso High School.

Wichita Falls, Tex.—The Chamber of Commerce of Wichita Falls has under consideration the proposition of the construction of an interurban railway between Wichita Falls and Burkburnett. The matter was presented to the board of directors by W. L. Sonntag, a railroad contractor of Evansville, Ind. The line would obtain its power from the Texas Light & Power Company.

Seattle (Wash.) Municipal Railway.—Extensions, additions and betterments of the Seattle Municipal Railway system were authorized by the City Council recently by the passage of an ordinance enumerating in detail the improvements contemplated and authorizing an issue of utility bonds to the amount of $790,000 to finance the construction program specified.

Ohio Valley Electric Railway, Huntington, W. Va.—It is reported that the Ohio Valley Electric Railway contemplates the construction of a line on Eleventh Avenue from Eighth Street to West Fifth Street.

Power Houses, Shops and Buildings

Iowa Southern Utilities Company, Centerville, Iowa.—The Iowa Southern Utilties Company will reconstruct its power house at Centerville.

Rockford & Interurban Railway, Rockford, Ill.—The Rockford & Interurban Railway contemplates the erection of a new power plant at Belvidere.

Bangor Railway & Electric Company, Bangor, Me.—Improvemnts are contemplated by the Bangor Railway & Electric Company at both the Ellsworth and Veazie power stations; also the reconstruction and reinsulation of the feed wires between the two stations. At the Ellsworth station a 25,000-kw. generating unit will be installed and at the Veazie station three high-efficiency waterwheels will replace the old wheels now in use.

New England Power Company, Worcester, Mass.—The New England Power Company, which furnishes energy to the Berkshire Street Railway, plans extensions and improvements to its power plant and distributing systems, involving an expenditure of about $1,000,000 this year. The proposed work will include enlarging the power station at Vernon, Vt., and the installation of water wheels and generators, increasing the generating capacity by 15,000 hp., the erection of additional substations, and also connecting the present system, which covers central and western Massachusetts and a large portion of Connecticut and Rhode Island, with the Metropolitan Board of Boston by erecting a feed line into and from the stations of the Edison Electric Illuminating Company of Boston.

Public Service Corporation, Newark, N. J.—Work will soon be begun by the Public Service Corporation on the erection of an electric transmission line to extend from Bordentown to the Municipal Water Works.

New York Municipal Railway Corporation, Brooklyn, N. Y.—Plans have been prepared by the New York Municipal Railway Corporation for the erection of two new one-story structures at 420-22 Broadway.

Ohio Electric Railway, Lima, Ohio.—The Ohio Electric Railway contemplates improvements to its local plant, involving an expenditure of about $200.000. The company also plans to build within the next five years, either at Indian Lake or Scotts Crossing, a power plant to cost about $2,000,000.

Lawton Railway & Lighting Company, Lawton, Okla.—After July 1, the Lawton Railway & Lighting Company will abandon its power plant and secure all its power from the Comanche Light & Power Company. The Comanche company will install additional equipment to take care of the increased business, including a synchronous motor generator with 250 kw. capacity.

Altoona & Logan Valley Electric Railway, Altoona, Pa.—The construction of an addition to its power plant at Tyrone, to cost about $500,000, is being considered by the Altoona & Logan Valley Electric Railway.

Waynesboro (Pa.) Electric Company.—Preliminary work has been begun by the Waynesboro Electric Company, which is controlled by the Chambersburg, Greencastle & Waynesboro Street Railway, for the construction of a new high-tension power system from the present terminus at Blue Ridge Summit to Greenstone, about 2 miles.

Sneedville, Tenn.—John N. Adams, Chemical Engineer, Charleston, Tenn., will construct a hydro-electric plant on the Clinch River at the Auger in Hancock County, to furnish energy for the operation of an electric railway. The transmission system will extend from Morristown to Moorsburg, Treadway, Sneedville and Kyle Ford. The plant will develop 4,000 hp.

Texas Electric Company, Dallas, Tex.—Construction will be begun immediately on a six-story addition to the east end of the Dallas Interurban Building, to make the entire structure of an even height of eight stories. The addition will cost approximately $150,000. Plans have been prepared and are now ready for contractors' estimates.

Trade Notes

Ford Mica Company, Inc., is now at 14 Christopher Street, New York City.

Inquiry 29,478.—A Brazilian engineer, who will be in the United States shortly, desires to purchase materials for the construction of an electric railway, and for electric railroad supplies. Consult Bureau of Foreign and Domestic Commerce, Washington, D. C., using number.

Electric Locomotive Exports.—Exports of electric locomotives for March 1918, were $17,000 while for March 1919, they more than doubled, to $35,687. For the nine months through March 1918, these exports amounted to $122,679, and these nearly doubled to $223,452 for the same length of time through March, 1919.

Bailey Meter Company, Cleveland, Ohio, announces the removal of main office and works to East Forty-sixth Street at Euclid Avenue, Cleveland, Ohio. The Boston office will be maintained to render engineering and sales service in New England and Atlantic Coast States under the management of H. D. Fisher.

Walter Treat Walker has been appointed manager of the Buffalo office of the Western Electric Company. During the war he served as first lieutenant in the Signal Corps, U. S. A., and on his discharge from the service he was appointed manager of the Newark office, in February, 1919. Gregory Brown has been appointed manager of the Newark house to succeed Mr. Walker.

Charles H. Dennis, formerly operating head of the Railway Audit & Inspection Company, has been elected general manager of the Railway & Industrial Protective Association, Inc., of Maryland. Mr. Dennis will maintain operating offices in Philadelphia. V. L. Edmunds, formerly general manager of the Railway & Industrial Protective Association, has been elected vice-president in charge of operating.

J. W. McCabe, who until recently has been district manager of sales for the Chicago Pneumatic Tool Company, at Buffalo, N. Y., has been appointed special representative for the company's foreign trade department, and will depart shortly for an extended trip throughout the Orient, the Philippine Islands and Australia. W. H. White has been appointed acting district manager of sales at Buffalo to take charge of that territory during Mr. McCabe's absence.

John E. Muhlfeld has associated with him several other engineers and has formed the Railway and Industrial Engineers, Inc., with offices at 25 Broad Street, New York City, to act as consulting and advisory engineers among the bankers, railroad and industrial corporations. For the last three and one-half years he has been president of the Pulverized Fuel Equipment Corporation, but he has resigned as president of this corporation to devote his entire time to engineering work. Mr. Muhlfeld retains his interests in and remains a director of the Pulverized Fuel Equipment Corporation.

Charles Gilman, at a recent meeting of the board of directors was elected to a vice-presidency of the Massey Concrete Products Corporation, to have headquarters in New York. Mr. Gilman will be in charge of sales in the Eastern territory of the corporation, comprising New York, Pitsburgh, Southern and Canadian Districts. Part of his early concrete work was on the New York subways in 1904 and 1905. In 1911 he became identified with the concrete products business as assistant to Mr. Quincy, then the vice-president of the American Concrete Pile & Pipe Company. When this organization was taken over by the C. F. Massey Company in 1912 he became Eastern engineer and in 1913 he became Eastern manager.

E. A. Hitchcock has recently become connected with the Bailey Meter Company of Cleveland, Ohio, as vice-president. He will supervise the training of technical graduates for the company's service and sales departments. During the past six years he has been connected with the E W. Clark & Company Management Corporation as advisory, consulting and power sales engineer. Previous to that time he was Professor of Experimental Engineering at Ohio State University.

William Arthur, of the Arthur Power-Saving Recorder Company, New Haven, Conn., addressed the Springfield (Mass.) Rotary Club on May 29 upon the economical use of energy in electric railway operation. The Springfield Street Railway is equipping its cars with the Arthur recorder, and in the course of his remarks Mr. Arthur stated that during the past year the use of this equipment saved 34.01 per cent of the power required at Meriden, Conn., 25.09 per cent at Hartford, Conn., 22.4 per cent at Bridgeport, Conn., and 18.56 per cent at New Haven, despite a traffic increase of 9.17 per cent in the last-named city. Mr. Arthur pointed out that careless operation may cause a needless loss of 100 tons of coal per motorman per year and maintained that by utilizing coasting possibilities to the utmost, a saving of 25 to 30 per cent in power requirements per year can be made without falling behind the schedule of car operation.

New Advertising Literature

Jeffrey Manufacturing Company, Columbus, Ohio: A eleven-page catalog, No. 244, describing standard bucket elevators.

C. H. Wheeler Manufacturing Company, Philadelphia, Pa.: An illustrated booklet of 191 pages to describe its condensers and auxiliaries.

Union Switch & Signal Company, Swissvale, Pa.: Bulletin No. 92, in which Vane Type Alternating Current Relays are described.

Hickey & Schneider, Inc., 441 East Jersey Street, Elizabeth, N. J.: Bulletin No. 13, of forty-eight pages, which covers H. & S. outdoor-type bus supports.

Carbolineum Wood Preserving Company, 518 Prairie Street, Milwaukee, Wis.: Circulars No. 29 and 39, telling about the "Arrow" carbolineum wood preservative.

Hilo Varnish Corporation, Marcy and Flushing Avenue, Brooklyn, N. Y.: Third revised edition of bulletin No. 1 on "Hilo" black enamels and varnishes for air drying and baking.

Sprague Electric Works of the General Electric Company, 527 West Thirty-fourth Street, New York City: Bulletin No. 48713 on the Sprague adjustable-loop system of overhead material handling machinery for terminal sheds.

H. B. Ives Company, New Haven, Conn. A pamphlet descriptive of trolley wheels and bushings. The bushings are self-lubricating, being filled at the factory with a heavy lubricating compound under pressure, so that they can be used throughout their life without lubricating oil.

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Volume 53 New York, Saturday, June 21, 1919 *Number* 25

The Last Call for Dinner

IT WAS a momentous investigation that began in New York on Thursday morning when the new Federal Electric Railways Commission held its first hearing. Practically every other course to secure justice for the electric railway companies of the country was tried before the President appointed this special commission. But although the essential nature of the properties to community development has been generally recognized and the injustice of compelling the companies to give this service at less than cost because of war conditions has been universally admitted, relief measures have been refused in many cities. Where the railway companies appealed for bread in the form of higher fares and reduced taxation, they have received a stone, and in consequence some fifty street railways are in the hands of receivers.

Now the last call for dinner has sounded. The federal authorities, with their wider view of the situation, have appointed a commission to investigate the entire subject, and this commission is now sitting. The fact that the President of the United States has thus acted ought to call forth the best efforts of every man in the electric railway industry. The constructive factors of the United States, particularly with relation to the electric railway industry of the country, ought to come forth in support of the President. The men in the industry ought to suggest remedies for all the things that they think are wrong. They know better than anyone else what is happening to the electric railways, and it is their duty now to help in recommending a solution. The burden of representing the electric railway interests in this investigation will naturally fall largely on the American Electric Railway Association and its committee of one hundred, and they should receive hearty support.

There have been so many important questions relating to the technical and engineering phases of the electric railway industry during the past thirty years that fundamental questions in connection with the earning power of these properties have been largely ignored. The consequence is that many railways which have been completely reconstructed several times during the past decades are operating under charters granted during horse-car days. The existing hearings should result in a condition which will be fair and liberal both to the investor and labor, and now is the time to get these fundamental conditions changed. By this we mean that in the future it ought to be impossible for a well managed public utility in a growing and prosperous city to be in a position where it cannot recompense both its investors and its employees adequately. Both men and owners should be paid on a parity with the conditions in other industries, with due regard, in the first case, to the skill exercised, and in the second case, to the hazards run.

The Constant-Speed Motor in Heavy Electric Traction

THE commutatorless induction motor has been considered, since its inception, a desirable source of motive power for heavy electrification, but the necessity for using two contact conductors opposed an effective barrier to its progress until within a few years. To be sure this type of motor was used abroad on the Valtellina line of the Italian State Railways, in the Simplon tunnel and elsewhere, but for years the Cascade tunnel electrification of the Great Northern Railway in Washington was the only example of a polyphase-motor-equipped road in this country. Some operating data and a brief review of the equipping of this tunnel zone by the Great Northern's electrical engineer are given elsewhere in this issue. Attention is directed especially to the striking evidence of the power of the motors furnished by an instance in which the drivers of one of the locomotives cut deep into the rails. Mr. Marshall's article is of particular interest because little has been heard of this electrification since all four of the locomotives comprising it were overturned by an avalanche of snow in 1910.

About four years ago the Norfolk & Western Railway began operation of its electric zone in the West Virginia mountains with a novel modification of the type of locomotive used in Washington, but in which only one overhead conductor was employed. Power received in single-phase form at the locomotive is transformed in an induction-type phase converter to three-phase form for use in the driving motors. The result has been a combination of the virtues of the single- phase and polyphase systems. The next step, now in process of being taken, was characterized by the Pennsylvania Railroad's exhibit at the Atlantic City convention of the past few days. This road has inaugurated a study of the qualities of the phase-converter locomotive for use on its Altoona division. As the Pennsylvania is a heavy stockholder in the N. & W. this step is logical and commendatory of the results secured further south. The division for which this type of locomotive is proposed is one containing heavy grades through the Allegheny Mountains. The general features of the experimental locomotive exhibited are similar to those of the N. & W. machine, but a synchronous rather than an induction type of converter is used with a view to improving the power factor.

Some of the advantages of the constant-speed locomotive were given in last week's issue in an article by A. H. Babcock, consulting engineer Southern Pacific Railroad. Those inherent qualities which appeal to us most forcefully are the simplicity and ruggedness of the polyphase motor, its adaptability to power regeneration and the ease with which a high power factor at the motor can be secured.

Some Non-Spectacular But Useful Electric Zones on Steam Roads

THE reference in the preceding editorial to the Great Northern electrification suggests a word of appreciation for several short sections of large railroad systems on which electric operation has been doing its special work on a small scale for years. So smoothly and unostentatiously do these function that they are largely forgotten. For example, take the pioneer Baltimore & Ohio tunnel zone in Baltimore, Md., now rounding out its quarter century. This blazed the way for the application of direct current in many other quarters. Then there is that largely-forgotten single-phase spur of the Erie at Rochester, N. Y., where plans were tried out that later were expanded on the New Haven and other roads, most lately on the Chestnut Hill branch of the Pennsylvania at Philadelphia. Of the same type and also quite early were the Sarnia tunnel section of the Grand Trunk and the Hoosac tunnel section of the Boston & Maine. And the direct current zone of the Michigan Central under the Detroit River must not be overlooked, either.

The above are but a few of the instances where electric operation has so long been a matter of course that attention is no longer paid to it. These installations, however, have furnished and are furnishing the data which will become invaluable as the merits of electric operation are better and better appreciatd. We by no means claim that the problems in this field are all solved or that the positions of the men in charge of the operation of present electrified zones and divisions are sinecures. We aver, however, that the electric locomotive is no longer an experiment, and that its present rate of metamorphosis is no more rapid than a live art warrants.

The One-Man Car Is Its Own Skip Stop

DURING our period of big-car development we have strayed a long way from the true purpose of a street railway, to wit, to keep the people from walking. In the day of the bobtail horse car that purpose was in at least one sense carried out better than now because it was possible to stop the car just where the customers wanted it without any annoyance to fellow-passengers. As cars became bigger, the passenger was asked to walk to a corner in boarding a car and from a corner in leaving it. More recently, it has been found that the stops must be still further apart if economical operation, good speed and pleasant riding for all passengers are to be efficiently attained. Thus we reached the point where a man who rode say one mile might have to walk a goodly fraction thereof along the route because he was not taken on and let off at exactly the places most convenient for himself. Now to start a person's pedals going is dangerous business for the street railway, and it is still more dangerous if no car is in sight when he reaches a stop sign. Unless he is going a distance unprofitably long for the railway, he is likely to keep moving and spend his money for something else.

Here is just the point where the modern one-man car combines the personal service feature of the bobtail vehicle and the higher running speed of its electrical successor. The one-man car does not have to stop precisely at one's doorstep, but it can come closer than the big car toward this ideal because inherently it has a smaller number of stops per mile. For instance, to keep the number of stops of a fifty-passenger car down to six, we must permit it to stop only at six specified stopping places within a mile. But this arbitrary arrangement is not necessary with a thirty-five-passenger one-man car, for, other conditions being equal, it will not have to stop more than six times per mile in any event to make stops at the crossing most satisfactory to each passenger. Thus, as we said as early as June 22, 1918, the smaller car actually embodies the skip-stop principle so far as the features of passenger convenience and free running speed are concerned.

We do not ignore the fact that the total number of stops for all cars will be greater in the case of one-man car operation. However, the cost of the extra stops with 15,000-lb. cars is a less fearsome proposition than with 30,000 to 40,000-lb. cars. It seems odd that cars should have grown so heavy that it was almost cheaper to skip a single passenger than to stop for him! The return to the small, one-man car with its optional-stop, frequent-service possibilities is a return to a saner viewpoint of the true function of a street railway. Hence, the "Don't let em' walk" principle of the one-man car is not a negation of the general skip-stop idea.

The Daylight-Saving Law in Danger

THERE is a determined effort on the part of a considerable number of our countrymen to have Congress "call off" the summer practice of turning the clock hands forward *pro tempore* each spring. This effort is to be regretted as it is apparently due to a desire to put individual preference above the common good. The electric railway industry can look at this matter in an unprejudiced way, being affected very little as far as the transportation end of the business is concerned. Those who do lighting as a side line undoubtedly lose some patronage, but the extra daylight hour at the end of the day probably brings in some additional transportation revenue from those who use the cars then to get out into the country or to the parks for recreation. But, to speak broadly, it is in the general interest of conservation to utilize to the full the hours of daylight, as Benjamin Franklin sagely observed when he was ambassador at the French court. If our readers agree with this they will take no offense at the suggestion that they utilize their company publications and other publicity mediums in supporting the daylight-saving movement, explaining clearly at the same time, to quote Franklin again, that they have "no axe to grind."

Comments on the Detroit Wage Settlement

AGAIN a contract has been discarded and an award of the War Labor Board set at naught. Developments in Detroit during the past week have shown that an agreement on the part of union labor, to abide by such an award is sacred only while it is in favor of the employee. Had the management of the company rejected the decree because it was unsatisfactory or too burdensome—as such a decree usually is—there would have been no end to criticism on the part of the public. The many companies which were affected by these awards accepted the additional expense although it meant another step toward bankruptcy, knowing that even the proclamation of peace is not likely to lead to a reduction in this item of expense.

The setting up of a 60-cent maximum wage in Detroit holds a threatening aspect for properties in other large cities. This rate may have been justified by the high cost of living in that city and the company probably had to pay it because of the scarcity of labor and the appeals for help from competitive industries. However, inasmuch as the War Labor Board saw fit to put other cities in the same class with Detroit in fixing a wage standard this conclusion is not likely to be overlooked by organized labor when wages are up for readjustment elsewhere. In our issue of Jan. 18 we pointed out the injustice which was likely to result from this attempt to fix a standard wage, and we believe that recent developments have helped to accentuate our criticism.

Cost of living may be unusually high in one city and lower in another community. The railway company in the former place may be exceptionally prosperous (if such an expression can be used even in a comparative sense) while in the other city it may be facing a receivership. On the War Labor Board's theory the same wage scale would be fair for both companies. We cannot see any justification for this, and we contend that each company should have an opportunity to prove the cost of living and the situation as to labor supply in its own community.

It was probably more than a coincidence that the platform employees of the Cleveland company should have presented their demands for a 60-cent maximum wage on the same day that the Detroit settlement was made. These men, like those in Detroit, were bound by the federal board's ruling until the end of the war, but they insisted that the wages established last August were no longer adequate. The company has replied that it cannot grant the increase unless the franchise is amended to remove the fare limit which was recently fixed. Here again we find a situation which might set an unfair precedent for other cities of the 48-cent wage class, because the Cleveland company may be able to get a higher rate of fare while others on whom similar demands are made may be less successful.

One fortunate development may come from these wage disputes. In Detroit the people were impressed as never before with the company's need for additional revenue and a slight increase in fares was granted, although it had been refused several times before. The public seem to need such crises to impress them with the merits of the utilities' petitions for relief. Perhaps they will see a justification also in the request of the Cleveland company both for a higher fare and an increased dividend for stockholders. President Stanley argues that the purchasing power of a dollar has depreciated to such an extent that a 6 per cent return is no longer adequate and that the widows and orphans who depend on such dividends for a living are entitled to the same consideration as the men who operate the cars. The day may be at hand when the investor as well as the employee is to get a living wage. In that case, there may be a silver lining to these clouds.

House Paint or Attractive Finish for Cars?

MOST of us recall the gaudy coloring and elaborate gold leafing and striping of the old-time horse car. As the railway lines were consolidated and electrified, simplicity and uniformity became the rule almost to the point of obliterating the car number and the company's monogram or symbol. In more recent times, the statement has been made that a car is simply a house on wheels and deserves no more attractive finish.

We do not intend to advocate the restoration of the filigree school of car painting nor the long-drawn-out painting schedules that were characteristic of the time. What we do question is whether it is wise to attempt to save a few dollars on paint, varnish or enamel, if thereby a company loses the ride-pulling value of attractive rolling stock.

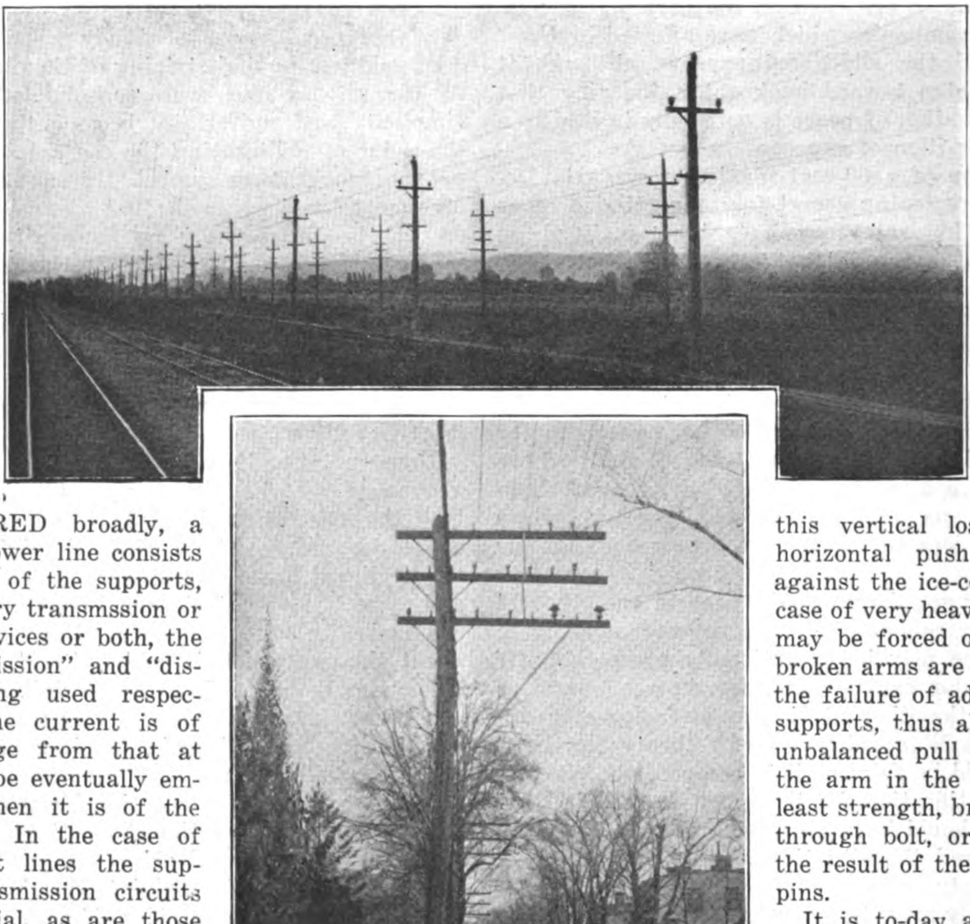
House paint or its equivalent may be good enough for a subway car which always runs underground, but it isn't the most attractive finish for a public conveyance which does most of its work in the light of day. Even the negligent house owner will paint his dwelling spick and span if he wants to sell it and thinks thereby he can make it look much more attractive. What, then, about the car which is selling itself always? Should a company be bound down to use dull, drabby colors because they happen to wear better or should it adopt a combination that will make "a hit, a most palpable hit" with the riding prospects? Orange and blue, for example, may not be the most durable colors, but wasn't it shrewd business for the Charlottesville & Albemarle Electric Railway to adopt as its own car colors those of the University of Virginia? We shall not attempt to figure how many more rides, if any, were due to this color scheme, but we know that it met with acclaim from the townspeople, the faculty and the university. Good-will is a precious asset to be acquired in divers ways.

It was the bold and irrepressible Peter Witt who suggested one day: "Why not paint electric cars cream white?" This may be unprecedented in America but it isn't in Europe. If memory serves aright, cream is the shade (or rather the *light*) used by the Cologne-Bonn interurban railway and a number of city railways on the Continent. Whether advertising value was in the minds of their operators we know not, but that the cars looked more inviting than shades too akin to dust goes without saying. White cars like white gloves simply must be kept up to the mark. We should expect the modern enamels of any shade to withstand better the frequent but inexpensive use of mop, cloth and squeegee than the old-fashioned paints and varnishes. It is not up to the master painter to recommend such drastic changes as these, for his must be the path of economy for its own sake. The policy of selecting car colors on the basis of their advertising value is one that belongs wholly to the "Selling Rides Department"—when we get that department!

Insuring Durability of the Pole-Top Fittings

The Author Takes Up Details of Attaching Crossarms to the Pole, Bracing Them in Place and Providing Insurance Against Breakdown Under Every-day and Emergency Strains

BY CHARLES R. HARTE
Construction Engineer The Connecticut Company, New Haven, Conn.



TOP VIEW, TRANSMISSION LINE WITH SINGLE BRACE. BOTTOM VIEW, OUTRIGGED ARMS

CONSIDERED broadly, a pole or tower line consists primarily of the supports, which may carry transmssion or distribution devices or both, the terms "transmission" and "distribution" being used respectively when the current is of different voltage from that at which it is to be eventually employed, and when it is of the same voltage. In the case of very important lines the supports for transmission circuits are quite special, as are those for very important distribution circuits and contact systems, but in very many cases—probably in the large majority—the same type of support is used for both, and this applies not only to the pole, but to the crossarm which carries the conductors.

As with so much of the overhead, the old telegraph practice has been continued with little modification of material or methods, the changes being those necessitated by the heavier loads, and to-day our crossarms are "gained" in the pole, held to it by a through bolt, and kept from tipping by braces attached to arm and pole, practically as in the case of signal and communication lines.

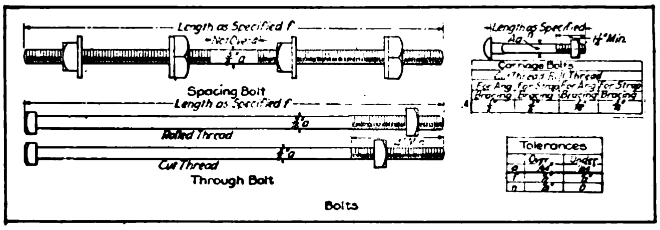
WHY CROSSARMS SOMETIMES FAIL

In regular service a crossarm is a beam supported at its middle and carrying the vertical load of the weight of the wire supported (one-half of each of the ajacent spans) plus the maximum ice load on that wire. In case of wind, the stress is the resultant of this vertical load and of the horizontal push of the wind against the ice-covered wire. In case of very heavy sleet the arms may be forced off the pole, but broken arms are generally due to the failure of adjacent spans or supports, thus allowing a heavy unbalanced pull to come against the arm in the direction of its least strength, breaking it at the through bolt, or splitting it as the result of the leverage of the pins.

It is to-day almost universal practice to hold the arm by a through bolt through its middle, and through the pole. In cedar, the bolt hole is often bored of the same diameter as the bolt if the latter has cut threads, or of the diameter of the threads if these are rolled. Cut threads are cut out of the bolt, and unless the latter has upset ends, which is very unusual for overhead work, the effective diameter of the bolt is less than the actual shank diameter; rolled threads, on the contrary, are rolled up from the shank, so that the effective diameter and the actual shank diameter are the same, but as the diameter over the threads is greater, holes for rolled bolts have to be a little larger than for the bolt of the same size with cut threads.

In chestnut the hole is usually bored a trifle larger, and it is invariably larger in the crossarm itself. While there is little likelihood that the arm will actually be split, a tight fit generally results in breaking out bad splinters on the face, for the bolt should be driven through the pole first. Perhaps it would be better to say that it is generally so driven, for some overhead men claim that if good material is used the bolt will also require replacement by the time an arm has to be replaced.

Then the "advantage" of not having to pull the bolt through the pole to remove the arm quite disappears.


Length as Specified f
Not Over
¾"a
Spacing Bolt
Length as Specified f
¾"a
Rolled Thread
¾"a
Cut Thread
Through Bolt
Length as Specified
¼" Min.
Carriage Bolts
Cut Thread Full Thread
For Ang. Bracing
For Strap Bracing
For Ang. Bracing
For Strap Bracing
Tolerances
Over
Under
a
f
n
Bolts

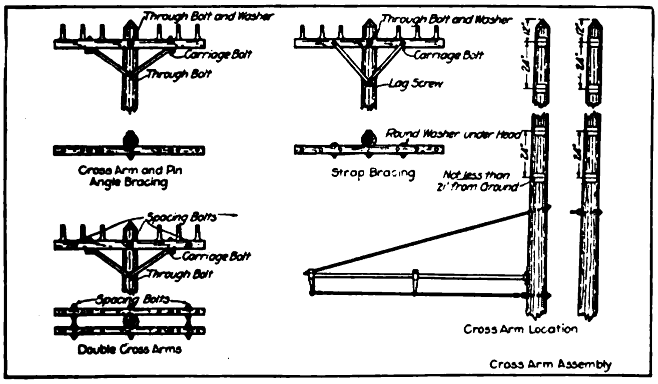
BOLTS FOR OVERHEAD LINES*

*This and the following line drawings are reproduced from the Engineering Manual of the American Electric Railway Engineering Association.

The arm is given a good bearing on the pole by a "gain," formed by making at right angles to the pole two parallel saw cuts each ¾ in. deep at the center, and a distance apart just equal to the depth of the crossarm. The wood between these cuts should be taken out with a broad chisel, and the resulting surface hollowed very slightly, so that when the arm is bolted on, it first bears at the edges of the gain, thus preventing rocking. If this is properly done, and the width of the gain is such as to give a tight fit, there need be little fear of any trouble under reasonable loading, but it is suprising how few linemen can really make a good gain.

This has led to the development of several types of patent gain. One of the simplest is a piece of sheet steel, curved to fit the pole, with lugs to hold the arm in place, a central hole permitting the through bolt to pass. Where the pole diameter at the arm is known and constant, and where the gain can be bent to this curvature this device is said to be very satisfactory, but the irregularity of the general run of natural poles makes necessary at least as much work as would insure good fitting wood gains, while a poor fit on the pole makes the patent gain as poor as a bad fit in wood.

For any but the heaviest of arms a ⅝-in. through bolt is sufficient, although a ¾-in. bolt is frequently and a ⅞-in. bolt occasionally used. The threads may be cut or rolled. The latter is better because the full section of the bolt is available, as the threads are raised on it, and the threads are more even and stronger than cut threads because the rolling gives a tough, smooth surface.


Through Bolt and Washer
Carriage Bolt
Through Bolt
Through Bolt and Washer
Carriage Bolt
Lag Screw
12"
24"
12"
24"
Cross Arm and Pin Angle Bracing
Round Washer under Head
Strap Bracing
24"
24"
Not less than 21' from Ground
Spacing Bolts
Carriage Bolt
Through Bolt
Spacing Bolts
Double Cross Arms
Cross Arm Location
Cross Arm Assembly

CROSS-ARM LOCATION AND ASSEMBLY

In either case the threads should be 4 in. in length to allow for variations in the pole diameter at the arm. For any given line the probable diameter can be estimated as soon as the pole-top design is determined, and the allowance of a small percentage of bolts longer and shorter by 2-in. steps will take care of unusually large or small poles.

It is almost universal practice to use square washers 2¼ x 2¼ x $\frac{3}{16}$ in. for either ¾-in. or ⅝-in. bolts. This gives a net bearing surface of a trifle more than 4½ sq. in. The standard round washer for ¾-in. bolts has a bearing area a trifle more than 2½ sq.in. The difference in cost is not such as to warrant taking chances that the round washer is sufficient, although there seems to be little real evidence one way or the other.

PREVENTING ROTATION OF THE CROSSARM

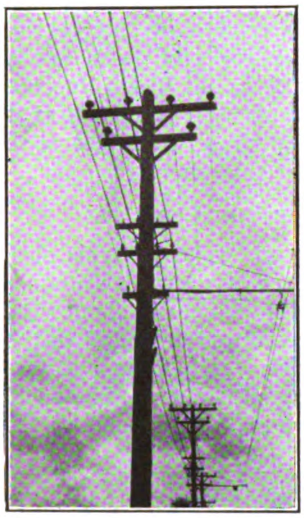
For the lighter arms and for many heavy arms also, the strap brace is the chief source of resistance against any tendency of the crossarm to turn about the through bolt. The brace is lag-screwed or bolted to the pole, and carriage-bolted to the arm at such points as to make an angle of approximately 45 deg. The usual practice, of course, is to use two braces, fastened to the pole by a single bolt or lag, and held to the crossarm by carriage bolts, the braces being below the arm. For moderate voltage transmission with two crossarms and for use with suspension insulators, however, the braces for the top arm are sometimes fastened to the pole above the arm, to give better clearance for the lower "phases." This location also tends to discourage "sneak" currents from following the metal and burning the pole and arm at the points of contact. It should be said, however, that the development of the modern insulator has reduced these burnings to a minimum, and a more general recognition of the fact that jumping the potential of a line built for 2300 volts to 6600 or 11,000 without changing insulators, is at least likely to cause annoyance. On the other hand, it is not so long since burning of the pole and arm at the points of contact was a very real danger, and there are still in operation lines with but a single brace and lines with wooden braces, designed to prevent such troubles. Indeed, on a line from Logan to Ogden and Salt Lake City, Utah, and possibly elsewhere, the crossarm was mortised through the pole and held in place by a wooden tree nail, cutting out not only braces but all metal as

ARMS PULLED OFF POLE BY SLEET LOAD

SUSPENSION ARMS WITH BRACES ON TOP

well, the insulator pins and their fastening being also of wood.

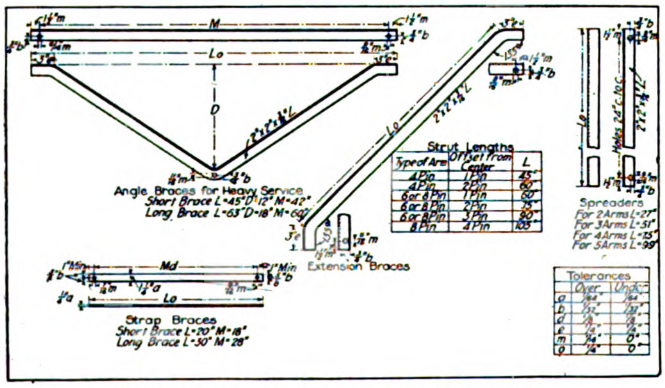
The standard strap brace is ¼ in. thick, 1¼ in. wide and 30 in. long. It has a hole of $\frac{9}{16}$ in. diameter with its center 1 in. from one end, for the pole bolt or lag, and a similar hole of $\frac{7}{16}$-in. diameter with its center 1 in. from the other end for the arm bolt. The material should withstand bending at the larger hole around a pin of diameter equal to twice the thickness of the brace until the ends are parallel, without fracture on the outside of the bend. For two-pin arms a brace 20 in. long is usually used, while for long arms, braces 32 in. long or even longer are sometimes employed. For heavy service, however, the present tendency is to use a single piece of angle iron of a broad V-form with the horizontal leg uppermost. The two ends are bent down so that when in place they are horizontal and the arm rests upon them, where it is held by carriage bolts which pass vertically through the arm. While various sizes of angle are used for braces, the usual section is 2 in. x 2 in. by $\frac{3}{16}$ in. The standard sizes of braces are 63 in. and 45 in., measured along the crossarm, with "drops" at the bend of the V of 18 in. and 12 in. respectively. The pole bolt hole is $\frac{11}{16}$ in. in diameter and the two carriage bolt holes are $\frac{9}{16}$ in. in diameter.



33,000-VOLT TRANSMISSION LINE WITH WOODEN BRACES FOR ARMS

Note poor fit of top of right brace against pole.

As in the case of the crossarm bolt, the hole for the pole bolt for either type of brace is bored from the face or arm side of the pole to the back, but the bolt itself is driven from back to face, with a round washer under the head. To insure proper line-up in assembling, the braces are first bolted to the arm; the latter is next bolted to the pole and properly squared with it; the braces are then put in position and the exact position for the pole bolt marked. At the brace end of the bolt no washer is required as the brace itself serves that purpose.



CROSS-ARM BRACES AND SPREADERS

Strap braces are held to the arm by ⅜-in. carriage bolts, driven from the back of the arm outward, a round washer being put under the head, but none under the nut which fits against the brace. Angle braces are held by ½-in. carriage bolts driven down through the arm, with a round washer under the head; the nut, as in the case of the strap brace, requires no washer since it is against the angle.

A word might here be said about wood braces. These were employed somewhat when leaky insulators were more common, but the cost of properly fitting them in place left little to their credit, while the tendency of the wood to split if, as in many instances, they were bolted or nailed in place made them an element of weakness. To-day they are rarely seen.

THE CROSSARM TENDS TO ROTATE HORIZONTALLY ALSO

Still another form of brace, somewhat different from those described, is used to prevent a crossarm from twisting horizontally on the pole. For a comparatively light strain a strip of angle iron of about the same length as the arm, and fastened to it at the ends, is carried behind the pole where it is anchored by the through bolt of the arm. If, however, there is a really heavy twisting pull the best plan is to install an I-bolt in the arm as near the pull as possible, putting a generous square washer under the nut and running an anchoring guy in the line of the pull, or as nearly in that line as possible, to some good anchorage. Most crossarms are installed singly and have equal lengths each side of the pole, but often "double arms" are used at points of extra strain, while cramped quarters sometimes necessitate "alley," "extension," or "outrigged" construction, which may also have to be of double-armed design.

ANGLE-IRON BRACE

The two insulators at top of arm are carried on a short arm giving spacing for 11,000 volts; main arms are bored for 33,000-volt spacing, the future potential of the line.

Double arms are practically what the name implies, two arms at the same elevation but on opposite sides of the pole. Where they are placed at an angle the line of the two should split the angle unless a much heavier pull is to be anticipated from one direction than from the other, in which case the arms should square with this direction.

SOME HINTS ON INSTALLING DOUBLE CROSSARMS

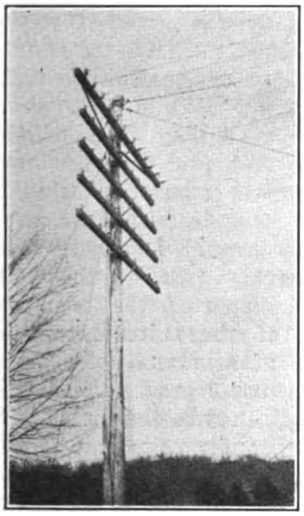
The proper installation of double arms is not quite as simple as it looks, but there are a few "kinks" which help very materially. The two arms are held to the pole by the same bolt, which should be in the center of each "gain," but it is anything but easy to bore accurately through the pole. If the second "gain" is centered on the hole after it has been bored the two arms are quite unlikely to match. By cutting the "gains" properly opposite, however, and boring a little more than half way from each, the holes as a rule can be connected and the bolt driven through even if there is a small bend, and the brace bolt can be similarly installed.

By using a spacing bolt of the proper length instead of a through bolt (of course omitting the two inside nuts) either arm or brace can be removed without disturbing the other.

It is well to have a piece of soft steel, 3 in. or 4 in. long, with a hole about 2 in. deep tapped to fit the spacing bolt, which temporarily can be screwed on one end as a driving head. In the absence of this, two nuts can be used, the first being screwed on a short distance, and then the second one run on so that the end of the bolt lacks about ¼ in. of coming through.

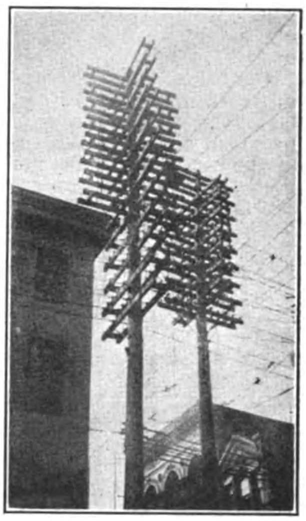
The first nut is then screwed up against the second to lock it. If the bolt goes through reasonably easily a single nut on the end will serve, but the double nut is safer and the special head best of all.

Double arms should be tied into a rigid structure. This can be done by putting spacing blocks near the ends, of a length equal to the distance between arms at the pole, and bolting through both arms and the block. Variations in the poles and "gains," however, make necessary quite a little fitting for good work. A better plan is to use a regular spacing bolt, which is simply a rod of proper length threaded for all but about 4 in. at the center and having two nuts and washers on each end, one for each side of the arm. The bolt goes about one-eighth of the arm length in from the ends. The inner nuts are brought snugly against the arms and the outer nuts are then screwed against them on the outside, washers of course going between each nut and the arm face. Extension arms are usually "every-day" arms fastened to the pole at a point other than the middle. If the difference in length of arms is small they may be braced as usual, but if there is much overhang it is customary to put a regular strap brace on the short end, and a special, long, angle-iron brace which makes an angle of 45 deg. with the arm, on the other. For very long overhang or very heavy unbalanced loading this bracing is double, one on each side of pole and of arm. Where there are two or more arms, a vertical angle-iron "spreader" or "spacer" starts at the bolt which holds the diagonal brace at the arm and runs vertically, fastening to each arm above. This is also doubled for heavy work, and sometimes there are two such sets of spreaders, in which case one set is placed near the ends of the arms and the other a distance from the pole equal to about one-third the length of the long side of the arm.


TELEPHONE LINE WITH DEAD END TOP ARM AND SPECIAL BRACE

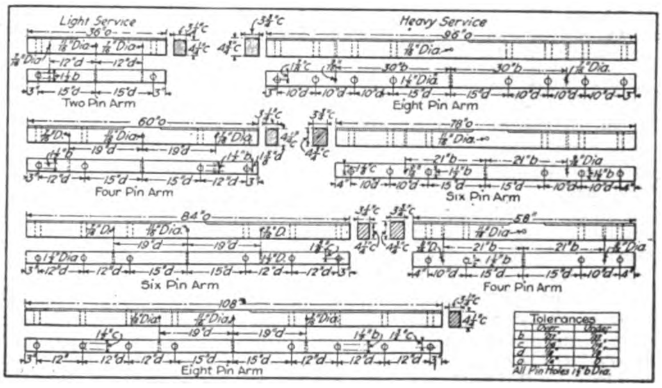
So much for the installation of crossarms, and the hardware in connection therewith. It might be well to mention that the latter has been pretty well standardized by the American Telephone and Telegraph Company, the Western Union Telegraph Company, the National Electric Light Association and the American Electric Railway Association in the order of their action. The fact that the last-named association has also standardized on this material seems to be known to comparatively few.

The arms themselves are less satisfactorily agreed upon. The A. T. & T., W. U. and A. E. R. A. agree upon the 3¼-in. x 4¼-in. section for light service arms, and the 3¾-in. x 4¾-in. for much of the heavy service. In 1917 about 75 per cent of the crossarms used were of these two sizes. The N. E. L. A., however, has 3½-in. x 4½-in. for its standard section, which has to be dressed from a 4-in. x 5-in. stick. The 3¼-in. x 4¼-in. arm can be cut from a 7-in. x 9-in. stick, making four, while the 3¾-in. x 4¾-in. arm is cut from the 4-in. x 5-in. stick, the same stick used for the N. E. L. A. smaller section. For very heavy transmission lines special sections are used, but here time and money can be saved by choosing sections which can be dressed readily from commercial sizes. There will be lost about ¼ in. each way at best, giving 3¾-in. x 5¾-in., 4¾-in. x 5¾-in., 3¾-in. x 7¾-in. and 5¾-in. x 7¾-in., for example, as finished sizes from 4-in. x 6-in., 5-in. x 6-in., 4-in. x 8-in. and 6-in. x 8-in. stock.


DOUBLE BUCK-ARMED POLE

Note spacing block at end of arm.

Pin spacing is more readily varied than is the section, and as a matter of fact there is quite a little variation among the several associations. Both the N. E. L. A. and the A. E. R. A. put the pole pins 15 in. from the middle of the arm, giving 30 in. of climbing space. The N. E. L. A. uses 14½-in. spacing for other pins on the four-pin and six-pin arms, and 12-in. spacing on the eight-pin arm. The A. E. R. A. uses 12-in. spacing for other than pole pins on light service arms, and 10-in. spacing on heavy service arms. The A. T. & T. use 16-in. spacing for pole pins except in joint use, where this distance is doubled to 32 in., and 12-in. spacing elsewhere, while the W. U. uses 16-in. spacing for pole pins and 12⅜ in. elsewhere on the ten-pin arm, 19 in. and 15½ in. on the eight-pin arm, 19 in. and 17¼ in. on the six-pin arm, and 20 in. and 22 in. on the four-pin arm. Each association had good reasons for its choice, but the number is a little unfortunate.



WOOD CROSS-ARM

In the matter of physical properties and finish the "big four" are substantially in agreement although the wording differs somewhat. The A. E. R. A. specification is as follows:

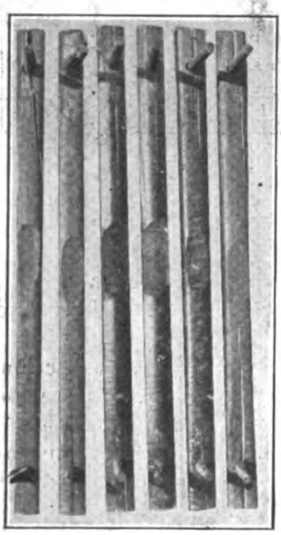
SPECIFICATIONS FOR WOOD CROSSARMS

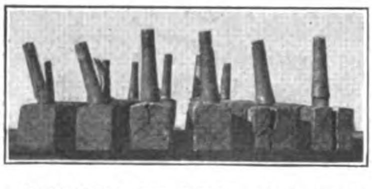
Material Requirements. Crossarms may be of cypress, Douglas fir, Norway pine or yellow pine, but must be thoroughly seasoned, sound, and free from wane or defects which would reduce strength; the grain must be close and not out of parallel with any edge of arm more than 1 in. in 3 ft. of length.

Pitch Pockets. Pitch pockets not exceeding 2 in. in depth, up to 12 in. in length or ¼ in. in width, not entering pin or bolt holes on the top or sides of the arm, will be permitted provided the area does not exceed ½ sq.in. if within 1 ft. of the center bolt hole, nor exceed 1 sq.in. if outside the 1 ft. limit. Pitch seams or streaks which do not open the grain are not considered "pockets."

Shakes and Checks. Ring shakes, end checks, or other checks entering pin or bolt holes will not be permitted; a few fine checks not entering pin or bolt holes, nor exceeding 6 in. in length nor ½ in. in depth, will be allowed.

Knots. No knots will be allowed within 24 in. of the center of any arm, nor entering any pin or bolt hole. Sound knots not exceeding ¾ in. diameter, and not entering any pin or bolt hole will be allowed between limits 24 in. and 36 in. from the center of any arm; outside limit 36 in. from the center of any arm, sound knots not entering a pin or bolt hole may increase in size to not exceed 1 in. diameter at the end of the arm.





FAILURE OF PINS AND RIMS UNDER CONDITIONS OF SERVICE

Sap Wood. Cypress arms must be free from sap wood or pitch heart; Douglas fir, Norway pine, and yellow pine arms may contain, on top or one side only, clear sap wood of maximum cross-section not exceeding 15 per cent of the total cross-section of the arm.

Warp. Crossarms must be out of wind; must not be bent edgeways in any direction, nor sideways in more than one direction; and a straight edge applied to a concave side must not show offset exceeding ⅛ in. per foot of length of the arm.

Finish. Arms must be delivered unpainted with every face planed, square to adjacent faces and bored as specified. Holes must be accurately located, square with face, clean cut, not badly splintered where the bit passed out, and within 1/32 in. of the correct diameter.

Boring. (*a*) All crossarms must have holes 1⅜ in. diameter on the center line of the top, one on either side of and with the center 15 in. from the arm center, others 12 in. apart center to center on light service arms, and 10 in. on heavy service arms. (*b*) All crossarms must have one center hole 11/16 in. diameter in the center of the side. (*c*) All crossarms to be strap braced shall have two holes each 7/16 in. diameter on the center line of the side, one on either side of the center hole; 12 in. distant for two pin arms and 19 in. distant for all others. (*d*) All crossarms to be angle braced shall have two holes, each 9/16 in. diameter on the center line of the bottom, and spaced one either side of the middle, 21 in. distant for four-pin and six-pin arms, and 30 in. distant for eight-pin arms.

Classes and Section. Crossarms are of two classes: Light service arms, 3¼ in. wide by 4¼ in. deep; and heavy service arms, 3⅝ in. wide by 4⅝ in. deep.

Lengths. Crossarms lengths must be as shown in the table at the top of the next column.

Size of Arm	Light Service	Heavy Service
Two-pin	36 in.	
Four-pin	60 in.	58 in.
Six-pin	84 in.	78 in.
Eight-pin	108 in.	96 in.

NOTE: Accompanying illustrations show overhead line material as described in the preceding specifications.

Wood crossarms are often painted, but if this is done before the sap is thoroughly dried out it is much worse than no treatment at all. It not only seems to accelerate decay but it also conceals the decay, usually until a bad failure tells the story. For this reason not a few overhead men install arms with no treatment whatever, but there is an increasing tendency toward the use of creosoted or kyanized arms, although the linemen dislike the occasional tendency of creosote to "sweat out" in hot weather. There is, too, a not entirely unwarranted fear that treatment tends to weaken wood, particularly in the case of treatments employing a fairly high temperature. That in such cases there has been an initial loss of strength and particularly a marked increase in brittleness is beyond question, but recent investigations show that there is at least a partial recovery after a short interval.

There have been various figures given for the strengths of crossarms, but most of them are the results of the United States Department of Agriculture tests (Forestry Service Circular 204). While they show the ultimate strength of arms rigidly held to the pole, and given equal loads at each pin, they are anything but correct for the service capacity of similar arms. The "pole" used in these tests had a piece of gas pipe as a liner for the through bolt hole, thus materially increasing the bearing area of the bolt, and a special heavy bracket supported the arm end of the through bolt. Both of these items gave a resistance to the combination of arm and pole far in excess of that which is had in usual practice. On the other hand, the braces were attached to the arm 14 in. instead of 19 in. from the through bolt, and if the drawing (Fig. 2 of the circular) is correct, they were fastened to the back instead of the face of the arm, both of which facts would reduce the capacity over that of usual practice.

In actual service failure usually occurs by the arm pulling off the pole, by the arm breaking from a side pull or by the arm splitting as the result of the pin leverage. This raises the question whether the present arm design is the most economical, particularly in the shorter lengths. There would seem little reason for providing great strength in a vertical direction if the strength against a side pull does not bear the corresponding relation to the stress likely to come in that direction, or if the arm support cannot safely carry as much as the arm. There is needed a series of service condition tests for, after all, it is the strength of the parts in combination with which we are particularly concerned.

Structural steel has been used to some little extent for crossarms, with various results. Two forms used for transmission lines have proved very satisfactory; the Byllesby "wishbone" type, and the Pierce "bo-arrow" form, each of which is substantially a Y, fabricated from angle iron and turned on its side. A number of angle, channel and built-up straight forms are also used for both distribution and transmission, but in this country there seems to be quite a little difference of opinion as to their desirability. Unquestionably the wood situation makes desirable the development of a good substitute, but the latter is not yet here.

Car Performance from the Engineer's Office to the Track

Degree of Accuracy to Which Performance of Railway Equipment Can Be Predetermined Is Shown by Comparison of Test Results with Calculations Made Before Test Motors Were Designed

BY C. W. SQUIER
Electrical Engineer

IN THE SERIES of articles which I have contributed to the ELECTRIC RAILWAY JOURNAL during the past year on the considerations which govern the choice of railway motors, I have described the methods commonly used for calculating the performance of motors previous to their design and operation. The degree of accuracy with which railway motor performance under actual operating conditions can be predetermined is surprising. In order to illustrate the close agreement which exists between theory and practice I shall in this article give figures for motor performance that were calculated before the motors were designed and compare these with results later actually obtained in service with the equipment.

In requesting the various motor manufacturers to submit bids and recommend motors, definite data were given regarding the service requirements. These included profile and alignment of a certain line that showed average characteristics, and a statement of the service features desired, such as schedule speed, duration of stop, duration of layover, average line voltage, train resistance values and car weight. In submitting their suggestions each of two manufacturers proposed to furnish two series, 600-volt, tapped-field motors of 140-hp. capacity at 600 volts for each car. Each submitted speed-time and power curves for operation over the line for which the profile and alignment were furnished. The schedule speed and energy consumption were calculated from these curves and were as follows:

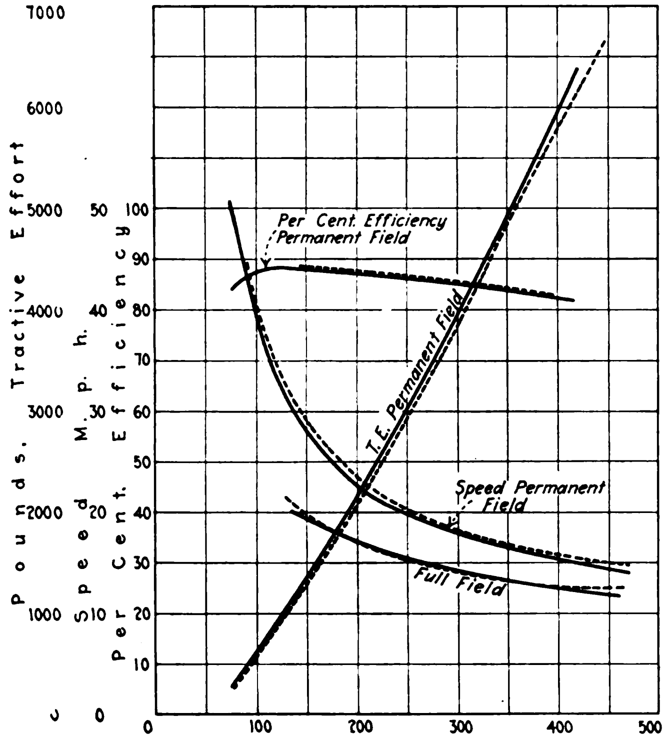
For motor No. 1 the energy consumption was 60.8 watt-hours per ton-mile, with a schedule speed of 14.9 m.p.h. and 38.8 per cent coasting. Motor No. 2 required 78.8 watt-hours per ton-mile with a schedule speed of 15 m.p.h. and 26.7 per cent coasting. By comparison of these figures it will be noted that motor No. 1 showed considerable advantage in the amount of energy required compared with motor No. 2. Motor No. 1 was geared with a ratio of 2.46, while motor No. 2 was geared with one of 2.65. Considerable study was given to this condition and many curves indicating speeds and the power consumed by the cars operating with the different motors were calculated by using the characteristic curves of the respective motors. Motor No. 1 was apparently better adapted for the service under all conditions.

After discussion of the results with the engineers of the several manufacturers, those responsible for the design of motor No. 2 agreed that they would render their motor as efficient and economical for the service as was motor No. 1. This they did by reducing the speed of the armature and by increasing the gear ratio. Many studies were again made by the various engineers with this redesigned motor to make sure that the motor was of proper design and gear ratio and the best for all service requirements as laid down and determined by previous operating data. It must be realized that these motors were being especially designed for the particular service requirements, and to meet these certain definite characteristics were required. In the theoretical calculations the motor which was the most economical in power consumption for the service was the one with a low armature speed and with as high a gear ratio as the service permitted, and the fields of the motors were arranged to be tapped when the motors were connected directly across the line in order to get a sufficient maximum speed to make the high schedules on the various runs as specified. This combination of low armature speed, very high gear ratio and tapped-field combination made rapid acceleration possible with a reasonable starting current and involved the minimum losses in the resistors.

COMPARISON OF THEORETICAL CHARACTERISTICS WITH THOSE ACTUALLY OBTAINED

An accompanying illustration shows the characteristic curves for the motor which was finally adopted. The full lines show the characteristics as calculated from design and the dotted curves are the characteristics which were actually obtained when the motors were tested at the works of the manufacturer. By comparing these two a better idea can be obtained of the closeness with which theory can be made to agree with practice. The speed of the motor as constructed was slightly higher when operating with permanent or tapped field with the same current than the speed as calculated from design. When operating with full field the speeds above 175 amp. and below 325 amp. were slightly lower than that calculated, but for current values below 175 amp. and above 325 amp. they were slightly higher. The efficiency of the motor as constructed was slightly higher than the calculated efficiency for all current values above 145 amp. and for speeds below 30 m.p.h. The assumed gear losses which were used for the theoretical calculations were 9.5 per cent at 75 amp., 7.5 per cent at 90 amp., 5.5 per cent at 120 amp., 5 per cent at 150 amp. and 5 per cent at 180 amp.

After the motors were received by the railway company and the cars were completely equipped ready for operation, elaborate arrangements were made to check the performance of the motors to permit accurate comparison with the preliminary calculations. A section of track was set aside for use as a test track and runs were laid out so as to duplicate as nearly as possible the service originally specified to form the the basis for the motor design. Tests were made to determine all of the variables which had entered into the original calculations, and final tests were made to ascertain the power consumed in service, the temperature rise of the motors and other parts of the equipment and other desirable data which were used in calculating the motor capacities.



COMPARISON OF CALCULATED CHARACTERISTIC CURVES WITH THOSE OBTAINED FROM TEST

A two-car train was used for this test, each car being loaded with bags of sand so that the total weight per car was brought exactly to that specified for determining the equipment capacity. This train was operated over the several series of runs continuously at proper speeds with the amount of coasting, duration of stop, etc., regulated to the specification requirements and to produce the schedule speeds which had been originally given. The energy per ton-mile, exclusive of that used for compressors, heat and light, or in other words that used for actually propelling the train, was 62.97 watt-hours. The schedule speed corresponding to this power consumption was 16.1 m.p.h. and the coasting made was 43.4 per cent. By comparing these with the original figures which were determined by calculation, a fair a can be gained of the closeness with which the equip- fulfilled expectations. There was an excess of 2.17 watt-hours per ton-mile shown by the test, but this could be readily accounted for by the schedule speed, which was 1.2 m.p.h. higher than that for which the original calculations were made. The percentage of coasting obtained in the test operation was 4.6 higher than that originally estimated.

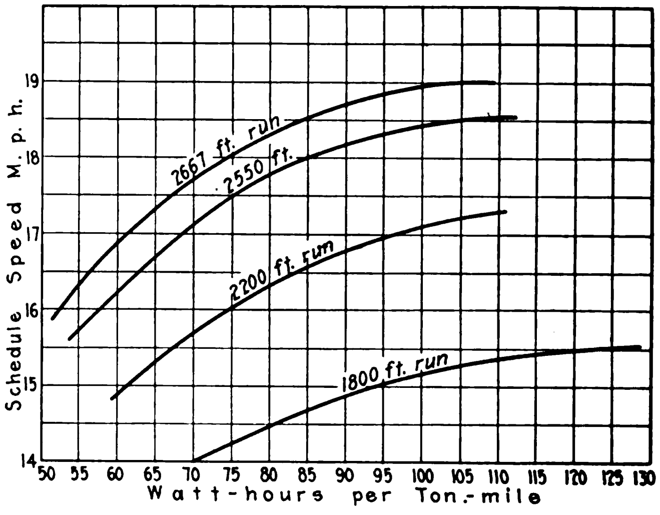
By comparing the characteristic curves previously mentioned these variations will be seen to be about what would be expected. As the speeds were slightly higher for the motor as finally constructed with the same current, it would be expected that a higher schedule speed could be made with a great percentage of coasting.

In order to determine the effect of the variation of schedule speed upon the power consumption, a series of graphs was plotted using theoretical figures and runs of several lengths made at different schedule speeds. A set of these graphs for runs of 1800 ft., 2200 ft., 2550 ft. and 2667 ft. is shown in an accompanying illustration.

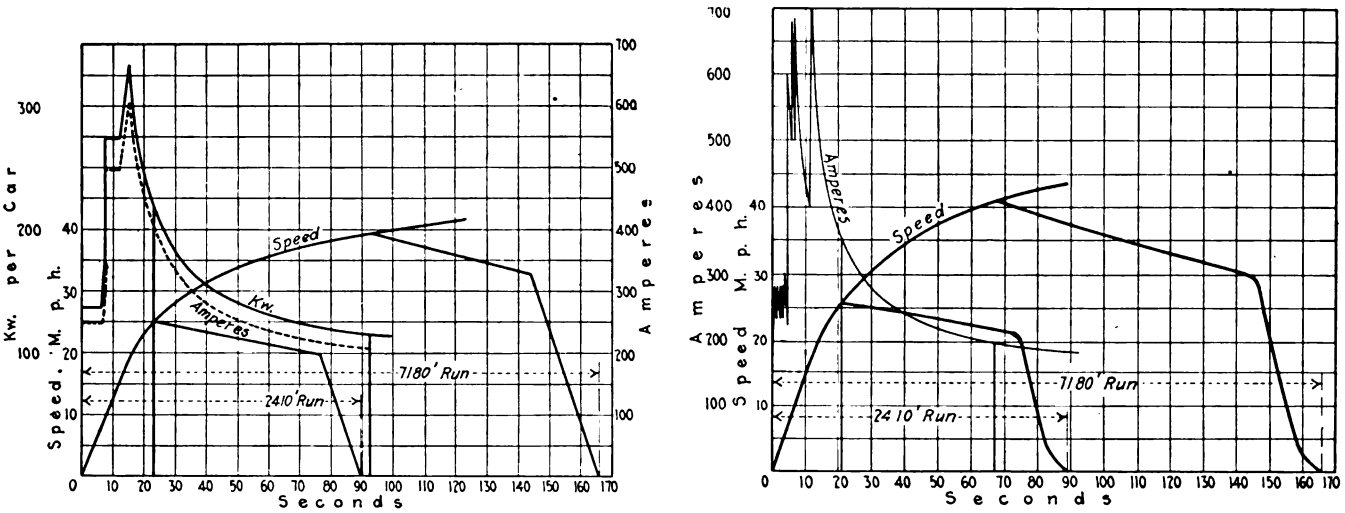
OPERATING DATA WERE OBTAINED TO CHECK EACH PART OF THE SPEED-TIME GRAPH

For comparison of what may be termed a typical speed-time graph obtained under operating conditions with the theoretical speed-time graph originally plotted, many runs were made and accurate readings were taken. In the theoretical speed-time graph, originally plotted, an acceleration of 1¼ m.p.h.p.s. was assumed. Theoretically this required a tractive effort of 3800 lb. per motor, which was produced with a current of 248 amp. per motor, operating with full field, and 302 amp. per motor on tapped field. These figures are all obtained from the theoretical characteristic curves of the motor plotted before this was designed.

Calculations showed that the peak to which the current would swing when passing from full to tapped field with an accelerating current of 248 amp. when operating with full field was excessively high as the maximum current swing was estimated to be about 490 amp. To reduce the magnitude of this current swing, the control equipment was so arranged that the transition from full field to tapped field could not take place until the motor current had dropped to 200 amp. Results of tests made on a tangent level track with a fully loaded car showed that the average ac-



POWER CONSUMED AT DIFFERENT SCHEDULE SPEEDS AND WITH VARIOUS LENGTH RUNS celerating current was approximately 260 amp., and this produced a rate of acceleration of 1½ m.p.h.p.s., ¼ m.p.h.p.s. higher than that originally considered. The calculated and test performance are shown in two other illustrations giving speed-time and current graphs for runs of 7180 ft. and 2410 ft., obtained both from theoretical calculations and from actual tests. By referring to the graphs obtained from actual service operation, the figures just referred to be will be seen to have been obtained. With the short run made at schedule speed of 15 m.p.h. with a twenty-second stop, the maximum speed obtained is seen to be 26 m.p.h. as against 25 m.p.h. originally estimated. With the long run of 7180 ft., the speed at the point of cut-off is 40.75 m.p.h. as against 39.2 m.p.h originally estimated. The shape of the speed-time graph with power on after the straight line accelerating period has been passed shows the test speed to be somewhat higher than the calculated speed, due to a higher train resistance having been assumed than was actually encountered; this was further demonstrated by the coasting tests described later.



SPEED-TIME, POWER AND CURRENT GRAPHS—AT LEFT, THEORETICAL GRAPHS AS CALCULATED; AT RIGHT, GRAPHS OBTAINED FROM TESTS

The net results of this difference in train resistance was to make the calculated time for the coasting period twenty-seven seconds shorter for the express run than was actually obtained on test. The coasting periods for the short local runs were practically the same on test as calculated. This is because the short runs required power for only a short time, so that the speeds at the point of cut-off were nearly the same.

To facilitate the calculations it was assumed that the voltage was increased uniformly during acceleration instead of by steps as in actual operation. This accounts for the difference in the character of the current and power consumption curves in the two cases. No appreciable error, however, was introduced by this assumption.

The average line voltage was assumed at 550, and that found on tests was 547, a very close agreement. The actual energy consumption for the short runs was 63 watt-hours per ton-mile, as against the 58 watt-hours calculated. This difference is readily accounted for by the increased rate of acceleration found in actual service.

To check the coasting portion of the speed-time graph, a large number of coasting tests were made by allowing the train to roll at various speeds over a section of tangent level track while readings of speed, time and distance were taken. In addition many tests were made by allowing the train to roll on grades of various degrees of steepness. A comparison of the figures actually obtained for train resistance showed that those originally used for the theoretical calculations were approximately 10 per cent high. These actual results, however, checked closely with some previous test figures developed by J. V. Davies from tests made on the Hudson & Manhattan Railroad, and which were used as a basis for the theoretical train-resistance values. To insure a conservative margin these test figures were increased somewhat for the theoretical calculations.

AVERAGE BRAKING RATE CHECKED CLOSELY

A composite braking graph was also developed from a large number of tests. The average slope of the central part of this graph indicated a braking rate of about 2 m.p.h.p.s. However, there was some time lost between the movement of the brake handle and the actual application of the brakes. In order to make a smooth, service stop the braking rate was decreased and graduated off at the stop so that the average for the entire braking period was about 1½ m.p.h.p.s., the value originally assumed.

It should not be inferred from the above that the calculation of the operation of trains or cars can be reduced to an exact science, or that the time for any run and the resulting load upon the equipment can always be predetermined within the limits indicated. These test results were obtained under conditions duplicating as nearly as possible those assumed for the initial calculations. There were no delays such as occur in actual service due to variations in the duration of station stops or additional stops and slowdowns such as are necessary for signals. Throughout the test the schedule speed was kept almost exactly at that assumed in the initial calculations. A special man made a record of the time and gave his information to a motorman's "coach" provided with a stop watch. The coach instructed the motorman as to the length of time that the power should be kept on to maintain the schedule speed at the assumed value. Thus this operation was performed under ideal conditions and under the assumed conditions as nearly as it was possible to operate the train.

To indicate what variation might be expected from

TEST RESULTS WITH TRAIN IN PASSENGER SERVICE

Average Length Run, Feet	Average Number Passengers per Car	Schedule Speed, Miles per Hour	Per Cent. Coasting Obtained	Watt-Hours per Ton-Mile
2,352	21	15.8	26.3	87.5
2,352	22	15.2	26.0	97.8
2,909	31	15.7	24.8	82.6
2,909	14	16.6	20.0	80.6
2,909	38	15.6	25.6	83.9
2,909	23	15.4	19.9	80.2
2,909	28	15.7	25.8	82.7
2,909	31	16.3	25.5	74.1
*2,770	26	15.8	24.2	82.4
†2,410	200	16.1	44.1	63.0

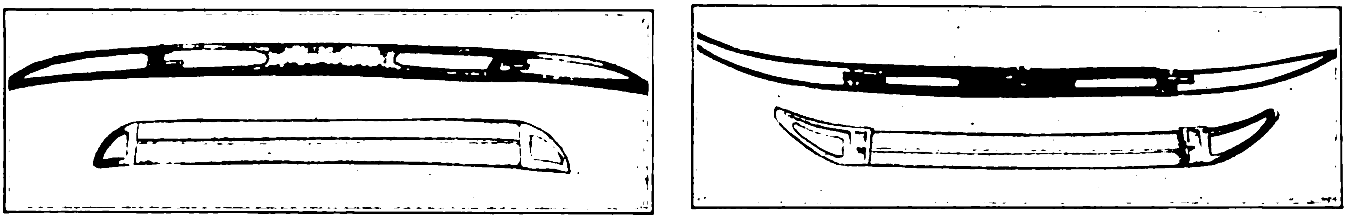
* Average for above eight runs.

† Results of test with train operated in service duplicating theoretical assumptions.

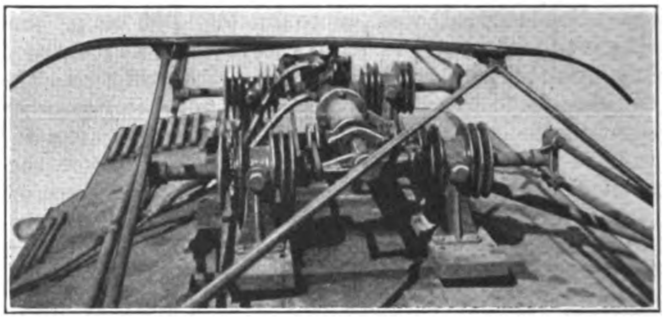
this operation when passengers were being carried and the train operated in regular service another series of tests were made. These, of course, included the incidental delays due to various causes such as high winds, signal stops, variation in the duration of stops, and special stops and slowdowns. The results of eight runs made in passenger service are given in an accompanying table and for convenience in comparing these figures with those obtained from tests under ideal conditions these test figures are given below the averages. The average length of run in passenger service was a little more than 300 ft. longer than that in the test service. The schedule speeds were almost the same, being 15.8 m.p.h. in actual passenger service against 16.1 m.p.h. for the test service. There was a large decrease in the per cent of coasting obtained under actual service conditions, this being reduced from 44.1 per cent to 24.2 per cent. The power consumption, of course, increased correspondingly, the increase being from 63 to 82 watt-hours per ton-mile, that is practically 30 per cent.

A comparison of the results shows the great advantage which may be obtained by regulating the amount of coasting. As there was a variation in the schedule speed obtained, the watt-hours per ton-mile do not follow the percentage of coasting in all cases. These tests were also made with different motormen operating the train so that there was a difference in the operation due to the personal element as well as to traffic conditions. After all is said about the close agreement of theoretical calculations with results actually obtained in operation, the final element in producing efficient operation is the human element. The same accuracy and analytical common sense essential in methods of work and calculations are likewise essential in the operator.

This comparison emphasizes the fact that proper allowance must be provided in the preliminary calculations for equipment so as to make up time in case of delays. The examples given, however, show that when the conditions of operation are specified, the actual performance of the electrical equipment for a given service can be predetermined with considerable accuracy, and in most cases this can be done without making very elaborate calculations.



AT LEFT, WEARING SURFACE OF OLD AND NEW TYPES OF PANTOGRAPH SHOES; AT RIGHT, UNDER SIDE OF OLD AND NEW TYPES OF PANTOGRAPH SHOES



NEW TYPE OF PANTOGRAPH SHOE IN POSITION SHOWING CONNECTION DETAILS

Longer Life With Lower Cost for Pantograph Shoes

High-Speed Line in Colorado Gets 30,000 Miles From Its Trolley Shoes at Cost of 60 Cents Per Shoe

THE Denver & Interurban Railroad, Denver, Col., operates 45 miles of 11,000-volt, alternating-current, single-phase catenary system between Denver and Boulder, Col., with a short branch to Eldorado Springs, a popular summer resort located in a canyon of the Rockies. Boulder, a city of 15,000 population, harbors the State University with about 1500 students and the finest armory in the State where several hundred soldiers were trained during the war. The interurban line, which operates on a private right-of-way except within the city limits of Denver and Boulder, carries by far the greater part of the local traffic between these two cities and maintains an hourly schedule during the day and evening. The 60-ton motor cars in regular service average 5000 miles a month and travel of very high speeds, often hauling trailers.

This service is very hard on the pantograph trolley shoes. The type which has been in use for some years consisted of a center section made of $\frac{1}{16}$-in. galvanized iron 6 in. wide and with aluminum ends as shown in the lower parts of two of the accompanying illustrations. The total reach of this shoe was 60 in., which proved to be too short, for due to the swing of the car the pantograph occasionally got caught in the catenary and was ripped off. To replace the renewable center when worn out the whole shoe had to be removed, as it was fastened to the base by a center rod. These shoes cost $1.05 each, and had a life of 10,000 miles.

A new type of shoe which is now in use is shown in the upper part of the illustrations just referred to. This shoe includes a center section 4 in. wide and 40 in. long, made of $\frac{1}{8}$-in. sheet steel. The ends are made of small steel angles, and the total reach is 90 in. The center may be quickly renewed without disturbing the ends. These shoes cost 60 cents each and last for 30,000 miles in this class of service.

Mechanical Section of A. R. A. Meets at Atlantic City

First Convention of Former M. C. B. and A. M. M. Associations Since 1916—Exhibit, as Usual, an Important Auxiliary to Technical Sessions

AFTER omitting the two meetings covered by the war period, Section III, the mechanical section, of the American Railroad Association, which replaces the former Master Car Builders' and American Railway Master Mechanics' Association, met at Atlantic City beginning June 18. The meeting will continue to and including June 25. The exhibit of railway supplies is, as formerly, an important feature of the meeting.

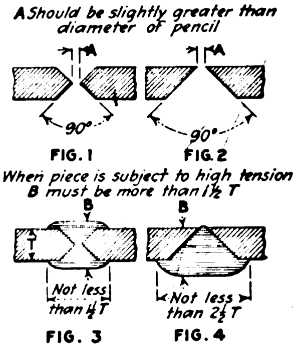
GAS AND ELECTRIC WELDING AS APPLIED TO TRUCK PARTS

Among the committee reports of most direct interest to electric railway men presented during the first part of the convention, that on welding truck side frames, bolsters and arch bars takes first place. The committee recommends that in welding, either by the use of gas or electricity, care and judgment on the part of the operator are of prime importance. The operator's ability as to the desired proficiency should be certified by the mechanical officers in charge or by an instructor qualified by experience in general railroad welding with the method involved. The committee adds that as the metal added is liable to be porous and relatively brittle, and as the heat at the surfaces welded affects other sections near the weld tending to reduce strength and toughness, certain general rules should be followed substantially as below.

Welding cracks or fractures will not be permitted on axles, arch bars, car wheels or tires, truck equalizers, spring or bolster hangers, brake staffs, brake wheels, coupler bodies, knuckles, knuckle pins, locks, lifters and throwers, as well as parts made of alloy steel or heat-treated carbon steel. Building up worn surfaces will be permissible on parts subject to compression only; on *spring or bolster hangers** and in *holes in levers*, provided that the material remaining in the part is equal to at least 80 per cent of the original section; on *center plates, truck sides, bolsters and column castings*, provided the material remaining in the part is equal to 60 per cent of the original section; and on journal boxes, coupler bodies, knuckles, locks, lifters and throwers, flat spots on rolled steel wheels and tires if the thickness of thread is 1 in. or more above the limit of wear groove.

Welding cracks or fractures will be permitted on parts subject to compression only and general car parts not subject to high-tension strain except as otherwise prohibited, on car and roof sheets, draft castings, car sills, posts, braces, carlines, side plates and end plates, and on the following where welding is permitted only when the area of the crack is less than 40 per cent of the total area through the section at the point of fracture, but it is not permissible to weld any crack located within 6 in. of an old weld: *Cast-steel truck sides, pressed and structural steel truck sides, bolsters and transoms, cast-steel bolsters, brake beams and cast-steel coupler yokes.*

The edges of pieces for welding must be prepared as shown in Figs. 1 and 2. If both sides of the fractured member can be worked upon, the fracture should be prepared as shown in Fig. 1. Where only one side of the fractured member is accessible, the plan shown in Fig. 2 should be followed. The entire crack should be burned or chipped out sufficiently far back that there will be no portion of the crack in the metal. Failure to do this permits the crack to work its way across the metal to the farther side, due to the constant vibration, even after the weld has been made. A hole may be drilled at the end of the crack or check, and the chipping or burning should be directed toward the hole. The surfaces where the new material is to be applied must be clean and bright and reasonably smooth and, therefore, if the surfaces are prepared by the burning process the surfaces must be finished by chipping before welding.


A Should be slightly greater than diameter of pencil
A
A
90°
90°
FIG. 1
FIG. 2
When piece is subject to high tension B must be more than 1½ T
B
B
T
Not less than 1½ T
Not less than 2½ T
FIG. 3
FIG. 4

SECURING GOOD RESULTS IN WELDING

The portion of the part adjacent to the fracture should be heated before the welding is begun. In welding the operator should begin to weld at the point farthest away from the outside edge and work the weld towards the edge. All efforts must be made to prevent oxidation and to accomplish this the work should be placed at an angle that will allow the blowing out of all slag or impurities in the fuse metal, and the torch should be given a rotary movement to assist in their removal.

The new material must be deposited to the form shown in Figs. 3 and 4, in order properly to reinforce the weld, and "B" should be somewhat greater than "T." For cast-steel truck sides, pressed and structural-steel truck sides, bolsters and transoms, cast-steel bolsters, brake beams, cast-steel coupler yokes, car sills, posts, braces, stakes, carlines, side plates and end plates, "B" must be at least one and a half times "T."

In building up worn surfaces on spring or bolster hangers, or welding holes, cracks or fractures in the parts listed in the preceding sentence, with the exception of truck transoms welded in place, the parts must be carefully annealed by uniformly heating to about 1400 or 1500 deg. Fahr., and slowly cooling.

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*Parts of which the names are *printed in italics* may not be welded unless removed from the car or truck; but truck transoms may be welded in place by removing the truck from under the car body.

Worn surfaces, permitted to be built up to the original section by depositing of new metal thereon, must first be made clean, bright and fairly smooth, and after the metal is deposited they must be dressed to the required dimensions and gaged where necessary. When truck side frames and bolsters are welded the weld must be made smooth and a suitable record of the welding must be legibly stamped upon the weld.

In another report the committee on car wheels treated largely of items of steam railroad interest. However, it should be noted that the committee reported the decision of the executive committee that the association shall obtain standard rings of 33 and 36-in. diameters which can be used for reference. These rings are to be certified by the United States Bureau of Standards and will be used, in cases of dispute, to check wheel tapes.

SOME SUGGESTIONS GERMAINE TO ALL STANDARDIZATION WORK

The character of the report of the committee on brake-shoe and brake-beam equipment was also largely of steam railroad interest. The committee made some general observations, however, which are suggestive to any other committees which have work to do in the line of standardization. One point is that when standards are "unapproved" by the authorities, the reasons for the failure to approve the recommendations should be stated so that the committee can benefit in further work.

The committee says further: "We have heard from time to time in the past of the representatives of some roads 'trying to force matters,' others being on the defensive, either on account of pending 'damage' to them, or of simply a 'disinclination to change anything,' and then, too, of the selfish influence of manufacturers' interests. It is the belief of the present committee, that each of its members should enter upon your committee work independent of the operation of any such impeding factors, as contributing to the fullest, through it their individual engineering judgment, skill, experience, etc., to the solution of the country's brake-beam and brake-shoe problems. No one should work upon the committee as representing the road from which he may happen to come, but as one called to co-operate with other committee members in the solution of the general questions involving all lines, to which as a committee member, his talents and efforts should be freely and impartially addressed. Conditions peculiar to his own line should only weigh with him, as with his fellow-members, in proportion to their significance when compared with other conditions represented in the country."

The brake-shoe and brake-beam committee is considering the advisability of presenting next year a report on the "state of the art" both as regards brake beams and brake-shoes. In the present report a number of charts have been presented, especially for the benefit of the younger members of the association who may be interested in the history of the standard and recommended practice sheets, showing the changes which have been made in these sheets during recent years.

On motion of the committee on nominations the following were elected to serve for two and one years respectively: Chairman, W. J. Tollerton, general mechanical superintendent, Chicago, Rock Island & Pacific Railroad; vice-president, James Coleman, superintendent car department, Grand Trunk Railway. Seven members of the general committee were also elected to serve for two years and seven for one year.

EXHIBITS BIGGER AND BETTER THAN EVER

In number and variety of material displayed the exhibits surpassed those of any previous similar railroad convention. They totaled 301, and covered about 93,500 sq.ft. of floor space. The previous record was made in 1913 when there were 277 exhibits in a floor area of 87,360 sq.ft.

The general impression conveyed was that a large number of parts which formerly had been specified and designed by the operating companies were now being taken up vigorously by the manufacturers and produced as specialties. Steel in all its various forms has been used extensively and increasingly.

The exhibits of machine and shop tools were especially elaborate. The improvements in this class of machinery have resulted from an endeavor to cut down the time and labor necessary to machine various parts. Provision for more rapid and efficient setting up of the work and for insuring greater reliability are the most conspicuous.

The scarcity of labor during the war has evidently stimulated the development of automatic machines. The continued use of these machines should lead to far reaching economies in electric railway shops which manufacture or finish their own repair and maintenance parts. One operator can run from two to four machines which turn out the work as rapidly as a turret lathe and much more quickly than a center lathe.

The development which has been made in automatic chucking devices is surprising. A form of magnetic chuck shown provides a rapid method of preparing parts for face grinding. Electric railway mechanical departments will certainly soon show the benefits to be derived as a result of the rapid progress made in shop tools.

Other exhibits of particular interest to railway shop men were those displaying hoists, travelers, jacks and other lifting devices. Special features displayed in connection with these were designs to facilitate the handling of light parts efficiently and rapidly and at the same time to provide sufficient capacity for lifting heavy parts. There were many exhibits of pneumatic and electric shop tools. These portable machines are adapted for electric car repairs which can be made over the shop pits without dismantling the various heavy parts. The exhibits included both pneumatic and electric drills, reaming machines, cutting guns, grinders, riveters, hammers, saws, chippers, bolt drivers and rammers. The use of special heat-treated steel in the construction of these tools marked an advance of interest.

The several displays and demonstrations of electric truck tractors showed their particular adaptability for use in electric railway shops and particularly those in which new equipment is being installed on cars. The low-platform types with provision for elevating, lowering and dumping, are especially designed for use in shops where the space is limited and where sharp turns are necessary. The removal and reinstallation of compressors or other heavy electrical equipment installed underneath car bodies can be handled quickly and efficiently with one man and these tractors provide efficient means for replacing the work and labor used with hand trucks, wheelbarrows and other means of transportation in shops. Provision is made for hauling trailers as desired.

The rapid progress that welding has made during the last few years is indicated by the large amount of equipment of this character displayed. This included all classes of gas, electric and thermit welding apparatus. In the electric exhibits both alternating-current and direct-current motors were used to drive generators or were driven from gas engine or line shaft. Systems requiring no auxiliary equipment were also shown, some for use on circuits of voltage as low as 125.

In one welding display a large number of articles of artistic design and workmanship made with constant-energy sets showed the possibility of using welding apparatus for delicate operations and specimens of large welds exemplified the rugged work that can be accomplished with this system.

Master mechanics and superintendents of equipment of electric railways found plenty to occupy their attention in the exhibits of car parts and car fixtures, specialties and appliances. These included new types of seats and seat parts, car trimmings, hardware, curtains, safety treads, as well as drawn steel and pressed-steel shapes and stampings. An anti-rattling and window-sash brake device of new design is arranged to retard the downward movement of the sash and offer no resistance to the sash being raised. Two springs of different strength are used. In raising the sash a shoe compresses the weaker spring and the window can be easily raised. In lowering, the shoe automatically slides to a position to compress the heavy spring. This increases the pressure and prevents the sash from falling.

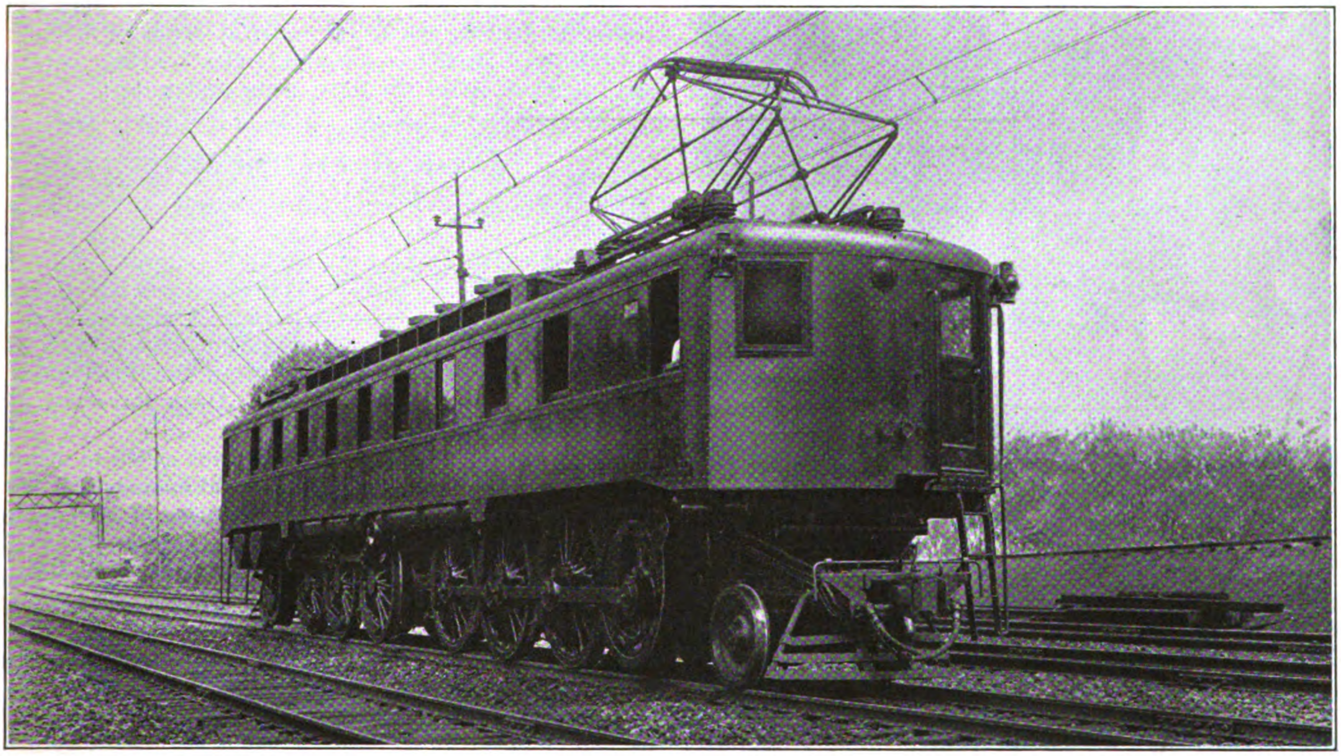
The display of car heating equipment included electric heaters, switches, thermostats, etc. Improvements in electric heater construction provided for ventilated cores with a case construction to give better and more efficient radiation of heat. Special alloy wire is used exclusively for heater coils. Great advances have been made in providing binding posts and special connectors for attaching the wiring. In former days heaters were furnished with copper insulated leads soldered to the coils. This necessitated making a splice to connect them, and the solder often softened from the heat. By attaching the ends of the coils direct to terminals furnishing additional provision for connecting the outside wiring, troubles of this nature are avoided. Lightness of construction is obtained by using sheet-steel and other sheet-metal punchings instead of castings.

A 600-volt portable cab heater with plug socket was a special feature. This should be of great benefit for cars with motormen's caps or in cases where train operation is employed.

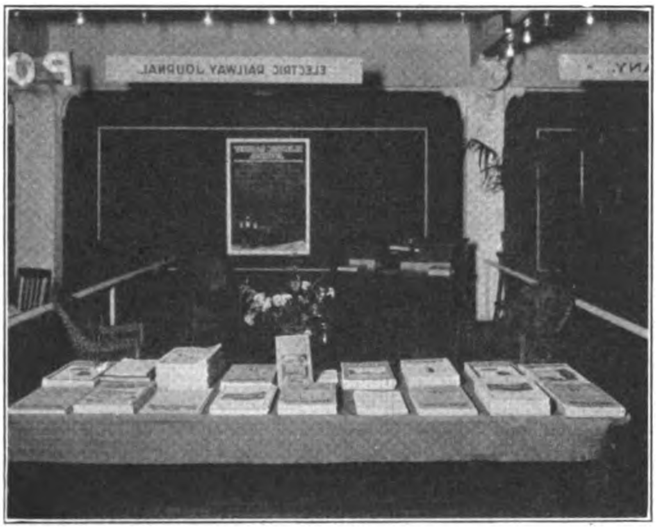
For shops and stations wall and floor type heaters are arranged for mounting in batteries so that any number of units may be employed.

Improvements in thermostats included moulded insulating bases for mounting and provision for removing the contact portion complete. Ample space with binding posts for wiring is a feature. Covers are fastened with through screws so they can not be removed unless the complete thermostat is loosened. The regulating switches for thermostatic control are provided with blowout for the main contacts. Relays have exposed contacts for ready inspection made of german silver or "monel" metal. Where equipments are installed underneath cars waterproof boxes are provided. These are arranged for mounting at either top or back, have binding posts for attaching all wires and are provided with knockouts so that the wiring may be brought inside the box in conduit.

Other exhibits of especial interest to rolling-stock engineers were those of trucks, wheels, brakes, brake-shoes slack adjusters and foundation-brake rigging. In the various trucks and truck parts shown special attention had been given to the design of springs, journal


250-TON, 4800-HP. SINGLE-PHASE, THREE-PHASE PENNSYLVANIA LOCOMOTIVE, SHOWN AT ATLANTIC CITY

boxes, bolsters and method of suspension. A special construction for guiding the bolster consisted in providing slots in the ends of the bolster, both forward and behind the columns. Carrier bars pass through these and rest on the trunnions of the spring caps, thereby forming the support for the bolster and locking the side frames securely into position. As the carrier bars pass through the bolster at a point on a level with the journal bearings they deliver all side thrust to the frames, without any tendency to tilt the side frames, and thereby eliminate the necessity for a spring plank.


ELECTRIC RAILWAY JOURNAL BOOTH AT THE A. R. A. CONVENTION

Included in the Pennsylvania Railroad exhibit on Tennessee Avenue near the railroad station is the 250-ton Pennsylvania electric freight locomotive. This represents the present maximum capacity for a single-cab unit. The principal object in the design was to concentrate the greatest power possible within the limitations imposed by existing track structures, clearances and modern electrical development. This locomotive has 4800 hp. capacity, with 140,000 lb. starting tractive effort. The free running speed is 20.6 m.p.h. Power is received from a 11,000-volt single-phase contact wire and fed through a transformer and phase converter to three-phase induction motors geared to a jackshaft. Some of the principal dimensions are: Total weight of locomotive, 250 tons; weight on drivers, 210 tons; number of driving axles, 6; capacity of locomotive—one-hour rating, 4800 hp.; starting tractive effort, 140,000 lb.; tractive effort at hourly rating of motors, 87,200 lb.; speed, 20.6 m.p.h.; total wheelbase, 63 ft. 11 in.; rigid wheelbase, 13 ft. 4 in.; overall length, 76 ft. 6¼ in.; height from rail to locked position of pantograph, 15 ft. 6 in.; height from rail to top of cab, 14 ft. 8 in.; width over cab body, 10 ft.; overall width, 10 ft. 1 in.; driving wheelbase, 38 ft. 8 in.; diameter of driving wheels, 72 in.; diameter of pony wheels, 36 in.; weight on each pony truck, 20 tons; voltage of locomotive, 11,000 a.c. Two of these engines in regular service will handle a 6300-ton train up a 1 per cent grade of 24 miles at a constant speed of 20.6 m.p.h.

This locomotive was built at the Altoona shops of the Pennsplvania Railroad and the design was evolved under the direction of J. T. Wallis, general superintendent of motive power, Pennsylvania Railroad, together with B. G. Lamme, chief engineer, Westinghouse Company.

The track exhibits were of particular interest this year. In addition to the exhibits of railroad equipment there were a number of heavy railroad mounts for the Army and Navy Ordnance which demand the natural interest attaching to equipment of this character at the present time and also are interesting due to the problems of extraordinary stresses which had to be solved in designing this equipment. They show in a general way the gigantic war activities which were engaged in by the manufacturers. The railway mounts include two 14-in. army rifles as well as several smaller sizes and a 12-in. mortar. The mounts for the 7-in. and 8-in. army rifles were of the well-car type carried on standard M.C.B. 50 and 70-ton trucks respectively.

These exhibits were shown through the courtesy of the Ordnance Department of the United States Navy and were in charge of naval officers and enlisted men together with representatives of the manufacturers.

Among other exhibits of special interest to electric railway men were those of storage batteries, electric headlights, paints, insulating material, air hose fittings, ventilators, journal box packing, roller bearings, draft gear, couplers, steel castings, bolts and nuts.

Iowa Railway Men Meet

THE Iowa utilities were in convention as this issue of the JOURNAL goes to press. The Iowa Electric Railway Association meeting at Colfax, Iowa, officially opened its railway sessions on Thursday morning of this week, but on Wednesday afternoon a joint session was held with the Iowa section of the National Electric Light Association during which a paper on the Iowa State Board of Conciliation was read by Dean Raymond of the State University.

The session on Thursday morning was called to order by Vice-President F. J. Hanlon, general manager Mason City & Clear Lake Railroad, in the absence of President C. E. Fahrney, general manager Ottumwa Railway & Light Company. Following the disposal of routine business, R. J. Smith, superintendent way and structures Tri-City Railway Company, Davenport, opened the discussion on the best paving to be used in connection with track, with reference to advantages of cement, creosote blocks, brick and asphalt. Mr. Smith gave as his opinion that brick laid in grout and with joints filled with grout gives the best paving where traffic is not extremely heavy. A general discussion followed substantiating this opinion.

The afternoon session opened with papers on the safety car by T. C. Roderick, assistant general manager Tri-City Railway Company. This was followed by extensive discussion showing great interest in the subject, all the comments being favorable to the car and the discussion centered on details. The second paper was on the automatic control of substations and was read by C. W. Place, engineer of the General Electric Company. The presentation of this paper was followed by a general discussion on reclaiming of track and special work by welding and grinding, led by R. J. Smith.

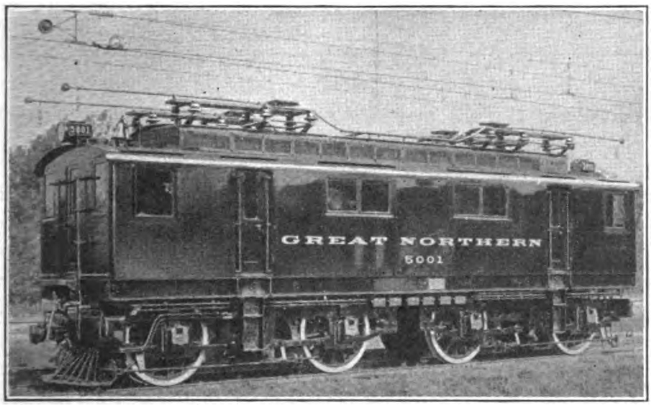
At the executive session J. P. Ingle, manager Keokuk Electric Company, was elected president of the association for the coming year and member of board of directors for five years. Abstracts of the papers presented at the Iowa meeting most closely allied to the electric railway industry will appear in a later issue of this journal.

1918 Data for the Pioneer Constant-Speed Electrification*

In Cascade Tunnel, Electrified Ten Years Ago, Great Northern Railway Uses Constant-Speed Four Motor Units on 1.7 Per Cent Grade

BY E. MARSHALL
Electrical Engineer, Great Northern Railroad, St. Paul, Minn.

IN 1909 the Great Northern Railroad began the operation of four electric locomotives through the Cascade tunnel, in the State of Washington, to do away with smoke conditions of steam operation. This tunnel is about 14,000 ft. long with a uniform grade of 1.7 per cent eastbound. In the yard of the west end of the tunnel there is a grade of 2.2 per cent on which trains must be started. A train is brought to this grade by three Mallet locomotives and is taken, together with the three idle locomotives, up the grade and through the tunnel in two cuts by three electric locomotives.


CASCADE TUNNEL LOCOMOTIVE OF GREAT NORTHERN RAILWAY

The electric locomotives are four in number, in single units, each with four motors. Each motor is a three-phase 25-cycle, slip-ring induction motor, running at a synchronous speed of 375 r.p.m. Its capacity is 250 hp. at a three-hour rating or 375 hp. at a one-hour rating. Each motor is geared to its axle by a pinion on each end of the motor shaft, making a double drive. The gear ratio is 4.26 and the driving wheels are 60 in. in diameter. This then gives a locomotive speed when the motors are running at exact synchronism of 15.79 m.p.h.

TABLE I—LOCOMOTIVE DATA, CASCADE TUNNEL ELECTRIFIED

Total weight, lb	230,000
Weight on drivers, lb	230,000
Number of driving axles	4
Number of other axles	0
Diameter of wheels, inches	60
Gear ratio	4.26
Number of motors	4
Output of motor for one hour (nominal), horsepower	400
Output of motor for one hour (test), horsepower	505
Rise in temperature, dehrees Fahr	75
Output of motor for three hours (nominal), horsepower	250
Output of motor for three hours (test), horsepower	397
Rise in temperature, degrees Fahr	75
Forced ventilation, cu.ft. per minute	1,500
Number of poles on motors	8
Frequency, cycles per second	25
Synchronous speed of motors, r.p.m	375
Voltage between terminals	500
Synchronous speed of locomotive, m.p.h	15.7
Number of transformers	2
High potential voltage of transformers	6,000
Rating of transformers (three hours), kva	400
Forced ventilation, cubic feet per minute	1,500
Number of steps in control	13
Continuous rating locomotive, pound tractive effort	25,00
Accelerating rating locomotive, pound tractive effort	38,000
Momentary rating locomotive, pound tractive effort	56,000
Maximum rating locomotive, pound tractive effort	72,000
Length over all of locomotive	44 ft. 2 in.
Total wheelbase	31 ft. 9 in.
Rigid wheelbase	11 ft. 0 in.

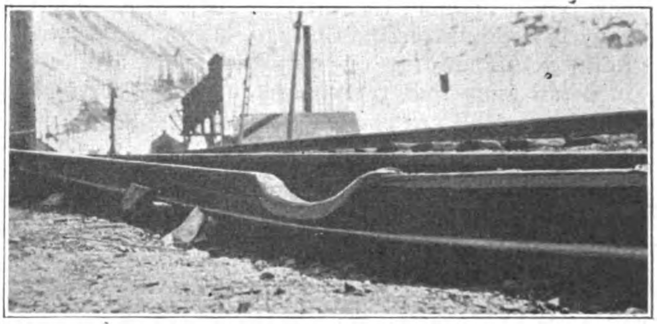
TABLE II—OPERATING DATA CASCADE TUNNEL ELECTRIFICATION

Freight mileage	24,528
Return (idle) mileage	24,528
Passenger mileage	13,020
Passenger (idle) mileage	13,020
Special mileage	12
Special (idle) mileage	12
Total	75,120
Tons 1 mile, cars and contents	8,461,770
Passenger train cars, 1 mile	48,096
Average gross tons per engine-mile	345
Average haul is double the above or	690
Cost of repairs, total	$5,653.91
Miles per pint of oil, valve	313
Miles per pint of oil, engine and car	19
Cost per mile for repairs, in cents per mile run	7.53
Cost per mile for wages, in cents per mile run	27.39
Cost per mile for lubricants, in cents per mile run	0.2
Cost per mile for supplies, in cents per mile run	0.33
Cost per mile for total, in cents per mile run	35.45

This was the first constant-speed locomotive installation in this country, and constant-speed operation was selected because up to the time of its adoption this was the only method whereby regeneration could be secured without getting into what then seemed to be prohibitive complications. Regeneration appeared to be of great value for mountain grades. Of course, for this particular installation regeneration has proved to be of no value, on account of the short distance involved, and because we do not handle trains with the electric locomotives westbound. It was, however, part of a general scheme to electrify the entire mountain grade, taking in a distance of about 60 miles.

Power is delivered to the locomotives by a three-phase overhead-contact system, using two wires for two phases, and the track return for the third phase. The voltage is 6600 between the overhead wires and between each wire and the rail. The power plant is located 30 miles from the tunnel and generates power at 6600 volts, 25 cycles, three-phase. This is stepped up to 33,000 volts, and transmitted to a substation at Cascade tunnel where it is stepped down again to 6600 volts.

One of the features of constant-speed operation is that there must be ample power behind the locomotive to handle the load, as no increase in torque can be obtained by any means whatever. Also if the load is too great for the amount of power available, the requirements cannot be reduced as can be done with the series, or variable-speed motor. This makes it necessary to keep the train load down well within the power capacity of the system. An accompanying photograph indicates


AN EVIDENCE OF THE POWERFUL TORQUE OF THE GREAT NORTHERN LOCOMOTIVE

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*Previous articles on the Great Northern electrification will be found in the following issues of the ELECTRIC RAILWAY JOURNAL: Oct. 31, 1908, page 1276, details of locomotive; March 27, 1909, page 545, referred to in a general discussion; Nov. 20, 1909, page 1052, extended abstract of A. I. E. E. paper by Dr. Cary T. Hutchinson, read at New York meeting of Nov. 12; March 19, 1910, page 494, account of overturning of locomotives and other damage by avalanche at Wellington, Wash., March 1.

what happened by reason of the constant speed characteristics of these locomotives. We operate with two locomotives in the rear of the train and one ahead. On one trip a fuse blew on one of the rear locomtives and this double unit stopped. It being dark in the tunnel the forward engineer knew nothing of this occurrence and his locomotive started to slip. As it could not exceed the speed of 15 m.p.h., he supposed he was moving through the tunnel. In due time he considered that he ought to be through, but discovered that this locomotive was standing still and had ground the rail two-thirds of the way through. The two accompanying tables on the preceding page give locomotive and operating data for this electrification. Table I contains the principal dimensions of the locomotive as well as its weight, output, rating, etc. Table II includes some very interesting figures on mileage made and data on the operating cost of these locomotives for the year 1918.

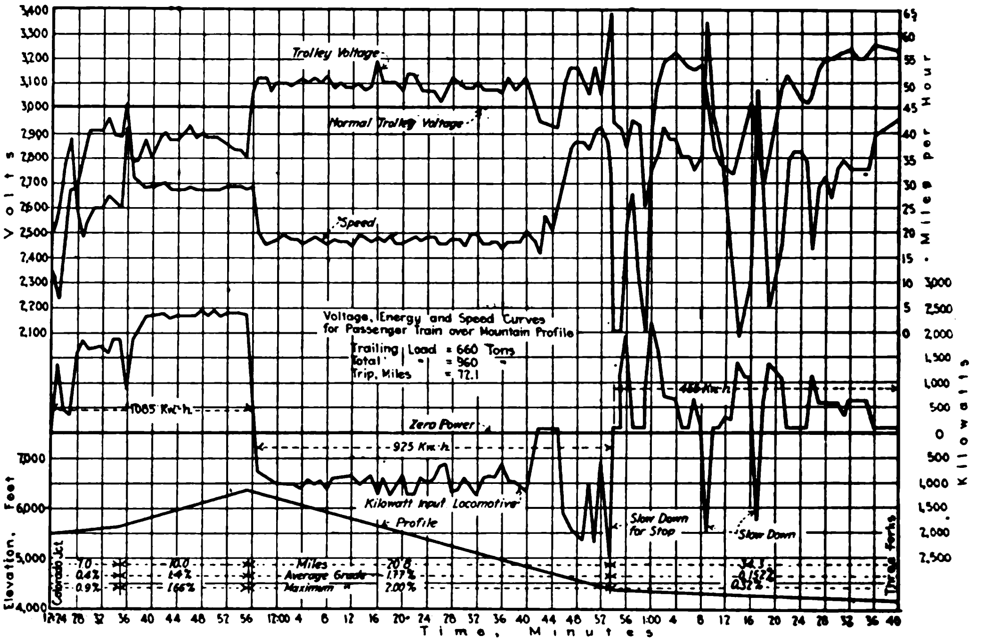


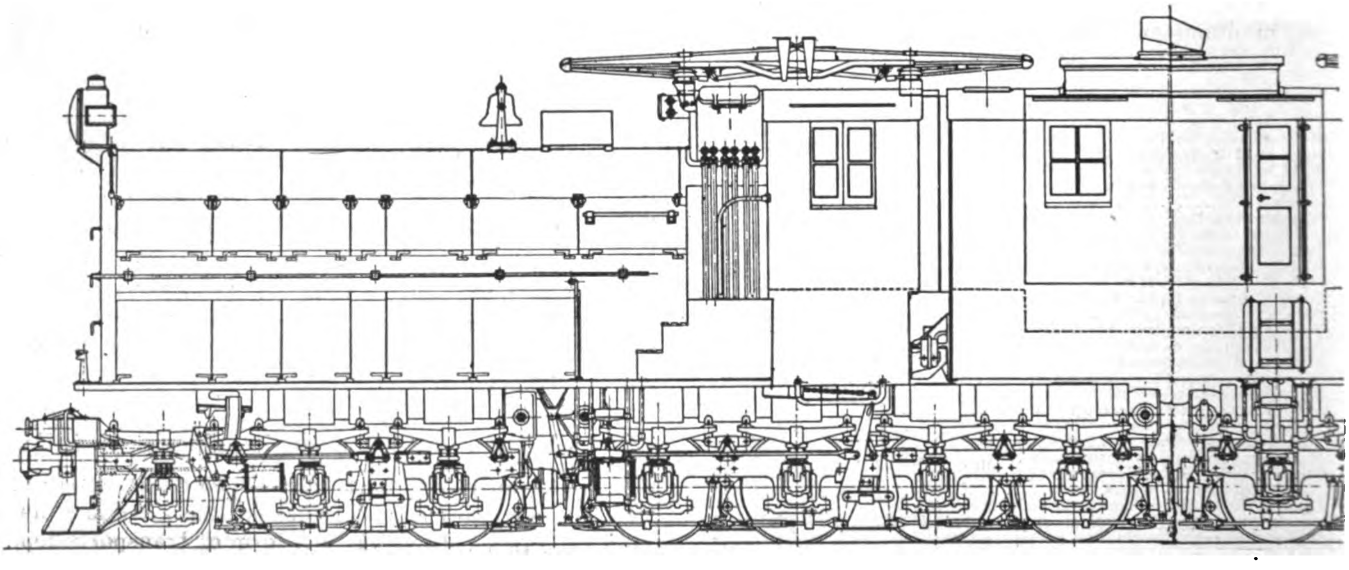
CHART SHOWING OPERATING CONDITIONS FOR 960-TON PASSENGER TRAIN OPERATING FROM COLORADO JUNCTION (BUTTE) TO THREE FORKS, MONT.

Power Regeneration on the St. Paul

IN ITS June issue the *General Electric Review* reprints the paper read by W. B. Potter and S. T. Dodd before the Western Railway Club at Chicago on April 21 (published in this paper for April 26). The *Review* shows some interesting illustrations, not available at the time the ELECTRIC RAILWAY JOURNAL article was published, from which the accompanying two have been selected.

One of these illustrations shows some details of the new type of locomotive which the General Electric Company is building for the Chicago, Milwaukee & St. Paul Railway. The drawing indicates several differences in detail from that reproduced in connection with the report of A. H. Armstrong's New York Railroad Club paper published in the issue of this paper for March 23, 1918, page 561. For example, the pantograph is now shown mounted on the cab instead of the hood. More details of the knuckles connecting the central section of the cab with the other section are visible also.

The second illustration gives data regarding regeneration on the section of the electrified section between Three Forks and Butte. In this connection the authors say: "The amount of power returned to the trolley by regeneration varies with the amount of the grade and the type of train. On specific tests it has been shown that a train on a 2 per cent grade has regenerated 42 per cent of the power required to pull the same train up the grade. On a 1.66 per cent grade 23 per cent has been regenerated. The records for a particular month over the entire Rocky Mountain Division of the C. M. & St. P. for both freight and passenger trains show that the regeneration was equivalent to 11.3 per cent of the total power used."



PARTIAL ELEVATION OF 265-TON PASSENGER LOCOMOTIVE UNDER CONSTRUCTION FOR C., M. & ST. P. RAILWAY—CASCADE ELECTRIFICATION

Advantages of Service-at-Cost*

Plan Is Desirable Through Equitable Adjustment of Fares and Service—It Removes Antagonism and Fosters Co-operation

By Harlow C. Clark
American Electric Railway Association.

THE laws of New York State as they now exist have taken away from the cities the right of regulation and control and the spectacle is presented of the largest state in the Union adrift on a sea of uncertainty and absolute inefficiency insofar as the control and regulation of one of the semi-public enterprises most important to the welfare, health and comfort and convenience of its citizens is concerned. The situation is one that is intolerable alike to the communities and to the investors. It is one that must be speedily corrected if the onward march of the Empire State is not to be halted.

In seeking the way out, it is necessary first of all to have a clear conception of the service and the duty that an electric railway performs. Street, interurban and suburban railway transportation is first of all a community function. As I conceive it, the only reason why it should not be performed by the community itself, acting through its corporate organization, is that it can be better and more efficiently and more economically performed by private enterprise.

I am not going to enter upon a discussion of the advantages and disadvantages of municipal ownership. It may be that in the halcyon days that are always before us, our form of government will so improve and develop that it will be capable of performing every service for its citizens better than similar service could be performed by private enterprise. There is nothing, however, in the history of our national, state or city government to indicate that so far in its history it has ever been as efficient and as economical as private enterprise, or most important of all—that it has ever brought to the conduct of such enterprises the initiative that has placed America in the forefront of the nations in everything that pertains to the physical welfare of its people.

Moreover, as far as the State of New York is concerned, the discussion of public ownership as affecting electric railways is, I think, academic. There is said to be no city in the State which is in a position, under the bonding limitations of the State Constitution, to purchase its electric railway system.

Important Elements of Cost

If we are not to have government operation of our electric railway systems, what then? It seems to me that we should seek to secure the advantages of private enterprise and initiative to get for the communities the best possible service, at the lowest possible cost.

There are several things that the public requires of corporations which it calls upon to perform public service for it. First of all it requires their money, not only that amount which covers the initial cost, but a continuous flow of money to develop, improve and extend the enterprise. It also requires their skill, their knowledge, their experience and their efficiency. These it must pay for, and the rate that must be paid decreases as the assurance of a proper return increases.

In addition to this assured return, which is capital's wage, there must be, if the public is to receive the best that is in the men who carry on their public service, some additional incentive for the exercise to the fullest of those qualities which give private management its value. I am not yet enough of an optimist to believe that the necessity of reward, to induce initiative and care and hard work and deep thinking in the management of business, is no longer with us.

These two elements of cost—the return to capital and the reward for initiative—are the only two which result from private operation and ownership, and the first does so only as the return demanded upon private investment differs from the return demanded upon public investment. Every other cost, with the single exception of taxes, is unaffected by the kind of ownership and operation under which an electric railway is conducted. These other elements are operating expenses, taxes, depreciation and maintenance. There is no virtue in public ownership or operation which can eliminate any of these costs except taxes.

It is evident that the money to pay these costs can come from but two sources—either from the car rider, who receives the service, or from the taxpayer. The policy of state subsidization of public utilities is even now being advocated, and more than that is actually in practice in Massachusetts. I doubt, however, whether this paternalistic policy will generally appeal to the American people.

Hence, if we are to have the "best possible service at the lowest possible cost," it is necessary that the fares shall vary as the cost of furnishing the service varies. It is perfectly evident that a fixed fare will, over any considerable length of time, be either too much or too little. What we must have is a fare that will readily and easily respond to the changes in the cost of the service demanded. This flexible relation between cost and price is what prevails in every other industry. The tax levies of cities change from time to time as the expense of administration changes. If, then, we are to adopt for the business of furnishing public service the same natural economic laws that apply to all other enterprise, we must have a flexible fare.

The next most important step is to determine the kind, character and extent of the service to be furnished. That I consider to be a direct function of the public itself, for it is a matter that depends upon the price. It should be the privilege of the public to specify the service required, and it should be the duty of the company to furnish it, as long as it is possible to furnish it for the fare received.

We must remember, however, that it is to the interest of both the public and company that fares be as low as is consistent with good service. One of the great advantages of the plan I am outlining is that it tends to bring about a spirit of co-operation between the company and the public that results in low fares. There is but one alternative to high fares under existing conditions, *i.e.*, extreme economy in operation, and this economy cannot be secured without the support and assistance of the public.

The advent of the automobile has made a great change in the conditions under which electric railways are being operated. It is very evident that a large part of the field formerly occupied by the electric railway has been invaded by this new form of transportation, which is furnishing a kind of competition that cannot be gotten rid of. It seems to me that what is immediately needed is a survey of the situation in each city, in order to ascertain how the service performed by the electric railways can be so readjusted as to eliminate all that is no longer necessary. It is certainly true that most electric railway systems are now furnishing service that is both unwarranted and unnecessary, and that they are being compelled by regulatory commissions and by public opinion to pursue many practices and methods which could and would be done away with if the public realized how important an effect they had upon the cost of operation and consequently upon the fare.

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*Abstract of address before New York State Conference of Mayors at Schenectady, N. Y., June 11, 1919.

There are in addition many operating economies that could profitably be introduced, if the public was convinced that it was in the interest of low rates and good service. Among these are the one-man car, turnbacks, increased speed, and the enforcement of traffic regulations which would better protect the schedules.

SUMMARY OF SERVICE-AT-COST PLAN

The service-at-cost plan proposes the following:

1. That private individuals and corporations shall act as the agents of the public in providing electric railway service.
2. That such agents shall receive for their services (a) such a rate of interest upon their investment in the property used and useful in serving the public as will attract capital into the business, and (b) an additional compensation as a reward for initiative, to be measured by the economy and efficiency manifested in the management.
3. That the degree to which the electric railway system shall be called upon to bear public taxes and imposts be determined in the light of fairness and justice as between the tax-payer and the car rider against whom such imposts are directly levied.
4. That the cost of operating the property shall be borne by the persons receiving the service, through a system of fares so adjusted as to respond to the variations in costs.
5. That the public, under such a system of fares as will provide the cost of whatever service is required, shall prescribe the service to be furnished.
6. That because under the plan proposed the rate of fare will largely depend upon the economy and efficiency with which the property is operated, the co-operation of the public in the elimination of unnecessary service and in the introduction of all proper operation economies be enlisted.

I greatly doubt that any intelligent, honest and well-informed body of men seeking a solution of the problem of the traction interests will very far depart from these principles. Their soundness is, as I see it, unaffected by any considerations of state or local control, or of varying systems of fares and fare collection. They can be applied through public service commissions or municipal directors, and they function as well if fares be measured by the distance the passengers are transported as if flat rates are in effect.

If they are to be applied to existing situations in communities already served by electric railway systems created under the old theory of the relations between municipalities and transportation utilities, a valuation of the property of the companies is a necessity. I see no unsurmountable obstacle in such valuation. I do not believe that any inflexible formula has yet been arrived at by courts and commissions by which the value of any particular property can be determined in justice to everyone concerned. The history of each company must be taken into consideration. I do believe that it is possible for reasonable men, even though their interests may seem to be opposed, to get together and arrive at an honest conclusion. In six cities in which service-at-cost agreements are now in effect valuations have been reached, and each valuation made has made the next one easier.

I conceive the merits of service-at-cost to be these:

That it establishes a method by which the price of electric railway service may be brought into correct relation with its cost.

That it is applicable to all methods of operation and control, whether by public or private corporations or under state or local regulation.

That it permits the public to specify the kind and the extent of service to be furnished.

That it is applicable to any system of charging, either by distance, by zones or by a flat rate.

That it induces co-operation between the public and the management in securing economical and efficient management.

That it removes the antagonism between the public and the corporations furnishing them transportation service.

That it establishes the transportation utilities as agents of the public, performing for the public a public service and receiving therefor a reasonable, a sufficient and an assured return.

I have no fear for the future of the electric railway industry. It is gradually adjusting itself to the higher price level, which we all know is upon us to remain. Undoubtedly fares will be higher than before, but the ability of the citizen to pay them has increased. Considered in terms of the average income, the fares will never, in my opinion, take from the patron so large a portion of his income as did the 5-cent fare when it was first established.

Solving the Traction Problem

The Problem from the Public Point of View Demands a Solution in the Form of Public Ownership Based on a Conservative Valuation

DELOS F. WILCOX, at the New York State conference of mayors at Schenectady on June 11, urged municipal ownership as the real solution of the present electric railway situation, and he favored action by the next Legislature in New York. He declared, however, that valuation is the crucial point, for municipal ownership cannot afford to start off under the handicap of an excessive purchase price. As regards financing, Dr. Wilcox referred to the method followed in Seattle by which the municipal railway bonds were made a first lien upon the gross earnings of the railway. He thought that this might offer a way of handling the financial problem in New York.

ELEMENTS OF THE COST OF SERVICE

In opening his remarks Dr. Wilcox analyzed the cost of service under (a) operating expenses, (b) accruing depreciation, (c) taxes and (d) return on investment. Under the first head he said that the public has a right to demand efficient management, which should include the taking advantage of progress in the art to reduce the operating costs now chargeable to unnecessary trackage, uneconomical routing, over-heavy cars, over-consumption of power and waste of platform labor. As for depreciation, he said that this had been too much neglected by over-optimistic managers, and that a correct policy should now be followed. This will have a tendency to increase the recognized cost of service and emphasize the demand for larger revenues.

Large taxes on electric railways were assessed because of the exaggerated ideas of the excess profits of electric railways, and budget makers for city and state have come to depend on them. In many cases the taxes have borne no direct relation to the profitableness of the industry and therefore are very little affected by a decrease in revenues or by an increase in operating expenses. A proper means of reducing the outgo in the case of hard-pressed electric railways, in the speaker's opinion, would be the reduction or the complete elimination of the special taxes and charges which have been levied against them in the days of their assumed or real prosperity. But this method of granting relief should not be adopted unless the companies demonstrate their good faith and efficiency by making use of all reasonable methods for the reduction of operating expenses.

The cost of capital, said Dr. Wilcox, has increased largely because the margin of safety, that is, the percentage of a company's income remaining after the payment of fixed charges, has decreased. But this decrease in the margin of safety, in the speaker's opinion, has been due largely to over-capitalization and the consequent inability of companies to sell common stock. Apologists for electric railways protest that the sins of the predecessor managements are now outlawed, but the trouble is that obligations rashly assumed will not cease to torment a man or a company until they are either repudiated or paid.

In regard to the general condition of electric railway finance, Dr. Wilcox said in part:

> Electric railway finance must be put upon a sound conservative basis. I say this knowing full well that in most cases the remedy proposed cannot be voluntarily accepted by the electric railway managers, directors and lawyers, who are in nominal control of the properties and the policies. These men frequently represent a narrow marginal interest that is threatened with extinction whenever earnings fall or expenses rise. Nevertheless, this marginal interest includes practically the entire group of active men whom we see and negotiate with as the operators and nominal owners of the electric railways. To them it is a matter of life or death to maintain their narrow footing and retain their jobs and their power.
>
> When the prices of materials increase so that it is almost impossible for an electric railway to earn a moderate return on a conservative investment at any rates that may be charged, these men seize upon this condition to assert that it has doubled the value of their property. They recognize perfectly that the fundamental fact of importance to them from the point of view of their private interest is the valuation. If they can get a high enough value recognized, then public service commissions will be impotent to control rates or to compel radical improvements in service. If they can get a value fixed that makes electric railway operations appear unprofitable, then they can forestall municipal ownership by putting it under an initial handicap that could not be overcome for many years, if ever.
>
> The foundation of the structure of electric railway investments in this country is rotten, and this is one of the fundamental reasons why the business has been unable to weather the storm of war times. I do not say that this is the only reason, but I do say that no plan which calls upon the public to pour more revenues and still more into the coffers of the electric railways will result in putting them on their feet financially without wrecking them as public utilities, unless this rotten financial foundation is removed and the whole structure rebuilt on a sound basis.
>
> I gravely doubt the possibility of getting the electric railway business upon a sound basis with its own consent. It feels itself desperately sick and would like to be cured, but apparently it prefers death to castor oil. I do not anticipate that the committees of the American Electric Railway Association and the United States Chamber of Commerce, or even the new federal advisory commission, will get very far in helping the bankrupt companies, unless they prescribe a disagreeable remedy.

Dr. Wilcox then took up the question of who is to pay the cost of service, mentioning the following points that require consideration: Is it to be the largest number of persons who can be persuaded by low fares and good service to avail themselves of electric railway facilities? Or is it to be the residual number of street car patrons who cannot be driven away by high fares and inconvenient service? Or is it to be the people who can be arrested and compelled to ride in street cars even though, at the price charged, they would prefer to walk, take a jitney or buy a Ford? Or shall a levy be made on the land owners for a share of the cost, and people be taxed because they could ride but do not?

In connection with the various aspects of this matter of paying for service, Dr. Wilcox said in part:

> American zoning experiments do not look to a decrease in the fares below the old 5-cent unit, even to the short rider, and so far as these zoning plans have been put into effect and so far as the results of proposed zoning plans have been forecast by the companies, they have been attended or will be attended by a decrease in traffic resulting from the increase in fares. The electric railway companies in this country have been flirting with permanent ruin by the pursuit of a rate policy that tends to diminish their usefulness as a public utility by driving away traffic, particularly that portion of it which is from the financial point of view most profitable to the carriers.
>
> It seems clear that there is little chance of reaching an agreement with the electric railways by which they will accept as the cost of service a figure that we can afford to pay. At least matters have come to such a pass that in many cases we cannot afford to saddle upon the car riders the full cost of service as measured by the demands of private ownership and operation. But with public operation for the benefit of the private owners, after the Massachusetts plan, or with subsidies out of taxation to make up for deficiencies in revenue where rates are kept down to the level which the general welfare of the community demands, we get into a realm of uncertainty and danger that ought to be avoided if possible. To make a service-at-cost plan effective under private management requires a persistent application of public intelligence and public will that is just as difficult as efficiency in direct public operation. It can hardly be doubted that the Cleveland plan has worked more satisfactorily than any other plan of private operation which has been tried in connection with any important electric railway system in this country, but Cleveland has its troubles, and the agitation for municipal ownership seems to be just as keen there as it is in other American cities. The case for public ownership and operation rests squarely upon the premise that the function of local transportation is public business.

Despite the legal and financial difficulties involved, Dr. Wilcox believed that until the cities adopted a definite program for definite action toward the municipalization of utilities, very little progress toward a solution of the electric railway problem would be made. He did not hesitate to blame the cities, and more particularly the mayors and other officials, for the negligence which has been displayed by them with respect to the electric railway problem. It is their narrowness of vision, their lack of initiative, their unwillingness to tackle big public jobs or to assume big responsibilities, that have kept cities in a condition of unreadiness and impotence. Yet the traction problem is the cities' problem.

In conclusion, Dr. Wilcox urged the passage of municipal ownership legislation that can and will be used. To his mind, one of the most important things in this connection is that the law shall leave a city free to initiate and carry through a municipal ownership policy without having to come to an agreement with the existing company as to how or when the policy is to be put into effect, or as to the price to be paid for the company's plant. There is needed an adequate public utility condemnation law so drawn as to protect the cities from having to pay an exorbitant price for property already devoted to the public service, merely because it is being taken from its private owner to be continued in the same service under more responsible management. In short, he declared, the crux of the traction problem is the valuation.

Safety Car and Public Ownership Discussed

Properly Devised Service-at-Cost Franchise Might Serve for Present, Says Dr. Wilcox—Local Chambers of Commerce Being Canvassed

THE public utilities committee of the Chamber of Commerce of the United States held its third hearing in Washington, D. C., on June 13 in regard to the electric railway situation. The main speakers were Henry G. Bradlee, Stone & Webster management corporation, and Delos F. Wilcox, consulting franchise expert, New York, N. Y., their subjects being respectively the one-man safety car and the general problem of the electric railway industry.

Mr. Bradlee, after describing the origin and the development of the safety car, directed attention to the three savings in wages, power and maintenance costs and to the increases in revenue from the greater service and riding that go with the use of this car. Mr. Bradlee stated that in general Stone & Webster find motor buses more expensive than the light-weight safety cars for heavy traffic; but sometimes because of the smaller investment required it is better to try buses during the test period in opening up new territory. As for the conversion of old cars, he declared that this would result substantially in only labor saving, with no benefit to the public through increased service.

Mr. Bradlee said that Stone & Webster companies have shown decreases in the number and the cost of accidents since the adoption of safety cars. In regard to employees, he averred that no man has been dropped because of one-man operation, for the increased service given with the safety cars and the very heavy labor turnover in the electric railway industry have enabled the companies to take care of all the old employees, new men not being taken on quite so fast for a short time.

In Dr. Wilcox's opinion, the present electric railway situation is due partly to financial policies voluntarily pursued by the companies, partly to restrictions imposed by the public and partly to economic changes. In connection with the first item he criticized the tendency of companies to neglect depreciation provisions and to be forever pushing for a bigger capitalization or a bigger capital value. In most cases, he admitted, electric railways are not receiving a fair return upon a conservative valuation of the property in public use. Even with such a fair return, however, the fixed charges in many cases could not be paid and sufficient margin for stock be left to attract new capital for development.

Under the heading of public restrictions Dr. Wilcox placed the fixed fare and tax burdens. He favored a flexible fare except in cases where the public policy of the community requires a certain fare for the sake of city development, it being understood that the full cost of service must be paid in some way. Likewise he favored reduced or eliminated taxes where they do not constitute a proper part of the cost of service. In so far as the paving tax is legitimately created by car operation, it should be charged against the railway, but in so far as it is simply a relic of past days and not related to present operation, it should be abolished. The replacement of paving after track repairs is a proper charge against the railway.

In the face of existing conditions, Mr. Wilcox thought that the only way out would be through public ownership. The tendency is toward a greater recognition of electric railway operation as a public business and a greater public control thereover, and the world does not move backward. There is a great movement in favor of service-at-cost resettlements, but such arrangements have the disadvantage of being indirect. Dr. Wilcox admitted, however, that public opinion is divided on the question of the advisability of municipal ownership and also that much time would be required to straighten out existing legislation so as to make such ownership possible.

In response to a query from P. H. Gadsden, as to whether efforts should not be made to scrap existing franchises and secure universal acceptance of new service-at-cost franchises based on fair valuations with the right of municipal purchase when the cities should secure the power, Dr. Wilcox agreed that such a general plan would help to steady the situation. Moreover, it would be a good permanent policy as regards preparation for an ultimate decision either way on the question of municipal ownership. Dr. Wilcox made the reservation, however, that the service-at-cost franchises must have satisfactory safeguards in relation to the purchase price of the property, an amortization process if the city so desired, and control over fares and extensions. He deplored the fact that no general authority exists for finding fair values and making both sides accept them, for the extravagant claims made when valuations are handled by direct negotiation militate against speedy settlements.

The members of the public utilities committee present were Lewis E. Pierson, New York, N. Y., chairman; P. H. Gadsden, Philadelphia, Pa.; E. K. Hall, New York, N. Y.; F. B. DeBerard, New York, N. Y.; A. W. Harris, Chicago, Ill.; Henry G. Bradlee, Boston, Mass.; H. L. McCune, Kansas City, Mo., and C. L. Harrison, Cincinnati, Ohio. Royal Meeker, commissioner of the bureau of labor statistics, who with Mr. Gadsden is a member of the recently created Federal Electric Railways Commission, also attended. Mr. Gadsden explained the proposed work of the federal body, and the public utilities committee expressed itself in favor of full co-operation.

LETTER SENT TO LOCAL CHAMBER

In order to add to the data already secured at hearings, the public utilities committee on June 11 sent to local chambers of commerce throughout the United States a letter asking for information concerning the local transportation situation in the larger cities. The letter was in part as follows:

> The committee on public utilities of the Chamber of Commerce of the United States has been so deeply impressed by the extent and gravity of the financial condition of street railways everywhere that it plans to make a report as soon as possible upon this national problem.
>
> Everyone agrees that the actual solution of each separate situation must be made by the official representatives of the community concerned, but certain general principles are common to all cases and the problem is of vital importance in its relation to the home owner, the manufacturer, the merchant, and business and social welfare generally. The problem is essentially a business problem, and it will not be well solved unless the representative business men of every city give it careful study and consideration and tender their best judgment and advice.
>
> In order to assure the compilation of a comprehensive report with practical and helpful recommendations, the national chamber's committee asks for the immediate co-operation of a committee of your organization and hopes that, if a proper committee is not already constituted, such a special committee may be appointed at once.

Side Lights on the Fare Zone—Why Fare Stages Should Vary in Length

It Is Better Business to Serve the Majority Than to Attempt to Give Exactly the Same Distance for a Given Fare

BY WALTER JACKSON

"WELL, here's another request from the Clamsboro Commercial club to extend Zone. 18 another 800 ft. That means the northbound riders could reach the Clamsboro stores without paying an additional fare. No wonder the Club members are united on this. What do you think we ought to do?"

"Why give it to 'em and thank the club for the tip. In trying to sell more of their merchandise, they are trying to show you how to sell more of yours."

"I can't see it that way at all. Seems to me we're expected to give another 800 ft. when we can hardly break even now. According to our latest survey, it costs just 4.76108 cents to carry a passenger through that zone. Give him another 800 ft. and we're busted good and plenty."

"Now, old man, let's forget those laboratory decimals for a minute and get down to hard pan. How much money are you getting from passengers who are sporty enough to pay another nickel for the sake of riding that 800 ft.?"

"Not enough to choke the fare box or callouse the palms of the conductor. Fact is 'most everybody gets off and walks; and we don't get any thanks for giving them the exercise, either."

"So you're not getting the money after all?"

"Lord, no. But we've got to be consistent and have everybody pay exactly the same rate. It's beyond me why the public doesn't see that we are simply trying to be fair."

"Sure, you're trying to be fair. The only trouble is that you're standing so straight that you're falling over backward. By the way, if your northbound passengers to Clamsboro are left 800 ft. short of the stores, then your southbound passengers must be able to override by the same distance."

"They can, but they don't. It's only a theoretical advantage. No reason, you know, why they should, because most of them are out to shop in Clamsboro and the rest are going through to other zones."

"I see. So if you shortened the zone of southbound riders by this 800 ft., nobody would start talking about discrimination, huh?"

"Nobody I can think of."

"And, on the other hand, it's pretty certain that none of your northbound riders are going to kick if you give them an additional 800 ft."

"You bet they wouldn't, as that's just what they have been after for years. But, as I said before, we can't afford it."

"What d'you mean, can't afford it? You just said that practically nobody paid that additional fare. Chances are that if you do extend that zone you'll make a lot more than at present."

"Give more and get more? How come, how come?"

"Why, because you will be taking the passengers exactly to the place they want to get to without creating the feeling that the railway is trying to do them. They won't care a peanut shell if you give them 1.843 miles for a nickel in one place and 2.41144 miles in another provided you land 'em in the jazz part of town instead of half way down the cemetery. If you must shorten the zone, cut back far enough to make walking out of the question. When I say you'll make more money by giving that extra 800 ft., I mean that people will ride oftener because your service will no longer be associated with any annoyances or hardships. These business men are right. They know that if the customer carries away pleasant associations he, or more often she, comes again. Who knows how many times the nickels that you need went into telephone orders. And even if this extension doesn't bring you an extra penny directly, it will save you many a dollar in better public relations."

"You're right. There's merit in the idea of shortening or lengthening the stages from the point of view of the mass of our passengers. As you know, I was raised in the old 5-cent suburban school which let the stages come wherever the milestones happened to be. I guess we can put this common-sense way across with the public as long as the Public Service Commission can be induced to see that what looks like discrimination is really the squarest thing after all. If we please the bulk of our riders, we needn't worry about what the regulators and the courts may say about this departure from old practices."

Supervision of Public Improvements

Should Be Under Special Department, Not Army, Says Recent Protest

M. O. LEIGHTON, chairman national service committee of Engineering Council, acting as chairman of the Engineers, Architects and Constructors' Conference on National Public Works, has just addressed a strong protest to the chairman of the committee on commerce, United States Senate, on a bill to create an "auxiliary engineer corps" in the United States Army for duty on the works of public improvement. This bill was introduced June 5, 1919, by Senator Ransdell of Louisiana "by request."

Such a program, according to Mr. Leighton, is opposed by a great majority of the engineers, architects and constructors of the United States who are advocating instead the consolidation of the engineering and construction work of the government into a department of public works. The United States stands practically alone among the great and small nations of the world in that it has no such department, and a bill will be introduced in Congress in the near future for the creation of a department of public works. Mr. Leighton says in his letter to the chairman of the Senate Committee on Commerce that such a plan is far superior to that described in the bill mentioned which "is merely a part of a very ambitious plan to place the army in the saddle over all engineering operations of the government."

The last section of the electric railway system encircling the city of Tokyo, Japan, was put in operation on March 1. A passenger may get on at any point of the circle, and alight at any other point on the route. A part of the circle passes through the busy part of the city as an elevated railway. The system belongs to the Imperial Government Railways, and constitutes an important adjunct to the main railway system.

Committee of One-Hundred

List of Those Appointed to Assist in Presenting the Electric Railway Case Before the Federal Electric Railways Commission

PRESIDENT PARDEE of the American Electric Railway Association announced on June 19 that the committee of 100 was nearly complete. The membership on that day is given in the list below. There remain only nine appointments to be made.

MILTON E. AILES, Vice-President Riggs National Bank, Washington

H. M. ATKINSON, Director Georgia Railway & Power Company, Atlanta

FRANK BACKUS, Vice-President American Steel & Wire Company, Worcester

JULIAN M. BAMBERGER, President Bamberger Electric Railroad Company, Salt Lake City

S. R. BERTRON, Director United Gas & Electric Engineering Corporation, New York

HENRY A. BLAIR, Chairman Board of Directors, Chicago Surface Lines, Chicago

CHARLES BOETTCHER, Chairman Board of Directors, Denver Tramway Company, Denver

NICHOLAS F. BRADY, President New York Edison Company, New York

FRANK W. BROOKS, President Detroit United Railway, Detroit

BRITTON I. BUDD, President Metropolitan West Side Elevated Railway, Chicago

H. M. BYLLESBY, President H. M. Byllesby Company, Chicago

CLARENCE M. CLARK, President E. W. Clark Management Corporation, Philadelphia

EMERY W. CLARK, President First Old National Bank, Detroit

E. G. CONNETTE, President International Railway, Buffalo

NORMAN McD. CRAWFORD, Vice-President Columbus Railway, Power & Light Company, Columbus, Ohio

THOMAS A. CROSS, President United Railways & Electric Company, Baltimore

GERHARD M. DAHL, Vice-President Chase National Bank, New York

ARTHUR V. DAVIS, President Aluminum Company of America, Pittsburgh

MOREAU DELANO Brown Brothers, New York

A. C. DINKEY, President Midvale Steel Company, Philadelphia

HENRY L. DOHERTY, President Henry L. Doherty & Company, New York

WALLACE B. DONHAM, Vice-President Old Colony Trust Company, Boston

R. J. DUNHAM, Vice-President Armour & Company, Chicago

VAN HORN ELY, President American Railway, Philadelphia

WALTER F. FIELD, Vice-President Philipps Insulated Wire Company, Providence

HENRY FLOWERS, President Fidelity National Bank & Trust Company Kansas City

ALLEN B. FORBES President Harris, Forbes & Company, New York

FRANK R. FORD Ford, Bacon & Davis, New York

FREDERICK GOFF, President Cleveland Trust Company, Cleveland

FRANKLIN T. GRIFFITH, President Portland Railway, Light & Power Company Portland, Oregon

B. H. GRISWALD, Jr. Alexander Brown & Sons, Baltimore

W. F. HAM, President Washington Railway & Electric Company, Washington

GEORGE E. HAMILTON, President Capital Traction Company, Washington

OLE HANSON, Mayor City of Seattle, Washington

C. H. HARVEY, President Knoxville Railway & Light Company, Knoxville

Chairman

GUY E. TRIPP
Westinghouse Electric & Manufacturing Company, New York

Vice-Chairmen

JOHN H. PARDEE
President American Electric Railway Association, New York

H. L. STUART
Halsey, Stuart & Company, Chicago

JAMES H. McGRAW
President, McGraw-Hill Company, New York

J. D. MORTIMER
President North American Company, New York

PHILIP J. KEALY
President, Kansas City Railway, Kansas City

THOMAS N. McCARTER
President Public Service Railway, Newark, N. J.

A. W. BRADY
President Union Traction Company of Indiana, Anderson

O. B. WILLCOX
Vice-President Bonbright & Company, New York

SAMUEL M. CURWEN
President J. G. Brill Company, Philadelphia

ANTON G. HODENPYL Hodenpyl, Hardy & Company, New York

SAMUEL INSULL, Chairman Board of Directors, Metropolitan West Side Elevated Railway, Chicago

A. B. LEACH, President A. B. Leach & Company, New York

ARTHUR W. LOASBY, President First Trust & Deposit Company, Syracuse

HOMER LORING, Chairman Public Trustees, Eastern Massachusetts Street Railway System, Boston

HORACE LOWRY, President Twin City Rapid Transit Company, Minneapolis

A. M. LYNN, President West Penn Railways, Pittsburgh

RICHARD McCULLOCH, President United Railways of St. Louis, St. Louis

WILLIAM B. McKINLEY, President Illinois Traction System, Peoria

SAMUELS McROBERTS, Executive Manager National City Bank, New York City

S. Z. MITCHELL, President Electric Bond & Share Company, New York

THOMAS E. MITTEN, President Philadelphia Rapid Transit Company, Philadelphia

RANDALL MORGAN, Vice-President United Gas & Improvement Company, Philadelphia

J. K. NEWMAN, Chairman of Executive Committee, American Cities Company, New Orleans

J. R. NUTT, President Citizens Savings & Trust Company, Cleveland

E. H. OUTERBRIDGE, President Pantasote Company, New York

J. S. PEVEAR, President Birmingham-Tide Water Railway, Birmingham

E. W. RICE Jr., President General Electric Company, New York

EDWIN W. ROBERTSON, President Columbia Railway, Gas & Electric Company, Columbia

E. N. SANDERSON Sanderson & Porter, New York

W. KESLEY SCHOEPF, President Cincinnati Traction Company, Cincinnati

J. N. SHANNAHAN, President Newport News & Hampton Railway, Gas & Electric Company, Hampton

THEODORE P. SHONTS, President Interborough Rapid Transit Company, New York

PAUL SHOUP, President Pacific Electric Railway, Los Angeles

FRANCIS H. SISSON, Vice-President Guaranty Trust Company, New York

CLEMENT C. SMITH, President Wisconsin Securities Company, Milwaukee

JOHN J. STANLEY, President Cleveland Railway, Cleveland

CHARLES A. STONE Stone & Webster, Boston

J. J. STORROW Lee, Higginson & Company, Boston

LUCIUS S. STORRS, President The Connecticut Company, New Haven

EDWARD T. STOTESBURY J. P. Morgan & Company, Philadelphia

J. F. STRICKLAND, President Dallas Railway, Dallas

KNOX TAYLOR, President Taylor-Wharton Iron & Steel Company, High Bridge, N. J.

A. W. THOMPSON, Federal Manager Baltimore & Ohio Railroad, Baltimore

W. B. TUTTLE, First Vice-President San Antonio Public Service Company, San Antonio

T. H. TUTWILER, President Memphis Street Railway, Memphis

WILLIAM VON PHUL, Vice-President United Railroads of San Francisco

G. W. WATTLES, Vice-President Omaha & Council Bluffs Street Railway, Omaha

H. H. WESTINGHOUSE, Chairman Board, Westinghouse Traction Brake Company, New York

THOMAS N. WHEELWRIGHT, President Virginia Railway & Power Company, Richmond

JAMES G. WHITE, President J. G. White & Company, New York

HARRISON WILLIAMS 60 Broadway, New York

TIMOTHY S. WILLIAMS, President Brooklyn Rapid Transit Subsidiary Companies, Brooklyn

GEORGE T. WILSON, Vice-President Equitable Life Assurance Company, New York

J. H. WILSON, President Mobile Light & Railroad Company, Mobile

O. D. YOUNG, Vice-President General Electric Company, New York

Federal Investigation Opens in New York

Ex-President Taft, as First Witness, Says that Public Antagonism Must Be Removed to Get Industry Out of Discouraging Situation

THE Federal Electric Railways Commission, recently appointed by President Wilson to investigate the general electric railway situation, began its public hearings with a session on June 19 in New York City. The chief witnesses were ex-President William H. Taft and John H. Pardee, president American Electric Railway Association.

Mr. Taft began with a recital of the work of the National War Labor Board, of which he is joint-chairman, in its efforts to insure maximum production during war time. He has concluded, from his experience, that the restricted financial condition of electric railways in the past kept wages down below what they should have been. The board early decided that in determining wages it would be inequitable to consider, as a basis, the companies' ability to pay, but it recommended that the companies be allowed increased revenues. The board frequently met with response on the part of state authorities, but upon local councils and referendum voters the recommendation had no more effect than if it had been written in water.

The War Labor Board at first recommended the appointment of a federal commission with control over rates, it being Mr. Taft's view that it was within the constitutional power of Congress to give the President authority to grant rate relief to needy electric railways in war time. The recommendation was not accepted, and now the near-peace situation does not justify legislation to this end. In reply to queries as to what the present commission can do, however, Mr. Taft declared that its duty is to get the facts from all interests concerned and to make findings thereon. Such findings, in his opinion, will have a strong moral effect throughout the country. He particularly thought that the commission should receive evidence as to the exact situation in individual localities but that no decision or suggestion as to the settlement of local questions should be made unless the dispute was voluntarily submitted by both parties and the commission deemed it wise to act.

THE INDUSTRY NEEDS HELP

The general situation in the electric railway industry, Mr. Taft said, is most discouraging. As factors in the situation he mentioned the expansion of the systems, the growth of automobile competition, high war costs and, in some cases, public belief in past corruption and over-capitalization. In his opinion, however, the advantages which some railways secured through sinister means in the early days have been more than offset by the injustices later inflicted by the public in a desire for revenge.

The fixed 5-cent fare has been another handicap. Some of the public evidently believe that this fare is guaranteed to them by the Constitution and look upon an increase as the grant of an outrageous profit to the investors. As a matter of fact, Mr. Taft stated, a fixed fare in the long run is not just for either side, and the public should consider that the purchasing power of the nickel has greatly declined in recent years. The difficulty with increasing fares, however, is that higher fares cause reduction of traffic. A railway rate increase. which may be paid eight or ten times a day by a family, is much more irritating than other utility increases payable monthly.

COSTS ARE NOT GOING DOWN

The electric railway industry, Mr. Taft said, was established on the basis of a cheap fare and cheap labor and materials. It was never contemplated that the 5-cent fare would be sufficient to bear the burdens of present-day operation. It is true that the War Labor Board did not deem it wise to fix a general minimum wage, and that the basic wages from 36 to 42 cents in various cases, according to living costs, were only temporary adjustments for six months or during the period of the war. Nevertheless, Mr. Taft asserted, the awards made have established a more or less permanent higher standard of wages, and there is not a bit of doubt that the operating expenses of electric railways will remain on a high level. If he were a member of the federal commission, trying to formulate a suggestion for a permanent solution, he would advocate the commission's addressing itself to the public upon the basis of present prices being the normal ones for the future.

SUGGESTIONS FOR IMPROVEMENT

In the course of his replies to various queries, Mr. Taft touched upon several points relating to improvement of the situation. In order to overcome public prejudice on the ground of financial history, it will be necessary to ascertain the real investment in the properties. Upon this an adequate return must be allowed if the credit of the industry is to be restored. As in many cases in recent years, commission approval should be required for the issuance of new securities. Electric railways should not be required to pay taxes under any other rule that that applying to other forms of invested capital. Furthermore, the companies should be so reorganized as to have power to give up unprofitable lines that should never have been built.

As for fares, Mr. Taft felt that any fare above 7 cents was sure to cause a loss of business. The zoning system, in his opinion, should be tried more than it has been, for the flat-fare system, adopted mainly for convenience, has not produced the results expected. In the zoning system there should be a charge to encourage the short-haul rider, and the minimum might be below 5 cents.

If increased fares leave a deficit which must be met through taxation, the public will naturally take over control of the management. Mr. Taft's belief in the reduced economy of public operation, however, made him hope for the continuation of private operation. The service-at-cost plan is theoretically just, but its practical workings in the various cities should be studied. While the incentive to efficiency and economy may not be so strong under service-at-cost as under private operation. there is still enough motive, in the absence of an absolute guarantee of return, to make the management more economical than under public operation. In Mr. Taft's opinion, service-at-cost franchises would allay rather than strengthen the demand for public ownership. It would not be practicable to have all franchises converted at once to the service-at-cost plan, but the success of such franchises in one state would be likely to lead eventually to uniformity throughout the country.

Lastly, Mr. Taft suggested that in trying to devise a permanent solution of the electric railway problem the federal commission should not seek to fix exact terms but should outline equitable principles and leave the working out of details to public bodies. As to whether such bodies, for the exercise of control over rates and service, should consist of state commissions or city councils, he believed that the more practicable plan would be to give complete control to the state bodies. In view of the strong desire of people for local regulation, however, and the fact that a certain amount of initial supervision by the cities might help to reconcile them to state control without sacrificing too much speed and efficiency, it might be wise to allow the cities thus to participate. State commissions are better qualified to make all final decisions, and matters of rates and service should not be left to the cities without appeal to the commissions.

RAILWAYS OFFER AID

Mr. Pardee stated that at a recent meeting of the executive committee of the American Electric Railway Association a committee of one hundred of the leading owners, operators, bankers and others was appointed to prepare a presentation of the situation as it is viewed by the electric railway interests. A meeting has been called for June 26 in New York, and sub-committees are working out a definite plan which it is hoped will be adopted then. A week later, Mr. Pardee thought, the committee could make its first report, the idea being to present different phases of the situation one at a time. In reply to a query as to whether or not the committee would desire a three or four-day session for the presentation of all its data, Mr. Pardee said that some parts of its work would require more time than others but that such a general session might be possible at a later date.

COMMISSION ASKS FOR LARGER APPROPRIATION

Gaylord C. Cummin, consulting engineer, New York, at one time city manager of Grand Rapids, Mich., and also of Jackson, Mich., was the only witness on Thursday afternoon. He divided electric railways into two groups, those which had an earning capacity sufficient to pay their way and those which did not. For the latter group, where they were a public necessity, he saw no future except with a subsidy. Most roads belong to the former group. He considered no form of franchise universally satisfactory, the best being service-at-cost. With such, however, there should be a sliding scale of return, the rate increasing when the fare decreased, so as to give an incentive to the company to economical operation and to the public to co-operate with the company. He thought that municipal operation should be considered only as a last resort as the public was a poor employer.

In referring to the extent of automobile competition he mentioned the gasless Sundays of last Autumn, when the traffic on several electric railways with which he was acquainted increased from 30 to 40 per cent. He considered electric railways should be relieved of burdens, like that of paving, which were not connected with railway operation. He believed the companies ready to adopt improvements conducive to economical operation, such as the one-man car under conditions for which it was suited, but pointed out that lack of credit often prevented action along these lines. He urged the reestablishment of credit as a primary step.

At the conclusion of Mr. Cummin's testimony Chairman Elmquist announced that the meeting was adjourned.

After the organization meeting, held in Washington, June 18, Chairman Elmquist gave out the following statement: "In order to handle the electric railway situation adequately and comprehensively the commission decided it would be necessary that more money be provided to carry out the program. We have therefore asked for an appropriation of $100,000 which will come before the Senate appropriations committee within the next few days. We have received a number of inquiries from various cities throughout the country presenting specific problems arising from the electric railway situation in those localities. We want to emphasize that the function of the commission is merely to investigate and recommend as regards the general situation, and it is not its purpose to advise on any specific situation that confronts a given community. The commission has not the facilities to do this and moreover it is necessary that both sides of the question be presented before a just and reliable recommendation can be made."

Recovering Track Material in St. Louis

THE track yards of the United Railways of St. Louis are located adjoining the repair shops and general office of the company on Park Avenue where they occupy a tract of two city blocks. The property has a direct steam railroad connection so that heavy materials are easily received. In the yards at present the company is meeting with much success in making available for reuse a great deal of old track material, particularly screw spikes, joint plates, joint bolts and Nichols' joints. The means employed is the sand blast.

The screw spikes, when removed from old track, have usually parts of the old ties adhering to them, but a short treatment with the sand blast cleans them perfectly and after being dipped in oil they are ready to use again. Fish plates require no treatment other than the sand blast.

Nichols' joints are taken out of the track by cutting the rail on each side of the joint near the end of the plate. The plates are then taken into the yard and the rivets knocked out with a pneumatic hammer with a long stroke, called a pneumatic "gun." The spelter is easily knocked loose from the plates and is then ready for remelting.

The company tried various ways of operating the sand blast, particularly with bolts and screw spikes which are so small that they could not easily be set up against a board. Finally the best way was found to be to put the bolts and screws in the hoppers of some old dismantled wheelbarrows so that they roll around as the sand blast plays on them.

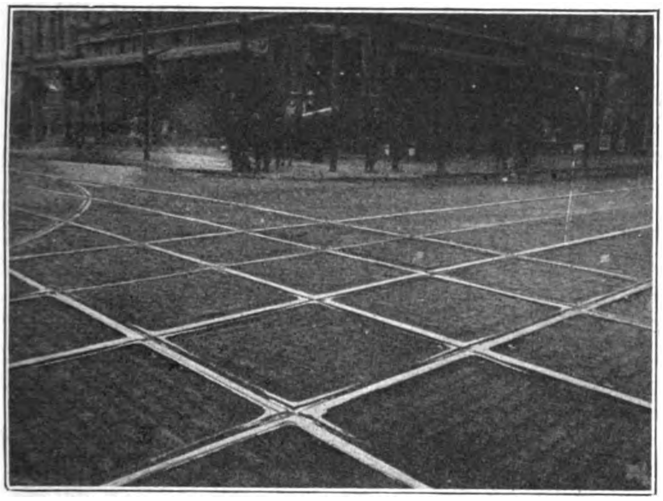
Manganese Special Work Repaired by Welding

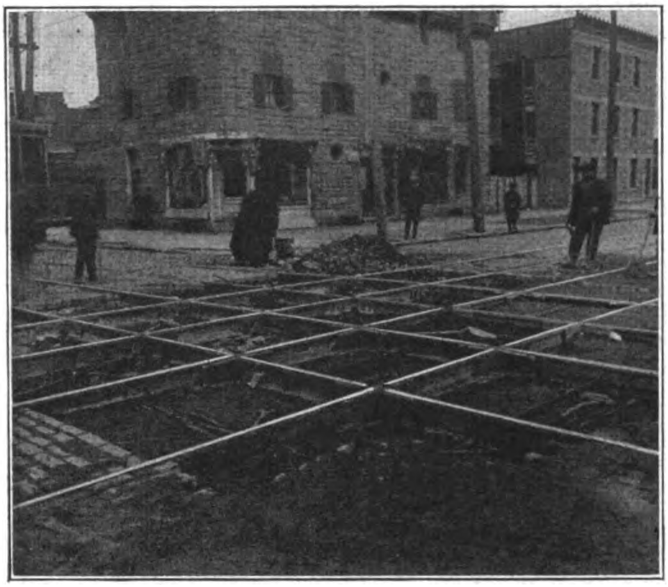
The Method Used by the Montreal Tramways for Reclaiming and Repairing Cast Manganese Special Work Is Described and Some Figures for Savings Are Given

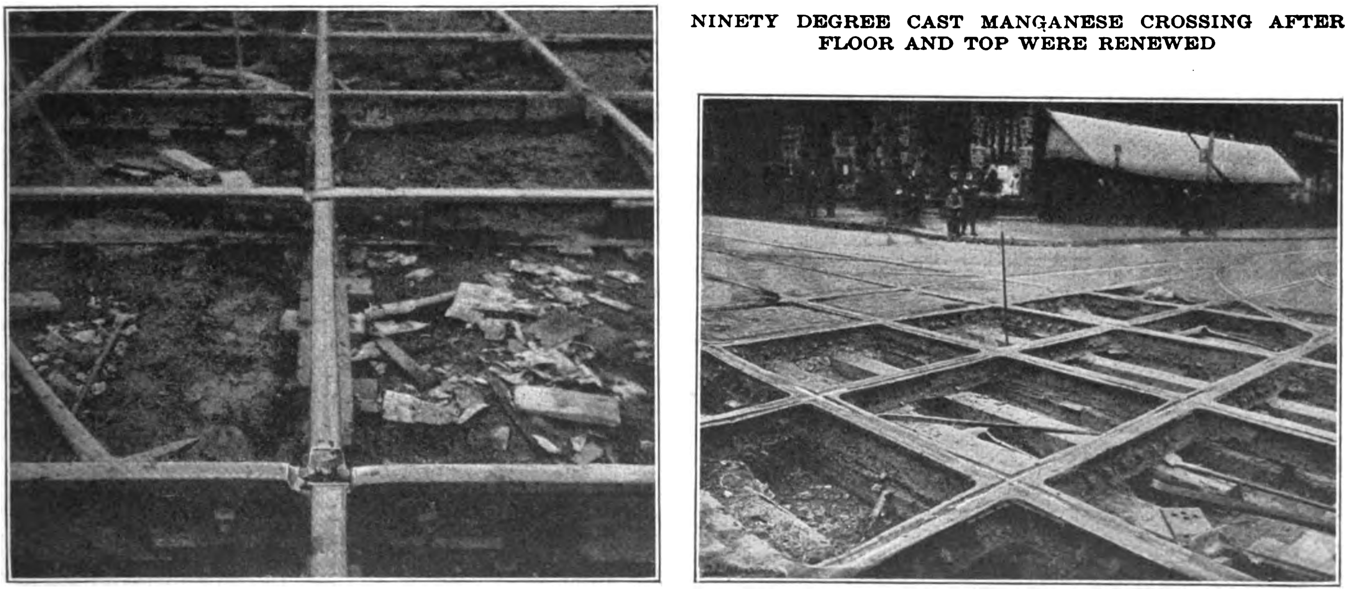
BY JULIAN M. SCOTT
Superintendent of Tools and Machinery Montreal Tramways

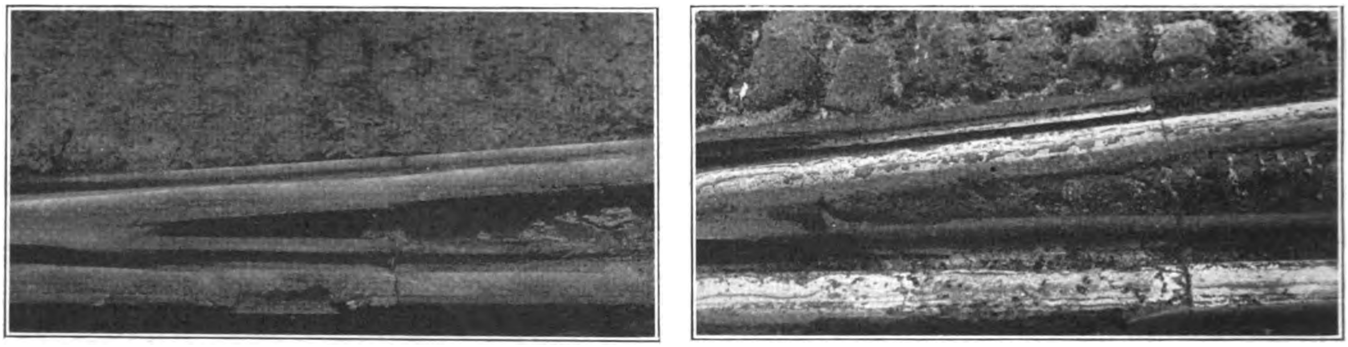
IN THE April 19, 1919, issue of the ELECTRIC RAILWAY JOURNAL an article appeared which dealt, in a general way, with the application of electric arc welding to track work, and included its use for manganese special work repairs. From this portion of the article, I would conclude that the author's experience with this class of work had been rather unfortunate and entirely contrary to results obtained by the Montreal tramways, where, with a few exceptions, all classes of worn and broken manganese special work are repaired with satisfactory results and with a large saving in labor and material.

An accompanying illustration shows a 90-deg. double-track cast-manganese crossing. This is one of our most important intersections and bears heavy traffic on both streets. In the fall of 1916 the diamonds of this crossing were practically worn out; all the floors were broken through and most of the corners missing. Our usual method of rebuilding floors and corners was applied and with a small amount of filling done periodically, this crossing will be kept in service until, at least, 1921. The serviceable condition of these diamonds is proved by the fact that our engineers consider them worth new foundation and paving this spring. For five


NINETY DEGREE DOUBLE TRACK CAST MANGANESE CROSSING


NINETY DEGREE CAST MANGANESE CROSSING AFTER FLOOR AND TOP WERE RENEWED


RECLAIMING RAIL DIAMONDS—AT LEFT, BEFORE REPAIR; AT RIGHT, READY FOR PAVING IN



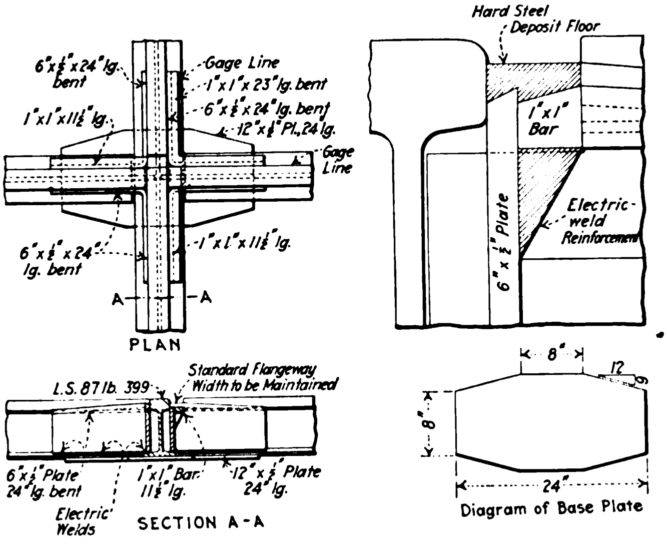
RECONSTRUCTING THE HEEL OF A DAMAGED MATE—AT LEFT, MATE WITH PIECE SHELLED OUT; AT RIGHT, REPAIRED MATE

years these repairs will have deferred an expenditure of $6,000 and made a net saving of $5,550 on interest and depreciation charges, at a cost of less than $200. A second illustration shows the condition of one of the corners of this crossing after having the entire floor and top renewed.

Another valuable and highly successful class of repair is that of replacing pieces broken from the tread and other portions of switches, mates, crosses, etc. In this same class might be included the building in of badly cupped ends on these same pieces. The heel of a perfectly good 115-lb. mate from which a large piece shelled out is shown on this page. Ordinarily this mate would have to be immediately scrapped, but in this case it was returned to full working life, as indicated in the next illustration.

The points of frogs and mates when worn short and off center are readily replaced. Switches and mates on which the bulk of the traffic takes the curve, become worn low on one side, causing derailments, etc. This trouble can be mitigated for a time by grinding, but before long the only cure is replacement. We remedy this trouble by building the tread up to the original height and shape.

To illustrate the saving, the following figures are an approximation of the value of such work to this road during 1918. All figures are based on the assumption that the life of each piece of special work is prolonged one year, thus deferring expenditures and earning the depreciation and interest charges. No allowance is made for pieces saved from the scrap pile and returned to remaining working life.



METHOD OF WELDING AND REINFORCING DIAMONDS

526 pieces of special work treated representing a value of	$159,000.00
Interest for one year on the deferred investment at 6 per cent	$9,540.00
Depreciation at 12½ per cent per year	$19,875.00
	$29,415.00
Total cost of the work—all charges included	$1,200.00
Saving effected	$28,215.00

This is a very substantial saving and proves beyond question the value of repairing special work.

Special work of the hard-center type is treated in exactly the same manner and with equally satisfactory results. Our method and materials are of the simplest. When building in large breaks or holes, the first material used is bare ¼-in. round common mild steel electrodes. The wearing top is built on with bare ¼-in. round electrodes of low-grade tool steel having a carbon content of 0.85 to 0.95, which has proved to be good material at a reasonable price. The current is kept at the lowest point which will give proper fusion, and is about 140 amp. at 30 to 40 volts across the arc. No welding operations are ever carried on at 250 volts, and the standard resistance welders deliver about 70 volts, which will give 35 to 40 volts across the arc.

We are at present reclaiming and adding floors to some 87-lb. built-up high T-rail diamonds by a method which has proved satisfactory. The rail is fairly good, but the rail ends and connections are bad.

The last two illustrations show portions of the diamond before and after repair, and the sketch details the method. The total cost of this intersection reclaimed, amounts to $500.

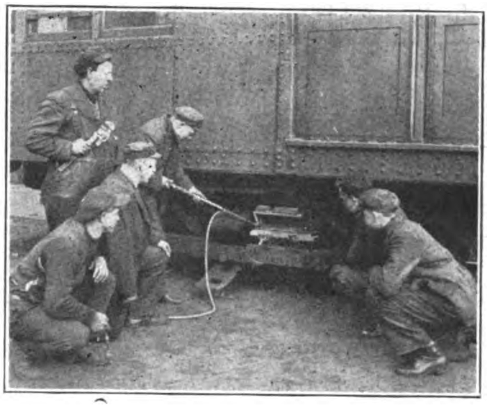
Keeping Down Air Resistance of Trains

In view of the progress made in aeronautics during recent years a writer in the *Engineer*, London, considers timely the renewal of interest in reducing the resistance met by trains in their passage through the air. He calls attention to the law that the power required to force a flat transverse surface through the air is, in horse-power per square foot, approximately 6 millionths of the cube of the velocity in miles per hour. Every square foot of transverse surface, then, requires about ½ hp. at 43 m.p.h., 1 hp. at 55 m.p.h., 2 hp. at 70 m.p.h., and 3 hp. at 80 m.p.h.

The article referred to quotes from the report of the Electric Railway Test Commission, based on work done at the Louisiana Purchase Exposition and elsewhere, relative to the importance of so shaping high-speed cars as to reduce the resistance to an economic minimum.

The leading editorial in the *Saturday Evening Post* for June 14 is on the electric railway financial situation. The title is "Settle This."

Some Mysterious Car Ailments



Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD

Another Suggestion for Securing Proper Connection for Fields of Interpole Motors

A SHORT ARTICLE in this department published in the April 19 issue of the ELECTRIC RAILWAY JOURNAL described trouble due to a wrong connection of the interpole fields of a motor. In the case described the interpole field was reversed and flat spots on the commutator developed very rapidly.

On a large Eastern property similar trouble was experienced not only from the interpole fields being reversed but also from the main field coils of tapped-field motors becoming reversed. These field coils were so constructed that they could be put in the motor either side up with equal facility. Where new fields were installed at the shops several cases occurred where these were installed wrongly and it became necessary to devise some means so that the shopman could tell readily when the fields were properly installed. A method which has proved entirely satisfactory was to stamp the terminals with numerals instead of with the letters "O" and "I" which were previously employed. These numerals were selected so as to tell not only which end of the coil was the commutator end but also which was the top and bottom side of the coil.

A Train That Wrecked Itself

IN ORDER to begin passenger operation on a certain high-speed electric line it was necessary to resort to some temporary construction at one of its terminals. The electric interlocking and signal plant could not be completed in time, and a temporary hand-throw switch was installed to regulate the movement of trains when entering and leaving the one-pocket terminal.

An employee, whose duty it was to govern all train operations into and out of this pocket, was stationed at this hand-throw switch on the tracks. During the course of his work he found it rather difficult to throw this switch without a better leverage. He accordingly slipped a short length of 2-in. pipe over the switch handle each time that he operated the switch. This method worked satisfactorily until one time the handle stuck so that he could not remove the pipe. The switch was thrown and the motorman had received the signal to proceed out of the pocket. The forward truck of the first car passed over the switch point in the proper direction, but on account of the curvature of the tracks and the length of the car there was sufficient overhang at the center of the first car so that the low body construction at the center doors struck the 2-in. pipe handle. This forced the switch to the opposite position just before the rear truck of the first car reached the switch point. The front truck thus started to operate on one track while the rear truck was on another track. There were several upright columns at this point with which the car collided. The force of impact was so great that it literally cut the car in half. Considering the present high cost of this type of car, which is about $25,000, the accident was a very costly one.

A Puzzling Case of Battery Control Trouble

A LARGE Eastern railway property operating cars equipped with multiple-unit, battery-type control, used single-car operation during the off-peak period and train operation during rush hours. At one of the inspection and overhauling shops trains were made up by adding a car taken from the yard to the one already in service. On one occasion the coupling was made, but as soon as the low-voltage control jumper was inserted the control equipment of both cars would not operate. An electrician was hastily summoned, and he found all battery fuses blown. He applied new fuses to one of the cars, but on attempting to install new fuses in the other car all fuses were immediately blown again. Thinking that there might be a short-circuit in the latter car, he removed the control jumper from between the cars and inserted new fuses so that the control equipment of both cars operated satisfactorily. This seemed to indicate that there was a short-circuit in the jumper itself. A new jumper was obtained and inserted, whereupon all the battery fuses were again blown. The passengers were then transferred to another train and the two cars were brought into the shop for a careful inspection and test. The control equipment on each car was tried out separately and both operated properly, but as soon as the cars were connected with a jumper the battery fuses would be blown. Connections were rung out and the usual tests for wrong connections were applied, but everything appeared satisfactory. The batteries were removed from both cars, and one of them was found to have been reversed; that is, the positive end had been placed where the negative end should have been and *vice versa.* With a single car this did not affect its operation as there was the necessary difference of potential between the positive and negative battery wires, but as soon as this car was coupled electrically to another car with batteries properly installed there was a short-circuit through the fuses and both batteries of the two cars. This, of course, resulted in the blowing of the fuses, through the connection of the negative of one battery to the positive of the other.

As a precaution to prevent a recurrence of this trouble the battery boxes were arranged with small wooden cleats so that it would be impossible to insert them improperly.

Paint and Varnish Prove Effective Insulators

A TRAIN operating in elevated service on a large Eastern railway system was ready to leave the yard but the motorman found that the train would not start. He examined all fuses to make certain that none had blown, and other parts of the equipment that might be the cause of the trouble, but nothing unusual was found. He then signaled for an electrician to help him out of the difficulty. The motorman operated hismaster controller at the front end of the train in the usual manner while the electrician noted the operation of the various switches of the multiple-unit equipment. It was found that the control operated properly but that the line switch did not come in. This being the first switch in circuit, there was no power to operate the train.

With this type of equipment, cut-out and reset switches were located in the motorman's cab. The cut-out switch was for the purpose of opening the line switch control circuits so that the control apparatus could be operated without the line switch coming in. The reset switch was to reset the line switch or circiut breaker in case it blew from overload. In this particular case the cause of the trouble was found to be a small amount of varnish on the switch blade of the cut-out switch. This car had been in the shop for its annual painting and varnishing, and in varnishing the woodwork of the interior of the cab a small amount of varnish had been placed on the switch blade. The trouble was quickly remedied by scraping this off and the train proceeded into service. Special instructions were given the painters to be careful not paint the contact surfaces of any switches or electrical equipment.

Too Much Lubrication Is as Bad as None at All

THE train dispatcher had just been remarking how smoothly everything was running when the telephone rang and an excited voice asked to have an electrician sent at once to the incline on the main line. The electrician hurried to the scene of the trouble where he found a two-car train stalled which was equipped for double-end multiple-unit control operation. Other cars were now being held up by the disabled train so that it was necessary to have quick action. By attempting to operate the equipment from the different master controllers of the train the electrician found that both cars would work correctly if operated from the No. 2 controller of the dead car. With the motorman in the front cab to apply the air brakes and give the signals for operation the electrician operated the train to the terminal from the cab at the middle of the two cars. The train was then ordered to the shop where a careful inspection was made. It was found that when the control was operated in the usual manner from the front cab that the control notched up correctly on the good car but would not notch up on the other. As both cars operated correctly from the No. 2 controller of the dead car, it was evident that trouble existed somewhere on the reverse control wire of the dead car. This trouble was finally located as a ground on the interlock finger of the main reverser. Current had passed to ground for a distance of 2 in. along the surface of the drum from this control finger to the grounded main circuit reverse finger. It was found that oil and vaseline which had been applied for lubricating the contacts had run down over the insulating surface and had gathered small particles of copper and brakeshoe dust which had ultimately caused the ground. This trouble was easily eliminated by thoroughly wiping the insulating surface of the drum. To prevent the recurrence of this trouble instructions were given to the repairmen to exercise more care in lubricating contact surfaces and to use less oil and vaseline.

The Chicken-Egg Problem Has Its Parallel in Railway Transportation

TWO railway men were discussing the subject of delays and overcrowding recently. The first maintained that whenever a car becomes overcrowded this condition results from being delayed. The second argued that it is the overcrowding that causes the delay and that the cars are delayed more and more because they are jammed full on the back platform so that passengers cannot readily get aboard.

This is the chicken-egg problem all over again. Eggs come from chickens, chickens come from eggs. Delays mean overcrowding, overcrowding means delays. Where did it start?

It may have been due to a person not standing at the right place when the car stopped, or to the passenger who made the car stop a second time to let him or her board or alight. It may be due to the passenger who hadn't the right fare or ticket ready and caused a delay on the platform, or maybe the passenger did not unfold his transfer before handing it to the conductor. Most likely it began with the first man who insisted on staying on the rear platform of the car. When one man remains there, others do the same. Two passengers who stand near the rear of a car beget more rear-end stickers, and so the game goes on. Passengers apparently do not understand that by moving forward in the car as far as possible, even when the car is not crowded, that the service will be greatly improved.

Peter Witt, in an address before the New England Street Railway Club recently, made these interesting comments upon why people stand in cars:

"I used to think the people wanted to sit, but when I saw a motor of inferior kind drawing a trailer of a superior kind, with the people standing in the motor and vacant seats in the trailer, I became convinced that people do not want seats. They want to get home, and they want to go by the first car that comes along, on the theory that it will get them home sooner. Of course they don't know, as you know, that the more they crowd the first car, the later they will get home."

This latter seems to give the overcrowding-means-delay argument the best of it.

F. N. Koziell, chief engineer Railway Storage Battery Company, calls attention to the statement of the weight of the Yucatan cars described on page 968 of the issue of this paper for May 17. The weight complete is 28.3 tons, not 37.5 tons as stated.

Insuring Standard End Play for Armatures

The B. R. T. Provides Calipers for Each Overhauling Shop to Insure Rapid and Uniform Installation of All Armatures

WHEN installing a new armature and new armature bearings in a motor shell one of the problems which the overhauler has to solve is the proper location of the bearing faces. Sufficient clearance should be allowed between the armature and bearing faces to insure free movement of the armature, for if this is too tight hot bearings will result. On the other hand care must be taken to see that the end play is not too great, otherwise the armature head may be ripped off by striking the brush-holders or the back ends of the armature coils may be damaged by striking the frame.

The mechanical department of the Brooklyn Rapid Transit Company has designed a special form of shop caliper to facilitate this installation and to make sure that all armatures are installed with a standard end clearance of $\frac{1}{16}$ in. The accompanying illustrations show the details and the method of use. The standard practice of this company is to require that all new armature bearings be fitted to the individual shafts on which they are to be placed and that their faces be finished to standard dimensions. The babbitting and rough finishing of all armature bearings is done at a single shop. Bearings are rough-bored to a diameter such that it will still be necessary to turn off $\frac{1}{16}$ in. of babbitt in order to fit the smallest size shaft allowed for the particular type of motor. Shafts are calipered at the overhauling shops and in the electrical repair department for uneven wear on bearing seat. Where necessary the shafts are trued up in a lathe. Shafts of armatures for surface cars which are worn $\frac{1}{8}$ in. and of elevated cars which are worn $\frac{1}{16}$ in. below standard are scrapped. In order to provide for uniform clearance bearings are calipered with a combination inside and outside caliper. The outside end is set to fit over the shaft on which a special clearance gage strip 0.012 in. thick has been placed. The bore of the bearings is then made to fit the inside end of the caliper.

The method used in fitting armature bearings into motor frames by means of the special shop calipers, illustrated herewith, consists first of setting the caliper to give the distance between the outside faces of the armature collars. This gives a reading *A* on one scale of the caliper. The caliper is next set to give the measurement between the inside faces of the motor shell housings *B*. By referring to tables for the different types of motors' samples of which are given herewith, the distance that the bearings project inside the frame and indicated by *C* and *D* is read directly. The bearings to be used are then placed in position and the amount that it is necessary to turn off the faces to give the desired dimensions is obtained.

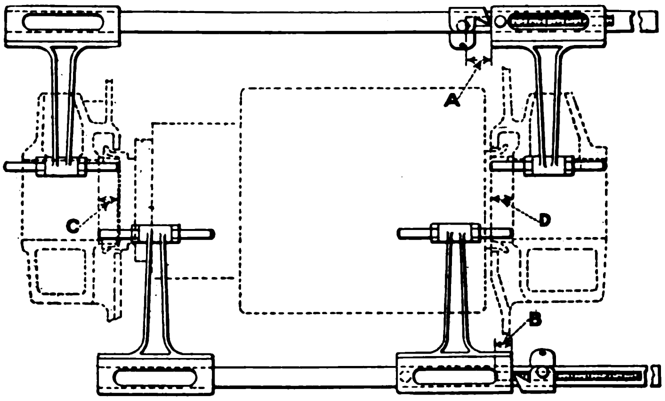
To illustrate this let us consider the installation of a new armature and bearings in a Westinghouse-101 mo-

WESTINGHOUSE No. 101 MOTOR

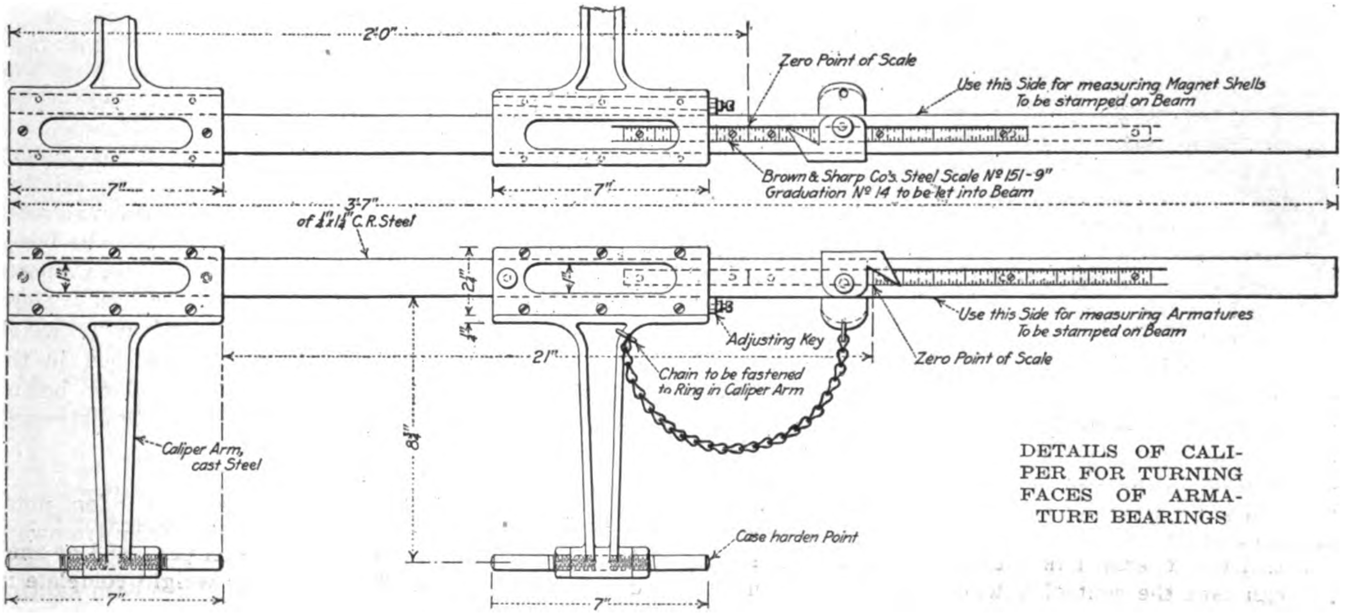
Reading at *B*	Reading at *A* [illegible] C	D	[illegible] C	D	[illegible] C	D	[illegible] C	D	[illegible] C	D
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

GENERAL ELECTRIC No. 234-A MOTOR

Reading at *B*	Reading At *A* [illegible] C	D	[illegible] C	D	[illegible] C	D	[illegible] C	D	[illegible] C	D
3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



METHOD OF USING CALIPER GAGES


2'0"
Zero Point of Scale
Use this Side for measuring Magnet Shells To be stamped on Beam
Brown & Sharp Co's. Steel Scale Nº 151-9" Graduation Nº 14 to be let into Beam
7"
7"
3'7"
of 1"x1/4" C.R. Steel
2 1/2"
1 3/4"
Use this Side for measuring Armatures To be stamped on Beam
Adjusting Key
Zero Point of Scale
21"
Chain to be fastened to Ring in Caliper Arm
Caliper Arm, cast Steel
8 3/4"
Case harden Point
7"
7"

DETAILS OF CALIPER FOR TURNING FACES OF ARMATURE BEARINGS tor. If the reading *A* is ⅝ in. and *B* 1 in. we find by referring to the table for this motor that the distance *C* by which the bearing should project inside at the commutator end is 1 9/16 in. and the distance *D* by which the bearing should project inside the motor at the pinion end is 1¾ in. Bearings fitted to these dimensions will provide 1/16 in. end play for the armature.

The use of these calipers and tables provides a very accurate and rapid method for fitting the bearings and makes certain that all are installed uniformly and with the correct clearance.

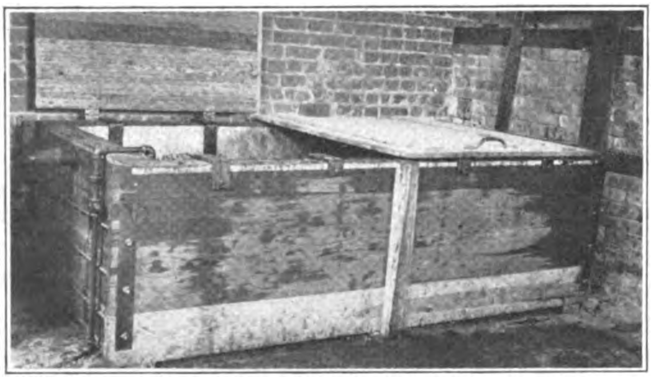
Keeping Quenching Oil Cool for Tempering Steel Springs

Union Traction Company of Indiana Builds Water and Air-Cooled Tank at Its Anderson Shops for Use in Tempering Springs

AT THE Anderson shops of the Union Traction Company of Indiana, trouble was experienced in tempering car springs because the oil in which the hot springs were immersed direct from the furnace could not be kept cool. A new cooling tank has recently been constructed and the results indicate that there will be no further trouble in this respect.

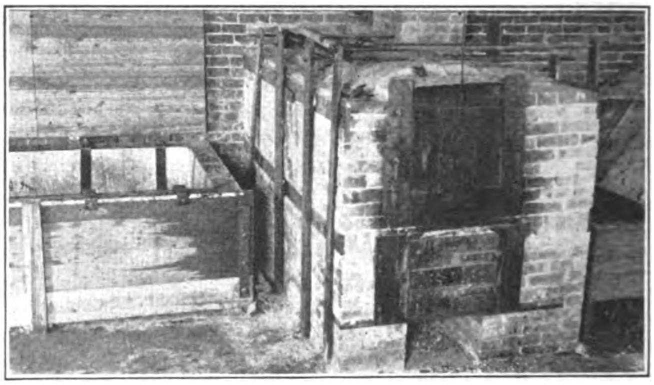
The tank frame is constructed from 1¼-in. timber and measures approximately 7 ft. long, 4 ft. wide and 27 in. high, with the ends of the side timbers protruding and tied with rods as shown in an accompanying illustration. The inside of the tank is lined with No. 24 galvanized iron, leaving a wall space of 4 in. on all four sides. A second lining of galvanized iron is put in at the bottom and all joints soldered. Cold water is piped into this wall space entering through a 1½-in. pipe near the top at one end and leaving at the opposite end through three 1-in. pipes leading into a 1½-in. outlet.

Several pipes are laid across the bottom of the oil tank. These are perforated in the side with small holes and are connected to an air line piped over one side of the top of the tank. Four straps of 2½-in. x ½-in. iron bent into U-shape act as braces to the sides of the tank. These extend to within an inch or two of the bottom and on them is laid a strip of wire mesh which gives a new bottom to the tank on which the springs are laid. The tank is fitted with covers and is filled with a quantity of oil.



NEW QUENCHING OIL TANK FOR TEMPERING STEEL SPRINGS

Car springs lose their temper with age and hard service. When they have lost much of their spring and have flattened considerably they are taken into the shop and again bent into the proper shape. They are then placed in the furnace shown in an accompanying illustration. The heat from the firebox below passes up through a hollow wall on one side and enters the oven through 4-in. x 5-in. ports about every 4 in. along one side, passes over the springs and is drawn through similar openings in the opposite side out into the chimney.



FURNACE FOR HEATING SPRINGS AND QUENCHING OIL TANK

After the proper temperature has been reached the springs are drawn from the furnace and quenched in the tank of oil. A flow of cold water circulating around the four sides and bottom of the tank and streams of air from the pipes in the bottom of the oil keep the oil cool and aërated, so that the springs are properly quenched without unduly heating the oil.

It is planned soon to install an air-operated bulldozer in this room with proper dies for bending the springs into the desired shape before tempering. This work is now done by hand.

Hollow Boring of Axles to Reduce Weight

THE Twin City Rapid Transit Company, Minneapolis, Minn., has for the past seven years been hollow-boring all of its 4¼ x 8-in. car axles in order to reduce the total weight of the car. A special lathe machine was designed and built by the American Machine Company for this purpose. A hole 2 in. in diameter is bored through the center of the axle, reducing the weight of the axle approximately 60 lb. at a cost of 60 cents per axle. This figure is based on the cost of labor approximately three years ago, as no axles have been bored recently.

Since 1912 approximately 2500 axles have been hollow-bored with no detrimental effects. It is believed that the metal in the center of the axle contributes very little to the strength and this would seem to be borne out by the fact that of the 2500 axles on this property no breakages or other accidents have occurred. These axles are not heat-treated, but are bought in the rough by the company, and are forged and finished in the company's shops. It is claimed that hollow boring of heat-treated axles actually increases the strength of the axles.

Electric Railway & Tramway Journal, London, notes that women conductors are disappearing from tramways in almost all parts of Great Britain, in many cases rapidly, making way for the men who have been fighting for their country.

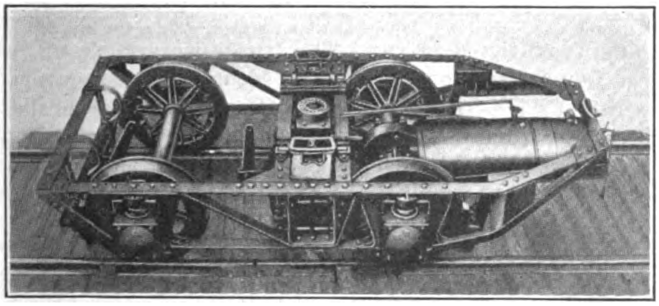
Life of Creosoted Piles

Still Sound After Twenty-eight Years' Service in Southern Pacific Wharf

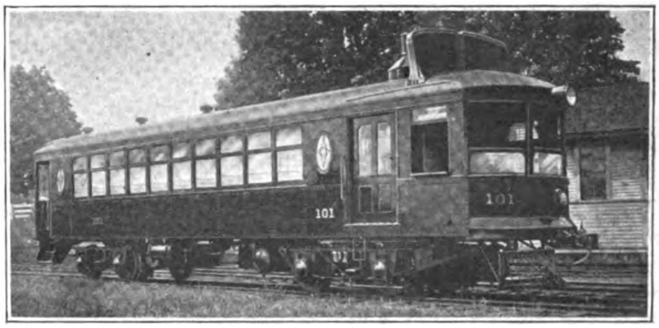
INTERESTING facts as to the effect of salt water on wooden piles were developed this year when a wharf of the Southern Pacific Railroad on San Francisco Bay was removed to make room for port improvements. The wharf was the oldest creosoted pile structure which thus far had been dismantled on the Pacific coast and contained about 14,000 creosoted piles which had been in service for periods ranging from eighteen to twenty-nine years. Of these piles, interest centers particularly in 600 which were of Douglas fir, well seasoned before being treated with creosote by the Bethel process in the fall of 1889, and were driven in 1890. Records show that under a pressure of 200 lb. per square inch and a temperature of 260 deg. Fahr., the piles absorbed 14.17 lb. of creosote per cubic foot.

Of these 600 piles, thirty-three were selected at random for test purposes when the wharf was dismantled. Out of this number twenty-two (67 per cent.) were entirely sound; two (9 per cent) had been slightly attacked by borers; six (18 per cent) had been severely attacked and two (six per cent) were so damaged as to be unfit for further use. These percentages were typical of the entire lot, it is reported, and about 70 per cent of the 600 are to be redriven just as they are. In fact, this percentage of poles suitable for redriving, it is reported, applies approximately to the entire 14,000 piles. Those not as suitable showed damage only between mud line and high-water mark, and other portions of these piles were in good condition.

The results of this study are believed to confirm the theory that a creosoted pile is absolutely immune from attack of marine borers such as exist in Pacific Coast waters, so long as the shell or portion of the pile impregnated with creosote remains intact. If the borer can gain access to the inner and untreated core through some defect in the wood, he will work upward and downward in the untreated wood, but in no case have traces of borers been found in the creosoted section.



FRONT TRUCK AND METHOD OF INSTALLING ENGINE OF UNIT RAILWAY CAR

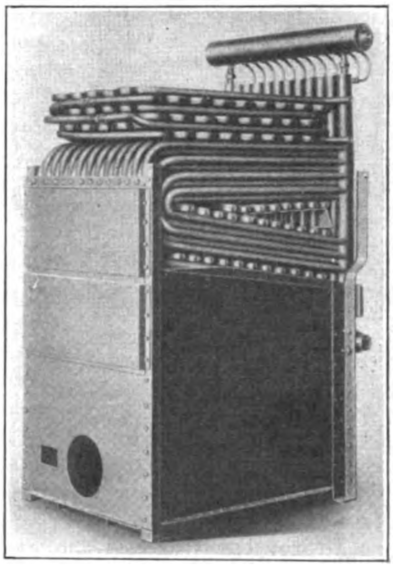


NEW TYPE OF STEAM-DRIVEN RAILWAY CAR USING GASOLINE OR KEROSENE AS FUEL

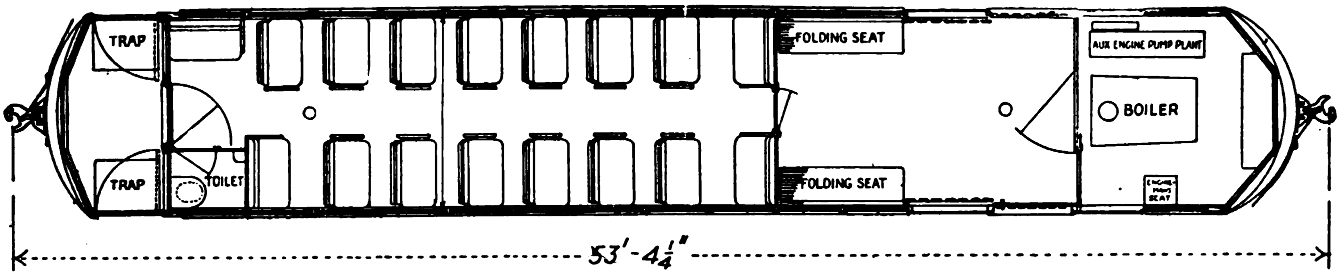
Steam-Driven Passenger and Baggage Car for Railway Operation

THE Unit Railway Car Company, Boston, Mass., is placing on the market a steam-driven car to which the name "Unit Railway Car" has been applied. It is propelled by a twin cylinder engine developed by F. O. Stanley, inventor of the Stanley steam automobile. The engine is mounted on and forms a part of the forward truck as shown in an accompanying illustration. Power is transmitted direct to the axle by a spur gear, the engine and driving gear running in an oil bath in an oil-tight case.

Either kerosene or refined crude oil may be used for fuel. The fuel is fed to the combustion chamber under constant pressure controlled by an automatic valve. The water is also fed automatically to the boiler, which is located in the forward part of the car. Control of the steam as it passes from the boiler to the engine gives direct control of the car, and this is effected by a throttle valve placed in the steam line where it leaves the boiler. The throttle valve is operated by control levers in a similar manner to that used in the control of the modern locomotive. The trucks used are of the archbar type and are equipped with Timkin roller bearings. The engine and front truck



BOILER AND SUPERHEATER FOR STEAM-DRIVEN RAILWAY CAR



SIMPLIFIED PLAN OF LAYOUT OF STEAM-DRIVEN RAILWAY CAR constitute a unit, the bolter being placed quite near the driving axle in order to secure proper weight on the driving wheels.

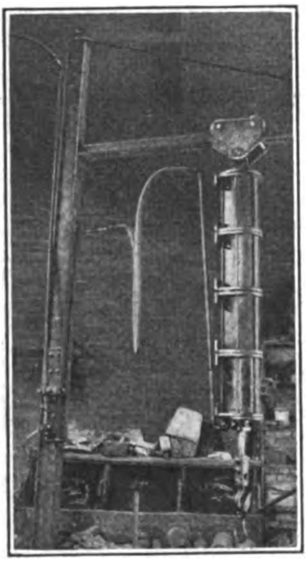
The manufacturer shows one of these new types of car at the Atlantic City convention of the American Railroad Association, in session as this issue of the ELECTRIC RAILWAY JOURNAL goes to press.

Air Hoist Built from Old Brake Cylinders

Union Traction Company of Indiana Designs a Hoist from Scrap Material for Use in the Brass Foundry

TO FACILITATE the handling of 60-lb. and 80-lb. crucibles to and from the furnaces in the brass foundry of the Union Traction Company, Anderson, Ind., an air hoist has been erected. This has been built almost entirely from scrap material, so that the cost of the hoist has been confined practically to the labor of construction and erection.

The hoist itself is made from four old 7-in. straight air-brake cylinders, discarded from antiquated equipment. The cylinders are separated from each other by a pasteboard gasket and are held together by six ½-in. rods, extending the full length of the four cylinders and passing through holes drilled in the flanges. As an additional factor of safety, the cylinders are spot welded together with the oxy-acetylene torch. The plunger is a 1½-in. steel rod with a large hook on the lower end and is operated in the same manner as the brake-cylinder plunger. The hoist is suspended by a ring from a four-wheel truck which operates on a horizontal track 10 ft. long. This track is composed of two angle irons, set back to back and separated by lugs. The track is fastened 9 ft. from the floor by a large angle to the bottom of a 6-in. I-beam which serves as a vertical support extending from the floor to the ceiling and so pivoted at each end as to revolve freely. The free end of the track is suspended by a rod from the top of the vertical support.



AIR HOIST BUILT FROM OLD SCRAP 7-IN. BRAKE CYLINDERS

Air at the shop pressure of 90 lb. is piped to the vicinity of the hoist and this line is connected by a rubber hose to a pipe on the vertical support. An ordinary three-way air valve is inserted in the line about 4 ft. from the floor, and the piping then extends up the support again and is connected with the hoist by means of a long rubber hose to permit the use of the hoist within a radius of 10 ft. in any direction from the vertical support.

The chief use of the hoist, as already mentioned, is to lift into and out of the furnaces, by means of a special grip device, the crucibles of brass which weigh approximately 160 lb. The hoist is capable, however, of easily handling 2000 pounds.

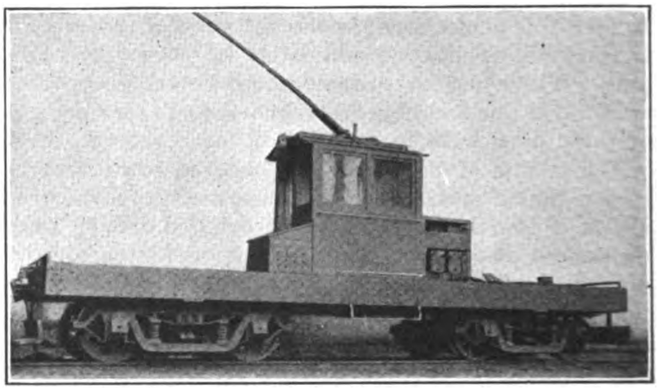
Economically Constructed Locomotive for Handling Coal

Much of the Material Which Was Used in the Construction of a 60,000-Lb. Locomotive Was Salvaged

THE Union Traction Company of Indiana has recently completed a locomotive for use exclusively in handling coal at the power house. The over-all dimensions are: length 30 ft., width 8 ft., height from top of rail to clearance line 12 ft. 6 in. A great deal of the material used in the construction of the body was salvaged.

The end sills, side sills and cross sills consist of one 15 in., 40-lb. channel each, the end sills and side sills having flanges set in. There are four longitudinal sills each being a 4-in. x 10-in. stringer, and the draft beams are 10-in. I-beams. The cross sills are spaced 6 ft. apart and the wheelbase is 18 ft. The flooring of the car is 1¾ in. yellow pine. The 15-in. channels used for sills were salvaged from an old bridge on the company's right-of-way, and the draft beams were salvaged from one of the shops.

The cab of the locomotive is of wood construction, 4 ft. x 6 ft., the material being salvaged and rebuilt from an old work car. The K-14 control equipment used also came from the same car. The trucks were made by the St. Louis Car Company. The locomotive is equipped with four GE-57 motors, M-15-C automatic air brakes, Tower couplers and electric markers. A 23-watt headlight is operated in a five-light series with two markers and two lights within the cab. The total weight of the locomotive is approximately 60,000 lb.



LOCOMOTIVE BUILT BY UNION TRACTION TO HANDLE COAL FOR POWER PLANT

It has been found under operating conditions that the locomotive is a trifle light for handling several cars of coal on a grade. Weight will be temporarily added by placing materials on the platform, and eventually the 15 in. of floor space between sills will probably be filled with concrete. Other locomotives in use by the company have the sloping end hoods, but this equipment was built without the hoods so that, if necessity required, it could be used as a general utility car in transporting materials or men as well as to pull a train.

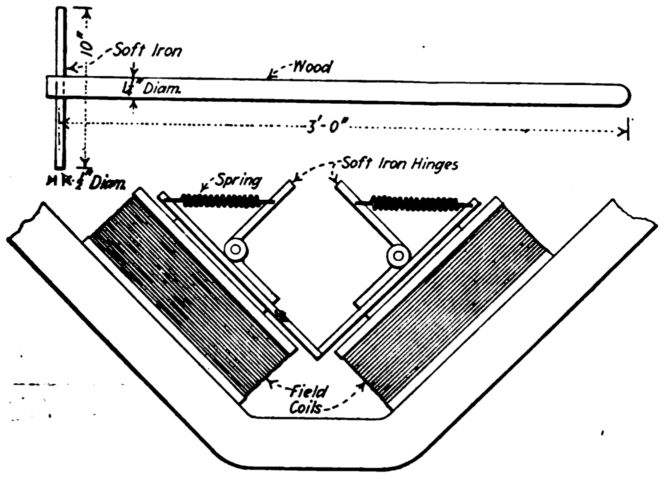
In the article on third-rail bonding appearing in last week's issue of this paper one of the cuts shown in the center of page 1155 was inverted and the captions for the twin terminal bond and soldered type of ribbon bond were interchanged.

Testing Newly Installed Field Coils for Polarity

Simply Constructed Shop Devices Insure Proper Installation and Connection of Railway Motor Field Coils

WITH some types of motors it is a very easy matter to reverse the field coils or to install improper coils. With such motors the only safe plan after new fields have been installed is to test their polarity. Testing with a compass is not a satisfactory method, as the magnetism from the motor field is liable to reverse the polarity of the compass needle so that a false indication will be given.

One method for testing the polarity of newly installed field coils which has been in use at the East New York surface shop of the Broklyn Rapid Transit System for several years has proved entirely satisfactory. The testing apparatus used consists of two pieces of round soft iron, about ½ in. in diameter and 10 in. long, which are inserted transversely in the end of two wooden rods about 3 ft. long, and 1¼ in. in diameter. The iron rods make a driving fit in the poles which serve as handles. By means of a water rheostat a current of from 7 to 10 amp. is passed through the field windings. Two of the testing devices are used while making the test, one end of each iron rod being placed in the center of each field magnet. Befor the circuit is closed through the field winding the outside ends of these testing rods are held apart about 2 in. When the current is passed through the windings they will be drawn together where the two pole faces have opposite polarity and repelled if the faces have the same polarity. The wooden handles on these testing devices are used as a safety precaution. In an earlier form of the apparatus, the workman held the iron pieces directly and experience showed that there was danger of the two pieces being drawn too forcibly together if an excessive current was passed through the motor field. Under this condition if the workman had the iron pieces in his hands he would be liable to injury and a short-circuit at the field terminals might result, while with the wooden handles he has a longer leverage and can hold the pieces steadier.



SHOP TESTING APPARATUS FOR DETERMINING POLARITY OF RAILWAY MOTOR FIELDS. AT TOP, IRON ROD WITH HANDLE. AT BOTTOM HINGED PIECES HELD IN POSITION BY SPRINGS

Another device similar to the preceding in its method of operation is shown in another illustration. This consists of a wooden framework upon which two-hinged iron pieces are mounted. The wooden framework is so constructed that the hinge pieces will come in the center of the pole faces of a motor. In their normal position the hinged ends are held about 2 in. apart by two springs. In place of a water rheostat for cutting down the current to the desired value for energizing the field coils, a resistor has been constructed of approximately 60 ohms resistance. The end of this has a flexible lead which is attached to a hook pole. A 20-amp. fuse is mounted on the pole in series with the connection as a matter of precaution. The hook of the pole is placed over a trolley wire and the regular railway shop voltage will cause from 8 to 10 amp. to pass through this resistor and through the field windings. The advantage of this last method over the preceding is that one man can make the test on a pair of field coils by placing the testing apparatus in position first and then closing the circuit, while with the preceding method it is necessary to have two men, one to hold the testing pieces in position and the other to close the circuit.

AMERICAN ASSOCIATION NEWS

Mail Hearing in Boston

A HEARING was given to the New England electric railways at Boston, Mass., on June 13 and 14 by Attorney-Examiner George N. Brown of the Interstate Commerce Commission upon rates to be paid by the United States government for the transportation of mail on trolley lines in that district. Joseph Stewart, assistant to the Attorney General, appeared as at earlier hearings as counsel for the Post Office Department and S. S. Ashbaugh appeared for the electric railways, representing the American Electric Railway Association. The New England case was prepared with great thoroughness under the leadership of a committee of the New England Street Railway Club headed by R. B. Stearns, chairman, the other members being C. K. Reed, Howard Fritch and D. P. Abercrombie, Jr.

As was the case in the Washington hearing of June 9, the evidence showed that the companies are receiving but 25 to 33 per cent of what should be paid for the services rendered. It was brought out that twenty-seven leading companies receive a total of but $49,359 annually for their mail service. The schedule of witnesses included members of the above committee and the following: Clark V. Wood, president Springfield (Mass.) Street Railway; Roscoe Anderson, Rhode Island Company; Elton S. Wilde, Union Street Railway, New Bedford, Mass.; R. E. Hood, Massachusetts Northeastern Street Railway; M. G. Stratton, Shore Line Electric Railway, Norwich, Conn., and V. S. Curtiss, Connecticut Company, New Haven.

The exhibits filed in the case included a map of all the electric roads in New England, lists of companies, mileage of companies, statistical summary of replies to the committee's questionnaire, detailed data as to mail service, costs and revenue on each system replying, maps of individual roads showing mail routes. Witnesses were examined as to their special burdens in handling through, side and terminal service since 1916, when the present law went into effect governing electric railway mail pay, and witnesses for companies under public control emphasized the intent of the legislation under which they operate to provide for meeting all costs of all classes of service in the revenue received from operation. It was provided in the procedure that each company might have its own ideas as to the proper method of rate-making, but all were agreed that the present compensation is absurdly inadequate. It was pointed out that unless the rates are very materially increased, a general withdrawal from the carriage of mails by electric roads in New England must follow.

An example of the burdensome nature of mail transportation under present conditions was presented by R. B. Stearns, first vice-president, Eastern Massachusetts Street Railway, Boston. On this system, which includes 915 miles of track, there are twenty-eight mail routes. In 1918, 42,247 trips were made between terminals, the average weight of pouches being 18 lb. The pouches ranged in weight from 8 to 100 lb., the heavier cases arising from the transportation of shoe heels by parcel post.

The length of the routes varies from 0.75 to 19.2 miles, the weighted average length of route being 4.37 miles. The annual pouch ton-miles is 8383, and the company receives but $5,874 for its mail-handling service. The carriage of parcel post sacks is the chief cause of congestion. The interference with traffic and annoyance to passengers are so serious that the company would have discontinued the carriage of mails last spring had it not been for the hearings now being realized. The side service is especially troublesome and should be eliminated entirely, and should be handled by specially delegated government employees. The compensation for parcel post packages should be on the basis of space and weight required, and no company, Mr. Stearns said, should be obliged to carry milk, chickens and produce on its passenger cars. Much relief would be obtained if the Post Office would limit passenger car mail to first-class matter in three or four pouches, arranging for the carriage of other mail on the freight cars of the company. The relation of the mail revenue to the total passenger earnings, which are about $13,000,000 per year, is too small to justify the present service. The company is furnishing a $40,000 service for less than $6,000.

Many instances of apparent discrimination, inequalities in compensation, and inadequacy of revenue resulting from present arrangements were brought out by the witnesses. It was shown that in numerous cases where railways have given up the carriage of mails, the contractors succeeding have been paid by the government three to four times as much as the companies were able to obtain.

Zone Systems of Fare Collection Discussed

A MEETING of the American Association committee on zone systems was held in New York City on June 13. Of the committee, W. H. Sawyer, Columbus, Ohio, Chairman; Thomas Conway, Jr., Philadelphia, Pa.; J. H. Hanna, Washington, D. C.; L. H. Palmer, Baltimore, Md.; R. P. Stevens, Youngstown, Ohio; L. S. Storrs, New Haven, Conn., and C. L. S. Tingley, Philadelphia, Pa., were present. E. B. Burritt, secretary of the association, and Walter Jackson, of the ELECTRIC RAILWAY JOURNAL were also in attendance.

The committee confined itself largely to a general discussion of the scope of the work, and Dr. Conway suggested as an outline for the committee's report that it contain sections on bibliography, terminology, field of application for zone systems, varieties of zone systems, methods of fixing rates and methods of collecting fares. Doctor Conway and Prof. A. S. Richey were appointed to draft a report along the lines suggested. R. M. Feustel, president Fort Wayne & Northern Indiana Traction Company, and Mr. Jackson will be asked to assist the sub-committee. July 7 was selected as a tentative date for the meeting of the sub-committee and July 11 as that for the next meeting of the full committee.

The committee on collection and registration of fares, of the Transportation & Traffic Association, was requested through the secretary to confer with the committee on zone systems before submitting that portion of its report dealing with the collection and registration of fares on zone systems.

Providence Section Activities

THE Rhode Island Company section held meetings on April 7 and May 6 with attendances of more than 100 at each. At the April meeting A. L. Campbell was elected president, W. C. Slade and A. E. Paddock vice-presidents, H. B. Shaftoe and S. J. Allard secretaries, E. E. Worrall treasurer, and C. E. Redfern, J. A. Lockhart, W. D. Wright and A. V. Gardiner directors. At this meeting W. D. Wright, superintendent of equipment, described in non-technical language the development of the equipment features of an electric railway car. Theodore F. Green, co-receiver of the company, explained what is being done to straighten out the company's financial affairs. At the May meeting Corp. H. E. Eklund related his war experiences. At both of these meetings the entertainment features were made much of by the members in attendance.

LETTER TO THE EDITORS

Rule Should Be In Code

NATIONAL FIRE PROTECTION ASSOCIATION
ELECTRICAL COMMITTEE

BOSTON, MASS., June 13, 1919.

To the Editors:

In the 1915 edition of the National Electrical Code the second paragraph of Rule 23, section "a" read as follows:

> Where the switch required by No. 24 "a" is inside the building, the cutout required by this section must be placed so as to protect it, unless the switch is of the knife-blade type and is enclosed in an approved box or cabinet, under which conditions the switch may be placed between the source of the supply and the cutout.

Through an error this section was omitted when the 1918 edition was printed.

The electrical committee of the National Fire Protection Association has voted that this matter be given the widest publicity, that all interested parties may be advised that this section was omitted. The electrical committee would recommend that inspection departments approve an installation in accordance with this paragraph.

RALPH SWEETLAND,
Secretary Electrical Committee.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Detroit Men Accept

Compromise on Wage of Sixty-five Cents Maximum—Fare Increase Part of Settlement

The employees of the Detroit (Mich.) United Railway resumed work Thursday night, June 12, after voting to accept the compromise wage offer of the company. The increase of wages, which is retroactive to May 16, provides for a scale of 50 cents an hour for the first three months, 55 cents for the next nine months and 65 cents an hour after one year's employment. This increase, according to W. D. Mahon, president of the Amalgamated Association, makes the Detroit men the highest paid employees of their kind in the United States and Canada.

COMPANY PRESENTS SETTLEMENT PLAN

Immediately following the issuance of the court order by Circuit Judge Marschner by which the controversy as to proper fare rate was placed in the hands of an arbitration board, officials of the railway presented a plan to the men whereby they would all be granted a straight increase of 10 cents an hour. This proposal was flatly rejected and finally a program calling for increases of 7, 9 and 12 cents an hour was decided upon. This plan involves about the same amount of money as the first.

As a result of the strike settlement 3-cent tickets on the Pingree lines, the Cross Town, Sherman, Harper and Fourteenth lines will be abolished and workingmen's eight for a quarter tickets will also be done away with on June 21. While the court order fixed the fare on all lines at 5 cents, President Brooks of the company instructed the employees to accept outstanding workingmen's tickets and tickets of the so-called 3-cent lines for full fare the same as previously until midnight, June 21.

INCREASES FOR OTHERS LIKELY

In line with the increases granted the 3000 platform men, who operate the cars, it is expected that employees of the company serving in other departments will be granted increases also. The combined wage increases have been estimated as adding more than $1,000,000 to the annual operating expenses of the company.

The company has announced it intends to charge only one 5-cent fare to North Detroit in the future, instead of two, as has been collected previously. The city was also notified that the company would comply with the Council resolution and proceed with the Twelfth Street and St. Jean Avenue extensions.

The special election on the $10,000,000 bond issue to provide funds for beginning a municipal railway system will be called early in August instead of July 22, as formerly planned. The fact that the Council must specify in the resolution and ordinances fixing the election, that money will be raised for extensions and purchase of the day-to-day agreement lines, makes the postponement necessary.

COUNCIL HAS APPROVED NEW FARES

The Council approved the 5-cent fare agreement reached with the railway by Mayor Couzens and Corporation Counsel Wilcox. A resolution calling for the appointment by the Council of the city's arbitrators to the board was passed. The board will determine after three months whether the company needs to charge 1 cent for transfers. It is expected that the board of arbitrators will be named in the very near future.

Strike at Lowell, Mass.

The lines of the Lowell (Mass.) division of the Eastern Massachusetts Street Railway were shut down by a strike which began on June 16, the cause being the introduction of a hand fare register. The strike took place in violation of the agreement of the employees' union to arbitrate all matters in dispute, and the chief bone of contention was the attempted use of these registers by conductors on open cars.

Thomas Lees, manager of the Lowell division, issued a statement early in the day, pointing out that the employees had disregarded their agreement and expressing the company's regret at the inconvenience caused the public by the walkout. Later in the day the public trustees of the company issued the following statement over the signature of Homer Loring, chairman of the board:

> This is not only a strike by the Lowell employees in violation of the existing arbitration agreement, but it is an attempt on the part of these employees to control the matter of collecting fares. The fare register, against which the strike is directed, insures two things—first, that the passenger pays his fare, and, second, that the company gets it after it is paid. Its use on many large lines has been personally investigated by the trustees, who are firmly of the opinion that such use is beneficial alike to patrons, employees and owners.
>
> The Legislature has placed on the trustees certain very definite responsibilities as to administrative and operative duties, and if we are to allow the men to dictate the method of collecting fares we are shirking a major responsibility at the outset.
>
> We regret the inconvenience to the people of Lowell, and the loss of revenue both to the company and the men, but the issue must be squarely met—our conductors in Lowell cannot be allowed to decide what system of fare collection the company shall adopt.

Comment Worth Pondering

Minneapolis "Journal" Talks from Shoulder on Local Traction Situation

The Minneapolis *Journal* says service is paramount in any settlement of traction affairs there. In some quarters the effort has been made to befuddle the issue as contrasted between that city and St. Paul, in both of which the Twin City Rapid Transit Company operates, but the *Journal* refuses to be beguiled. In a recent public debate it was contended that it is unwise to adopt a cost-of-service franchise in Minneapolis on a basis of 7 per cent return on a valuation of $24,000,000, because that would mean a 6-cent or 7-cent fare in Minneapolis, while St. Paul, with a franchise guaranteeing a 5-cent fare and eighteen years to run, would have an intolerable advantage. In replying to this argument the *Journal* pubished the following comment:

> One trouble with this argument is that it assumes the rate of fare to be the paramount consideration. But if Minneapolis had a 6-cent service, with plenty of cars running, with extensions built where necessary, while St. Paul struggled with a 5-cent service that meant cars crowded and infrequent and no extensions, how long does Mr. Keyes suppose St. Paul would stand for retention of her present franchise?
>
> In other words, service is more important than rate of fare—more important to the individual car-rider, and more important to a growing city which cannot permit its development to be stunted by lack of transportation facilities.
>
> Since it is probably not practicable for the two cities to act together in arriving at a settlement, and since the State cannot step in, it follows that one of the cities must take the lead and make a settlement. The other will follow very quickly. If Minneapolis is to postpone settlement just because St. Paul has a 5-cent franchise running till 1937, must she put up with the present pinched service for the next eighteen years?
>
> The 5-cent fare is throttling the development of both cities, because it is producing financial anemia in the company. There is great need for the transfusion of new capital into its veins in order to restore its health so that it can function properly. But no investor is going to submit himself to such an operation, unless it appears that the patient is to be properly nourished.
>
> This community would not need to concern itself greatly over the health or illness, the life or death, of the Twin City Rapid Transit Company, were it not for the service that corporation performs, or ought to perform for the community.
>
> Let us not permit the desire to "get the best" of the company in a bargain blind us to our own interests as a community. The chief thing that we need to consider in any new franchise is whether it will result in good service at the lowest cost compatible with sound financing. Service is the first consideration; as low a rate of fare as possible is the second.
>
> We believe the discussion is proceeding on right lines as to valuation and return. These are at the base of the question, and another checking, as is proposed, may clear it.
>
> The company must have enough to pay charges and standardize service. We believe 6 cents at the start is about established as a necessary fare.

Winnipeg Completely Tied Up

Upheaval in Canadian City Regarded as an Effort to Establish the Rule of the Soviet

For more than a month, Winnipeg, Man., a city of 200,000 people, has been in the throes of a general strike affecting 35,000 workers, aimed at depriving the city of its public utilities and necessities of life and acclaimed to be an attempt on the part of the radical leaders in control of the local Trades & Labor Council to establish the rule of the Soviet. The Ministers of the Crown have described the strike as a revolutionary attempt to overturn governmental authority and to supplant sane, progressive trade unionism with the idea of one big union. This is akin to the I. W. W. and Bolshevist movement in other countries. That the strike has extended over so long a period is due to the wholehearted manner in which the citizens have banded together in an effort to defeat the movement.

A dispute between metal trades employers and employees was seized upon by the Trades & Labor Council as the *casus belli*. The metal trades employers, while being prepared to negotiate schedules, with committees of their own employees or international representatives of the latter, refused to recognize the Metal Trades Council—a combination of unions including several with which the metal trades employers had no dealings and nothing to discuss. The Metal Trades Council, which is composed of very radical Socialists, insists on being recognized as the official negotiating body for all metal trades workers. The employers, however, refused to recognize any extraneous body.

WILL NOT ARBITRATE A PRINCIPLE

In spite of the fact that the employers of labor were prepared to negotiate with unions or committees of their own employees the Metal Trades Council received the support of the Trades & Labor Council on the plea that "the employers refused to recognize the principle of collective bargaining," and in order to force the employers to accept the definition of collective bargaining as drawn up by the Metal Trades Council, a general sympathetic strike of all unions, including firemen and policemen, associated with the Trades & Labor Council, was called. The strike leaders, holding that they could not arbitrate a principle, which in this case was collective bargaining, refused to arbitrate. They struck on May 15.

Incensed at the attempt to deprive the city of fire and police protection, urban transportation, water, light, milk and bread, etc., the citizens have banded together into a "committee of one thousand" and have issued the edict that before a settlement of the metal trades dispute is made the question of the sympathetic strike must be settled once and for all.

Volunteer forces were organized to man the police and fire brigades, the light and water plants, and the milk plants and bakeries. Having thus successfully nullified the attempt of the strike committee to reduce the city to starvation, the citizens have expressed determination that the sympathetic strike weapon, as it applies to various utilities, shall not be resorted to every time there is a dispute between a private employer and his employees. Permanent staffs for the fire, police, and other utility departments have to sign a "loyalty" oath before being taken on, in which they declare they will not become members of any union affiliated with an outside body, and that they will not participate in sympathetic strikes.

EFFECT ON WINNIPEG ELECTRIC RAILWAY

So much for the general situation. It seemed to be essential to an intelligent understanding of the effect of the strike on the Winnipeg Electric Railway, which operates light, power, gas, and transportation utilities, that the movement be reviewed very briefly in its wider phases. Fortunately the railway was able to keep its light and power and gas plants in full service, but transportation has been completely tied up since May 15. The 1700 motormen, conductors, and shop employees struck in sympathy with the metal trades employees and not through any dispute with the company.

At the time the strike on the Winnipeg Electric Railway was called a board of conciliation was engaged in arbitrating the demands of the motormen and conductors for 70 cents an hour (maximum) and an eight-hour day. Several sessions of this board had been held, but A. Scoble, business agent of the railway union, had told the board that unless the demands of the men were met they would go out on strike. The union refused to name a representative to the board, and refused to put in "its case." Three days before the sympathetic strike was called the railway men were asked, by their union officials, to vote on the question: "Are you in favor of a strike to enforce your demands." Reference was made to conciliation, and the result of the vote was 97 per cent in favor of a strike. No vote was taken on the sympathetic strike issue, but the men responded to the call of the Trades & Labor Council and went out on strike on the morning of May 15. Meantime the board of conciliation investigating the men's demands has suspended sessions until the strike is over.

No action was taken with regard to resuming railway service until June 9 when the City Council of Winnipeg passed a resolution requesting the company to operate cars immediately. Several conferences were held between officials of the company and the city with regard to the provision of police protection. In response to the demand of the City Council, A. W. McLimont, vice-president and general manager of the Winnipeg Electric Railway, published an advertisement in all local papers asking the men to report for work at their respective carhouses at 8 a.m. on June 12. This advertisement closed with the following appeal:

> I wish to convey to you men my personal feeling that you are not now aiding the cause for which the general strike was called by continuing to deprive the people of Winnipeg of transportation. On the contrary, you are injuring your personal standing in the community and getting the authorities and the public alike down upon the employees of the Winnipeg Electric Railway. Remaining on strike now only results in seriously injuring the company which employs you and depriving it of revenue it must have to conduct its business and provide the wherewithal to pay your wages in order that you in turn may support your families and yourselves.

On June 11 members of the railway union held a meeting to consider this new development, and after discussion they decided unanimously to remain out on strike in sympathy with the other workers. Strong pickets were placed at the respective carhouses the following morning, and only two employees reported for duty. Resumption of service, of course, was impossible.

In a letter to Mr. McLimont, the president of the railway union, said:

> We appreciate the spirit in which your letter is couched and we hope that in the very near future we will be able to resume our former positions, and continue our past amicable relationship, and we would request that you use your good offices with the many other influential interests that are working with the object in view of restoring to our fair city of Winnipeg that spirit of good fellowship and brotherly love that should permeate every man and woman that has the welfare of the community at heart.
>
> Try with us to establish again the spirit "Do to others as we would have them do to us."

At a meeting of the City Council on June 14 the question was discussed of permitting jitneys to ply the streets just so long as the railway service was tied up. After discussion the city solicitor asked for time to study the question before making a statement as to what rights the city had to permit jitneys to run under the circumstances.

Fourteen cars were in operation on June 19 until sundown. They plied the principal thoroughfares and were greeted with cheers. No untoward incidents occurred. The company issued an ultimatum on June 18 to employees to return to work on June 19 which stated:

> The employees who do not report and are not available when required to enable the company to resume service will be replaced by permanent new employees and will lose their seniority. New employees taken into service will not be dismissed to make places for any old employees who may subsequently decide to return to duty.

Several regular employees responded. These men and supervisors and inspectors manned the fourteen cars in service. A mass meeting of the electric railway employees was set for June 19 to decide on future action. Eleven leaders of the general strike were arrested on June 18 charged with seditious conspiracy.

Something to Think About

George B. Cortelyou Advises Publicity, But Lays Stress on Adequate Service as Essential First

George B. Cortelyou, president of the Consolidated Gas Company, New York, and the American Gas Association, in an address before the joint meeting of the Natural Gas Association of America and the American Petroleum Institute, summed up the utility situation as follows:

We hear much of the needs of the utilities. Presupposing that they are honestly and efficiently conducted, what is their greatest need to-day? Simply that they should have what we mean when we ask for a "square deal."

Apologetic Publicity Condemned

A public utility is a part of the community—an essential part—its personnel are citizens, taxpayers, business men, as surely as any others who bear those honorable names. Why should there be the discrimination that in many places exists in the public mind? Partly because of past mistakes, of the misdeeds of a few, of the exigencies of politics, of a variety of causes, but in my judgment quite largely because we have underestimated the inherent sense of fairness of the American people when they are informed, when they are in possession of the facts.

We have not given them the facts. Much of our publicity has been of a halting, apologetic kind, as though we were on the defensive. I say to you, gentlemen, that the facts are with us—the nature of our business, the cost of conducting it, the burdensome restrictions put upon it, the lack of flexibility in its regulation, the part it plays in the life of every community. We must make every company in very truth a public utility and then see that the public is made to realize that it is. With this established, we have made progress toward adequate rates, enhanced credit and an ample and responsive market for our securities.

How many American communities know even the general features of our business? Properly told it would be a most interesting story; in these days when so much stress is laid upon practical information, it would be eminently practical.

And cost of production! Highly interesting, too; also, serious and well-nigh ruinous for some companies, but extremely instructive in itself and when compared with that of other products. Restrictions are probably necessary in some degree in all business, but does business thrive in proportion to the stringent character of these restrictions? Rather, does it not expand and realize the hopes of both producer and consumer alike in proportion to their tendency toward reasonableness?

And that brings us to the absence of flexibility in public regulation. I undertake to say that much of the regulation of this character makes it impossible for the companies to render their best service. That is what each community wants from its utilities, the best service, and if it can be sure that the exactions put upon them are counter to its own best interests, we have prepared the way for sympathetic response to our just claims.

The public is better informed of the part played by the utilities in the war than of their daily routine of business—and it was a splendid and essential part—but it seems to me that, aside from all other aspects, that most patriotic and creditable record is useful as a foundation for the diffusion of a more permanent understanding of their vital relations to all industrial activity.

Honest Management and Honest Service Confound the Croakers

With a prompt and widespread resumption of business one of the most urgent demands of the country, and with governmental war restrictions lifted, why is not this a good time to acquaint the public with the part the utility can play in the business life of the community, if encouraged to its best efforts, and to look squarely in the face this deterrent influence of unnecessarily burdensome regulation?

Many of us who believe thoroughly in the regulation of utilities, when it is administered fairly and impartially, feel that not a little of it is dispensed upon theories far removed from that wholesome conception.

We must hasten the day when we shall, as great industries, take and maintain our place in American business life by the side of merchant and manufacturer and banker, and as surely and with as general acceptance. But back of all publicity must be adequate equipment, trained personnel, contented labor and a management alive to its responsibilities; for when the response comes to our announcements we must be ready to meet it in full measure.

In our business nothing confounds hostile attacks so quickly as good service; nothing silences hasty criticism so thoroughly as honest and efficient management.

Strike in Vancouver

Demonstration There Another Manifestation of General Unrest Throughout Canada

Platform and shop men of the British Columbia Electric Railway's Vancouver and North Vancouver city systems ceased work on June 5 in a sympathetic strike, outbreaks of which have spread with revolutionary aspects throughout Western Canada.

The union took a ballot on June 1 and registered three to one against the sympathetic strike. The Trades & Labor Council of Vancouver held a mass meeting of all unions on June 2 and in spite of a majority of the unions of the city being against the strike, this council called upon the unions of the city to walk out on a general strike, the street railway men's and electrical workers' included.

Strike Declared June 9

The strike in Vancouver began at 11 a.m. on June 9. The street railway men decided to hold a mass meeting the following night. In the meantime, strikers are alleged to have intimidated the car men with threats of violence if they did not quit work. It is felt certain that this was the cause of the street railway men at their mass meeting voting two to one in favor of a strike. On that occasion, only two-thirds of the men who had previously voted against the strike voted the same way, the others presumably having gone over to the other side.

On June 7 transportation was being provided by means of jitneys and private automobiles. The City Council of Vancouver repealed the by-law prohibiting jitneys for the time being, much to the anger of the strikers.

Interurban Lines Not Affected

Cars were still being operated on all interurban lines on June 7. Central Park and Burnaby Lake lines are operating to their connections with city lines, the men being attached to the New Westminster trades and labor council, which has registered against a sympathetic strike. The New Westminster city system was also operating on June 7. The Fraser Valley and Lulu Island interurban lines continued service, the trainmen there being attached to the Brotherhood of Railway Trainmen, which is not countenancing the sympathetic strike.

The electrical workers voted to strike, but up to June 7 only the line men had gone out. The substation operators were still at work.

Cleveland Men Want More

Despite Recent Wage Settlement Men Still Restless—Company Wants Fare Limits Removed

The employees of the Cleveland (Ohio) Railway voted on June 11 to ask for an increase of 12 cents an hour in wages. They are now receiving 43 cents for the first three months' service, 46 cents for the next three months and 48 cents thereafter. The men contend that one of the conditions of the award made by the Federal War Labor Board is that the agreement under which they are now working may be reopened in order to increase the wages in proportion to the advance in the cost of living. The present agreement does not expire until May, 1920.

In an interview, John J. Stanley, president of the railway, announced that he would ask the Council to consider the advisability of making an additional operating appropriation of $1,500,000 annually to meet the increase in wages sought by the employees. About $1,000,000 of this would be taken in the increase the platform men have asked and he feels that, if this is granted, shop men and other employees should have a proportionate increase. When the demands of the men were presented to him, Mr. Stanley replied that he would consult the Council, inasmuch as it must furnish the money for any additional pay.

Mr. Stanley also suggested that the maximum rate of fare of 6 cents and 1 cent for transfer be stricken from the Tayler grant and that no maximum be specified on account of the uncertainty as to expenses. He further suggested that the return on the investment be advanced from 6 per cent to 7 per cent. Stockholders, he said, are receiving no increase on the money they have put into the company, although others concerned in the road have been thus favored.

Short Strike on Boston & Worcester

Union employees of the Boston & Worcester Street Railway, Boston, Mass., struck on June 13 for about ten hours owing to the failure of the War Labor Board to establish a finding issued in January last which awarded a maximum wage of 47 cents an hour to platform men. Following the announcement of the board's award last winter a disagreement arose as to its handling, particularly in relation to expenses involved in the proceedings. Upon learning of the strike, which completely tied up the road and threw a heavy traffic over to the parallel Boston & Albany Railroad, the War Labor Board confirmed its award and service was resumed. Besides the through service between Boston and Worcester, local service in Marlboro, Hudson and Framingham was interrupted. About 250 employees were involved. The award is retroactive to Nov. 1, 1918, but the total amount which it involves has not yet been determined.

Illinois Commission Enlarged

With the adjournment of the Legislature of Illinois only a few days away, members of the House took action on June 12 which sent to the discard all the bills which were intended to pave the way for improved transportation facilities in Chicago. With the next legislative session two years distant, this means that no permanent settlement of the traction problem can be made meanwhile even though the City Council may pass an ordinance which will need new statutes to make it effective. These bills appeared to have the support of all factions in Chicago, but they were presented at Springfield too late for thorough discussion.

On the same day that these bills were rejected, the Senate passed the House bill which increases the size of the State Utilities Commission to seven members. It is expected that three of the commissioners will devote their entire attention to Chicago matters, leaving three others to look after downstate matters.

Rapid Transit Loop Construction to Begin

At a meeting of the Board of Rapid Transit Commissioners in Cincinnati. Ohio, it was made known that construction work on the proposed rapid transit loop will begin on July 1, when a dam will be built at the canal spillway in Cumminsville to divert the water in the canal from its course.

Chief Engineer Krug reported to the commission that as soon as the dam is built the first contracts to be let should be that portion of the canal subway from Canal and Walnut Streets to Plum and Liberty Streets, as this portion must be built before any work on the parkway can be done. The cost of the loop is estimated to be $1,191,800. The initial issue of bonds for the canal section will be $1,200,000.

The following resolution was adopted:

> To correct any misunderstanding that may be in the public mind the Board of Rapid Transit Commissioners states that the commission was appointed to build the rapid transit project as a whole. It can do nothing else. The first part to be built will be that section of the route now occupied by the canal. It is the intention of the commission to proceed with the building of the balance of the route just as soon as possible.

Toledo and Cincinnati Wage Awards

The War Labor Board has announced its decision in the Toledo controversy. Motormen and conductors in the employ of the Toledo Railway & Light Company are allowed a wage scale of 42 cents an hour for the first three months, 44 cents an hour for the next nine months and 46 cents thereafter.

All other employees are allowed a straight wage increase of 8 cents an hour. As both the Toledo Railways & Light Company and its employees agreed in advance to abide by the board's decision the new wage rates become effective immediately.

The board has also sustained a ruling of one of its sub-committees that the Cincinnati Traction Company must pay 700 of its miscellaneous employees increases which will put their wages on a scale ranging from 42½ cents to 57½ cents an hour. The company protested the ruling on the ground that this scale would give the miscellaneous employees a higher average than motormen and conductors. The board suggests that this inequality could be easily remedied by granting the motormen and conductors a corresponding increase.

Look Before You Leap

The Winnipeg (Man.) Electric Railway is carrying on a good steady work for safety. Here are a few epigrams taken from that company's bi-monthly *Public Service News.*

The cost of safety is only a thought.
Before the accident, think.
And then, without a doubt
There will not be an accident
For you to think about.

Far better for automobilists to wait a minute at a crossing than forever at a cemetery.

A bed at home is worth two in the hospital.

There was a man who fancied that by driving good and fast
He'd get his auto 'cross the track before the car came past;
He'd miss the fender by an inch and make the car crew sore—
There WAS a man who fancied this—he doesn't any more.

Wage Arbitration Under Way

Patrons of the Pittsburgh (Pa.) Railways are face to face with the probability of an 8-cent fare as a result of the War Labor Board hearing on the wages conducted in Pittsburgh on June 16 and 17 by Charlton Ogburn, transportation examiner of the board. Testimony offered at the hearing made it very plain to the public that if the men get the increase of 12 cents an hour they demand, the money to pay it must come directly out of the riders' pockets in the shape of a fare increase, and opinion of witnesses was that 8 cents must be the new figure in the high fare area. No opinion was expressed as to what charge would result in the present 5-cent area. Five cents is charged now in a district of a radius of approximately 2 miles from the downtown termini, and 7 cents for a ride any part of which passes outside that area.

Concluding arguments in the case will be heard before William H. Taft and Basil M. Manly, joint chairmen of the board, in Washington the latter part of the week ended June 28, it was announced at the conclusion of the Pittsburgh hearing. The decision of the board is expected within two weeks thereafter. This decision, however, will not be final, as any award made the men must be approved by the United States court of the Western Pennsylvania district, under which receivers are operating the Pittsburgh Railways. By the terms of the agreement which terminated the May strike of the men, refusal of the court to aprove an award in their favor will leave them free to strike again.

Co-ordinate All Transportation

Transportation throughout the United States is being hampered by a superfluity of governmental boards, all seemingly working for the same purpose, but independently and without coordination, in the opinion of Maj.-Gen. William M. Black who arrived at St. Louis on June 16 to let contracts for the construction of steel towboats. The St. Louis press quotes Major-General Black as follows:

> I am quite convinced that business cannot receive the best results from the agency it depends on most—transportation—until steam, electric, water and all other forms of transportation are put under one departmental head.
>
> All must be co-ordinated, so that transportation as a whole will do the greatest possible good for the country. In my judgment, this is impossible under present conditions, no matter what artificial aids are given one agency.
>
> To-day a separate government organization has control of water transportation, another has control of the railroads, and all told, there are about half a dozen boards doing work that should be done under one head. This kind of management cannot result to the best advantage any more than in a municipal government.
>
> Transportation is the most important element in the business life of America, yet the railroads, important as they are, are being hampered by legislation—because of the will of the people more than any other agency. The Standard Oil Company and the beef trust are little criticised to-day compared with the railroads.

Joyless Jersey Jitneys

They are planning to take the joy out of the Jersey jitneys. Atlantic City may be the world's playground, Jersey City and Camden, to those who do not live there, may seem to be the world's dumping grounds and Jersey commuters may continue to take money out of New York City and Philadelphia and horde it in New Jersey, but in Jersey a contract is a contract. Jersey City says so, and it intends to act to that end.

But to begin at the beginning again. Jersey City is up in arms against the jitney. Not only is it threatening dire things, but it is doing them. And the jitneurs, as they call them in Jersey, are quaking in their seats, as their rough-riding Fords pound down the pavement, with Jersey justice hot on their trail. At one fell swoop eighty-eight jitneurs, members of the clan that is said to have taken $4,000,000 away from the Public Service Railway, were jugged recently for charging a 10-cent fare on Bergen Avenue in Jersey City.

That city fixed a 5-cent fare for the jitneys. But some time ago the jitney men, avowing that they could not make the service pay at 5 cents, began to charge 10 cents. The arrests followed. Just as the culprits were about to be arraigned in court the jitneurs recalled that there was such a thing as a writ of certiorari. Armed with this they restrained the chief of police for the time being from requiring the jitney men to appear before the City Commissioners for the purpose of showing why their licenses should not be revoked for overcharging. And there the matter rests, or did rest, when this account was written.

News Notes

New Franchise at Paducah.—A new and more liberal franchise was auctioned off on June 6, at Paducah, Ky., and was purchased by the Paducah Traction Company.

Carhouse to Be Moved.—The Northwestern Ohio Railway & Power Company has announced that its carhouse will be moved from Genoa to Oak Harbor, Ohio.

Want $5 for an Eight-Hour Day.—The employees of the Worcester (Mass.) Consolidated Street Railway have voted unanimously to reject the company's proposal to retain the employees of the railway on a platform-time basis. The employees insist on their demand for an eight-hour day with a straight wage of $5.

Receiver's Compensation Fixed.—The United States District Court has allowed Wallace Donham $50,000 as final compensation for services as receiver for the Bay State Street Railway, Boston, Mass., from Dec. 12, 1917, to May 31, 1919, in addition to the salary which he received at the rate of $15,000 a year.

Supervisor on Inspection Tour.—Lynn B. Milam, supervisor of public utilities of Dallas, Tex., has gone to Salt Lake City, San Francisco, Los Angeles, Portland, Seattle, St. Paul, Minneapolis and Cleveland for the purpose of investigating the city railways in these cities with a view to improving service at Dallas.

Railway Office Robbed. — Bandits entered the office of the Cleveland, Southwestern & Columbus Railway at Seville early on June 9 and, after binding the night watchman and two other men who were in the station, blew open the safe with dynamite. They secured about $1,000 in cash and escaped in an automobile.

Bridge Service Unprofitable.—William O. Wood, president of the New York & Queens County Railway, Long Island City, N. Y., has informed Borough President Connolly that his company would be unable to continue to operate across the Queensborough Bridge after Dec. 16 next unless there was a modification of the contract between the company and the city.

Seattle to Operate Buses.—The City Council of Seattle, Wash., has authorized Thomas F. Murphine, superintendent of public utilities, in charge of the Seattle Municipal Railway to operate a bus service to and through Carleton Park, Magnolia Bluff, from the end of the city car line at Fifteenth Avenue, N. W., and West Wheeler Street. Property owners will provide the buses, and the city will undertake their operation provided they are satisfactory and can be operated on a basis that will pay their expense.

Improper Diversion of Funds.—Assistant Attorney General Packard of North Dakota on June 7 ruled that the extension to the Capitol Car Line, operated by the State from the inland station at Bismarck to the Capitol, for which the last Assembly appropriated $40,000 from the Capitol Building's funds, cannot be built with these public moneys. To use the Capitol Building fund for this purpose, the Assistant Attorney General holds, would be an improper diversion of funds. The opinion was furnished at the request of the board of control.

Company Makes Liberal Franchise Offers.—In order to reach a settlement with the Commissioners of Stark County in the controversy over the Canton-Massillon line, the Northern Ohio Traction & Light Company is said to have agreed to a 10-cent fare, to build double tracks between Canton and Massillon, to pay the county $75,000 toward the improvement of the north side of the roadway, to provide crossovers at frequent intervals and to pay for a curb on each side of the proposed double tracks.

Transit Director Urges Legislation.—To obtain funds to complete the Frankford elevated line in Philadelphia, Pa., Director Twining, of the department of city transit, urges passage of the Salus bill by the Legislature. This measure would permit the transfer of funds which could be used for completion of the Frankford line on June 13. Director Twining said the bill was in the hands of a sub-committee of the House, and that unless the measure should be reported immediately with a favorable recommendation, it would not be possible to pass it.

This Fellow No Piker.—An interesting case came up in Louisville during the finals of the spring races, when Butler Welsh, motorman, and John Bohon, conductor, on a Barrett Avenue car of the Louisville Railway were held up and robbed of their watches and cash shortly before ten o'clock at the loop. A few days later the watches, money and interest of $2 was sent to Samuel Riddle, superintendent of transportation of the railway, with a request that he turn it back to the car men. The sender stated in the letter that he went broke on the races and had to have cash to get going again. Apparently he picked a winner and got off of his uppers.

Conductorettes in Manila.—Filipino girls have recently taken jobs as "conductorettes" on the new autobus lines established at Manila to supplement the wartime shortage of street cars in that city. In spite of the initial shock conveyed to the conservative element of the island people at the appearance of native girls in positions hitherto filled exclusively by men, information reaching the United States department of labor indicates that the experiment has been pronounced a marked success, the directors of the company having expressed themselves as being highly gratified with the results, and the girls equally delighted.

No Home Rule in Illinois.—The proposed home rule legislation in Illinois was killed by both the Senate and the House. The Senate committee on public utilities laid the proposed bill on the table by a vote of thirteen to nine and reported out a bill by the committee increasing the membership of the commission to seven members. The House committee on public utilities reported out the home rule bill and the bills validating franchise ordinances with the recommendation that they do not pass. This recommendation was approved by the House by a vote of eighty-four to fifty-three. The above action insures that there will be no change in the public utilities laws affecting the jurisdiction of the Illinois Commission.

Toronto Men Want More.—In view of the wage increases demanded by employees of the Toronto (Ont.) Railway and the company's statement that it is financially unable to grant these increases, Mayor Church will confer with representatives of the Ontario government, the Ontario Railway Board and the railway in an effort to avoid a deadlock. The Mayor has stated that the city would not consent to any increase in the fares of the company, nor would the railway be taken over until 1921. He suggested that any dispute arising from the demands of the men should be settled by arbitration and conciliation. A committee representing the union will meet Manager Fleming of the railway to present their demands to him. These include an eight-hour day, pay at the rate of 55 cents an hour, and several minor changes.

Wage Arbitration Proposed.—The Des Moines (Ia.) City Railway has made application to the federal court for permission to arbitrate the proposed wage increases asked by the employees. Permission from the Federal Court is necessary on account of the fact that the company is being operated by receivers. The proposed schedule provides for a sliding scale of wages for trainmen as follows: first three months of service, 14 cents an hour increase over present scale; for men between three months and one year service 16 cents an hour increase; more than one year's service 18 cents an hour increase. For brake and pipe workers a straight increase of 30 cents is asked. For men in the paint shops an increase of 18 cents is asked and the carhouse and power house employees ask for 10 cents an hour. If the schedule is approved by the court it will go into effect on March 1, 1920. Judge Wade has set June 24 for the hearing on the request.

Financial and Corporate

Special Master in Rhode Island

R. E. Lyman Designated to Untangle Maze of Complications at Providence

Richard E. Lyman has been appointed master in chancery, and the receivers of the Rhode Island Company, Providence, R. I., have been given temporary directions for operation of the company by Presiding Justice Tanner in the Rhode Island Superior Court. Mr. Lyman was ordered to untangle the maze of complications into which the road's affairs have developed.

COURT INSTRUCTS RECEIVERS

The receivers, by virtue of the decree entered following a hearing, were authorized to pay the federal revenue taxes, to pay rentals of the Rhode Island Company to the United Traction & Electric Company, the amount to be determined by the master, and meanwhile to operate the lines, paying the traction company, the lessors of the property, at the rate of 3 cents per car-mile per month.

The master in chancery was ordered to determine and report to the court: The sum for rentals to be paid the United Traction & Electric Company from Jan. 30, the date of appointment of a temporary receiver, to April 21, when the court decreed leases terminated; the amount to be paid the receivers for operating expenses; the monthly compensation to be paid the lessor companies for rentals, beginning on April 21; the exact disposition of properties of the lessors and any losses resulting from neglect or breach of lease terms; and the exact ownership of all property, lines, equipment and rights-of-way, etc., composing the system.

The master was also empowered by the court, under the decree, to hire such engineers and accountants as might be necessary to aid in a proper determination of all the issues referred to him, and was directed to report to the court on each issue involved as soon as possible.

EAST SIDE TUNNEL A PROBLEM

Chief among the ownership problems to be settled is that relating to the East Side tunnel. The many other financial difficulties due to operation of the lines owned by several different companies and leased by the Rhode Island Company, and sale and exchange and improvements are likewise left to the master to untangle.

Eugene A. Kingman of Edwards & Angell represented the United Traction Company and Clifford Whipple, the receivers when the matter of the decree came before Presiding Justice Tanner, on petition filed by the lessor companies. There was no opposition to the terms of the decree, which had been discussed and agreed upon beforehand. The appointment of the master and thus the settlement of ownership questions became necessary when the leases of the Rhode Island Company were declared by the court on May 14 to have terminated by default of payment. The decree entered therefore was only the logical outcome of the decision previously made.

Not only are the receivers to retain control and operate the Rhode Island Company system under the decree, but they are given 3 cents per car-mile per month as the rate of compensation to be paid the lessors until such time as the master shall determine "a fair and reasonable" rate for such rentals. When the master has ascertained what the rate shall be it will be retroactive to April 21, according to the court's order.

The decree empowers the master to hear such evidence as may be presented by those concerned in the affairs of the company and to apply to the court for final authorization in employment of accountants and engineers or other needed assistants.

The decree also directs the master to make his report on the various questions as if each was embraced in a separate decree, the purpose of this being to expedite settlement of the sundry problems, and states lastly "all parties in interest are given leave to apply to the court as the occasion may arise."

Rhode Island Results Improve

The deficit for April of the Rhode Island Company, Providence, R. I., is placed at $61,169, according to a report filed with the Public Service Commission by Comptroller C. A. Babcock. This deficit, however, indicates an improvement in operating conditions inasmuch as it was less by $30,294 than the deficit for March.

An increase in passenger receipts of $93,086, or 21.38 per cent over the corresponding month of 1918. This result was obtained despite a drastic curtailment of service, the receivers of the company reducing the car-miles to the extent of 149,059.

The total net income for the first four months of the year was $378,908, an increase over the corresponding period of 1918 of $8,864.

The total deficit for the four months was $324,225, an increase of $4,326. To judge from past figures and the prospects for the future, a deficit of $1,000,000 before the expiration of the year is not unlikely.

Temporary Receiver

Subsidiary of the Rhode Island Company Placed in Hands of C. S. Sweetland

Upon petition of the Central Trust Company, New York, Cornelius S. Sweetland, Providence, R. I., has been appointed by Presiding Justice Tanner of the Superior Court, temporary receiver of the United Traction & Electric Company, a New Jersey corporation with its entire holdings in the State of Rhode Island. The Central Trust Company alleged default in the payment of taxes due in 1918, insolvency, etc.

REASONS FOR ACTION

It is contended in the petition that the United Traction & Electric Company issued on March 1, 1893, first collateral mortgage bonds to the amount of $8,000,000, payable on March 1, 1933, and bearing interest at the rate of 5 per cent, payable semi-annually on March 1 and Sept. 1 of each year. These bonds are secured by 19,341 shares of the stock of the Union Railroad, 1276 shares of the Pawtucket Street Railway and bonds of the Union Railroad and later, before June 24, 1902, all the outstanding capital stock of these companies and of the Providence Cable Tramway.

The assets of the United Traction & Electric Company not covered by the mortgage to the complainant trust company consist of 50,000 shares of the capital stock of the Rhode Island Suburban Railroad, of claims against the Rhode Island Company and the receivers thereof and of certain moneys deposited for the payment of interest due on bonds, it is stated.

If the interest due on March 1, 1919, is not paid on or before Sept. 1, 1919, the principal of the bonds may be declared immediately due and payable. Suits and attachments against the property of the United Traction & Electric Company might be started by creditors with the purpose of obtaining early judgment and securing priority for their claims, it is pointed out, unless the court enjoined such proceedings and appointed a receiver. The property might also be sold to pay the taxes due. For these and other reasons, that the creditors may secure equal protection, the petition for the receiver was filed.

RECEIVER APPOINTED

Presiding Justice Tanner entered a decree appointing Cornelius S. Sweetland temporary receiver and enjoining all parties from bringing suits against or levying attachments upon the United Traction & Electric Company. The temporary receiver was authorized to take possession of the property and assets of the resident corporation and was required to file within ten days a bond for $25,000. June 23 was the date set for a hearing on the appointment of a permanent receiver.

Merger Before Commission

Indianapolis Companies Seek Sanction of State to Carry Out Plan Approved by Stockholders

Following the approval by the majority stockholders of the merger of the properties of the Indianapolis Street Railway and the Indianapolis Traction & Terminal Company, as reported in the ELECTRIC RAILWAY JOURNAL for June 7, page 1118, a hearing was conducted by the Public Service Commission of Indiana on June 11 and 12 on the petition of the officers of both companies asking that the commission approve the merger agreement.

While the hearing was going on before the commission, a group of minority stockholders of the Indianapolis Street Railway filed a petition in the Marion Circuit Court asking for a permanent injunction against the merging of the two properties, and demanding a cancellation of the lease of the street railway by the terminal company. The officers and directors of both of these companies, as well as of the Terre Haute, Indianapolis & Eastern Traction Company, are named in the suit. The attorneys representing the minority stockholders are the same as sought to prevent the sanction of the merger agreement at the stockholders' meeting on June 2.

SAVINGS UNDER MERGER

During the hearing before the commission on June 11 Robert I. Todd, president of the Indianapolis Traction & Terminal Company, testified that under the 5-cent fare the increase in receipts from Jan. 1 to date has averaged about $2500 a day. Mr. Todd stated that at the present increase in traffic, the gross receipts for the Indianapolis city property, not including revenues from the interurban passenger and freight terminals, will be about $4,500,000 for the year 1919.

Mr. Todd informed the commission that with the operating expenses at 70 per cent, on the basis of the foregoing figures there would remain a balance of $1,350,000 from which would have to be deducted the interest on all bonds, payments into sinking funds, the $300,000 dividend paid as rental on the Indianapolis Street Railway property, interest on car trusts and floating indebtedness, which would amount to a total of about $1,290,000, leaving a net balance of approximately $60,000. If the proposed merger is approved, however, Mr. Todd pointed out that there would be a greater net revenue for the year 1919, as under the agreement the Indianapolis Street Railway stockholders would give up five months' dividends on their stock, which would reduce the annual payment to $175,000 this year.

Mr. Todd then explained that the proposed merger also contemplates omitting the payment of $120,000 annually into sinking funds for a period of two years. The reorganized company would, therefore, have about $300,000 out of this year's revenues to expend on repairs and betterments to the property. The improvements contemplated by the management in case the merger is approved would cost approximately $700,000 to $800,000. This would include the immediate purchase of twenty-five new cars.

CREDIT FOR GOOD MANAGEMENT

Commissioner Haynes thought that where a company could operate on a 5-cent fare, as had been the case in Indianapolis, and give reasonably good service to the public, it deserved more than ordinary comment and justified the assumption that its business affairs and management have been very efficiently handled.

Samuel Ashby, corporation counsel for the city of Indianapolis, entered an appearance for the city at the hearing. He stated that the companies had the legal right to merge and reorganize—that as to the contract agreement, he thought it absolutely fair, and as a street railway stockholder would be in favor of it. He explained, however, that he was opposed to the merger on the ground that the commission's approval of it would carry also the judgment that the property was worth the total issue of $24,000,000 of securities. He stated that if the commission decides to approve the merger, the city will insist that a stipulation be written into the order that the commission's approval would in no way validate the entire $24,000,000 securities of the consolidated company. Mr. Ashby had no suggestion to offer as to how it would be possible to reduce the securities of the company under the proposed merger agreement.

REDUCTION IN SECURITIES

In answer to a question of the commission, Mr. Latta, one of the attorneys for the terminal company, said that the reduction in securities provided in the merger agreement conformed with the order of the Public Service Commission made last December. He stated that the merger agreement was made under the 1899 law of the State of Indiana as amended in 1903, authorizing a merger on "such terms as may be by them (the constituent companies) mutually agreed upon." Chairman Lewis asked whether there was not a law limiting the preferred stock to one-half the capital. (Under the merger the preferred stock is $5,000,000 while the common stock has been reduced from $5,000,000 to $2,500,000.) Mr. Latta replied that the law referred to did not apply, as the petitioners were not proceeding under the general provisions of the public utility act of 1913 in regard to the issue of securities; that they were not asking for permission to issue any new stock, but simply to secure a merger of the present stock. The hearing on the suit for an injunction will probably be heard on June 25.

Mostly About Power Contracts

The testimony of former and present directors of the United Railways, St. Louis, Mo., principally concerning power contracts, took up the greater part of the proceedings during the week ended June 14 in the receivership suit of John W. Seaman, New York, against the railway before Special Master Lamm.

Late on June 10 John I. Beggs, director of the United Railways and of the North American Company, and former president of the United Railways, took the witness stand on the call of the defense. In reply to a question by counsel Mr. Beggs said his business was "rehabilitating broken down plants." Mr. Beggs had hardly completed giving an account of his career when the hearing was adjourned for the day.

Another development of the day was the introduction of a copy of a hitherto unmentioned power contract between the United Railways and the Union Electric Light & Power Company, St. Louis, whereby the latter agreed to furnish any portion of surplus power received from Keokuk that the United Railways desired at 4 mills per kilowatt-hour. The plaintiff's petition alleged that a contract made early in 1918 charged the United Railways at the rate of 9 cents per kilowatt-hour. The contract introduced on June 10 during the testimony of W. E. Bryan, superintendent of power plants for the United Railways, it was testified, was made in April, 1918.

Mount Vernon's Abandonment

The Knox County Court of Appeals was reversed by the Supreme Court of Ohio on May 13 in its holding that the firm of Berman & Reed had the right to remove the railway rails at Mount Vernon without restoring the streets to their original condition.

The railway at Mount Vernon never was profitable. Finally the tracks were sold to Berman & Reed. That firm started to wreck the property, but was prevented from tearing up the line by an injunction suit in which it was sought to compel the new owners to give bond to insure the city that the streets would be restored to their original condition, if torn up. This case went through all the lower courts, with decisions against the city.

In passing on the question the Supreme Court ruled that the streets are held in trust for the public and are to be kept open. Rights in streets or highways granted to public service corporations are at all times held in subordination to the superior rights of the public, the court ruled.

The municipality, in contracting, has not the same capacity in giving its property as an individual, and there can be no implication that the streets may be left in a torn-up condition, according to this decision. It is held further that, as there was no adequate remedy at law, the resort to injunction is proper.

Key System Deficit $219,626

Report for 1918 Filed with Commission Shows Loss Despite Fare Increase

The San Francisco-Oakland Terminal Railways, Oakland, Cal., suffered a net loss of $219,626 for the calendar year 1918 and closed the year with a deficit of $751,126, according to the annual statement of the company just filed with the State Railroad Commission.

The net loss is recorded despite the fact that for the last six months of the year the company had the benefit of increased fares on both the Key and Traction systems. The commission early in June last year granted a 6-cent fare on the traction lines and an 11-cent fare for the transbay trip.

Railway operating revenue for the year amounted to $5,100,030, and railway operating expense totaled $4,025,876, leaving a net revenue from railway operation of $1,074,154. The gross income was $1,152,691, but deductions reached a total of $1,373,319, or $219,626 more than the gross income. The principal items making up the total deductions were $821,336 for interest on funded debt, $274,551 interest on unfunded debt, and $269,767 taxes on railway operations.

The detailed income statement for 1918 follows:

Railway operating revenue	$5,100,030
Railway operating expenses	4,025,876
Net revenue—railway operation	$1,074,154
Auxiliary operations—net	60,355
Net operating revenue	$1,134,509
Non-operating income	18,183
Gross income	$1,152,692
Deductions:	
Rentals	$1,650
Miscellaneous taxes	....
Taxes on railway operations	269,768
Interest on funded debt	821,336
Interest on unfunded debt	274,552
Miscellaneous deductions	5,013
Total deductions	$1,372,319
Net loss for year	$219,626
Debit balance year ended Dec. 31, 1917	375,764
Miscellaneous additions 1918	22,451
Miscellaneous deductions 1918	178,186
Dividends	....
Appropriation to reserves	....
Deficit Dec. 31, 1918	$751,126

Hearing on Dissolution

The first hearing of Willard N. Baylis, as referee, to inquire into the condition of the Huntington (N. Y.) Railroad, operating from Halesite to Amityville, Long Island, was held on June 10. Referee Baylis is also to decide if it is to the best interest of the creditors and stockholders for the road to dissolve. At the meeting no opposition to the project to dissolve appeared.

Testimony was given favoring dissolution to the extent that the Long Island Railroad, which controls the property, had loaned up to Nov. 30, 1918, the amount of $609,319; that besides this there is a bonded indebtedness of $26,000, owned entirely by the Long Island Railroad, and that the capital stock is $30,000, owned by the Long Island Railroad with the exception of $1,000, which is owned by a private estate.

The testimony showed that since 1912 the revenue of the road has been constantly decreasing so that from $251,238 seven years ago it has dropped to $41,200, computed during the year of 1918. Against this the operating expenses during the year 1918 were shown to exceed the revenue by $16,650. Jitneys and automobiles were blamed for the decrease in the revenue. The hearing will be continued.

Sale Unifies Power Supply

The Northern Virginia Power Company, Winchester, Va., has announced the sale of all the stock of that company to interests allied with the operation of public utilities in Western Maryland and parts of West Virginia. Between $1,500,000 and $2,000,000 is said to have been paid for the properties. The effect of the sale will be a unified system of the various plants of the Hagerstown & Frederick Railroad, the Potomac Light & Power Company, and the Northern Virginia Company. Physical connections will be made between the lines of the latter two, which operate half a dozen steam and water power plants.

Emory L. Coblentz, president of the Central Trust Company, Frederick, Md., is also president of the three companies. He states that the consolidation and elimination of competition assure efficient service. President Lewis F. Cooper and Directors E. V. Weems, S. L. Hoover and A. Moore of the Northern Virginia have resigned. The new board is composed of Emory L. Coblentz, Frederick, Md.; Shirley Carter, T. B. Patton and R. Gray Williams, Winchester; R. P. Chew, Charlestown, W. Va., and Harry C. Warden, Berryville, Va. Colonel Chew is vice-president, Mr. Williams general counsel, and Mr. Carter secretary and treasurer. M. A. Poole is general manager.

T. H., I. & E. Feels War Costs

The gross earnings of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., in 1918 were $3,731,287 as compared with $3,386,364 in 1917, an increase of $334,923, or 10.8 per cent. Operating expenses for 1918 were $2,472,219, an increase of $334,746, or 18.43 per cent, over 1917. Net earnings in 1918 were $1,259,067 as compared with $1,298,891 in 1917, a decrease of $39,823. In 1917 taxes paid amounted to $179,362, these payments increasing in 1918 to $232,536. These figures reflect war conditions which prevailed in 1918, the heavy increase in cost of material and increased wages having more than absorbed the increase in gross earnings.

For maintenance of ways and structures $328,638 was spent in 1918, an increase of $40,629 over 1917. Maintenance of equipment cost $239,754, an increase of $47,154 over 1917. The company's interurban lines carried 8,603,196 passengers in 1918 and the city lines carried 12,984,413. The company handled a total of 108,416 tons of freight.

The Terre Haute, Indianapolis & Eastern Traction Company has made a speciality of transporting live stock, 705 carloads having been hauled to the Indianapolis market from surrounding towns. The freight on these amounted to $15,000. The carrying of hogs, sheep and cattle from points on the Crawfordsville division—principally from Crawfordsville, Linnsburg and Linton —which was begun in the winter of 1917-1918, continued during the whole of 1918 and proved to be a very profitable part of the freight business.

The restoration of peace conditions and the attendant welcome home celebrations and the like have added largely to the gross earnings from Jan. 1, 1919, to June 1, 1919, the increase being 20 per cent over the same period in 1918. Against this, however, is the still prevailing high cost of material and the increased wages, which absorb a large part of the increase in gross earnings.

Chicago Elevated Unprepared to Redeem Notes

The National City Bank and the National City Company, New York, have decided that the situation of the $13,601,000 extended notes of the Chicago (Ill.) Elevated Railways is such that the formation of a protective committee is imperative. Hence the following committee has been chosen: C. E. Mitchell, president National City Company, New York, chairman; George M. Reynolds, president Continental & Commercial National Bank, Chicago; John H. Mason, president Commercial Trust Company, Philadelphia; T. Hartley Given, president Farmers' Deposit National Bank, Pittsburgh, and R. Floyd Clinch, of Crerar Clinch & Company, Chicago. Holders of the securities are invited to deposit their notes either with the National City Bank, New York, or with the Continental and Commercial Trust and Savings Bank, Chicago.

The Chicago Elevated Railway notes, which matured on July 1, 1918, and were extended, are again due July 1. The company, it is said, cannot pay them; although it has provided interest money due on July 1, there appear to be only two courses open to the noteholders — foreclosure or extension. Some of the Chicago holders have agreed that an extension should be accepted on the theory that the present management is better qualified to operate the property than any receiver or trustee.

When the notes were last extended the company paid a bonus of 1½ per cent, increased the interest from 5 to 6 per cent, and added to the security behind the notes by increasing collateral and by subordinating claims of the Commonwealth Edison Company. The company is represented to be in no position to repeat such concessions although confident of ability to meet interest payments.

Financial News Notes

Receiver Makes Road Pay.—Harrison B. Freeman, receiver for the Hartford & Springfield Street Railway, Warehouse Point, Conn., has reported to Judge Haines in the Superior Court that since April 1 the road has been more than paying its operating expenses.

Deposits Asked.—The June 1 interest on the 5 per cent collateral trust notes of the Washington (D. C.) Utilities Company having been defaulted, a protective committee has requested the noteholders to deposit their notes with the Metropolitan Trust Company, New York, N. Y., or the American Security & Trust Company, Washington, D. C., depositaries.

Payment of Interest Authorized.—Judge Julius M. Mayer, of the United States District Court, has directed Job E. Hedges as receiver of the New York (N. Y.) Railways to pay the semi-annual installment of interest, $37,500, due on July 1 on the improvement and refunding mortgage 5 per cent bonds of the Twenty-third Street Railway and also to expend $23,625 in repairing the tracks of that line, besides settling certain tax bills.

Mr. McCook Named Special B. R. T. Master.—Judge Julius M. Mayer has entered an order in the United States District Court naming Philip J. McCook as a special master to pass upon tort claims to succeed to ex-Judge Van Vechten Veeder, who was appointed some weeks ago. There are claims amounting to more than $1,000,000 from the Malbone Street disaster alone and under the judge's ruling it will be necessary for them to be proved before a special master.

1918 Results in London.—The traffic receipts of the London County Council Tramways for the year ended March 31, 1919, were £3,479,154, an increase of £613,465 over the previous year. What the working expenses, etc., amount to will not be known exactly for some time, but for the preceding year the net surplus was only £95,559. The additional change owing to the adoption of the forty-eight-hour week is estimated at £360,000 a year.

Offering of Commonwealth Notes.—Bonbright & Company, New York, N. Y., are offering at prices ranging from 99 to 94 and interest, to yield from 7 to 7.55 per cent, according to maturities, $750,000 of secured serial 6 per cent gold notes of the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., dated June 1, 1919, due serially, $100,000 annually, June 1, 1920, to 1923 inclusive, and $350,000 June 1, 1924.

New West End Bond Issue.—The Massachusetts Public Service Commission has approved the issuance by the West End Street Railway of $1,581,000 of coupon or registered bonds to be payable not exceeding thirty years from date thereof and to bear interest at not to exceed 7 per cent, for the purpose of refunding outstanding bonds which become due on Aug. 1.

Cleveland Tax Value Boosted.—The Ohio State Tax Commission has increased the valuation of the Cleveland Railway property $6,000,000. Secretary Henry J. Davies was in Columbus recently to file a protest against this increase. He said that car riders will be compelled to pay $96,000 more in fares to meet the tax on this sum, if it is allowed to stand. The new appraisal increases the valuation from $28,000,000 to $34,000,000. This is considered excessive.

Car Trust Certificates in Maine.—The Public Service Commission of Maine has authorized the Bangor Railway & Electric Company, Bangor, Me., to issue thirty-six promissory notes, each for the sum of $1,465.75, dated April 23, 1919, maturing monthly, interest at 6 per cent, secured by a car trust mortgage in a sum representing the aggregate of the notes and generally providing that the title to the cars shall not pass until the last of the notes shall have been paid.

Offering of Two-Year Gold Notes.—Bonbright & Company, New York, N. Y., are offering for subscription at 91½ and interest, to yield 7.30 per cent, $279,000 of bond-secured 7 per cent gold notes of the Arkansas Valley Railway, Light & Power Company dated June 1, 1918, and due Dec. 1, 1920. The bonds are redeemable as a whole or in part at any time after Dec. 1, 1919, at 100½ and interest. The proceeds from the sale of the notes will be used in part to refund $450,000 of 6 per cent notes which come due on July 1.

Approves Increase in Operating Allowance.—Following a request for an increase in the operation allowance of service-at-cost lines in Youngstown, Ohio, from 22 to 31 cents a mile, made two months ago by the Mahoning & Shenango Railway & Light Company, City Commissioner W. L. Sause advises a rate of 27 cents. Headed by Chairman J. C. Sullivan of the railway committee, some Councilmen oppose voting an increase in operating allowance, preferring to see the question arbitrated.

Court Approves Lease.—H. R. Freeman, receiver for the Hartford & Springfield Street Railway, Warehouse Point, Conn., has obtained from the court permission to lease from the New York, New Haven & Hartford Railroad 4¾ miles of the electric railway in Suffield, extending to the Massachusetts State line, with a view to securing an improved service. The lease is to run yearly until discontinued by either party giving thirty days' notice. The plan to negotiate the lease was referred to in the issue of the ELECTRIC RAILWAY JOURNAL for June 14, page 1191.

Wants Commission's Approval.—The Selma (Ala.) Electric Railway has asked the Alabama Public Service Commission to approve the sale of the property and franchises of the Selma Traction Company to the Selma Electric Railway and also to approve the execution and delivery by the Selma Electric Railway of its bonds, aggregating $50,000, secured by a first mortgage on the franchises and property. A hearing will be held on the matter on July 7. The application is made in connection with the plans for a reorganization following sale under foreclosure, to which reference has been made previously in the ELECTRIC RAILWAY JOURNAL.

Deposit Agreement Extended.—More than three-fourths of the first mortgage 5 per cent bonds of the Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., due on Jan. 1, 1930, having been deposited under the deposit agreement dated Jan. 22, 1919, notice is given that additional bonds will be received without penalty until July 1, 1919, after which date no bonds will be accepted except under such terms as the committee may prescribe. James Timpson, vice-president of the Mutual Life Insurance Company, New York, N. Y., is chairman of the committee. The Central Union Trust Company, New York, N. Y., is depositary.

Service Abandoned in Tiffin.—The Tiffin, Fostoria & Eastern Electric Railway, which operates the city lines in Tiffin, Ohio, anounces that it will not resume operation of city cars, which have been out of service for some time. It is stated that the tracks will be torn up and all activity on the city line suspended. The reason assigned is that the company has lost an average of $400 a month for the last year in operating its city lines. Service was suspended once before, but later an arrangement was made with the city calling for a readjustment of fares under which service was restored. This matter has been referred to in the issues of the ELECTRIC RAILWAY JOURNAL for Aug. 17, Sept. 7, Oct. 12 and Dec. 14, 1918.

To Vote Funds for Improvements.—A special meeting of the common stockholders of the Nova Scotia Tramways & Power Company, Halifax, N. S., will be held on June 24, to authorize an issue of $2,000,000 unsecured three-year notes, of which half is to be put out upon approval by the Public Utilities Commission of Nova Scotia. Following this meeting preferred stockholders will meet to sanction the notes. Active management of the property has been turned over to Stone & Webster, Boston, Mass., according to A. S. Pratt, the newly-elected president. The proceeds of the proposed note issue are to be utilized to buy additional cars and other equipment and for improvements and repairs.

Abandonment Threatened.—Officials of the Reno (Nev.) Traction Company have declared to Mayor Stewart, members of the City Council and the State Industrial Commission that the Sparks line is the only paying line they have. They threaten to abandon all lines in Reno if the city insists on holding the corporation to the terms of the franchise in the matter of street improvements. Two propositions have been submitted to the City Council by the company. One is to abandon all the lines in the city of Reno and pay 3 per cent of the gross earnings of the Reno-Sparks line. The other proposition would continue the lines as at present, but under a new charter, removing the clauses requiring the company to pave certain portions of the streets in the city.

Reorganization Plan Before Commission.—Jesse H. Steinhart, counsel for the reorganization committee of the Oakland, Antioch & Eastern Railway system, Oakland, Cal., on June 2 outlined to President Edgerton of the Railroad Commission the details of the plan agreed upon for reorganizing and refinancing the roads. Three railroads are involved in this reorganization, viz.: the Oakland & Antioch, the Oakland, Antioch & Eastern, and the San Ramon Valley Railway companies. The plan which has been ratified by more than 92 per cent of the bondholders of the component roads contemplates the organization of a new corporation, to be known as the San Francisco, Oakland & Sacramento Railway. The proposed capitalization and the disposition of the securities of the new company have been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Foreclosure Suit Brought. — The Farmers Loan & Trust Company, New York, N. Y., as trustee, following the consent of Judge Julius M. Mayer, in the Federal District Court, has brought a foreclosure suit in the Federal Court against the New York Railways, Job E. Hedges, receiver, and the American Brake Shoe & Foundry Company. The action is based on an adjustment mortgage, dated Jan. 1, 1912, made to secure an issue of $33,000,000 of 5 per cent thirty-year income gold bonds. Default in the payment of interest on the bonds, of which $30,616,487 are outstanding, and that the company is insolvent and wholly unable to pay its debts, are alleged in the complaint. It is further asserted that property and premises covered by the adjustment mortgage are and constitute very inadequate securities for the payment of principal and interest on the bonds. The mortgage properties, it is explained, are so situated that they cannot be sold in parcels without great injury to the holders of the bonds and scrip secured by the mortgage. It is said that the suit has been brought for the purpose of securing all legal rights of the trust company and that it will not necessarily be brought to a conclusion.

Successor Company at Mauch Chunk.—The Mauch Chunk & Lehighton Transit Company, Mauch Chunk, Pa., has been organized as the successor to the Carbon Transit Company and its securities have been approved by the Public Service Commission. The equity above the first mortgage, a bond issue of $100,000 of the Carbon Transit Company, was purchased principally by a majority of the former shareholders and the second mortgage bondholders at receiver's sale on Feb. 15. The new company has $150,000 of common stock, all issued; $50,000 of preferred stock authorized and $37,500 issued; $150,000 of 6 per cent forty-year bonds authorized and $100,000 issued and $150,000 of Carbon Transit Company first lien 5 per cent bonds, all issued, making the total capital liabilities $437,500. The officers of the company are: Ben Branch, president; William Dods, vice-president; Dr. George H. Mayer, treasurer; V. M. Wolff, secretary; C. A. Secor, comptroller; Granville Rehrig, superintendent, and Dennis Duga, assistant to the superintendent.

Hearing on B. R. T. Application.—Lewis Nixon, Public Service Commissioner for the First District of New York, held a hearing on June 19, on the application of Lindley M. Garrison as receiver of the Brooklyn Rapid Transit Company, the New York Municipal Railway Corporation and the New York Consolidated Railroad for authority to issue and sell immediately $15,000,000 in receiver's certificates. This application is made under the recent order of Federal Judge Mayer permitting the issuance of $16,000,000 in such certificates, of which $15,000,000 might be issued immediately. Transit Construction Commissioner John H. Delaney sat with Commissioner Nixon, as the former, in whom the rapid transit duties formerly exercised by the Public Service Commission for the First District has an interest in the financial arrangements and expenditures of the three companies named. A considerable part of the money obtained by the sale of receiver's certificates will be expended in construction and equipment of portions of the dual system of rapid transit.

St. Louis Receiver Reports.—Rolla Wells, receiver of the United Railways, St. Louis, Mo., during the week ended June 14 filed with the Federal District Court his first report of receipts and disbursements covering the period from April 12, when he took charge, to April 30. The report shows receipts of $1,378,362 and disbursements of $300,467 during this period. The latter item includes only wage expenditures and $14,496 paid for operating indebtedness incurred prior to the receivership. Judge Dyer has authorized the payment of $750,725 interest on bonds of the United Railways. Of this $667,560 is to be paid on July 1 and the balance on Aug. 1. Charles W. Bates, attorney for Receiver Wells in the United Railways receivership, filed an inventory of the assets of the company and imediately withdrew it to have the matter bound. The work of fixing the values of the various properties of the company, ordered by Judge Dyer, still is under way. The inventory as filed contains a description of the properties, but makes valuations only in certain cases.

Electric Railway Monthly Earnings

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '19	$11,305	$14,260	†$2,955	$508	†$3,463
1m., May, '18	17,225	10,572	6,653	475	6,178

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$148,997	*$111,941	$37,056	$21,317	$15,739
1m., Apr., '18	145,620	*107,066	38,554	30,996	7,558
12m., Apr., '19	1,857,935	*1,455,911	402,024	267,195	134,829
12m., Apr., '18	1,503,319	*1,279,649	223,670	364,362	†140,692

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$203,517	*$150,858	$52,659	$56,164	†$3,505
1m., Apr., '18	246,126	*169,013	77,113	71,158	5,955
12m., Apr., '19	3,114,017	*2,159,120	954,897	798,441	156,456
12m., Apr., '18	3,090,145	*2,150,267	939,878	841,377	98,501

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$2,007,033	*$1,259,433	$747,600	$537,564	$210,036
1m., Apr., '18	1,721,352	*1,122,208	599,144	494,273	104,871
12m., Apr., '19	23,386,932	*15,430,562	7,956,370	6,253,856	1,702,514
12m., Apr., '18	20,311,495	*13,326,305	6,985,190	5,504,730	1,480,460

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$82,390	*$55,017	$27,373	$20,730	$6,643
1m., Apr., '18	74,840	*44,032	30,808	19,557	11,251
12m., Apr., '19	957,407	*628,273	329,134	242,213	86,921
12m., Apr., '18	897,032	*530,058	366,974	232,075	134,899

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$332,311	*$288,019	$44,292	$69,748	†$25,456
1m., Apr., '18	321,032	*245,482	75,550	67,686	7,864
12m., Apr., '19	4,362,780	*3,447,611	915,169	824,197	90,972
12m., Apr., '18	3,806,380	*2,728,789	1,077,591	795,086	282,505

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$264,051	*$196,060	$67,991	$39,655	$28,336
1m., Apr., '18	218,862	*134,603	84,259	40,490	43,769
12m., Apr., '19	3,081,964	*2,154,543	927,421	477,878	449,543
12m., Apr., '18	2,488,835	*1,604,642	884,193	489,375	394,818

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$706,244	*§$423,930	$282,314	$192,280	$90,034
1m., Apr., '18	616,280	*§366,427	249,853	178,385	71,468
12m., Apr., '19	8,095,204	*§5,426,797	2,668,407	2,254,400	414,007
12m., Apr., '18	6,530,330	*§3,961,029	2,569,301	2,134,071	435,230

* Includes taxes. † Deficit. § In April, 1919, $21,026; April, 1918, $18,518; twelve months, 1919, $551,870; twelve months, 1918, $252,848, included for depreciation

Traffic and Transportation

Mobile Withdraws Appeal

Company There Decides Upon a Policy of Watchful Waiting Rather Than Commit Itself to Improvements

The Mobile Light & Railroad Company, Mobile, Ala., has withdrawn its appeal to the Council for a 6-cent fare. The reasons are best explained in the company's statement, which follows:

> We hereby ask for the withdrawal of our petition for an increased fare.
>
> While our petition asked for a 6-cent fare in the city division, no increase in school tickets, and no increase in the county divisions, the president of our company informed the members of the City Commission that we would accept a rate on tickets less than 6 cents, therefore, we cannot expect at this time a straight 6-cent fare.
>
> After considerable investigating and the making of conservative estimates on the increase in gross revenue from an increase in rates to the slight extent provided for under the ticket proposition, we have come to the conclusion that the increase in revenue would not justify us in putting into practice a rate schedule that would be difficult to handle and under which we would be expected to spend a large amount of money for track extensions, carhouses, cars and power-house machinery, and the inability to complete these improvements under a year with the possibility that by the time they were completed there would be no real need for them.
>
> Improvements needed would cost at present more than $300,000, about $125,000 above what we believe would be the cost of this work a year from now.
>
> The statement submitted to you for six months from Oct. 1, 1918, to April 1, 1919, was for a period when the shipbuilding plants were extremely active. This statement showed a deficit from operating of $7.136. A careful estimate for one year from the date of any grant allowing an increased fare on a ticket proposition figured on the basis of the six months' statement for an unusually heavy period of transportation would increase the gross revenue of our company less than $40,000 for one year, or after deducting the deficit for one year, on the basis of the deficit shown for six months, would leave only about $25,000 net income for a year, or only one-fifth of the excess cost above normal of the improvements mentioned.
>
> We prefer rather than run the risk of financial embarrassment by adding such a large amount to our investment which may not be needed eighteen months from now, to continue the present schedule of rates and wait and see what the future has in store as regards the volume of our business and the cost of power-house machinery, cars, tracks and the cost of building additional carhouses.
>
> We appreciate the almost universal opinion of the citizens of Mobile that we were entitled to an increase in fare. We further appreciate the fact that the transportaion system of any growing city has to be prosperous in order to help the prosperity of the city, and we do not feel like risking the investment of our stockholders by contracting for improvements that we might not be able to pay for, when the stockholders are not at this time receiving any return on their investment. We will do the best we can with our present plant and equipment but cannot extend the same under present conditions.

State Supreme Court Upholds Commission

The Supreme Court of Wisconsin on May 27 handed down a decision upholding the order of Aug. 23, 1912, made by the Railroad Commission of Wisconsin, requiring the sale of thirteen city fare tickets for 50 cents. Coupons issued in lieu of the extra tickets ordered by the commission while the case was on appeal must now be redeemed by the company. S. B. Way, vice-president of the company, is quoted as follows:

> The company will not attempt further appeal and will promptly redeem coupons, if presented at its office at 4 cents each in cash. The company interprets the decision as requiring it to refund to holders of coupons the value of a ride when purchased in lots of thirteen or twenty-six during the period while the commission's order of Aug. 23, 1912, was in effect in respect to commutation ticket rates.

Wants Ferry-Railway Transfers Stopped

Staten Island residents are hopeful of obtaining a modification of Federal Judge Julius M. Mayer's ruling which abolishes the transfer privileges on a 5-cent fare between the Staten Island municipal ferries and the Manhattan surface lines.

The court's decision to curtail the present 5-cent fare arrangement was announced after a hearing on a petition filed by Henry L. Stimson, counsel for Job E. Hedges, receiver of the New York Railways. It was contended by the company that under the present high cost of transportation the railway could no longer operate under the terms of the contract with the city and make a profit.

Judge Mayer announced, however, that he would consider a proposal from Corporation Counsel William P. Burr on behalf of the city to pay the traction company an increased share on each 5-cent fare This proposal is to be submitted during the week of Aug. 18. It provides that the city allot 0.0375 cent on each fare to the railway instead of 0.03644 cent as heretofore. With this it is expected that Staten Island residents will urge the retention of the 5-cent fare with a transfer at least during the week days to protect the commuters.

TRANSFER SYSTEM IN USE SINCE 1914

The system of transfers has been in operation between the municipal ferry running from the Battery to Staten Island and certain surface lines, since Sept. 9, 1914. Under the agreement of the New York Railway and the city, out of the 5-cent fare paid by a passenger using both car and ferry the railway received 3 cents and the ferry 2 cents.

After the expiration of the first six months the agreement provided that the system may be terminated by either party to it at the end of any calendar year six months from the date of its commencement by giving to the other party three months' notice of its intention to do so.

Six Cents in Memphis

After Many Vicissitudes, the Memphis Street Railway Is Allowed Increase by New Commission

It was announced on June 13 that beginning on June 16 the Memphis (Tenn.) Street Railway would charge a 6-cent fare. Both the company and the public appeared to be pleased at the change, although the 7-cent fare was strongly opposed. Residents of Memphis have come to look upon the fare matter from the standpoint of more tracks, more cars, and more interurban service being what Memphis needs to become a metropolis. As one resident put the matter, "the Memphis public are not sticklers over pennies, but they want first-class cars and frequent schedules and the congregation seated in whole rather than some having to stand on their heads or be suspended from crutches." Thus general approval is being expressed of the decision of the new State utilities commission, under whose ruling of June 12 the company will probably be enabled to overtake in part the burden of increasing costs. The order follows:

> IT IS ORDERED, That the receivers of the Memphis Street Railway, during the time it shall remain in the hands of the receivers, and the Memphis Street Railway, after the receivership shall have terminated, be and
>
> THEY ARE HEREBY AUTHORIZED, To establish on June 16, 1919, upon notice to this commission, and to the Memphis public, by one day's filing and posting in the manner prescribed in the rules and regulations of the commission, and thereafter until otherwise ordered by this commission, to maintain and apply to the transportation of passengers over its lines, a rate of fare, not to exceed 6 cents per person, where 5 cents or less is now charged, as an emergency rate. The tariff schedules for said railway shall show in plain terms that said 6-cent rate of fare is an emergency rate.
>
> IT IS FURTHER ORDERED, That an examination be made into the amount or amounts invested in the property of the Memphis Street Railway, upon which it, or its receivers, are entitled to a reasonable return, and that said examination be made by experts, one to be appointed by this commission, and one by the receivers, who shall be paid by the receivers or the company, and that the municipal authorities of the city of Memphis shall have the right, if they see proper to exercise it, of appointing an expert at their own expense, to act with the experts appointed by this commission and the railway, or its receivers, and that reports shall be filed with the commission by the experts, within four months from July 1, 1919, the reasonable cost of such examination and reports shall be paid by the receivers or the company. The reports of said experts may be joint or several, as determined by them, and upon filing of said reports, the right is reserved to the parties to the record in this case, to make application for such other and further relief as to them may appear to be reasonable and equitable.

Council Approves Fare Advance

The Public Utilities Commission of Colorado has granted permission to the Colorado Springs & Interurban Railway to file a tariff increasing the fare in Colorado Springs from 5 cents to 6 cents. The increase becomes effective on June 8. The action of the commission follows receipt of a resolution passed by the City Council of Colorado Springs requesting the commission to permit the railway to advance fares.

W. H. Taft Advocates Higher Fares

Increased Costs of Maintenance and Operation and Advanced Wages of Platform Men Practical Facts to Be Faced

A brief notice was published in last week's issue of an editorial article in the Philadelphia *Public Ledger* for June 12, by Ex-President William H. Taft, on the necessity for higher fares on city railways. The full text of this article, which is copyrighted, 1919, by the Public Ledger Company, follows:

The financial situation of the general steam railroad system of the country is bad enough, but it is far better than that of the electric street and suburban railway systems. There are several reasons for this, the last and perhaps the most influential of which has grown out of the war.

SOME MISTAKES MADE

In the first place many electric lines were built through territory which did not and could not furnish traffic enough to pay the expenses of operation at the time of construction, and they have never paid since. Many were built to develop the settlement of subdivisions, in the exploitation and sale of which directors and others were interested. Common councils and other municipal bodies also pressed for their construction, and they were undertaken without careful business foresight. An important element now interfering with the business in both city and suburban lines is the use of the automobile. The jitney business, which for a time threatened destruction to the street railways, has not survived; but the normal use of automobiles has increased so much as to constitute a serious reduction in railway receipts.

On city railways the fare has generally been 5 cents for all distances, the theory being that the volume of the business would reduce the cost per head of passenger in such a way as to make the fixed single fare profitable. Indeed, in some cities 3 and 4-cent fares have been forced. The public has thus been trained to regard anything more than 5 cents as an infringement upon its rights and privileges and an unjust swelling of the profits of traction capitalists. This feeling has been intensified among the people by the knowledge of the use of sinister and corrupt methods in originally securing franchises. The result is that in every community, however honest and earnest the present owners may be, they have an inheritance of popular distrust and hostility that works greatly to their detriment when they ask for justice at the hands of the public.

FIVE CENTS NOT REASONABLE COMPENSATION

Five cents under present conditions is generally not reasonable compensation for the service rendered in any city. The great percentage of increase in the cost of every material that enters into maintenance and operation requires, as a mere matter of fairness and equity, that the fares be increased. Coal, wire, rails, oil and cars have gone up with the price of other commodities in the community. Indeed, this condition was coming on before the war. One important element of the cost of operation has long been kept down simply through the necessitous circumstances of the street railways. That was the cost of labor. With their backs to the wall, the street railway managers refused to advance wages as wages advanced in other fields of labor. The platform men of street railways perform a semi-skilled service, the value of experience in which the companies themselves recognize by wages graded according to years of training. In order that the men should live upon the wages granted them at all, they have generally had to work from ten to twelve hours a day, seven days in the week. The unequal demand for service through the hours of the day and the "peaks" between 6 and 9 in the morning and 4 and 7 in the afternoon prevented runs of continuous hours for many of the men and required intervals in their periods of service, so that between the time of the beginning and the end of the daily runs of many fourteen to seventeen hours elapsed. This time was technically known among street railway men as the "spread."

WHY LABOR BOARD ADVANCED WAGES

When the war came on, the issue of wages on street railways came within the jurisdiction of the National War Labor Board, because the service of street railways all over the country was necessary to maintain maximum production in the factories where war supplies were made. Without street railway labor could not reach the places where it was employed. The National War Labor Board was asked to fix the wages of street-car men in many cities. Generally the street railway companies, obeying the patriotic impulse, submitted to the arbitration of the board. The slightest examination of the wages paid and the hours employed developed the fact that street-railway labor had been underpaid and that the hours were generally too long.

It was objected that the increase in wages and the reduction of hours would prevent companies from operating at a profit and might lead to bankruptcy. The attitude of the board, or of the two joint chairmen who usually sat as arbitrators, was that the question of wages in an arbitration like this was not one which could be affected by the question of profit of operation; that it was like fixing the price of coal or of any other element that entered into the cost of operation; that it must be governed by the range of wages for similar services in the same community and by minimum limitation as to the cost of living. The result was that the maximum wages were advanced in most cases from about 33 or 34 cents an hour to 48 cents an hour in the case of large cities, with variation down to 40 cents an hour in cities where the cost of living was less.

A MEASURE OF RECOGNITION

This increase, of course, added materially to the necessary expenditures of the railway company and the burden of the cost of operation; but it was only one of many elements which cut down dividends and interfered with the payment of the fixed charges on bonds and other securities. The National War Labor Board did not hesitate to recommend in every case an increase of the fares as only just to the owners of the street railway companies. A number of utility commissions of the various states responded to the recommendation and increased the fares. This action was noteworthy in Massachusetts and in Boston.

But often the statutes were in such form that state commissions had no jurisdiction to make the increase. The rates were fixed in a municipal franchise and could only be varied by the action of the common council or by a referendum to the people, and such referendums always resulted in a popular vote against the increase of fares beyond 5 cents.

Another difficulty was that too great increases in fares reduced the number of persons carried and left conditions as bad as before. The result for the companies was the grinding of them between the upper and the nether millstones, and that grinding is going on to-day, with the inevitable result of bringing the street railway companies and the suburban lines into receiverships and bankruptcy and a permanent injury and loss to a most useful and indispensable public agency of intercommunication.

Joseph K. Choate, in New York, representing a number of electric railways of that State, has asked the State authorities to recommend legislation looking to a relief of this situation. The capital invested in that State, he says, is more than $1,250,000,000. It is to be hoped that Mr. Choate's petition on behalf of his clients will be granted, that the whole subject may have the most thorough investigation and that action be taken by the State Legislature, which has the power to ignore franchises and other limitations now in the local laws and to do justice to the companies under existing conditions.

MUNICIPAL OWNERSHIP NOT A SOLUTION

There are those who believe that the situation can only be relieved by municipal ownership. This seems to many and to the writer to be a short-sighted conclusion. Such a change of ownership will not reduce the cost of operation. Instead, our experience is that it will greatly increase it if ownership is to include municipal operation. The intervention of politics always increases the cost of operation and leads to unwise business management. Many who favor municipal operation admit that the present system cannot be continued by municipal and state governments without a constant loss. They propose that the losses be made up by taxation. The theory is that, as the community is taxed to build roads and bridges and other means of communication, the same principle might easily be extended to actual transportation. But our experience in public control of that kind of active and complicated business management has not been fortunate. It foreshadows such lack of economy and increase in cost of operation as to make the change most unwise. It is far better that we should pay as we go. It is far better that we should measure the cost by a system of service at cost, with close public supervision and an increase of fare as the actual operations demand it, and with a small reasonable compensation for the use of capital, than that we should turn over to political control the conduct of such business enterprises, which need the best talent for their economical management.

But whatever the remedy to be undertaken, the condition of investments now reaching at least five billions in the country is so serious that public attention should be aroused to the necessity of devising ways and means to meet the crisis.

New York Fares Up Again

Mayor Unmoved by Receiverships, but First District Commissioner in Mood for Mutual Concessions

Both Mayor Hylan of New York and Public Service Commissioner Nixon have made statements recently in regard to the fare situation in New York City. The Mayor discussed the matter because of gossip to the effect that if the Board of Estimate of New York City refused to authorize an increase in fare the next Legislature would be asked to take the matter out of the hands of the city administration. The Mayor promised to do what he could to have elected to the Legislature only men who would oppose a higher fare. The Mayor's statement read:

> I will oppose an increased fare and if the transit corporations refuse to operate the lines the city will operate them in the interest of the people. It was stated in the press that if the Board of Estimate would not consent to an increased fare an appeal would be made to the Legislature of 1920 for a law which would take the power out of the hands of the city administration.
>
> I want to say now that the people should ask the designees of both parties of every Senatorial and Assembly district before primary day in September if they are for or against an increased fare to the transit corporations of the city, and if they refuse to take a stand against an increased fare they should be opposed in the primary and on election day regardless of party affiliations.
>
> I will take an active part in any Senatorial or Assembly district campaign to help defeat any candidate who refuses to take a stand against increased fares.

Mr. Nixon discussed the fare question for the purpose of correcting erroneous ideas growing out of his recent speech before the Brooklyn Chamber of Commerce. Mr. Nixon explained that many versions had been given to what he said in his Brooklyn speech, but that what he intended to say was that he thought further electric railway receiverships would be bad for the city, state and nation, and that every effort should be made to avoid them. If he had been vested with power to adjust fares to meet the situation, he would have acted by now. It was his idea that in any adjustment made there should be give and take from both sides. No adjustment could be one-sided. He said he desired to make clear the fact that nothing would be done by him under any circumstances except in co-operation with the Mayor.

Mr. Nixon explained that any amendment to the rapid transit contracts would be a matter for the attention of the rapid transit commissioner and that he would be interested only so far as the service and management were concerned. Mr. Nixon said that when the equipment and service were affected because of lack of funds it became his duty to present his views. From this viewpoint he discussed the fare question and the leases under the dual system and what might be considered as desirable changes in the rapid transit contracts. He is quoted as follows:

> The amendment of the rapid transit contracts is a matter for the Transit Construction Commissioner and the Board of Estimate to determine. If the demand for a higher fare were simply a question of operating costs the whole matter could be determined at once, as the increase in such costs is known to all. Much light has been thrown upon the other elements entering into the matter by existing receiverships. It has been pointed out that underlying leases and mortgages carried with them influences that might be most harmful in the future. Already we find certain of these properties demanding separation.
>
> But the companies ask that their deficiencies be made up by higher fares. Whether the city should pay the carrying charges on its investments out of taxes or increased fares is a matter of municipal policy. If, however, a permanent and equitable settlement of the present situation in all of its phases can be secured through an increase in fares and concessions in return on the part of the companies, there exists a compelling reason for such increase.
>
> There must, however, as the matter presents itself to me, be a readjustment of present conditions and an advance in the position which the city's investment takes under the dual contracts in the distribution of earnings.
>
> If the right to raise fares to meet an emergency exists, which right can only now be exercised by the city, it should in turn be assured of the right to reduce them when earnings advance.
>
> With such a situation clearly met it would seem that investments made in traction properties will have an assurance of certain return, and the interest paid should be on the basis which safe and guaranteed investments merit.
>
> If on account of permanent or long-term franchises certain provisions were forced into the dual subway contracts such provisions must be modified in the interest of the city in a fair adjustment.
>
> We cannot see the great system of transportation now so vital to our growing population jeopardized through physical deterioration, and while within two years the present fares may pay, a present need is facing us which cannot be met by drifting without general impairment.

On June 19 it was announced that the Public Service Commission for the Second District had refused the request of J. K. Choate, chairman of the committee on ways and means to obtain additional revenue of the New York electrical railways, for an investigation of the traction situation in New York State, with a view to recommending remedial legislation for the next Legislature.

At the suggestion of Governor Smith, to whom application for the appointment of a commission to investigate the situation had been made, Mr. Choate wrote to Chairman Charles B. Hill of the Second District Commission on June 3, calling attention to Governor Smith's suggestion and making a formal request for an investigation. Under date of June 6, Chairman Hill replied in part as follows:

> I observe that Governor Smith very naturally suggested that inasmuch as the State now has two public service commissions whose duty it is to investigate and to propose remedial measures connected with the subject matter it would seem that these commissions should be able to present suggestions on the subject, and that you present your claims to them and ask that they give the same consideration.
>
> I am greatly surprised, however, that you entirely ignore the fact that this commission anticipated both your suggestion and that of the Governor in the most comprehensive, explicit and public way, without urging by the electric railway interests, in its official report to the last Legislature. That report and its recommendation received very wide publicity in the press and very direct attention from the members of the Legislature. It was followed by the introduction of a bill designed to enlarge the powers of the commission in the respects recommended by the commission, and this bill also received great publicity and was much discussed both in the press and in the Legislature, and was the subject of a special joint session of the legislative committee held in the Assembly Chamber, at which former Governor Hughes appeared and spoke. This was probably the most largely attended hearing before any of the legislative committees.
>
> I am sending you under separate cover, a copy of the commission's annual report to which I have referred, with those portions marked which bear directly upon the question.
>
> As pointed out, this commission has anticipated your suggestion by one full legislative year. If a further hearing would produce additional facts on which to base suggestions for any different or further remedial legislation the commission will, as suggested in the Governor's letter, conduct such a hearing on the petition of any interested party.
>
> Regarding your suggestion of joint action by the two commissions, we feel that, in view of the great difference in character of the railroads in the two districts, the commission in the first district would probably much prefer to act upon its own initiative.

Immediately upon receipt of this communication, Mr. Choate sent a letter to Chairman Hill in part as follows:

> The committee of which I am the chairman was, of course, fully cognizant of the very valuable constructive work done by your commission in the matter of legislation. All of its members felt that your commission was fully alive to its duty in the matter, and had your suggestions been carried out, there would, of course, have been no occasion for further action in the premises.
>
> However, the Legislature adjourned without passing any remedial legislation, and the situation was left as it had been, except that the condition of the companies was, by the cumulative effect of the burdens they are bearing, in worse shape than ever before.

> The committee believes that unless something is done the State is threatened with a practical destruction of its system of electric railways.
>
> It was for that reason that it made its first suggestion to Governor Smith. It was for that reason, too, that it very gladly accepted Governor Smith's suggestion that such investigation could well be made by the commissions. The committee believes that the publicity which is necessary in order to create a public opinion that will result in the enactment of legislation, could, to a very large extent be secured if the two Public Service Commissions hold public meetings and the true picture of the industry's plight is thus presented.
>
> The committee believes, however, that the work can be done much more effectively if it could be undertaken by the commissions on their own initiative, rather than on formal application for a hearing coming from either the committee or any particular company.
>
> It agrees with you that the problems of the Second District are in a measure distinct, and it was for that reason that it suggested that the investigations be conducted separately. However, it is of the opinion that the remedy is in both cases very much the same, and that the solution which the commissions might arrive at separately, would be the same.
>
> I still hope that your commission will be able to see its way clear to conduct such an investigation.

Under date of June 13, Chairman Hill, in reply, communicated to Mr. Choate, the decision of the commission not to hold the investigation.

Mr. Choate expressed himself as very much disappointed over the outcome.

Mr. Taft Warns Denver Mayor

Chairman Taft of the National War Labor Board wired the Mayor of Denver from New York on June 14 as follows:

> Consider it is unjust and a breach of faith to pass the ordinance reducing the fare on the Denver street railway from 6 cents to 5 cents. A careful examination of the condition of the railway and its finances demonstrates that even with a 6-cent fare no dividends and no allowance for depreciation can be provided for, for the reduction to 5 cents will throw the company into bankruptcy. This is certain to introduce a wage discussion and will reflect on the fairness and honor of the city.

The telegram of Mr. Taft had its origin in connection with a letter of Frederic W. Hild, general manager of the Denver Tramway, in which city officials were asked to allow the 6-cent fare to continue as provided for in the ordinance passed by a former administration. In reply to this letter from Mr. Hild, Mayor Dewey C. Bailey on June 5 pointed out that a fare greater than 5 cents will not be considered during his administration.

Coincident with the reply letter, which was made public, came the statement from the Mayor that the proposed ordinance for the restoration of the fare to 5 cents would be introduced in the Council on June 9.

Mr. Hild wrote to the Mayor and asked him to refrain from reducing the fare to 5 cents at this time, declaring that such action would mean the "utter ruin and bankruptcy" of the company. The ordinance for a 6-cent fare, unless repealed, will remain in effect until twenty-one months after peace has been consummated.

The Mayor has based his reply on the provisions entered into between the tramway company and the city in its franchise.

Ten-Cent Fares Expected at Boston

It is understood that the trustees of the Boston (Mass.) Elevated Railway have practically decided to start a 10-cent fare on July 1. A decision will be announced on June 25, with a public statement reviewing the conditions and giving the reasons for the increase. The failure of the bill for the purchase of the Cambridge subway by the State and the fact that the cost of service is more than 9 cents per passenger appear to leave the trustees no other choice but to establish a fare in excess of the existing 8-cent rate.

Transportation News Notes

Village Refuses Increase in Interurban Fare.—The Village Council at Fairport, Ohio, has refused to approve an increase in the rate of fare between Painesville and Fairport, as requested by the Cleveland, Painesville & Eastern Railway. The rate has been 15 cents a round trip. The railway company asked that it be raised to 10 cents each way.

Returns to Five Cents Temporarily.—Benjamin S. Hanchett, president of the Grand Rapids (Mich.) Railway, voluntarily consented on June 13 to charge a 5-cent fare during July. The reduction of the fare is for a test only, and if the report of the company at the end of the month shows that it cannot continue operation and "break even" with less than a 6-cent fare, the City Commission promised its support.

Bankers Urge Fare Action.—New York bankers in the closing session of the twenty-ninth annual convention on June 13 adopted resolutions favoring the early return of the railroads to private control, with compensation from federal funds to place the properties in normal physical condition. Communities or cities were urged in another resolution to amend present laws and regulations to enable electric railways to increase fares.

Traffic Ordinance Revised.—The traffic ordinance prepared by the Corporation Counsel of Seattle, Wash., regulating traffic on the streets of Seattle was sent back to the Corporation Counsel for redrafting, after a three-hour discussion in which representatives of various automobile associations, team and truck owners' associations, municipal railway and corporation counsel's office participated. The revised ordinance is to be somewhat less drastic, and to provide certain parking privileges for automobiles on downtown streets.

May Have to Increase Cleveland Fare.—Should the advance in wages be allowed to the employees of the Cleveland (Ohio) Railway which is referred to elsewhere in this issue, the rate of fare may have to be advanced to 6 cents. Recently it was announced that the rate would be slightly reduced on July 1. At that time, there was no indication that employees would ask for an increase, since they are now working under an award of the Federal War Labor Board and it was supposed that they would continue at present wages until the expiration of their contract next May.

Another Kentucky Hearing.—Another hearing was set for Louisville, Ky., on June 20, in connection with the controversy between the Louisville & Interurban Railway and the Suburban Protective Association, representing the suburban passengers. The case is being carried on before the Kentucky State Railroad Commission. The legal advisors of the railway contend that recent holdings of the commission in reducing fares are illegal, as the commission exceeded its authority, in arranging a general schedule, instead of taking up singly complaints of rates on certain lines, from specified stations.

Chicago Fares Inadequate.—The increase of 1 cent in fare granted to the Chicago (Ill.) Elevated Railways last November by the Public Utilities Commission has proved altogether inadequate to meet the increased cost of operation, and the company is hoping for favorable action on its petition for a 7-cent fare. The report for the first three months of operation at 6 cents shows an increase in revenues of $248,849, while the operating expenses increased $588,351 over the same period of the previous year. Meanwhile the Chicago Surface Lines are operating at a 5-cent fare, and while increased traffic has helped to a certain extent this will not meet the cost of service. The company is waiting for a hearing in the courts on its appeal from the commission ruling which refused an advance in rates.

Eight-Cent Fare in Peekskill.—The Public Service Commission for the Second District of New York has granted permission to the Putnam & Westchester Traction Company to charge an 8-cent fare in Peekskill and 2 cents for a transfer in Peekskill to the Peekskill Lighting & Railroad Company. The new rates of fare to be established under the schedule to be filed may also provide an 8-cent fare outside Peekskill affecting zones 1 and 2. The order is to remain in effect for five years from May 24, 1919, unless the commission determines on investigation that conditions have so changed as to warrant a reduction or change in the fares. There was no opposition to the company's petition at the hearing and the commission approved the action of the Peekskill authorities in amending the company's franchise. The new tariff becomes effective on one day's notice.

Personal Mention

H. J. Van Buren has been appointed chief electrician of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., succeeding G. W. Twyford.

George M. Evans has been appointed chief electrical engineer of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., succeeding F. H. Gregg.

Keith Randolph has been appointed general freight and claim agent of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., to succeed H. J. Enders.

Frank Wendle has been appointed assistant superintendent of transportation of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., succeeding C. L. Osborne.

H. E. Chubbuck, vice-president executive of the Illinois Traction System, Peoria, Ill., has been elected a trustee of the Bradley Polytechnic Institute, Peoria, to succeed the late Judge Leslie D. Puterbaugh.

F. Arthur Harrington, connected with the claim department of the Bay State Street Railway at Lowell, Mass., has been promoted to the office of assistant claim agent of the Quincy division of the company.

Martin Schreiber, chief engineer of the Public Service Corporation of New Jersey, Newark, N. J., has been elected a member of the committee on electrolysis, representing the American Railway Engineering Association.

Richard E. Lyman, Providence, R. I., who has been appointed master in chancery to untangle the affairs of the Rhode Island Company, is an attorney of prominence. When the Central Trust Company, Providence, failed a number of years ago, Mr. Lyman was made receiver. He is well known in Rhode Island and quite conversant with the financial difficulties the Rhode Island Company has encountered.

E. Burt Fenton, for the last two years publicity agent of the Northern Ohio Traction & Light Company, Akron, Ohio, has resigned that position. He was formerly publicity manager of the W. S. Barstow & Company properties, and for some years past has specialized on matters pertaining to the public relations of utilities. Mr. Fenton is the author of several papers and magazine articles on this subject which have attracted wide attention and received favorable comment. He has not announced his plans for the future.

Godfrey Goldmark, who became chief counsel of the Public Service Commission for the First District of New York on Jan. 1, has sent his resignation to Commissioner Lewis Nixon with the request that it be accepted at once. At Mr. Nixon's request, Mr. Goldmark will continue until July 1. Mr. Goldmark's first service with the commission was as secretary to Oscar S. Straus, former chairman of the commission. He then became assistant chief counsel, and later succeeded William L. Ransom. Mr. Goldmark is to become the junior member of a new law firm of which Col. William Hayward and Maj. Holley Clark are the other members.

Hudson R. Biery, recently appointed purchasing agent of the Union Traction Company of Indiana, Indianapolis, Ind., was born and reared in Scottsburg, Scott County, Indiana. He worked for the Indianapolis & Louisville Traction Railway in 1906 during the construction of that road. In 1908 he became storekeeper for the company and in 1909 was made clerk to the superintendent of that property. The reorganization of the company in 1911 resulted in the reduction of the force and the consolidation of the duties of traffic manager and purchasing agent with those of superintendent under the title of assistant to the general manager and to this position Mr. Biery was promoted.

Lieut.-Col. Henry M. Byllesby, president of H. M. Byllesby & Company, Chicago, Ill., who served as purchasing agent for Great Britain and Scandinavian countries with the American Expeditionary Forces, headquarters in London, has just been advised that the English Distinguished Service Order has been conferred upon him. The minister of munitions of the British government, in advising Colonel Byllesby, writes as follows: "I have just learned with great satisfaction that the King has approved of the award to you of the Distinguished Service Order, a much coveted distinction, of which any officer may be proud. From the moment of your arrival in Great Britain you made it quite clear that you were determined to carry on and largely extend the assistance rendered to my department by your organization, and throughout the whole period of our cooperation with you our personal relations have been of the most cordial character. Please accept my warm congratulations on this well-deserved recognition of the great work you have done."

Cornelius S. Sweetland, Providence, R. I., who, as noted elsewhere in this issue, has been appointed by Presiding Justice Tanner of the Superior Court temporary receiver of the United Traction & Electric Company, Providence, has had exceptional experience in receiverships in the past. He was born on July 15, 1845, and after attending the public schools of the State, was graduated from Brown University in the class of 1866. He entered the banking business and was later made president of the Jackson Bank, which has since gone out of existence. He was receiver of the Inter State Street Railway, Attleboro, Mass., and when the holdings of the Union Railroad, Providence, were consolidated with other electric railway properties in the State and the United Traction & Electric Company formed, Mr. Sweetland was made treasurer. He was vice-president of the Union Trust Company, Providence, and when that bank closed its doors during the 1907 panic he was appointed one of the receivers. In 1889 Mr. Sweetland succeeded Zachariah Chaffee as trustee of all the property represented in the failure of A. & W. Sprague Manufacturing Company, one of the largest cotton mill properties in New England, the failure of which in 1873 startled the country. Mr. Sweetland's private business activity is represented in his holding a vice-presidency in the Rumford Chemical Works and as a trustee of the Alfred Anthony Land Company, both of Providence. In 1892 he was made a trustee of Brown University and eight years later was appointed treasurer, which position he holds at present.

Obituary

Paul M. Einert, for twenty years foreign supervising auditor of the Westinghouse Electric & Manufacturing Company and since last January special assistant to Guy E. Tripp. chairman of the board of directors of the Westinghouse Company, is dead.

J. T. Hury, traffic manager for the Birmingham Railway, Light & Power Company, Birmingham, Ala., died on June 3 at Asheville, N. C., after a protracted illness. The funeral was held from his residence in Birmingham on June 5. Mr. Hury was fifty-two years of age. He had been connected with the Birmingham Railway, Light & Power Company for the last twenty-eight years and for several years past he had been traffic manager.

Paul Leake, secretary of the Detroit Stock Exchange, is dead at his home after an illness of two months. Mr. Leake was widely known in financial and newspaper circles in Detroit and Grand Rapids. He was financial editor of the Detroit *Free Press* for a number of years, later going to Grand Rapids where he became publicity manager for the American Public Utilities Company, operating about fifteen public utilities in various parts of the United States. He was born in New York.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Signs of Better Traction Purchasing

Need for Rehabilitation and Certainty of Higher Prices Apparently Back of Activity

Reports from here and there indicate unmistakably that the tide of electric railway purchasing is on the turn. No large business is looked for but better business is on the way. This business is being placed apparently because the roads are beginning to realize the futility of holding off. Before another winter sets in a whole lot of work must be done to the road, the rolling stock and the overhead system.

Incidentally not a few managers realize that goods can be purchased at lower prices to-day than will prevail in August and September. Paints and oils may go higher, especially leads and zincs. Wire is advancing and, there are reasons for believing, will go at least 10 to 15 per cent higher during the next quarter. Rails can be expected to be higher before they are lower. Some concessions have been reported, but indications are that the steel market will be very tight shortly.

Managers may find it best to lay in coil winding supplies and all metal supplies well ahead of time.

Line Materials Expected to Go Higher

Advancing Prices of Copper and Lumber Make it Advisable to Place Orders Now

Prices of distribution and transmission-line material are lower at this writing than they probably will be at any time later in the year. Railways that are contemplating the extension or rehabilitation of lines or the building of new ones would not be making a mistake if they placed their orders for required material prior to July 1.

Wire is advancing steadily. At this writing weather-proof is on a 20-cent to 22-cent base and bare wire on a 19½-cent to 20-cent base.

Copper is being quoted at 17¾ cents for early delivery. In fact, there is every indication now that the copper will go as high, if not higher than, 20 cents a pound during the early fall months.

Wire, in other words, can be expected during the next quarter to advance further from 10 to 15 per cent or more.

Poles and cross-arms are due to advance from 10 to 16 per cent by the first of July, and in some instances cedar poles are advancing this week.

Pole-line hardware is undoubtedly as low as it is going. As soon as steel begins to stiffen in price, and that will probably happen the next thirty to fifty days, hardware may be expected to go higher.

Insulators show no tendency downward. In fact, it would not be surprising if, in view of possible higher transportation and labor charges, the price of insulators advanced before the fall months.

Guy lines, anchors and transmission towers will probably be guided largely by the price of steel. Inasmuch as steel is expected in some quarters to go slightly higher in July or early August, there seems to be no good reason for believing these products will go lower.

Transformers, it is learned on good authority, will go no lower this year. In fact, it is not improbable that costs may mount so rapidly that higher charges must be made.

Lightning arrester prices appear to be very steady. Cement for tower and pole ground work is also very steady.

No Reduction in Outdoor Switching Equipment

Prominent Manufacturer Holds that Reductions Will Come Only as a Result of Heavier Buying

In a conversation held by a representative of the ELECTRIC RAILWAY JOURNAL with a prominent manufacturer regarding price trend of outdoor substation and switching equipment, the manufacturer gave it as his opinion that prices could be lowered if production could be stimulated through buying. If his organization was to be kept together, after so much necessary expenditure to bring it to its present development, it was impossible to reduce the overhead. Consequently, with the low production due to curtailed buying in the last two years, the same overhead had to be distributed over a smaller number of units produced, thereby increasing the cost of each unit. If it were desired to let go of the trained organization over the short period of low production, then prices could be adjusted.

"The economic way to reduce the cost of the apparatus is to get back to quantity production," said the manufacturer. "That means that the power companies must get out of the rut of holding until prices lower. Prices will lower through buying, not through holding off. Peace is about to be concluded, the Victory loan is safely by, and Congress is now in session. This should have some stabilizing influence on industry.

Wire and Cable Sales Picking Up Rapidly

Indications Now Point to Full Capacity Production of Mills During the Coming Fall Months

Wire and cable manufacturers report a steady increase in orders booked. For a while incoming business was rather slow, particularly in the East. The Middle West and the South have been purchasing more steadily. Last week some very nice cable orders were placed in the East, and the manufacturers are of the opinion that better business is on the way.

Rubber-covered wire demand began to pick up perceptibly about five or six weeks ago and has gathered momentum ever since. Each time the price advanced the buying appeared to go ahead faster.

With advancing copper prices and assurances of 10 to 15 per cent higher prices by the early fall the wire market should rapidly become better. In addition, construction work is getting larger every day.

There is every reason to believe that by September the copper wire mills of the country will again be running at full capacity.

Transformer Prices Not Expected to Go Lower

War Increases in Raw Materials Do Not Reflect Prices for Finished Products

In the opinion of those in close touch with the manufacturing of transformers, the bottom has been reached in prices of such equipment. It is pointed out that labor costs show no tendency whatever to decrease. Some material costs are running lower than during the height of the war.

Thus, magnetic steel is now costing the transformer manufacturer about 9 cents per pound, compared with 14 cents in the period of maximum demand and allowing for wastage in the fabrication of lamination sheets of the proper shape. The maximum cost of this steel was practically equivalent to the price of copper the year before the war.

Considerable stocks of copper and steel which were purchased at prices in excess of ruling quotations are yet to be worked up at the factories. The overhead cost in transformer manufacture and the labor cost are to-day probably not far apart. Insulating materials are a little easier in price than last year, but with present high labor and overhead charges, with existing high cost of maintaining sales work in the field and with outputs far below the capacity of the factories, it is held that no reasonable basis for price reduction exists, bearing in mind always that the price advances of transformer equipment during the war did not exceed about 60 per cent compared with from two to five times that advance in many other manufactured commodities. There is no certainty that the prices of steel and copper will not advance materially during the present year, and neither is it positive that no further increases in the cost of labor will be registered.

Little is being heard of guarantees covering price reductions this year in the transformer quotations now being offered. Since the prices of such equipment did not follow the advances in material cost during the war, it results that very substantial drops can take place in raw-material costs before any sympathetic fall in product prices may be expected. Possibly in the future mass production on the basis of greatly increased labor efficiency may allow a moderate recession to be established, but the prospects are that prices now current will form the basis of quotations for a long time hence.

British Import Restrictions Removed

The War Trade Board announces that copper wire and copper-clad wire may be imported into Great Britain without individual license.

Pump Manufacturers Combine

The entire pumping machinery business of the Canton-Hughes Pump Company, Wooster, Ohio, has been purchased by the Chalmers Pump & Manufacturing Company, Lima, Ohio, which company is a reorganization of the Chalmers Manufacturing Company, with increased capital and manufacturing facilities necessary for the new business. The officers of the Chalmers Pump & Manufacturing Company are C. S. Brown, president; Frank D. Shumate, vice-president and sales manager; Fred Biszanta, secretary and treasurer. Messrs. Brown and Biszanta, as executives of the Chalmers Manufacturing Company, have been active as founders and builders of machinery.

Mr. Shumate, of Chicago, who has become associated with the new organization, brings to it a broad experience in the engineering and sales field of pumping machinery, gained through his connection with the Worthington Pump & Machinery Corporation for the past thirteen years throughout the Middle West, Southwest, Mexico and Canada. The Canton-Hughes Pump Company has built pumping machinery for many years and has a full line of single and duplex steam and power pumps, air compressors, jet and surface condensers for medium vacuum work, and many pumps for special purposes. The manufacture of the line will be continued actively.

The general offices and works will be at Lima, Ohio, with agents in all of the principal cities.

Rolling Stock

Indianapolis Traction & Terminal Company, Indianapolis, Ind., has reported to the Public Service Commission of that state that since the order of the commission on Dec. 28 it has converted 150 cars into cars of the prepayment type and that 100 more cars will be changed.

Franchises

Cleveland, Ohio—The City Council of Cleveland has granted the Cleveland Railway three franchises to construct a single track extension on West Seventy-third Street, from Denison Avenue S. W., to Linndale Road S. W.; double track extension on Broadview Avenue S. W., from Pearl Road S. W. to Tate Avenue S. W., thence to the intersection of Schaaf Road S. W., and a double-track extension in the southeastern part of the city, beginning at Union Avenue S. W., to South View Avenue S. E., via East 116th Street and Corlett Avenue S. E.

Track and Roadway

Calgary (Alta.) Municipal Railway.—The Calgary Municpal Railway plans to construct 1 mile of new track in the city of Calgary, and will use the rails, etc., from the line which was laid to serve the military camp on the Sarcee

NEW YORK METAL MARKET PRICES

	June 5	June 18
Copper, ingots, cents per lb	16.62½	17 75
Copper wire base, cents per lb	18.25 to 18.75	20.00 to 20 50
Lead, cents per lb	5.25	5 40
Nickel, cents per lb	40.00	40.00
Spelter, cents per lb	6.47½	6.90
Tin, cents per lb	†72.50	†72.50
Aluminum, 98 to 99 per cent, cents per lb	32.00 to 33.00	33.00

† Government price in 25-ton lots or more f.o.b. plant.

OLD METAL PRICES—NEW YORK

	June 5	June 18
Heavy copper, cents per lb	14 50 to 14 75	15 00 to 15 50
Light copper, cents per lb	11.75 to 12.50	12 00 to 12 75
Heavy brass, cents per lb	8.00 to 8 50	8 50 to 9.25
Zinc, cents per lb	5 00 to 5.50	5 25 to 5.50
Yellow brass, cents per lb	7 25 to 7 75	7 50 to 8 00
Lead, heavy, cents per lb	4 50 to 4 60	4 75 to 4 87½
Steel car axles, Chicago, per net ton	$23 00 to $24 00	$23 00 to $24 00
Old carwheels, Chicago, per gross ton	$21 00 to $22 00	$21 00 to $22 00
Steel rails (scrap), Chicago, per gross ton	$16 50 to $17 00	$18 50 to $19 00
Steel rails (relaying), Chicago, gross ton.	$16 50 to $17.00	$19 50 to $20.00
Machine shop turnings, Chicago, net ton	$6.00 to $6.50	$6 50 to $7.00

ELECTRIC RAILWAY MATERIAL PRICES

	June 5	June 18
Rubber-covered wire base, New York, cents per lb	21	22
Weatherproof wire (100 lb. lots), cents per lb., New York	23.25 to 24.00	26.00 to 23.25
Weatherproof wire (100 lb. lots), cents per lb., Chicago	24.50 to 24 75	25.75 to 26 50
T rails (A. S. C. E. standard), per gross ton	$49 00 to $51 00	49.00 to 51.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	$47 00 to $49 00	47.00 to 49.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	$45 00 to $47 00	45.00 to 47.00
T rail, high (Shanghai), cents per lb	3	3
Rails, girder (grooved), cents per lb	3	3
Wire nails, Pittsburgh, cents per lb	3.25	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3 35	3.35
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8
Tie plates (flat type), cents per lb	2.75	2.75
Tie plates (brace type), cents per lb	2.75	2.75
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb	3	3
Angle plates, cents per lb	3.90	3.90
Angle bars, cents per lb	3.90	3.90
Rail bolts and nuts, Pittsburgh base, cents per lb	4 35	4.35
Steel bars, Pittsburgh, cents per lb	2 35	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4 20	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.25	5.25
Galvanized barbed wire, Pittsburgh, cents per lb	4.10	4.10

	June 5	June 18
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.70	3.70
Car window glass (single strength), first three brackets, A quality, New York, discount †	80%	80%
Car window glass (single strength, first three brackets, B quality), New York, discount	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount	81%	81%
Waste, wool (according to grade), cents per lb	14 to 17	14 to 17
Waste, cotton (100 lb. bale), cents per lb.	8 to 12½	8 to 12½
Asphalt, hot (150 tons minimum), per ton delivered	.....	.....
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	.....	.....
Asphalt filler, per ton	$30.00	$30.00
Cement (carload lots), New York, per bbl	$2.90	$2.90
Cement (carload lots), Chicago, per bbl.	$3.05	$3.05
Cement (carload lots), Seattle, per bbl.	$3.13	$3.13
Linseed oil (raw, 5 bbl. lots), New York, per gal	$1.66	$1.83
Linseed oil (boiled, 5 bbl. lots), New York, per gal	$1.68	$1.75
White lead (100 lb. keg), New York, cents per lb	13	13
Turpentine (bbl. lots), New York, cents per gal	94	$1.17

† These prices are f. o. b. works, with boxing charges extra.

Indian Reserve. It is reported that an extension will also be built to Mewata Park, south of the Armories.

Wabash, Chester & Western Railroad, Chester, Ill.—It is reported that arrangements are being made to electrify the Wabash, Chester & Webster Railroad, which extends from Mt. Vernon to Chester.

Kingston, Jamaica—The government of Jamaica is arranging to have a survey made of the water power of the larger rivers in Jamaica, to see if electrification of the railways is now feasible. The cost of coal and the necessity for considerable railroad' extension, owing to unexpected agricultural developments, explain the proposed change.

Frankfort & Shelbyville Traction Company, Shelbyville, Ky.—F. W. Hinkle secretary and treasurer of the Frankfort & Shelbyville Traction Company, has announced that plans for the construction of the line from Frankfort to Shelbyville are progressing rapidly and that the line will be in operation by Jan. 1. It is reported that the company has secured options on rails, trolley wire, poles, right-of-way, three steel bridges, prices on grading, ballast, ties, etc., and that arrangements have been made whereby the Kentucky Traction & Terminal Company will provide the rolling stock. [March 8, '19.]

Power Houses, Shops and Buildings

Georgia Railway & Power Company, Atlanta, Ga.—Improvements are being planned by the Georgia Railway & Power Company to its power station at Dalton estimated to cost $6,000.

Union Traction Company of Indiana, Anderson, Ind.—A 36 ft. x 100 ft. tract on Main Street, Anderson, has been purchased by the Union Traction Company for a station site. The company plans to build a terminal and office building next year.

Louisville & Southern Indiana Traction Company, Louisville, Ky.—New freight sheds wiill be constructed by the Louisville & Southern Indiana Traction Company at 441 South First Street, at a cost of $8,000.

Eastern Massachusetts Street Railway, Boston, Mass.—Work has been begun by the Eastern Massachusetts Street Railway on the remodeling of the Middlesex Street carhouse in Lowell into a repair and construction shop which will take care of all the cars on the lines in the Middlesex valley district.

Brooklyn (N. Y.) Rapid Transit Company.—Judge Julius M. Mayer, in the Federal District Court, has authorized Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, to purchase power property at Kent and Davison Avenues; Williamsburg, owned by the Brooklyn City Railroad, for about $225,000.

Trade Notes

Crouse-Hinds Company of Syracuse, N. Y., announces that P. A. Fuss has joined its staff in an advertising capacity after a number of years of service for the Thomas Edison Company and the T. G. Plant Company.

Netherlands Legation at Washington has just opened a commercial department for the purpose of fostering trade between the United States and Holland and is in a position to give commercial information about trade between the two countries to American merchants.

Brunswick (Ga.) Cross-Arm Company reports that it is placing orders for two additional fast-feeding machines and intends to build an addition to its plant 50 ft. x 100 ft., about doubling the present size, for the purpose of operating a complete planing mill and catering to export business.

Foster Callahan, recently a first lieutenant of field artillery in the United States Army, has returned to civil life as representative in several Southeastern states of the Safety Insulated Wire & Cable Company. Mr. Callahan formerly covered this same territory in another connection and is well known in the electric railway field.

Carbolineum Wood Preserving Company, Milwaukee, Wis., announces that it has lately centralized its business, doing away with all former branches, distributers and agents, except only the Pacific Coast branch. All distributing will be done from stocks carried at different points with headquarters at the Carbolineum Building, Milwaukee, Wis.

James Leffel Water Wheel Company has sold its plant in the Lagonda district, Springfield, Ohio, to the Robbins & Myers Company, and has acquired more extensive property in Springfield. Engineers and architects are at work on plans for a large, modern and fully equipped plant and construction work will be rushed so that the new plant will be ready for occupancy by Dec. 1. The company found itself cramped for factory space in its old quarters.

H. F. Keegan Company, First National Bank Building, Chicago, Ill., announces its appointment as district sales agent for the Van Dorn & Dutton Company, gear specialist, of Cleveland, Ohio. The company has also secured the sales agency of the Eureka Company of North East, Pa., manufacturer of a complete line of commutators, commutator bars, controller parts, line material, trolley wheels, brush-holders and springs and bushings.

Dayton Insulating Die Company, manufacturer of molded insulation products and dies for same, has just purchased the Edgemont Die Casting Company of Dayton, Ohio, manufacturer of white-metal castings, and will consolidate and operate under a new name. C. A. Kurz will be president and I. W. Detamore is also connected with the new organization. Ground was broken during the third week in May for a new plant, about 60 ft. by 120 ft., two stories, steel and concrete, situated at Edgemont, a suburb of Dayton, Ohio.

Roller-Smith Company, New York City, announces that it is now represented in St. Paul, Minn., by A. H. Savage, Pioneer Building. Mr. Savage will handle the company's various lines of instruments, meters and circuit breakers in Minnesota and North Dakota and part of Wisconsin and South Dakota. Mr. Savage prior to 1914 represented the Fort Wayne Electric Works in St. Paul, and in 1914 he became a representative of the Wagner Electric Manufacturing Company of St. Louis, he being now in charge of the St. Paul office of that concern. At the present time Mr. Savage is treasurer of the Dakota Light & Power Company of Flandreau, S. Dak., and is also president of the South Dakota Power Association. He has been in the Northwest for over eighteen years.

New Advertising Literature

Hemingway Glass Company, Muncie, Ind.: Catalog No. 31 on Standard glass insulators.

Underfeed Stoker Company of America, Chicago, Ill.: Pamphlet describing the Jones automatic cleaning underfeed stoker.

Bridgeport Brass Company, Bridgeport, Conn.: Bulletin No. 12 on the reasons for and properties of Phono-Electric wire.

Irving Iron Works Company, Long Island City, N. Y.: A thirty-six-page catalog (2A) covering "Irving subway" fireproof ventilating flooring.

Electrical Manufacturing Company of Cleveland: A sixty-eight-page catalog (D), covering knife switches, panelboards, iron cabinets and switchboards.

Northern Equipment Company, Erie, Pa.: Pamphlet entitled "Proposal and Specifications for the Copes System of Boiler Feed Control."

Waterbury Battery Company, Waterbury, Conn.: Circular illustrating and describing the Waterbury "unit cylinder" primary battery cell (RSA signal cell).

Allis-Chalmers Manufacturing Company of Milwaukee: A monthly bulletin containing a list of the centrifugal pumping units it has available for shipment.

General Electric Company, Schenectady, N. Y.: Bulletins Nos. 47,417, 47,443 and 47,482, describing respectively type FP-7, type FK-13 and type FK-52B oil circuit breakers.

Murray Iron Works Company, Burlington, Iowa: Catalog No. 85 of ninety-five pages, describing and illustrating its Corliss marine, pumping and vertical engines, air compressors, tubular, marine, portable and water-tube boilers, and rocking grates.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53 New York, Saturday, June 28, 1919 *Number* 26

What Shall We Term the "Safety Car"?

THE discussion now in progress regarding phraseology to be used in connection with the light-weight, quick-service, one-man, etc., safety car reminds one of the early days of the bicycle. Once upon a time these machines were made with a big wheel in front and a little one behind, or vice-versa. With the former, the rider struck on his nose; with the latter, on the back of his head. Then came the "safety bicycle" or "safety," which had also virtues other than the name indicated; but this term appealed to the public and stuck until the new type of wheel had replaced the others. Then the machine was simply a "bicycle" again. In the case of the one-man car, only usage will in the long run determine the name. Managers, among themselves, will naturally often refer to the "one-man" car; in publicity work "safety" or "frequent-service" car is perhaps better. Variety in this matter is not undesirable. Sometimes force in statement will result from the use of more than one term.

Carry the Message to the Public

A REAL OPPORTUNITY is afforded in the coming hearings of the Federal Electric Railways Commission for the electric railway companies to get their case before the public. Up to this time the electric railways have realized the seriousness of their situation, but the public as a whole has not. Most people are not accustomed to worry much about the troubles of others. It is much easier for the average citizen to assume that the companies would get out of their troubles somehow, and if they did not, it would not greatly affect his daily life or fortune.

But with a federal commission engaged on the subject, the matter immediately acquires national and consequently journalistic interest. The testimony presented last week by Mr. Taft was sent out broadcast by the press agencies and helped to carry the lesson that something must be done. The original appointment of the commission and the preliminary correspondence in relation thereto between the Secretaries of Commerce and Labor and the President also attracted wide attention.

We dwell upon this phase of the hearings because it is an incidental advantage of the investigation now under way and one in which the railways can help. The duty of the commission is to get the facts and report upon them. The main duty of the railways is to supply these facts, so far as they can, but with this duty there is the opportunity just mentioned, namely, to help give these facts publicity through company publications, car cards, local daily papers and other ways.

With this publicity should be combined the thought of what the public owes the railways. Too many people think of what the railways owe the public without considering that there is any reciprocal responsibility. They insist that the railways should be ready always to furnish good and safe service in attractive, comfortable cars, and this is true. But they often forget that this can be done only when the public is willing to pay a reasonable price for that service, to co-operate with the company where it can be done and to boost and not knock. It is only where this responsibility is recognized that the best service can be given.

What Would Accelerate the Adoption of Standards?

THE American Electric Railway Engineering Association has been laboring a long time in the field of much-needed standardization in the several branches of electric railway engineering which come within its scope. It has adopted a number of standards and besides these its "Engineering Manual" sets forth many recommended practices which have substantially the same force and effect as the standards themselves. Nevertheless, the committee on standards, through a questionnaire put out about three years ago, found that only a very small portion of the association membership has adopted the standards. There appeared to be an inexplicable apathy on the part of the membership toward the standards, and while strong efforts have since been made looking toward their wider use, there has been but little progress recorded. This situation seems to indicate either one of two things: (1) The standards are not satisfactory, or (2) the membership really does not want standards.

The same conditions seem to exist in regard to the general failure of the steam roads to use the valuable standards and recommendations of the American Railway Engineering Association. Perhaps one of the reasons for this state of affairs in connection with both engineering associations may be found in the last clause of the statement found at the head of the Proceedings of the American Railway Engineering Association, to wit: "Its action is not binding upon its members." Another reason may possibly be found in the failure of those in responsible management to interest themselves in the subject. Let the general managers take a positive stand to the effect that association standards must be used wherever possible and we venture to predict a surprising increase in the rate of progress in standardization.

One of the most depressing of the reasons assigned by those who do not use the standards was that ancient crutch: "Local conditions prevent using." This has been ascribed from time immemorial by the unprogressive as the reason for staying in a rut. It may well be asked, "Why have any standards if no one will even make an effort to use them?" Of what use are the expensive technical committees if the results of their labors are to be passed over so lightly? A standard in the Manual is of little value, while one in use on the majority of roads should be worth much to all of them.

We are coming more and more to the view that strong measures must be taken if standardization is ever to become general in the electric railway field. The sudden cessation of the war was the only reason why the government did not take a hand in standardizing girder guard rails. Had the war lasted three months more, we should have been forced to use some one of only seven guard rails which the mills were to be allowed to roll. These were to have been selected from the hundred or more for which each of the mills possesses rolls. If this condition had come to pass, "local conditions" could not have prevailed and the adoption of guard-rail standards would have been advanced several years. The rail mills could accomplish the same result if they would arbitrarily confine their rollings to a few sections which would be furnished at the prevailing price, while all other sections would only be furnished at an increased price. Thus those who insisted on purchasing small tonnages of non-standard rails would pay the price for their non-conformity. Most rail users would soon see the expensiveness of individuality.

Why Not Get the Security Holders to Help?

IT IS SO UNUSUAL to find in the daily papers any word of commendation for public utilities, especially from "Pro Bono Publico" and similar correspondents, that when such friendly comments do appear, someone else writes in to inquire if the anonymous contributor is a security holder in the company referred to. This calls to mind the suggestion made by a banker recently that those who have invested in utility securities could do much to protect their investments if they were as active in calling for fair treatment as the opposition is in decrying any measures looking toward relief for these companies.

It occurs to us that such a plan would be specially effective in the smaller cities and towns. There are hundreds of thousands, perhaps millions, of persons throughout the country who have invested in such securities. In a small city where the individual counts for something and is known to his neighbors it would undoubtedly be a surprise to the community to find that it was not only men of wealth who were affected by the popular sport of crushing the transportation agencies. There is more or less prejudice against capitalists, but if it could be made known how widely distributed the utility holdings are there would surely be a more popular reception of appeals for fair play. To be effective, the stock or bondholder need not necessarily be a resident of the town in which the property is located, especially if it is one which is growing and seeking capital for civic improvements, as in the case with many towns, particularly in the West. To such communities a reputation for fairness to investors in the enterprises in their city is sought after, at least in the abstract. In such cities requests for fair treatment of the local transportation enterprise from those in a position to lend money should receive consideration.

Some effort has been made along these lines by companies with their stockholders but the bondholders have usually been considered as a class from which no assistance could or should be expected. This is so no longer, at least with most electric railway companies. Danger of loss of capital threatens not only the owners of the stock but those of the bonds as well. We should be glad to see some effort made to enlist their help, not only for individual cases but for assistance in solving the broad questions which affect the whole industry.

A Receiver Cannot Do The Impossible

SOME strange views exist as to the powers of a receiver. When a public utility company is hard pressed and it is hinted that a receivership is impending, a certain portion of the patrons may be heard to say "We should worry. It isn't our funeral, and besides the receiver may force the company to buy more cars and give better service."

As a matter of fact a receiver cannot do the impossible. He cannot get blood out of a turnip. A receivership generally means that the property in question is financially sick and that a "doctor" is required to prevent collapse. If the community is at all dependent upon the utility for its progress and well being, it should be an occasion of serious concern to all good citizens when such drastic measures are necessary.

A receiver is first of all an agent of a judicial tribunal, and he may do only what the court permits him to do. The primary purpose of his appointment is to preserve the value of the property for the interest of the creditors, and this object he must keep constantly in mind. What a receiver does must be legal or his actions can be undone. Under the protection of the court the ailing corporation, or rather its creditors, through their representative the receiver, may borrow some money for improvements, but the property must be able to earn a return on this capital. If there is any legal means to secure additional revenue, such as by raising fares, the receiver may also secure this help through the court. It must be remembered also that a receiver may receive authority to abandon non-productive routes, so that the people who depend on these routes for business development are likely to suffer from the conditions which made a receivership necessary.

A. R. A. Meeting Presages a Rousing October Convention

ATLANTIC CITY surrendered to the steam railroad mechanical department men who held an oldtime convention from June 18 to 25 on the familiar "million-dollar pier" in that metropolis by the sea. The attendance, spirit and interest in things technical and social passed all expectations. The men present at the meetings seemed impressed with the masterly way in which the sessions were handled and with the earnestness with which the discussions were followed. The last-named characteristic is at least partly attributable to the suggestion sent out by the Railroad Administration that the men who attended should study the proceedings with a definite view to reporting to their superiors as to methods of applying the lessons of the convention directly to their own properties. As long as the roads are in Uncle Sam's hands such a suggestion comes almost with the force of law.

This paper has advocated a similar use of the electric railway association meetings. While there is no centralized authority which can say in essence to all electric railway men at once that they are expected to go to the convention to get concrete suggestions applicable to their respective properties, yet there is an economic compulsion impelling them to do so. Undoubtedly many roads already have in operation definite plans to enable the convention attendants to get the teachings of the meetings directly and promptly to all employees who must apply these lessons if they are to be applied. Such a program, combined with careful study of the proceedings as reported in this paper, will insure an immediate and adequate return upon the considerable investment of money, time and energy which the convention involves.

There was a time when, very properly, the annual convention of the electric railway industry was looked upon primarily as an outing. Then there were few matters of vital interest affecting the utility as a whole. Now the opposite condition pertains, and the annual meeting of the American Electric Railway Association affords the only opportunity for a general taking account of stock and lining up the companies for a general advance. From considerations of necessity if no other, the coming one, of all conventions, ought to be the best, and reasoning from the success of the steam road meeting, it is going to be so.

Use Prepayment Areas to Multiply One-Man Cars

IT IS REMARKABLE what applications we can find for the modern one-man car if we really go about the matter from the new point of view of a device that can do so much to cut expenses and enlarge revenues and service. For example, where we would hesitate to try rerouting for big cars, we can justify the cost in advance if it will permit us to operate the smaller, lighter but more numerous units.

Regardless of rerouting, which may be delayed by technicalities concerning franchises, we can find wider application for the one-man car by installing prepayment areas to the greatest practicable degree at all those points where passengers board the cars *en masse*. This means that one or two cashiers will do the work of a score or more conductors; that the patrons will board the car from a higher level (perhaps flush with the car platforms), that doors at both ends of every car will be available for entrance, and that as the cars will get away faster the capacity of the terminal tracks will be appreciably increased. Once the cars, be they big or small, have left the prepayment area, their main work will be the discharge and not the taking on of passengers. In the morning, of course, they will pick up a full load eventually, but as the passengers will board in ones, twos and threes, the operator will not be subjected to any unusual effort. Further, in some cases—as where most riders are going to a large factory—the prepayment station at this point can be turned into a pay-as-you-leave area for the discharged riders, other riders paying as they leave the car.

An additional incentive toward the greater use of the prepayment-postpayment area is the coming of the odd flat or odd zone fare. We have seen for ourselves that even a change-making booth will not prevent the thoughtless or the selfish from boarding and delaying a prepayment car because they lack the exact change. Another good reason for the most liberal use of the prepayment area is in the opportunity it affords to give the customers a pleasant shelter while waiting for their cars. Protection against the weather, maximum ease in tendering fare and absence of all effort and pushing in boarding the cars will leave a pleasant "I'll come again" taste in the mouth of every patron. And last but not least, the prepayment area will bring the railway all the money paid by all the riders.

Post-War Maintenance Demands Trained Workers

AMONG the many significant things said and done at the Atlantic City meeting of the mechanical section of the American Railroad Association, none was more suggestive than the statement made by F. W. Brazier, superintendent of rolling stock New York Central Lines, of the great need for good mechanics in the car department of steam railroads. If this is true of these roads, which have been agitating the subject of apprentice training for so many years, what is to be said of the situation on electric railway properties? Echo answers, "What?"

Steam road shops are, on the average, large compared with the general run of electric railway shops. The mechanical departments, moreover, embrace many groups of men working in well-defined trades. It would seem, therefore, that with a demand as pressing as that which Mr. Brazier describes, and in view of the liberality in the matter of wages which the Railroad Administration has shown, the operation of apprentice systems with auxiliary mental training ought to be the usual and successful practice.

Electric railway master mechanics will have a tendency to throw up their hands and declare that if the steam roads cannot do any better than they have done, with so many elements in their favor, what can be done in the average small city or interurban road shop where the men are few, with duties not always well defined and with no money available to pay wages high enough to attract high-grade men. This attitude may be natural enough, but it will never get us anywhere. Granted that conditions are in many ways unfavorable, there are compensations, too. The relatively small size of the shop force permits close contact between master mechanic and men; and the same condition pertains with regard to the roadmaster, the overhead superintendent, the power plant engineer and their respective staffs. Elaborate systems of apprentice training are not usually practicable, but provision can be made for the development of individuals, with group instruction under appropriate circumstances.

An elaborate investigation among electric railways, made by the writer before the war set in, disclosed a very considerable lack of plan in developing skilled mechanics. While at that time there was not the acute labor shortage that has developed later, there was a shortage in real skill, the old-fashioned craftsmanship. The one-time process of "learning a trade," unsystematic as it often was, had been outgrown.

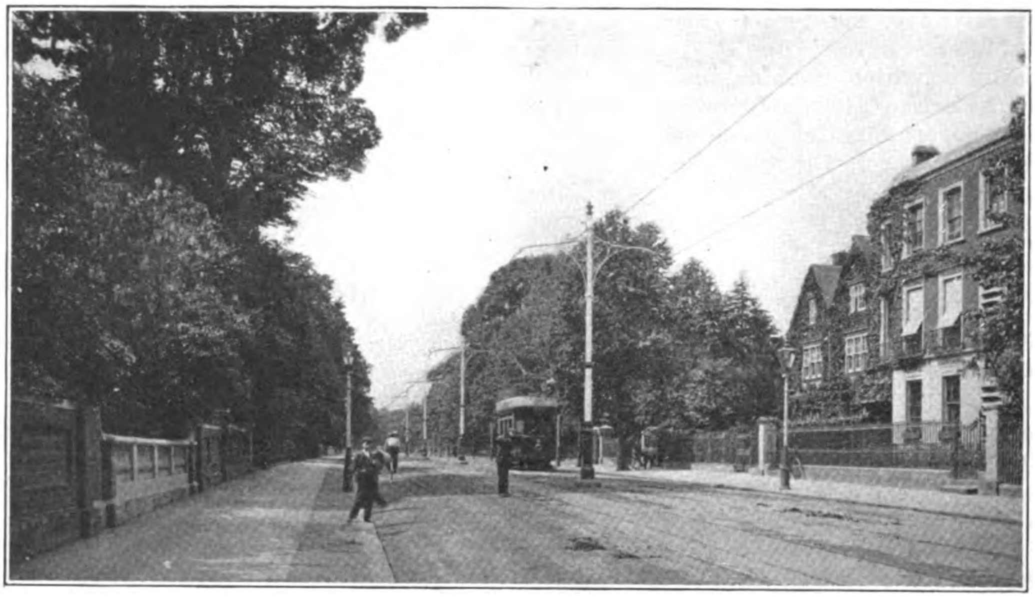
The American Association had at one time a committee on apprentice training. This "went by the board" in due course, for lack of support. Possibly the war period has so changed the labor situation that this committee should be revived or one with a somewhat different scope should be created. There are several men in the association vitally interested in this matter and their services should be secured for such a committee.

The Zone Fare in Practice

READING

More than 180 Rides Per Passenger Per Annum in a Community of 88,000—Combination of Penny Short Rides and 1½-Penny Rides from Center to End of Line, with Second Collection if Ride Is Across Town—Recent Fare Increase Has Been Successful in Increasing Revenue Although Closing of Aircraft School Cut Traffic

BY WALTER JACKSON



BATH ROAD, READING, IN THE WEALTHIER DISTRICT

ABOUT 40 miles west of London lies Reading, the mother city of Reading, Pa. It is somewhat smaller than its daughter, the population of the extended borough of Reading being 88,000 compared with 96,000 for the younger American city. There are not many resemblances between the two cities in general layout, but except for the older portion of the English city there is the same prevalence of small dwellings.

Reading, England, is not only an industrial community but also a commuting town for many men whose work lies in London. Consequently, the visitor will find a large number of one-family houses on ample grounds in addition to the closely built but small houses of the working classes. In the business section, buildings are rarely more than four stories high, while high tenements are non-existent. On the whole, then, the problem of congestion does not worry this famous old city on the Thames.

The principal source of the local traffic is a great biscuit bakery employing about 7000 people. Other establishments, including an equally famous seed business, as shown on the accompanying map, do not all together equal in size the biscuit plant. Fortunately for the tramways, most of these places are not too close to the residential sections.

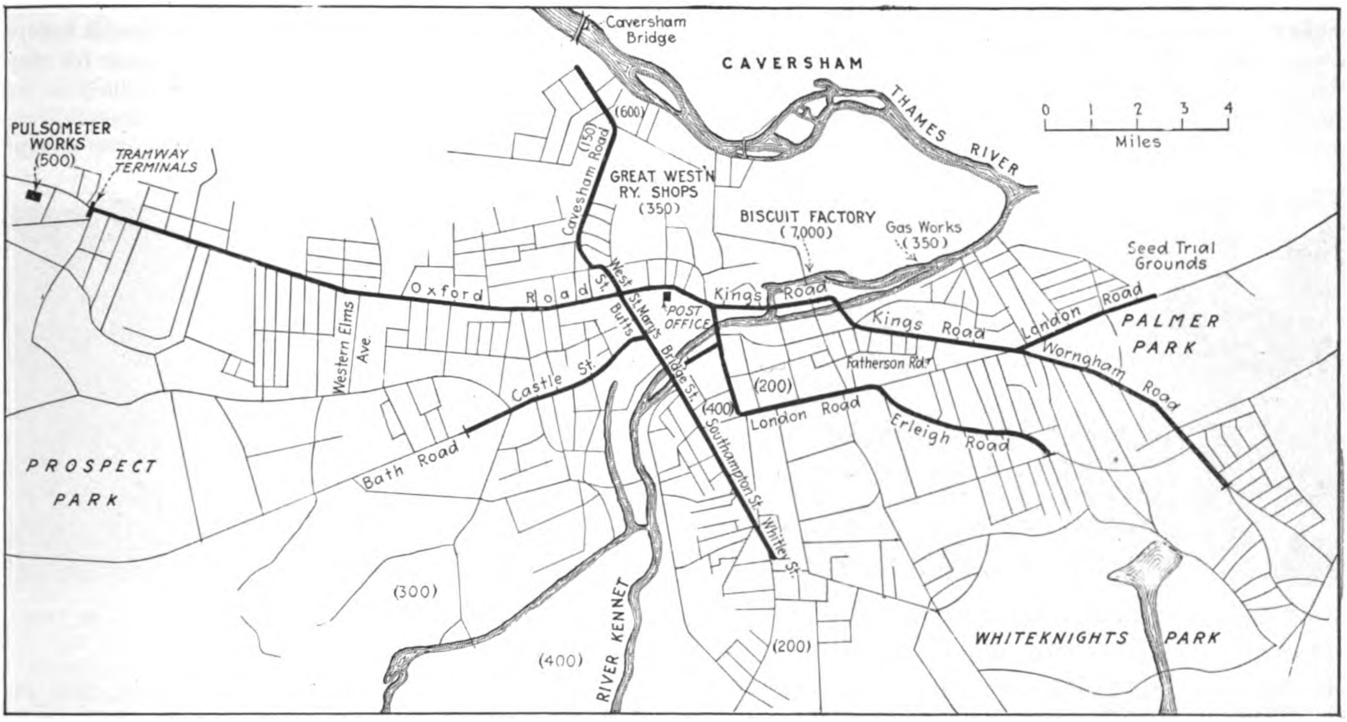
In addition to this business traffic there is that of the London commuter all the year round, while in the summer the popularity of boating on the Thames brings many pleasure seekers to Reading. It is hardly necessary to add that during the years of the great war, the last-named class of travel suffered. A set-off thereto was the development of Reading as an aircraft center.

ROUTING AND DENSITY OF TRAFFIC

The total length of single track in Reading is slightly in excess of 13 miles. Nearly all of this, or about 6 miles of route, is double-track, and the remaining single-track sections are to be double-tracked as soon as feasible. A good deal of rosette span construction is used as the successor to center-pole construction, which was removed because of increased automobile traffic. The Reading Corporation Tramways has compulsory powers to install rosettes, paying the owner of the building a nominal fee of 1s. per annum. In accordance with general British practice, offset trolley wire is common in order to avoid long brackets in double-track side-pole construction.

The map clearly indicates the routing scheme, namely, through routes both east-west and north-south. The main line, Oxford Road to Wokingham Road, 3.4 miles long, serves both residential and working-class districts, with a standard headway of five minutes with extras during the morning, noon and evening rush hours. At the old rate of fare it carried 4,192,195 1d. passengers and 60,550 2d. passengers during the six months ended Sept. 30, 1918—a substantial rate of increase over the fiscal twelve months ended March 31, 1918, when 6,609,949 1d. and 77,898 2d. passengers were carried.

Since May, 1918, fuel-saving considerations caused a revision of the triangular through line Erleigh Road-


Caversham Bridge
CAVERSHAM
THAMES RIVER
0 1 2 3 4
Miles
PULSOMETER WORKS (500)
TRAMWAY TERMINALS
(600)
(150)
Caversham Road
GREAT WEST'N RY. SHOPS (350)
BISCUIT FACTORY (7,000)
Gas Works (350)
Seed Trial Grounds
Oxford Road
West St.
Butts St.
St. Marys
POST OFFICE
Kings Road
Kings Road
London Road
PALMER PARK
Wokingham Road
Fatherson Rd.
Western Elms Ave.
Castle St.
Bridge St.
(200)
(400)
Southampton St.
Whitley St.
London Road
Erleigh Road
Bath Road
PROSPECT PARK
(300)
RIVER KENNET
(400)
(200)
WHITEKNIGHTS PARK

ROUTE MAP OF READING, WITH LOCATIONS OF PRINCIPAL INDUSTRIES AND NUMBER OF EMPLOYEES

Caversham-Whitley, which had a flat seven and a half minute service over 6.39 miles of route and carried 3,826,240 1d. passengers and 19,650 2d. passengers during the fiscal year ended March 31, 1918. The triangle has been replaced by two through routes—Erleigh Road to Bath Road via Broad Street, 2.19 miles long, and Whitley Street to Caversham Road, 1.67 miles long. This change eliminated the doubling back on the 1.55 mile leg between Erleigh Road terminus and the junction of West and Broad Streets.

It is not possible to make a direct comparison showing the way traffic was affected by the foregoing rerouting, but the figures may be of interest in showing the density of travel. Thus the Erleigh-Bath line, 2.18 miles long, with a residential patronage and a flat ten-minute service, carried 787,883 1d. passengers and 22,840 2d. passengers during the five months, from May 1 to Sept. 30, 1918. The Caversham-Whitley line, 1.67 miles long, serving a working-class district with a six-minute service, carried 1,923,912 passengers, all at the then prevailing rate of 1d., during the six months ended Sept. 30, 1918.

PREVAILING STYLE OF WORKMEN'S HOUSES ON OXFORD STREET—NO BIG TENEMENTS IN READING

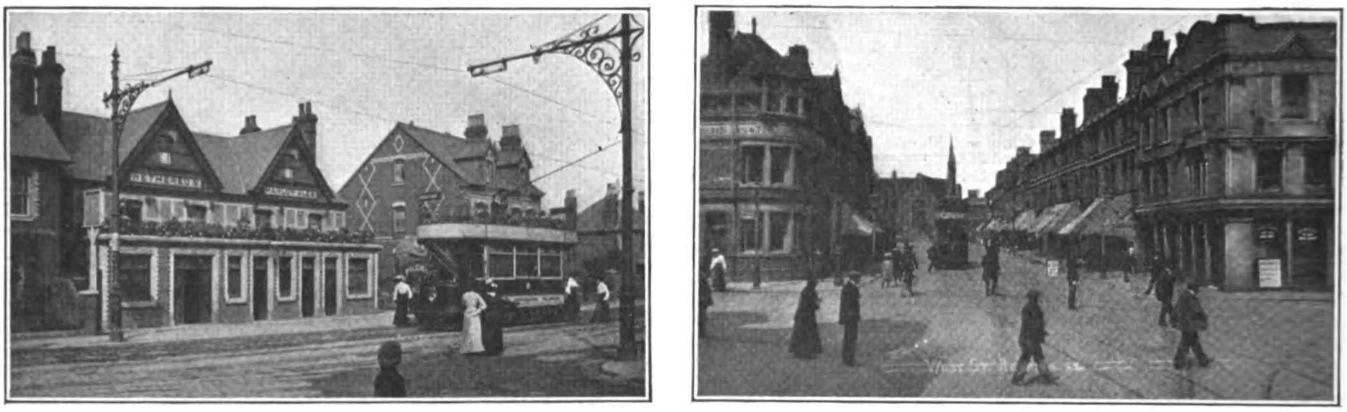
The Bath Road-London Road route was also abandoned in May, 1918, because of coal restrictions. As an independent line it had a flat ten-minute service over its 2.26 miles of route, serving suburban traffic largely with some working class traffic at the London Road end. The total traffic was 906,448 1d. passengers and 5277 2d. passengers during the fiscal year ended March 31, 1918. The route is now a part of the Erleigh-Bath line, except that one special car is added for Bath-London service during the morning, noon and evening peaks.

INCREASE IN FARE

Until Jan. 12, 1919, rides up to 1.89 miles were obtainable for the minimum penny fare. There was also one overlapping penny stage across town, 1.71 miles long, from Western Elms Avenue to Fatherson Road. In general, a ride from the center of the city to the end of any line cost only 1d. to the regular passenger, or 2d. if he rode across town.

Under the new schedule the penny rate is retained only for stages up to 0.9 mile, and a flat fare of 1½d. is charged for a ride from the center to the end of any line. As the confusing overlap has been abolished, the main line ride of 3.4 miles would cost 3d., the second 1½d. fare being collected separately as a precaution against over-riding. This particular line is divided into four stages at Oxford Road, Western Elms Avenue and General Post Office going east and at Wokingham Road, Fatherson Road and West Street junction going west. The Post Office and West Street junction are only about 200 ft. apart, so that this neutral zone is not an overlap in the usual sense in which that term is understood.

The result of the fare increase to date is indicated by the following figures, but it should be noted that the closing down of the school of the Royal Air Force coincided with the day on which the new fare system was introduced. The several thousand officers and cadets of the Royal Air Force formed a very remunerative class of passengers; in many cases they would travel distances of only 1500 to 1600 ft. and pay their fare of 1d. Even as regards the ordinary passenger, it should be emphasized that a large proportion of the traffic, under the new rates, must come from people who can be induced to ride 0.9 mile or less. The figures for various days of January and Feb. 3 are:



AT LEFT, IN THE SUBURBAN DISTRICT OF OXFORD ROAD, READING; AT RIGHT, WEST STREET, SHOWING THE PREVAILING TYPE OF DOWNTOWN BUILDINGS

	1918		1919	
Date	Receipts	Passengers	Receipts	Passengers
January 17	£175	39,458	£205	36,448
January 18	228	53,324	261	48,250
January 21	157	36,188	218	34,447
January 29	149	31,309	182	31,949
January 30	146	31,504	207	33,100
February 3	156	35,783	183	32,221

On a weekly basis, figures up to the week ended Feb. 27 are:

	1918		1919	
Week Ended	Receipts	Passengers	Receipts	Passengers
January 16 (part)	£588	138,169	£813	151,175
January 23	1,140	268,551	1,327	253,060
January 30	1,065	250,426	1,247	234,898
February 6	1,109	266,978	1,233	229,407
February 13	1,165	271,481	1,237	230,726
February 20	1,120	263,962	1,308	250,717
February 27	1,145	268,588	1,324	244,804
Total	£7,335	1,728,155	£8,491	1,594,787

Loss in passengers, 8 per cent—gain in revenue, 15.7 per cent.

When due allowance is made for the shutting down of the aircraft school, it is clear that the fare increase at Reading has gone over the top as well as could be expected in a small city. Such losses as were suffered by its American daughter city are certainly not evident.

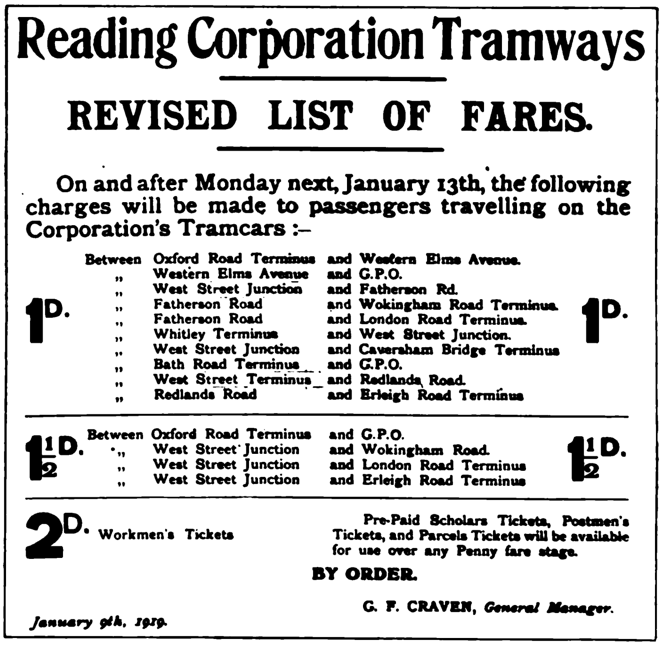
In addition to the full-price tickets, the Reading Corporation Tramways sells several other varieties at reduced rates as follows:

Workmen's return tickets, price 2d, are issued before 7.45 a. m. each weekday. These may be used for any return trip during any day except after 1.30 p.m. on Saturdays. On the return journey, the passenger gives up this ticket in exchange for a punched fare receipt surprinted "W" in red to distinguish it from fare receipts given for single-trip cash fares.

School tickets at ½d. each permit the user to ride a 1d. stage per ticket between 8 a.m. and 6 p.m. on Mondays to Friday inclusive, and between 8 a.m. and 1.30 p.m. on Saturdays. They are not available on Sundays and holidays. Such tickets must be given up to the conductor, who issues therefor exchange fare receipts surprinted "E." Although these tickets are sold only in bundles of twenty-four per shilling, it is customary for school teachers to retail smaller lots to their poorer pupils. The age limit of the holder of a school ticket is fifteen years.

The prepaid ticket illustrated is sold at full price in lots of thirty to merchants and others who prefer to give their messengers tickets instead of money for car rides. Each ticket is good for a penny stage and must be delivered to the conductor for an exchange ticket. In like manner, the letter carriers' tickets, which are sold to the post office at the rate of thirteen

GEORGE FREDERICK CRAVEN, the thirty-six-year-old manager of the Reading Corporation Tramways, is an engineer by profession. He is an associate member of the Institution of Civil Engineers, a member of the Institution of Electrical Engineers and a member of the Institution of Mechanical Engineers. He has been in his present appointment for the last six years. During the war the Reading Tramways Department undertook some special war work, and Mr. Craven has to his credit the design of some interesting specialties which were adopted and used. Mr. Craven holds the office of honorable secretary to No. 2 (Board of Trade) Tramways Area; he is district engineer for Industrial Coal Supplies under the Coal Controller, and in addition he holds the post of local fuel overseer under the Household Fuel and Lighting Order of 1918. During the war he gave advice on electrical matters to several large engineering firms and other manufacturers in the borough of Reading.



Reading Corporation Tramways

REVISED LIST OF FARES.

On and after Monday next, January 13th, the following charges will be made to passengers travelling on the Corporation's Tramcars :–

1D.
Between Oxford Road Terminus and Western Elms Avenue.
„ Western Elms Avenue and G.P.O.
„ West Street Junction and Fatherson Rd.
„ Fatherson Road and Wokingham Road Terminus.
„ Fatherson Road and London Road Terminus.
„ Whitley Terminus and West Street Junction.
„ West Street Junction and Caversham Bridge Terminus
„ Bath Road Terminus and G.P.O.
„ West Street Terminus and Redlands Road.
„ Redlands Road and Erleigh Road Terminus
1D.

1½D.
Between Oxford Road Terminus and G.P.O.
„ West Street Junction and Wokingham Road.
„ West Street Junction and London Road Terminus
„ West Street Junction and Erleigh Road Terminus
1½D.

2D. Workmen's Tickets

Pre-Paid Scholars Tickets, Postmen's Tickets, and Parcels Tickets will be available for use over any Penny fare stage.

BY ORDER.

G. F. CRAVEN, *General Manager.*

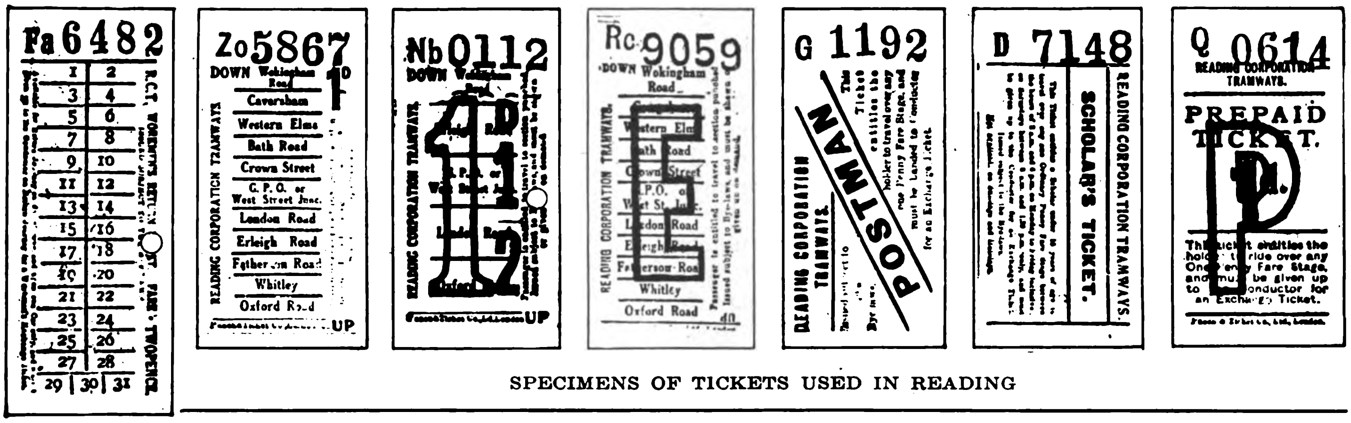
January 9th, 1919.

POSTER ANNOUNCING READING FARE INCREASE

instead of twelve penny tickets for a shilling, must also be given up for exchange fare receipts.

It should be clear from the foregoing that no matter what rate of fare the passenger pays, he must have a fare receipt that proves he is entitled to ride.

In a city with one predominant industry, the electric railway is at a disadvantage compared with the lines in larger places having varied industries. Quite recently, however, the Reading biscuit bakery adopted a forty-eight hour week for its 7000 employees, thereby abolishing breakfast riding and emphasizing the morning peak. This plant now opens at 8 a.m. and has a luncheon period from 12.30 to 1.45 p.m. A number of the smaller places begin at 6 a.m. and have a breakfast period beginning at 8 or 8.30 a.m. and a luncheon period from 1 to 2 p.m. Suggestions to stagger the hours of opening and closing have been made, but housekeepers object to preparing breakfasts at different hours for different members of the family.


Fa 6482
Zo 5867
Nb 0112
Rc 9059
G 1192
POSTMAN
READING CORPORATION TRAMWAYS
D 7148
SCHOLAR'S TICKET.
Q 0614
PREPAID TICKET.
P

SPECIMENS OF TICKETS USED IN READING

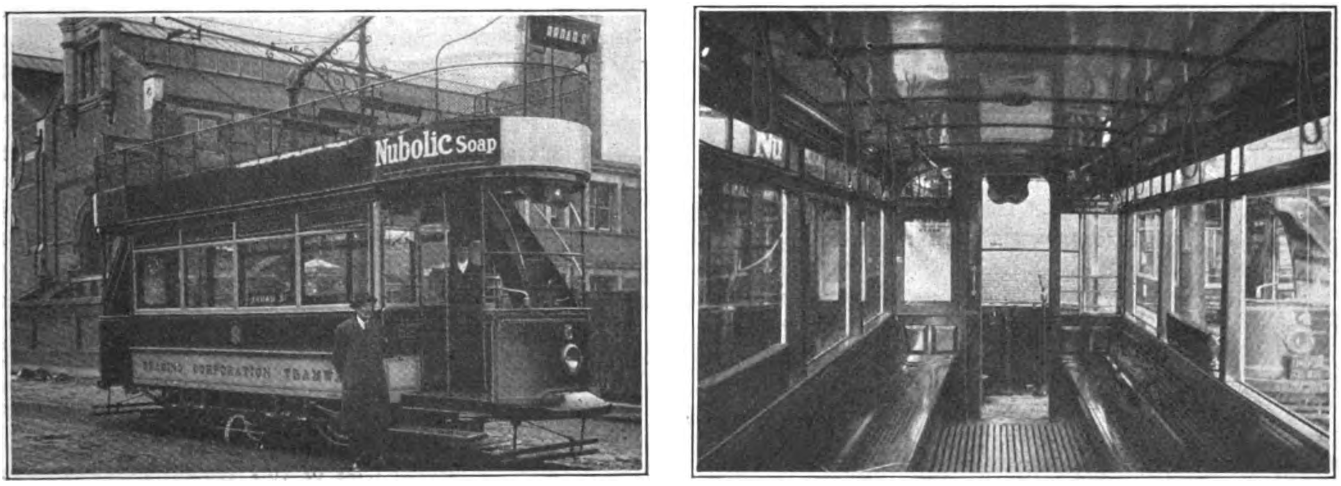
As already described in the case of the Aberdeen Corporation Tramways, all the tickets assigned to any one conductor are taken in serial order out of a bin containing 10,000 of each classification. The estimated requirements for the day, together with waybill and punch, are put up in an individual box which is handed to the conductor when he reports for the day's work. The identifications, the quantity and the last and the first numbers of the tickets are already written down on the waybill when he receives his stock, so that he can check the ticket numbers and the punch reading, before leaving. The conductor himself writes down the record of exchange tickets, "First numbers returned to office" and "Quantity sold," and figures out the amount of cash he should turn in. Conductors are allowed to hold 2s. for change. Overs are returned to the conductors, and shorts must be made up by them.

Unlike the practice on some other properties, the conductor does not get the same punch all the time. Punches are rented from the Williamson Ticket Printer, Ashton-under-Lyne.

All transactions with the conductors are carried out at the office of the traffic superintendent. The staff comprises two cash clerks, two checking clerks and two boys. One of the latter fills the conductors' ticket boxes, and the other is used for miscellaneous service.

There is no bus service in Reading. Although buses are operated through the city from near-by towns, they are not used for local riding as the rate of fare is practically triple that of the tramway. Tramway service begins at 5.15 a.m. with the workmen's cars and ends at 11 p.m., forty-five minutes earlier than before the war. On the main line cars are operated at a schedule speed of 8½ m.p.h., and the minimum on the shorter lines is 7 m.p.h. These schedules are to be expected in view of the size of the town and the necessity of frequent stops to encourage the short rider. The stops, in fact, are spaced 450 ft. to 600 ft., variations depending upon the location of traffic-gathering points, such as converging streets and important buildings.

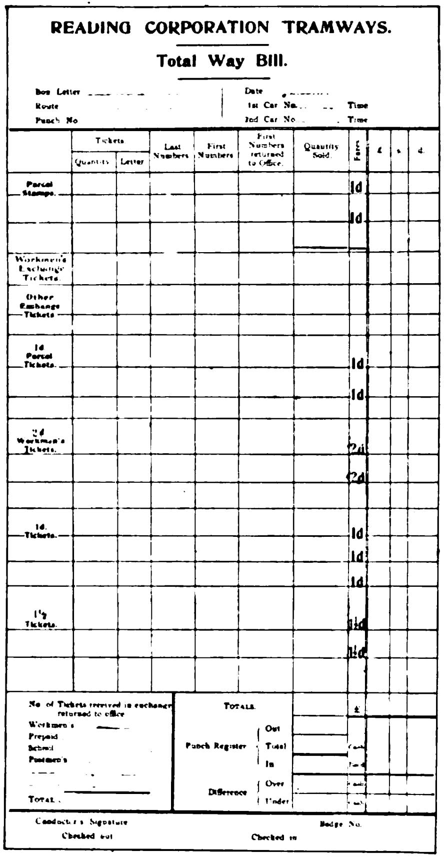
The system has thirty-six cars, of which six are double-truck. The smaller cars seat twenty-two on the



LATEST DESIGN OF READING DOUBLE-DECK CAR, AND INTERIOR VIEW OF LATEST CAR, WITH FARE ANNOUNCEMENT ON BULKHEAD lower deck in longitudinal seats and twenty-six on the open upper deck in cross seats. The larger cars, which are 33 ft. 6 in. over all, seat thirty below and forty-two above, all in cross-seats. There is no limitation as to standing. Because of railway viaducts, Reading's cars have no top covers.

All cars are mounted on Brill trucks. The single-truck cars carry two DK-25-A 25-hp. motors and Dick-Kerr DB-1 Form B controllers, and the double-truck cars carry Dick-Kerr 6-A or 20-A 40-hp. interpole motors with DB-1 Form C controllers or the Dick-Kerr 6-K controllers with non-detachable handle. Most of the hand brakes are of Ackley type, with a few Peacocks as well.

The lighting circuits per car are three in number, with five 16-cp. lamps per circuit. Incandescent lamps are used for the headlight, for the colored route-indicating light suspended above the motorman and for the roller-type destination signs. In addition to the two 250-volt grounding indicator lamps specified by Board of Trade regulations, which are in series between the trolley base and the ground, a bell is used for a leakage indicator as the bell ringing is more noticeable than lighting of the lamps.



READING CORPORATION TRAMWAYS.

Total Way Bill.

Box Letter
Route
Punch No
Date
1st Car No. Time
2nd Car No. Time

	Tickets Quantity	Tickets Letter	Last Numbers	First Numbers	First Numbers returned to Office	Quantity Sold	Fare	£	s.	d.
Parcel Stamps							1d			
							1d			
Workmen's Exchange Tickets										
Other Exchange Tickets										
1d Parcel Tickets							1d			
							1d			
2d Workmen's Tickets							2d			
							2d			
1d. Tickets							1d			
							1d			
							1d			
1½ Tickets							1½d			
							1½d			

No. of Tickets received in exchange returned to office
Workmen's
Prepaid
School
Postmen's
Total

Totals £
Punch Register Out
Total
In
Difference Over
Under

Conductor's Signature Badge No.
Checked out Checked in

READING ALL-DAY WAYBILL

The latest type of single-truck car, built in the local shops, is shown in the accompanying illustrations. It is 27 ft. 6 in. over all with 5 ft. 6 in. platforms, bulkhead doors 24 in. wide in the clear, step 14 in. high arranged to be folded directly by hand (not through a platform handle), and 33-in. wheels. Ventilation is provided by means of small end-hinged windows over the main windows, arranged to open one way on one side and the opposite way on the other, according to the direction of running.

In this car all filigree work has been eliminated, and the customary veneer finish is replaced by white enamel composition board. The two roller destination signs are placed at opposite ends on the upper deck. They are illuminated by means of two 16-cp. lamps. On the ground glass back of the front sign appears the admonition: "Kindly tender copper for your fare," and on the back of the rear sign the passenger is asked to "Please obtain ticket for every fare paid."

During the fiscal year ended March 31, 1918, the traffic receipts (exclusive of parcels service, advertising, etc.) of the Reading Corporation Tramways were £55,212 (approximately $276,000), corresponding to the carriage of 13,771,598 passengers as follows:

Prepaid tickets to city departments, full value	38,220
Prepaid tickets to business houses, full value	14,910
Free and charity	7,320
School education committee	84,000
School tickets to individuals	275,808
Workmen's return tickets	616,561
Postmen's tickets	25,323
Regular tickets	12,710,356
Total	13,771,598

On the basis of population served by Reading alone, namely, 76,500, the number of rides per annum per inhabitant rose from 143 to 180 in the fiscal year ended March 31, 1918, as compared with the preceding year. Traffic has kept on increasing at such a rate, however, that the figure of 180 may be said to apply now to the borough population of 88,000. In the last fiscal year the effect of the rerouting and increased travel is indicated by the increase in passengers per car-mile from 11.97 to 14.97. At the same time, the annual car-miles were increased from 912,258 to 920,174 car-miles, while the daily run per car rose from 89.3 miles to 93.4 miles.

In spite of the fact that the operating ratio rose from 53.41 per cent to 58.8 per cent, the net surplus was increased from £5,273 to £8,400. Larger amounts were also assigned to the sinking fund, reserve fund for renawals, etc. It is hoped that the increase in fare, which was held back as long as possible, will enable the railway system to maintain its strong financial position in the face of higher operating costs and a possible reaction in post-war travel.

Labor Indorses Technical Research

AT ITS Atlantic City convention just closed the American Federation of Labor adopted a resolution designed to encourage wider investigation of methods to promote better utilization of the nation's resources.

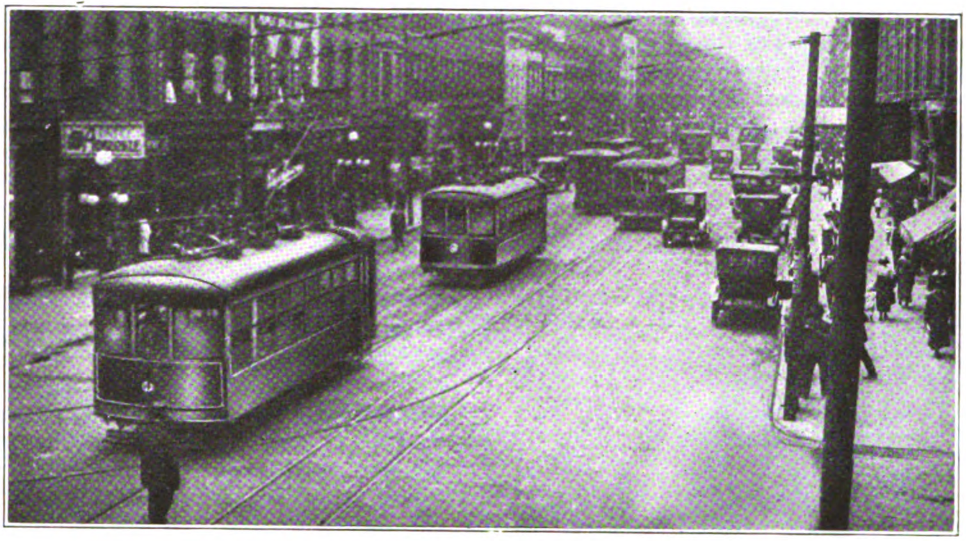
The preambles to the resolution recite that the productivity of industry is greatly increased by the technical application of the results of scientific research; that the health and well-being not only of the workers but of the whole population as well, are dependent upon advances in medicine and sanitation; that the increased productivity of industry resulting from scientific research is a most potent factor in the ever-increasing struggle of the workers to raise their standards of living; that there are numerous important and pressing problems of administration and regulation now faced by federal, state, and local governments, the wise solution of which depends upon scientific and technical research; and that the war has brought home to all the nations engaged in it the overwhelming importance of science and technology to national welfare.

The resolution follows:

Resolved, by the American Federation of Labor in convention assembled, that a broad program of scientific and technical research is of major importance to the national welfare and should be fostered in every way by the federal government, and that the activities of the government itself in such research should be adequately and generously supported in order that the work may be greatly strengthened and extended; and the secretary of the Federation is instructed to transmit copies of this resolution to the President of the United States, to the President *pro tempore* of the Senate, and to the Speaker of the House of Representatives.

Safety Cars Increase Earnings 25 Per Cent in Terre Haute

Thirty One-Man Cars Placed in Service in December Have Also Increased Car-Miles 25 per Cent, Reduced Accidents and Won Popular Favor



A TYPICAL FLEET OF SAFETY CARS ON WABASH AVENUE

TERRE HAUTE, IND., is a city of 75,000 population. The local railway service is furnished by the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, which operates about 30 miles of city lines with forty passenger cars, exclusive of 78 miles of interurban lines and twelve interurban cars. The city equipment has included double-truck 20-ton cars and single-truck 12-ton cars, all operated by two men.

On June 10, 1918, thirty Birney standard one-man safety cars were ordered for delivery in October. This was said to be the largest order which to that date had been placed by any one city at one time for safety cars. A publicity campaign announcing these cars was begun about the middle of September, and among the points emphasized in the first "Talks" were the safety features of the cars, the more frequent and rapid service made possible by their installation and the necessity of having exact fare ready. The first series consisted of ten advertisements.

When the publicity campaign was begun it was expected that the cars would be delivered about the middle of October. Delivery, however, was delayed a month due to the effect at the factory of the influenza epidemic.

After the cars were delivered additional advertisements were run, explaining on which lines the cars would be placed and covering other details of the service and later thanking the public for its co-operation. Investigation showed that as a result 95 per cent of the passengers had the exact fare ready when boarding the cars.

There was formerly a specific ordinance in Terre Haute which required two men to operate a car. Through the efforts of the company this ordinance was repealed and another was passed permitting the operation of the Birney safety car with one operator.

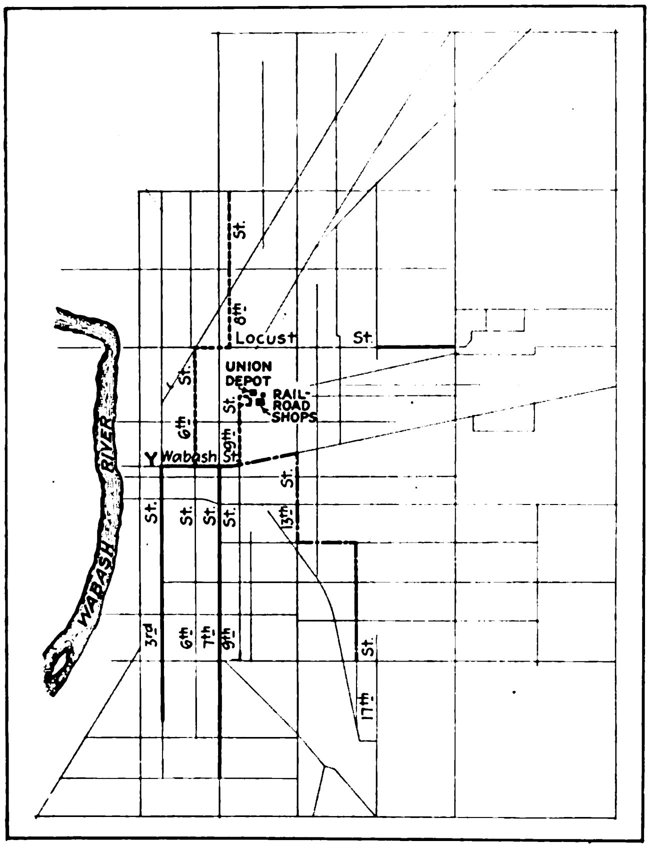
CARS COMPLETELY EQUIP FOUR LINES, INCREASING SERVICE ON EACH

The first cars were placed in service on Sunday, Dec. 1, seven of them replacing seven two-man cars on the South Seventh Street-South Third Street line with three of the new cars held as extras to be used during the rush hours. The headway was cut from ten minutes to eight minutes, with a four-minute headway during rush hours. This line, which is shown by a heavy line on the accompanying map, is partly double and partly single track and has a round-trip mileage of 8.5. The cars operate north on Third Street from Grant to Wabash, east on Wabash to Seventh and south on Seventh to the Southern Indiana Railroad tracks, returning over the same route.

Ten days later six of the new cars were placed in service on the Eighth Street-Union Depot line, replacing five two-man cars and cutting the headway from ten to seven minutes. This is a double-track line with a round-trip mileage of 5.82. The route, as indicated by a dotted line on the map, is from Eighth and Maple south to Locust, west to Sixth, south to Wabash, east to Ninth, north to the Union Depot. Here the cars loop and return over the same route.

Five days later four cars were placed in service on the South Seventeenth Street line, replacing four two-man cars and maintaining a ten-minute schedule. This was then a single-track line but a passing track has now been installed at Franklin Street, and with the addition of two more cars a six-minute service was commenced on Memorial Day. This line has a round-trip mileage of 5.12 and, as shown by a dot and dash line on the map, operates from Hulman and Seventeenth Streets north to Crawford, west to Thirteenth, north to Wabash, west to the Court House at Third and Wabash. Here the cars "wye," returning over the same route. One car was also placed on a short stub line, ½ mile long, on east Locust Street on a ten-minute schedule. This is indicated on the map by a heavy line from Nineteenth to Twenty-fifth streets.

All of these lines, with the exception of the East Locust line, pass over Wabash Avenue, the main business street of the city. This gives a headway of less than one minute through the business district. Outside of the business district all of the lines pass through residence sections. Terre Haute has many industries; it is the center of the Indiana bituminous coal fields and is the home of steel mills, malleable casting plants, rolling mills and three glass bottle plants. These industries are all so scattered, however, that there is no industrial center and the safety-car lines serve both the industrial and the residence sections.



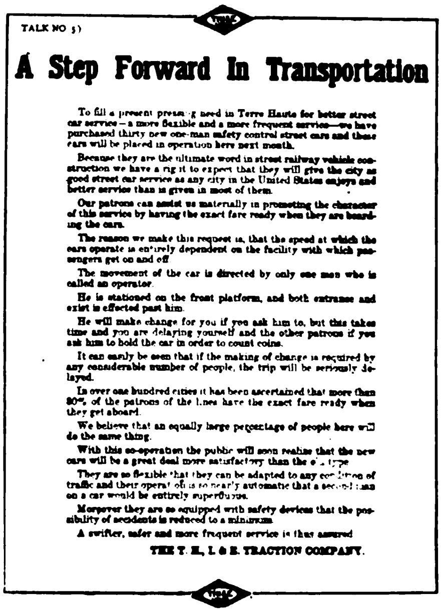
MAP OF STREET RAILWAY SYSTEM IN TERRE HAUTE SHOWING SAFETY CAR LINES

There are altogether six grade crossings in the city and the safety cars operate over three of them. Flagmen are stationed at each and, although on Wabash Avenue and North Sixth Street this is also a benefit to the two-man cars, the cost is all charged against the safety cars.

When the cars were first placed in service people made a great deal of fun of them, calling them various odd names reflecting on their size. The operation was successful from the beginning, however, in spite of the fact that the cars were placed in service just in time to catch the full brunt of the Christmas holiday rush. Special instruction sheets were issued to the men covering the operation of the new cars and no opposition was ever made to the one-man feature. In fact, the men are very well pleased with the cars, as they receive an increase in wages of five cents an hour when operating them. Men with seniority rights were given the first chance to pick the runs and they were required to make good. If they could not, other men replaced them. The first man to take out one of the new cars was the oldest motorman on the system, now in his thirtieth year as a motorman in Terre Haute, and he has never missed a day since.

The men not only like the extra $15 a month, but have been heard to state that they are not as tired at the end of the day after performing their dual service as formerly on the two-man cars. They say the cars ran more smoothly that the larger ones. Favorable comments have also been made by the press, and the local chamber of commerce has written to other chambers commending the cars and recommending their adoption in other cities.

The cars are of the standard Birney safety type, furnished by the American Car Company. The equipment includes two GE-258 motors, K-10 control, C-P-25 air compressors, friction bearing 78-M Brill trucks, Johnson single-dial fare boxes, and International 8-5 double clock registers. Three of the cars have also been equipped with Dayton air-operated register mechanism with most satisfactory results. The cars are double end and have a total weight of 13,200 lb. When first delivered they were not equipped with trolley stands, but some trouble was experienced at railroad crossings due to the higher overhead. Later, in order that they might be interchangeable among lines, all cars were equipped with 1-ft. trolley stands, the 14-ft. pole being retained. Each car is also equipped in each vestibule with a rack in which the operator inserts a card with his name printed in 2-in. letters. Above the rack are the words "Operator in Charge of This Car Is."



TALK NO 5)

A Step Forward In Transportation

To fill a present pressing need in Terre Haute for better street car service—a more flexible and a more frequent service—we have purchased thirty new one-man safety control street cars and these cars will be placed in operation here next month.

Because they are the ultimate word in street railway vehicle construction we have a right to expect that they will give the city as good street car service as any city in the United States enjoys and better service than is given in most of them.

Our patrons can assist us materially in promoting the character of this service by having the exact fare ready when they are boarding the cars.

The reason we make this request is, that the speed at which the cars operate is entirely dependent on the facility with which passengers get on and off.

The movement of the car is directed by only one man who is called an operator.

He is stationed on the front platform, and both entrance and exit is effected past him.

He will make change for you if you ask him to, but this takes time and you are delaying yourself and the other patrons if you ask him to hold the car in order to count coins.

It can easily be seen that if the making of change is required by any considerable number of people, the trip will be seriously delayed.

In over one hundred cities it has been ascertained that more than 80% of the patrons of the lines have the exact fare ready when they get aboard.

We believe that an equally large percentage of people here will do the same thing.

With this co-operation the public will soon realize that the new cars will be a great deal more satisfactory than the old type.

They are so flexible that they can be adapted to any condition of traffic and their operation is so nearly automatic that a second man on a car would be entirely superfluous.

Moreover they are so equipped with safety devices that the possibility of accidents is reduced to a minimum.

A swifter, safer and more frequent service is thus assured

THE T. H., I. & E. TRACTION COMPANY.

ONE OF THE SERIES OF ADVERTISEMENTS ANNOUNCING THE NEW SERVICE

596,166 CAR-MILES WITHOUT A WHEEL CHANGE

Up to June 1 the thirty cars had made a total of 596,166 car-miles. During this period of approximately six months of service, not one of the 24-in. chilled steel wheels had been changed, the average mileage per wheel being 19,872. Wheel-trueing brakeshoes are used on the cars when required. One explanation of the excellent wheel life is that Terre Haute is a very level city so that excessive braking is not necessary. There has been practically no motor nor truck trouble arising from internal causes and the air equipment has operated perfectly.

The service on the entire system as measured in car-miles has been increased 25 per cent, due entirely to the increased service given by the safety cars. As the lines equipped with safety cars represent 40 per cent of the total city mileage, the increase on these is correspondingly greater. There has been an increase in gross earnings of 25 per cent for the safety car lines, and an increase of 15 per cent for the entire city system, accompanied by a decrease in power consumption of 4 per cent, including four interurban lines operating twelve 54-ft. four-motor cars on an hourly schedule over the city tracks, together with freight and service cars within the city limits.

As an incident to the inauguration of safety car service, three Cheatham electric track switches were installed and others will soon be added. To operate the switches it is necessary to notch up to five points on the controller with the light cars, whereas two points are enough with the standard car. Until this was realized the operators experienced some trouble in working the switches and in some instances, upon failure to throw the switches at the customary two points, got out and threw them by hand.

Data so far available show a saving in maintenance of equipment of 2 cents a car-mile and in power of 1¾ cents a car-mile with the new cars. All of the savings together have enabled the company so far to continue existence on a 5-cent fare and no application for a higher fare has been made, although the city system is but half equipped with safety cars.

AVERAGE ACCIDENT COST PER SAFETY CAR LESS THAN 13 PER CENT THAT OF OTHER TYPES

Up to the present time in articles on safety-car operation little has been said about accident data. The result of four months' operation (Jan. 1 to May 1) of twenty-three safety cars in Terre Haute has given some very interesting figures, as noted in the accompanying table:

ACCIDENT DATA T. H., I. & E. TR. CO.—TERRE HAUTE LINES, JAN. 1 TO MAY 1, 1919

ALL CITY CAR LINES
(Not including interurban cars)

Covers twenty-three safety cars and sixteen other types of cars, and includes all accidents, with cost of settlement of damages to vehicles and personal injuries.

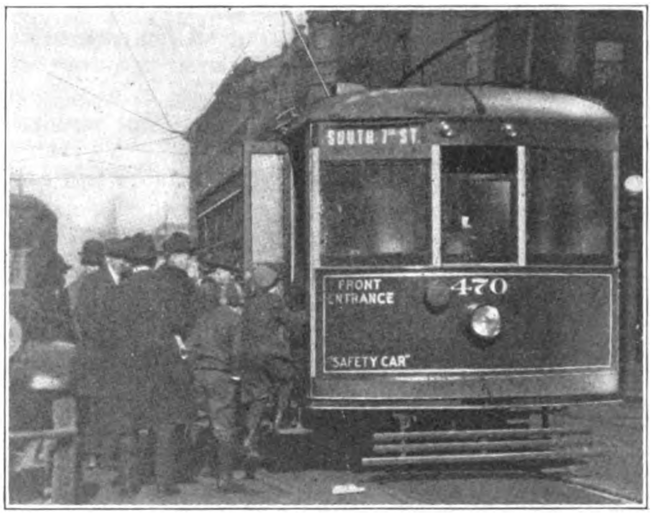
	Safety Cars	Other Type City Cars
Collisions, etc., in January	28	20
February	21	21
March	22	13
April	25	12
Total	96	66
Accidents involving expense	21	15
Total cost including repairs to street cars	$900.45	$4,928.77
Cost per accident	$9.38	$74.63*
Car-mileage data:		
Total car-miles, safety cars	416,700	
Total car-miles, other types	348,200	
Accidents per thousand car-miles, safety cars	0.23	
Accidents per thousand car-miles, other types	0.19	
Accident cost per thousand car-miles, safety cars	$2.16	
Accident cost per thousand car-miles, other types	$14.15	

* Includes cost of personal injuries.

While the table shows a greater total of accidents with the safety cars than with other types, there were practically 50 per cent more safety cars in operation. The total cost of the accidents involving safety cars was about 13 per cent of that involving other cars, and the cost per accident and average cost per car operated were less less than 13 per cent.

Jitneys commenced operation in Terre Haute about four years ago, and at the time safety car service was inaugurated there were in regular daily operation between ninety and 100 jitneys. A few of the operators were "casuals" and "floaters," that is to say, men who had other occupations and owned or rented a Ford for the purpose of dropping in during rush-hour traffic and picking up a few nickels on the various lines. On two lines where the schedules have been increased, the jitney bus traffic has been greatly diminished, although it has not entirely disappeared. On the South Seventh Street line on the day safety-car operation was commenced, there were eighteen to twenty jitneys operating regularly. Gradually this number has been reduced, until since the first of the year there have been but four or five operating regularly, besides five or six more which drop in for an hour or two on the rush-hour traffic.

The territory tributary to the South Seventeenth Street line has been a fruitful field for the jitney bus, on account of the car service being on a ten-minute headway until May 30, when it was reduced to six minutes. It is confidently expected that the jitney bus traffic will be successfully combated on this line with the improved car service, although it is still too early to give any figures.



NINETY-FIVE PER CENT OF THEM HAD THEIR EXACT FARE READY THE FIRST WEEK

Jitney buses operated for a long time in Terre Haute without regulation, supervision or restraint and without protection of any sort to the traveling public. Early in 1918 a jitney ordinance was passed, which required the jitney buses to take out licenses and carry insurance. This ordinance was amended before its final passage so that the insurance feature was very mildly treated, in that instead of requiring a bond to be taken out in a standard old-line liability insurance company, a "mutual" bond was allowed in "Jitney Drivers' Mutual Insurance Company." Any protection provided by this kind of insurance arises from assessment of the various policyholders. Even under this municipal provision, many jitney buses are operating without either license or bond for limited periods each day, or on heavy traffic days.

The jitney-bus drivers have their own organization and naturally receive sympathy and support on this account from other organized trades, but E. M. Walker, general manager of the Terre Haute property, states his belief, based on his experience during the past six months, that the safety car is the successful competitor of the jitney bus.

Another by-product of safety-car operation has been found to be the absence of complaints from the public concerning inattention on the part of the operator, who is so comfortably and fully occupied that he has no time to be discourteous.

In replying to letters from other companies interested in the operation of safety cars, Mr. Walker has summed up what these cars on his property have accomplished as follows: Elimination of step accidents; reduction in accidents of a general nature, due to facility of handling cars; faster schedules with same number of cars; satisfaction of the people, both expressed by word and indicated by increased patronage; successful competition with the jitney bus, which had become an active contender for the business; satisfaction of the city government as evidenced by resquests for extension of safety car service; satisfaction on the part of the operators, on account of increased wage and easier riding cars; saving in power, permitting an increase in car-miles with a reduction in total power requirements; reduction in car maintenance expenses; evident reduction in track maintenance, due to the light weight of the cars.

As stated before, the fare in Terre Haute is 5 cents. However, for the benefit of the post office, telephone companies, etc., metal tokens are sold in quantities at 5 cents each. These are of the same size as the nickel and are recorded as such by the fare box.

Indeterminate Franchise Is Most Equitable*

BY HALFORD ERICKSON
Hagenah & Erickson, Chicago, Ill.

THE kind of a franchise that now seems to be the most equitable to all concerned is the so-called indeterminate franchise or permit. Franchises of this kind are comparatively new. In only one state, Wisconsin, do they seem to have been in use long enough for even the semblance of a fair trial, and this discussion is largely confined to that state.

For nearly four years after the indeterminate permit had been provided in 1907 as a substitute for the ordinary utility franchise in Wisconsin, it was left optional with utilities to surrender their franchises and substitute the new grant, or to retain their existing franchises. In 1911, however, the Legislature decreed that all franchises coming under the provisions of the utility law of 1907 and not yet changed should become and have the same effect as indeterminate permits.

There are now two ways whereby an indeterminate permit can be secured: (1) By applying to the municipality for a grant to use the streets, etc., for the purpose of furnishing service where there is no utility occupying the field. This grant when exercised becomes by operation of law an indeterminate permit. (2) By securing a certificate of convenience and necessity from the Wisconsin Railroad Commission as authority to enter as a competitor a field already occupied by a utility furnishing similar service, and in addition to this by obtaining from the municipality such a permit to use the streets as the one just mentioned, which permit also becomes an indeterminate permit through the operation of law.

PROTECTION AFFORDED TO PUBLIC AND UTILITIES

Among the factors which tend to protect the public and to promote its convenience and welfare, the following may be mentioned:

1. The public is entitled to adequate service at reasonable rates that are free from unjust discriminations.
2. Since the municipality has the power to grant or withhold the use of its streets and highways for public utility purposes, it may also, where no utility exists and where a certificate of public convenience and necessity has been granted, either reject or accept applications for such use; and through the exercise of this power it is in position largely to control the situation.
3. The municipality has been granted the power to acquire at a fair price the property and business of the utilities by which it is served and can exercise this power and enter the public utility business whenever it chooses to do so, or whenever it becomes dissatisfied with the service, the rates or any other conditions.
4. Whenever public convenience and necessity demand it, the municipality or some other utility can obtain authority to enter the field and to furnish service in competition with the existing utility.

Among the factors which tend to increase the safety of the investment and promote fair treatment to the enterprises are the following:

1. The utilities for adequate service are entitled to rates that are reasonable under the circumstances.
2. The utilities are entitled to fair prices for the property that is used for the convenience of the public when it is taken over by the municipalities.
3. Except where active competition existed when the public utility and indeterminate permit laws went into effect, the utilities are entitled to the exclusive right to furnish the service until the property is taken over by the municipalities or until for good reasons competitors are authorized to enter the field.
4. Public utilities are entitled to have all investments made for the benefit of the public kept intact through proper charges made for the service rendered.

In connection with the factors just explained, consideration should also be given to the following propositions:

1. What constitutes adequate service is determined by standards and rules developed through careful investigations and wide experience. Such standards and rules are enforced by regular inspections and by other methods and proceedings.
2. Reasonable rates under normal conditions are made up of charges that are high enough to cover the operating expenses, including depreciation, and interest and profit on the fair value of the property and business involved.
3. In determining the fair value of the plants and their business consideration when possible is given not only to the cost of reproduction but also to the original cost of such plant and business together with other factors that may affect the value.
4. The power to authorize a competitor to enter the field under a certificate of convenience and necessity is exercised with the greatest care and with the most scrupulous regard for all the interests that are affected. Such certificates are not granted until it has been clearly established that public convenience and necessity demand such action. In passing upon such matters the commission is controlled by the utility's inability or unwillingness to render adequate service and other questions that vitally affect the public welfare rather than local frictions, political interests and untried and uncertain governmental experiments. The burden of proving that such competition is necessary and to the best interest of the public is also largely upon those who make such application. In addition to this the merits of such applications are carefully inquired into by the commission. With the adequate power which the commission has, not only for ascertaining the true situation but for compelling the existing utilities to furnish adequate service and to carry on their businesss so as to promote the

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*Abstract of address presented before public utilities committee of Chamber of Commerce of the United States in Washington, D. C., May 29, 1919.

general welfare, it is clear that it is not often necessary to grant such application.

5. The power to permit competition when needed is regarded as of almost as great importance as the power to revoke franchises, a power that rests exclusively in the Legislature. It is also a fact that such competition, if authorized, would under the circumstances be almost certain to spell ruin to the existing utility. When the existing utility, however, can be made to serve the public as well and at as low cost as any service of the kind that could be obtained from any other source, then it would manifestly be an injustice as well as a waste of capital and efforts to authorize competition. The power to authorize competition, however, has a considerable amount of value as a regulative force.

In conclusion, the indeterminate form of franchise affords more protection to both the public and the utilities than any of the kinds by which it was preceded. Whether the indeterminate permit would work as well in the absence of public utility laws and commissions as in connection with such laws is not entirely clear. It may also be a question whether such permits could be adopted in some states without far-reaching changes in their legal systems. But as most of the states now have so-called public utility laws and commissions these obstacles are probably not serious.

THE GENERAL SITUATION DEMANDS RELIEF

In addition to the foregoing remarks the general electric railway situation may be summarized in part as follows:

The electric railway situation is one for which adequate remedies should be found and properly applied. How can it best be met? About the only remedies that can be suggested is an increase in the rate of fare for passenger transportation wherever needed, and the elimination of all expenses and charges except such as are necessary for adequate service. In such cases the customary flat 5-cent fare will either have to be raised to a higher figure or restricted to shorter rides or to smaller areas or zones with an additional and lower rate for each succeeding zone. As to which of these methods should be chosen is a matter that would largely seem to depend upon the conditions of each particular place.

A flat rate of say 5 cents, or any other given sum, is not always desirable. This is especially true in the larger cities with long rides or lines. In such cities a flat rate causes the short distance rider to pay more than his share and the long distance rider to pay less than his share. For this and other reasons such flat rates also tends to discourage or reduce the short haul traffic and thereby to decrease the traffic density of the railway system. Flat rates therefore, are not only likely to be inequitable as between long and short haul riders, but by reducing the density of the traffic they also tend to keep the earnings down and the cost of operation per unit of traffic high.

Flat rates appear to be equitable in the smaller cities where the lines are comparatively short, and inequitable, as well as discouraging to certain parts of the traffic, in the larger cities where the lines and the hauls are comparatively long. These objections, on the other hand, do not seem to hold as against rates in the makeup of which due consideration is given to those expenses which do not vary with the length of the haul as well as to that part of the total expense which vary with the length of the haul. Rates in which distance is thus a factor are sometimes called zone rates and at other times again distance or mileage rates. Rates of this kind can mostly be so adjusted that both the short-haul and the long-haul rider are made to bear their just share of the total cost. They can also be so applied as to bring in the maximum amount of traffic.

JUSTICE IN ZONE RATES

It is of course a fact that in order to base zone rates on costs many complicated apportionments of the expenses and many distributions of the apportioned items are necessary. The fixed expenses which are largely independent on the length of the haul must be separated from the variable expenses which depend upon or vary with the length of the haul. The fixed expenses in turn must be distributed on the total passengers handled. The variable expenses must be allotted to the passengers somewhat in proportion to the length of their ride. In the latter distribution the total variable expenses, the total car mileage, the average number of revenue passengers per car-mile and the length of the zone are important factors. While these distributions when taken together are complicated, experience has demonstrated that they are practicable and of the greatest help in determining rates of fare that are just and fair to all.

Nor can it justly be said that zone rates are so difficult in application as to be impracticable for this reason. While such rates have not as yet been generally applied, enough experience has been had under them to show that they can be used without causing either passengers or employees any undue inconvenience. Through mechanical devices for checking or counting and proper rules for entering and leaving cars in addition to a little watchfulness, it is easily possible fairly and economically to administer a zone rate system. While it is true that zone rates are not as convenient in everyday use as flat rates, it is also a fact that in larger cities this disadvantage is more than offset by several important advantages.

CONGESTION IS NOT AN OBSTACLE

It has also been said that zone rates tend to retard the growth of suburban districts and to cause congestion of population and are therefore undesirable. It is very doubtful whether this objection should be given a great deal of weight. Experience shows that the distribution of the population in the larger cities is chiefly affected by such conditions as rents, character of the population, time consumed in going and coming, the standard of living and other causes of this nature. It is of course possible that under zone rates the small additional charges beyond the first zone might also contribute a little toward undue congestion, but it is hardly probable. At any rate it would be of much less importance in this respect than the causes just mentioned. On the other hand, there are also in the zone rates certain offsetting elements. If under such rates, for instance, the roads can be more easily placed in a sound financial position than under the flat-rate system, it would also follow that the roads could be more easily and quickly made to extend into new suburbs than would otherwise be the case. As such suburbs, when connected with the city by proper transportation service, usually tend to relieve congestion in the city, this is a matter of much importance.

Public utilities, including electric railways, are entitled, under normal conditions, to rates that will yield reasonable returns for the operating expenses including taxes, depreciation, and interest and profit on the fair value of the investment. The price for capital varies somewhat with the risks involved and with other conditions, but it is the price that must be paid if the capital is to be had. For several years up to the beginning of the war capital in the public utility field could not as a rule be had on normal income bases unless such utilities were earning about 8 per cent for interest and profit on the fair value of the plant and the business. During the war this rate has, of course, been much higher, but it is not unlikely that, when normal conditions have been established, the price of capital in this field may return to some such a figure as that just mentioned.

Resuscitation from Electric Shock

THE ELECTRIC RAILWAY JOURNAL publishes as a supplement with this issue a chart giving instructions for resuscitation from electric shock by the prone pressure method as recommended by the National Electric Light Association. The chart is an abbreviation of the booklet of rules for resuscitation from electric shock, as revised by the association and presented at the recent Atlantic City convention by the committee on safety rules and accident prevention, of which W. C. L. Eglin is chairman. In commenting on these rules Mr. Eglin called attention to the work, in 1911, of the prior committee on this subject. He then said, in part:

"The revision of the rules and also the chart, which consists of an abbreviated form of these rules, has been based on field experience covering a number of years; and while no very radical changes have resulted, changes in detail have been made which, it is felt, will make the operation of the method more effective, and to which the careful attention of instructors and those familiar with the method is directed."

Steam Railroad Master Mechanics Meet

The Second Part of the Atlantic City Convention of Section III, American Railroad Association, Was Devoted to the Field Covered by the Former American Master Mechanics' Association

CONTINUING the report, begun in last week's issue, of the record-breaking meeting of the men of the mechanical departments of the steam railroads, held at Atlantic City, June 18 to 25 inclusive, the following digest contains items of general and electric railway interest.

HEATING OF PASSENGER TRAINS DRAWN BY ELECTRIC LOCOMOTIVES

The report of the committee on design, maintenance and operation of electric rolling stock was devoted entirely to the heating of passenger trains drawn by electric locomotives.

The report traced the history of experiments, first with oil-fired boilers, next with electric boilers and finally with oil-fired boilers again. The early oil-fired boilers were abandoned on account of accumulation of carbon on the tubes, of trouble with back drafts and of difficulty in regulating the supply of oil and water. The electric boilers were found to be expensive to build and maintain.

After tests on improved types of oil-fired burners the type described in the issue of the ELECTRIC RAILWAY JOURNAL for June 10, 1916, page 1080, was developed. This was applied to twenty-nine locomotives. It is 39 in. in diameter, has 1380 copper flues 30 in. long and ½ in. in diameter, 436 sq.ft. of heating surface, a working pressure of 110 lb. per square inch and a capacity of 2200 lb. per hour. Improvements over earlier types consisted among others of the use of a water leg 18 in. deep and 2½ in. wide; increasing the bridges between the tubes to ⅜ in.; substitution of a forced draft in the firebox with a closed door for the natural draft used previously, and the use of two expansion joints of the bellows type in the boiler shell.

The fuel-oil burner used is very simple, very easily cleaned and adapted to eastern fuel oil, which has a paraffine base, or kerosene. The lower section of the burner, which carries the steam or air for atomizing the oil, projects beyond the oil orifice, forming a lip or shelf on which the excess oil may flow and still be atomized. Where it is more economical to use the heavy western oils having an asphalt base, it has been found necessary to leave off the lip, because of the liability of oil accumulating at that point and interfering with the steam jet, as shown by the experience of the Chicago, Milwaukee & St. Paul. Only when the boiler is started is air from the main air reservoir turned into the stack blower to insure a draft and onto the burner to atomize the fuel oil. As soon as there is a steam pressure approximating 50 lb. a three-way cock is used to substitute steam for compressed air. That only a very short time is required to obtain steam for this change is obvious when it is realized that with cold water in the boiler it requires only four minutes to develop a steam pressure of 10 lb. and ten minutes from starting the fire a steam pressure of 110 lb. is obtained.

Carefully checked recent tests have shown that the raising of the breeching, or smoke box, above the top flue sheet from its original height of 1½ in. to 10½ in. has resulted in increasing the steam capacity of these boilers 32.2 per cent. This is undoubtedly due to the fact that there is now a free exit for the gases from the outer tubes, which in effect increases the heating surface of the boiler, the products of combustion passing through these outer tubes having previously been choked by the limited area through which the gases from these flues could escape.

Particular attention is called to the fact that there is a superheater in connection with the boiler. It is possible to obtain any reasonable degree of superheat required. Good practice indicates that about 15 degrees is desirable, as a high superheat damages the steam hose and gaskets. Tests show that when the steam is somewhat superheated it requires less steam per car per hour to heat it satisfactorily.

The type of boiler just described is standard for the electric passenger locomotives on the New York Central, where its capacity is rated at 2200 lb. of steam per hour; on the Chicago, Milwaukee & St. Paul, where it is rated at 2600 lb. of steam per hour; on the New York, New Haven & Hartford, where the maximum capacity is given as 2700 lb. and an average of 2200 lb. per hour. It has been adopted for the electrified zone of the Canadian Northern Railway, where the heating plant is installed in a separate car, or trailer, instead of on the locomotive. Each of the railroads reports satisfactory results from these boilers. In each case the cars are heated from a steam header at terminals before the engines are attached, or are delivered, properly heated, by the steam locomotives to the electric engines. On the Chicago, Milwaukee & St. Paul the outside temperature is occasionally 40 deg. below zero, and the heating plant "appears fully to meet the requirements for the heating of the trains in the coldest weather." The New York, New Haven & Hartford Railroad reports that "in normal winter weather, on trains of nine cars or less, only one boiler is used, but with cold weather and longer trains we find it better to use two boilers, one for each locomotive."

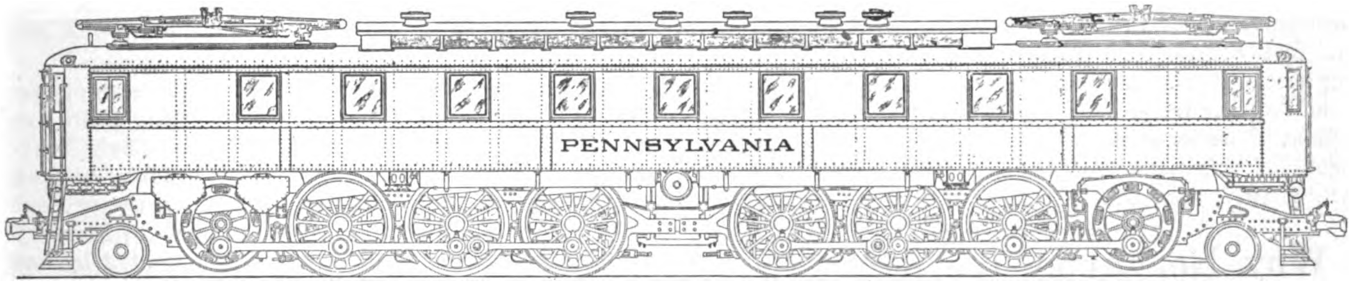
AMOUNT OF STEAM NECESSARY

The heating plant should be designed to develop the amount of steam required by the most severe conditions, and there are a number of conditions which influence the requirements. Among others are the following: The temperature of the outside air; the severity and direction of the prevailing winds; the number of cars in the train; the amount of radiating surface of the steam pipes; the cubical contents of the cars; the ventilating system used in the cars; the presence or absence of double sash; the materials of which the cars are built, whether wood or steel, for instance; the efficiency of the heat insulation, especially in the case of steel cars, including, particularly, the steam line under and between the cars; the steam control on the cars, whether hand or automatic.

As far as the committee was able to determine, there are no data as to the amount of steam needed to satisfactorily heat passenger cars which can be generally applied. The results are usually given in pounds of steam per car per hour for various outside temperatures, without detailed information as to car dimensions, construction, ventilation or heating system. Under these circumstances the records are of no practical value except locally.

COMPARISON OF OIL AND ELECTRICITY

So far as the committee is informed, no practical steam boiler has yet been developed which uses electricity as a source of heat. Assuming that such a heating plant is available, there are certain facts which should be borne in mind. The cost of electricity to produce a given amount of steam is from six to ten times that of fuel oil, omitting the item of fixed charges in the cost of current. The ratio depends on the relative cost of fuels. If the peak load for propulsion and heating current come at the same time, during the Christmas holidays, for instance, it will be necessary to increase the power station and substation capacity, not only increasing the capital invested, but incurring additional fixed charges which continue during the whole year though the additional apparatus is required for only a few months, during the heating season. Estimates made a few years ago showed that electrically generated steam would cost about $45,000 a year more than from oil-fired boilers, the number of locomotives involved being less than 35, not including fixed charges in the cost of current. If fixed charges are included, there would be in this case a saving of over $100,000 a season in favor of oil as a source of heat.



ELEVATION OF SINGLE-PHASE, THREE-PHASE LOCOMOTIVE EXHIBITED BY PENNSYLVANIA RAILROAD AT ATLANTIC CITY CONVENTION

There is undoubtedly an element of danger of fire in the use of fuel oil or kerosene. This was greater in the earlier designs of heating plants, when the oil was under air pressure, than with later designs, which feed the oil by gravity. Care in design, construction and operation have shown the hazard is small.

The experience with the electric steam boilers has been so very limited, that there are practically no facts on which to base an opinion as to the liability of fire and personal injury in their use. That there is an element of danger there can be no doubt. There are, however, certain conditions, such as long tunnels, which make the electrically heated steam boiler very desirable and in all probability will result in a successful design.

The report abstracted above was signed by C. H. Quereau, superintendent electrical equipment, New York Central Railroad, Chairman; G. C. Bishop, superintendent motive power Long Island Railroad; J. H. Davis, electrical engineer Baltimore & Ohio Railroad; George McCormick, general superintendent motive power Southern Pacific Railroad; H. R. Warnock, general superintendent motive power Chicago, Milwaukee & St. Paul Railway; W. L. Bean, mechanical assistant to federal manager New York, New Haven & Hartford railroad; J. T. Wallis, general superintendent motive power Pennsylvania Railroad; J. E. Pilcher, mechanical engineer Norfolk & Western Railway; A. C. Deverill, superintendent motive power Great Northern Railway.

In connection with the meetings there were many matters of interest and importance aside from the technical programs. For example on the evening of June 21 speakers of countrywide renown paid tribute to the railroad men who had participated in the war activities. To quote the New York *Times*: "The spokesmen for a thankful nation were Franklin D. Roosevelt, Assistant Secretary of the Navy, speaking for both the Army and the Navy Departments; United States Senator Walter E. Edge of New Jersey, and Colonel Henry W. Hodge, who was Assistant Director of Transportation in France for the American Expeditionary Force.

"The occasion was a recognition night rally under the direction of the mechanical sections of the American Railway Association, and master car builders, superintendents of motive power and other executives of the big trunk lines now comprising the federalized railway system of the United States crowded the hippodrome of the Million Dollar Pier and cheered every reference to General W. W. Atterbury and other transportation specialists who made history when America crossed the Atlantic."

On the evening of June 23 a lecture was given by Major E. D. Campbell, Artillery Division, Ordnance Department, United States Army, on "Railway Artillery". This lecture was a fit accompaniment to the exhibits of artillery of this type referred to in part in last week's issue.

MEETINGS OF RELATED ASSOCIATIONS

During the convention a number of meetings of related associations were held. Among these was the first meeting of the executive committee of the reorganized American Railroad Association. R. H. Aishton, regional director Northwestern Region was elected president, J. E. Fairbanks was re-elected general secretary and treasurer, and other offices were filled as well. The date Jan. 21, 1920, was set for the next meeting of the association.

The railroad Supply Men's Association also met and elected officers. George R. Carr, Dearborn Chemical Company, Chicago, Ill., was elected president, J. F. Schurch Rochester, N. Y., vice-president, and J. D. Conway of Pittsburgh, secretary-treasurer. New executive committeemen are W. H. S. Bateman, Philadelphia; John M. Gillespie, Pittsburgh; C. D. Jenks, Cleveland; L. S. Wright, Chicago; Colonel George L. Morton, Atlanta.

The Association of Railway Electrical Engineers also met in semi-annual convention for the informal discussion of pressing problems. Particular attention was given to the report of the committee on locomotive headlights, based upon a general questionnaire. The work of the committee of illumination also came in for consideration, as did that of the committees on electric arc welding and electrification. The latter, presented by E. Wanamaker, Rock Island Lines, showed that there is an increasing interest being taken by railroad managements in electrification projects. The committee desires information in its field for the benefit of those roads which are logically interested in electric traction.

Brief reference was made last week to the powerful electric locomotive exhibited by the Pennsylvania Railroad. This has been developed for use on the Altoona Division of the main line of the railroad in West Central Pennsylvania. It is claimed to be the most powerful locomotive ever built, having a rating of 4800 hp. normal rating, and being capable of exerting 7600 hp. during acceleration. A photograph of the machine was reproduced last week. A side elevation accompanies this article. The locomotive was described in detail in the issues of this paper for June 9, 1917, page 1048, and Oct. 6, 1917, page 619.

Why Not Apply the Safety Car to Interurban Service?

The Frequent-Service Feature Would Be Appreciated and the Operating Economies Would Affect the Balance Sheet Favorably

By D. C. Hershberger
General Engineering Department, Westinghouse Electric & Manufacturing Company

THE wonderful success of the quick-service safety car on city streets, in all parts of the country, demonstrates that it would also solve some interurban or surburban problems. It is capable of performing the present schedules on many low-speed lines, where old types of cars are now operating, It will also be capable of performing the necessary service on lines which at present have medium schedule speeds, provided the running time is increased and a greater number of cars put into operation in order either to maintain the present headway, or to reduce it if the traffic warrants. On some roads this will necessitate the changing of the present passing points on single-track lines, while in other cases additional passing points will be required.

Where relatively heavy cars are now used on lines having limited feeder capacity, the voltage at the car is usually low, which interferes with the operation of the present heavy cars. With the safety cars the power peak, as well as the average current on the line, is reduced to such an extent that a much higher average voltage will obtain. This improvement in voltage will aid the safety car in maintaining present schedules.

On some interurban lines the tide of traffic in a given direction is heavy for short periods, which may be in excess of the capacity of present safety cars if operated singly. To meet this condition these cars can be operated with two or more running on the same block on the heavy trips. In other cases, some of the old cars, operated as trippers, may be used for the peak load.

The safety car is capable of maintaining a reasonable schedule, and if the track is in good condition is practically free from pitching and rolling. As its weight is only one-third or one-fourth that of the interurban car which it would supersede, the car would obviously involve less expense for track maintenance or, conversely, with the same maintenance expenditure, the track could be kept in much better condition so that the safety car would actually have better riding characteristics than the old heavy cars operating on poorly maintained tracks.

The public which patronizes interurban or suburban lines prefers neat, well-maintained and well-operated cars, even though they may be small, to old "ramshackle," weather-beaten, noisy cars. The latter have a depressing effect on the car rider and encourage adverse criticism.

A few interurban and many suburban lines are equipped with longitudinal-seat cars. Such cars are less pleasing to the public than cross-seat cars like those of the safety type. Proof of this is seen in the fact that in cars having longitudinal seats along one side and cross-seats on the other, the cross-seats are always filled first.

The interurban transportation field presents an opportunity for a new type of one-man safety car. There are many lines which could be better served by a light four-motor, double-truck safety car with greater seating capacity, and geared for higher speed than the present safety cars. A car of this type, equipped with safety appliances, can be as easily and safely operated by one man as on the present safety cars now in use on city and suburban lines.

As the operator has the entire responsibility for safe transportation of his passengers he will be less careless in observing operating rules and signals, and in handling the public, than would either the motorman or the conductor were the responsibility divided between them. On interurban roads the duration of stops for receiving and discharging passengers is relatively small as compared with the total time between terminals; in fact it is much less than on city lines. Hence the question of stand-still time to permit boarding and alighting would not interfere with the service, as the public would become habituated to having the proper fare ready when boarding.

The question of fare collection is, of course, one of the first that comes to the mind of the transportation superintendent. On steam roads the patron would not think of tendering fares by zones for the reason that the railroads have never inaugurated this practice. The same is true with a large number of interurbans. Where zone systems are employed it would obviously be necessary to revise the present methods.

On many of the roads, where the two classes of safety cars referred to above could be operated, the crews know most of the patrons, and furthermore know their habits with respect to boarding and leaving the car. Thus it should be easy for safety-car operators to collect the fare for a whole ride at the time the passenger boards the car. However there are many places where this method of fare collection could not be employed due to franchise and other restrictions. In these cases other methods can be employed to advantage.

The application of safety cars to interurban service would meet with difficulties, but with tact and perseverance these can be overcome.

Iowa Association Holds Two-Day Meeting

Joint Session with Iowa Section of the N. E. L. A. Was Included—Discussion Was Intensely Practical and Timely—J. P. Ingle Was Elected President

AS NOTED briefly in last week's issue of this paper, the Iowa Electric Railway Association met at the Colfax Hotel, Colfax, on June 18 and 19. The afternoon session on June 18 was held jointly with the Iowa section of the National Electric Light Association. Papers were read by William Chamberlain, general counsel United Light & Railways Company, on "Rate Litigation in Iowa," and by Dean William G. Raymond, University of Iowa, on "The Iowa State Board of Conciliation — Its Work and Possibilities." An abstract of the latter appears elsewhere, and one of the former will follow. On the evening of that day an impromptu dance was held.

The morning of June 19 was devoted largely to routine business. In the absence of C. E. Fahrney, president of the association, Vice-President F. J. Hanlon presided. A general discussion on paving completed this session.

During the afternoon of June 19 papers were read by T. C. Roderick, assistant general manager Tri-City Railway, on "The Safety Car," and by C. W. Place, engineer General Electric Company, on "The Automatic Control of Substations." These will be abstracted in a later issue of the JOURNAL.

These papers were generally discussed and the discussion finally turned on the subject of track reclamation by welding and grinding.

Before the meeting closed Secretary H. E. Weeks called attention to the paucity of railway representatives at the meeting. After discussion it was decided to appoint a committee to draft a plan to increase attendance at, and interest in, the meetings. The following were appointed:

J. P. Ingle, Keokuk Electric Company, chairman; B. J. Denman, Tri-City Railway & Light Company; R. A. Leussler, Omaha & Council Bluffs Street Railway; W. H. Brooks, Westinghouse Electric & Manufacturing Company, and A. P. Jenks, General Electric Company. At the executive session following the general meeting officers were elected for the ensuing year as follows: President, J. P. Ingle; vice-president, F. J. Hanlon; secretary-treasurer, H. E. Weeks, and member of the board of directors for five years, J. P. Ingle.

The convention concluded with a banquet and dance attended by 150 or more delegates and guests of the two associations. After dinner the associations were welcomed to Colfax by the secretary of the Commercial Club who, with the Mayor, represented the city at the banquet. The main speaker was John F. Gilchrist, vice-president Commonwealth Edison Company, Chicago, Ill., who spoke on "Public Utility Regulation."

WEDNESDAY PAPERS FAVORED RATE LITIGATION

The paper read at the joint session on Wednesday by Mr. Chamberlain was considered so important to the members that the association plans to publish it in full in pamphlet form. In the discussion of the paper a question brought from Mr. Chamberlain the statement that the acceptance of a franchise does constitute a contract but that such acceptance does not constitute the acceptance of the franchise ordinance in which, and not in the franchise or lease, the rates are specified. In answer to another question Mr. Chamberlain replied that the decision of Judge Applegate, as referred to in the paper, does not affect railway properties unless they come to be included in the statutes covering general conveyances, a decision in regard to which has never been rendered. It was further brought out that a franchise voted upon by the public does not become any more of a contract than otherwise as the public merely signifies its approval of the action of the council.

An interesting point in the discussion of the paper by Dean Raymond was the statement by him that the method used by the board in determining the going value of a utility was to estimate the annual cost of operation of the property, to add a percentage—say 10 per cent—and to capitalize this at say 7 per cent. The result was assumed to be the going value. The discussion brought forth complimentary references to the fairness of the board, and to the influence that its decisions have had on the councils of cities whose controversies were not under consideration.

BRICK IS FIRST CHOICE IN PAVING

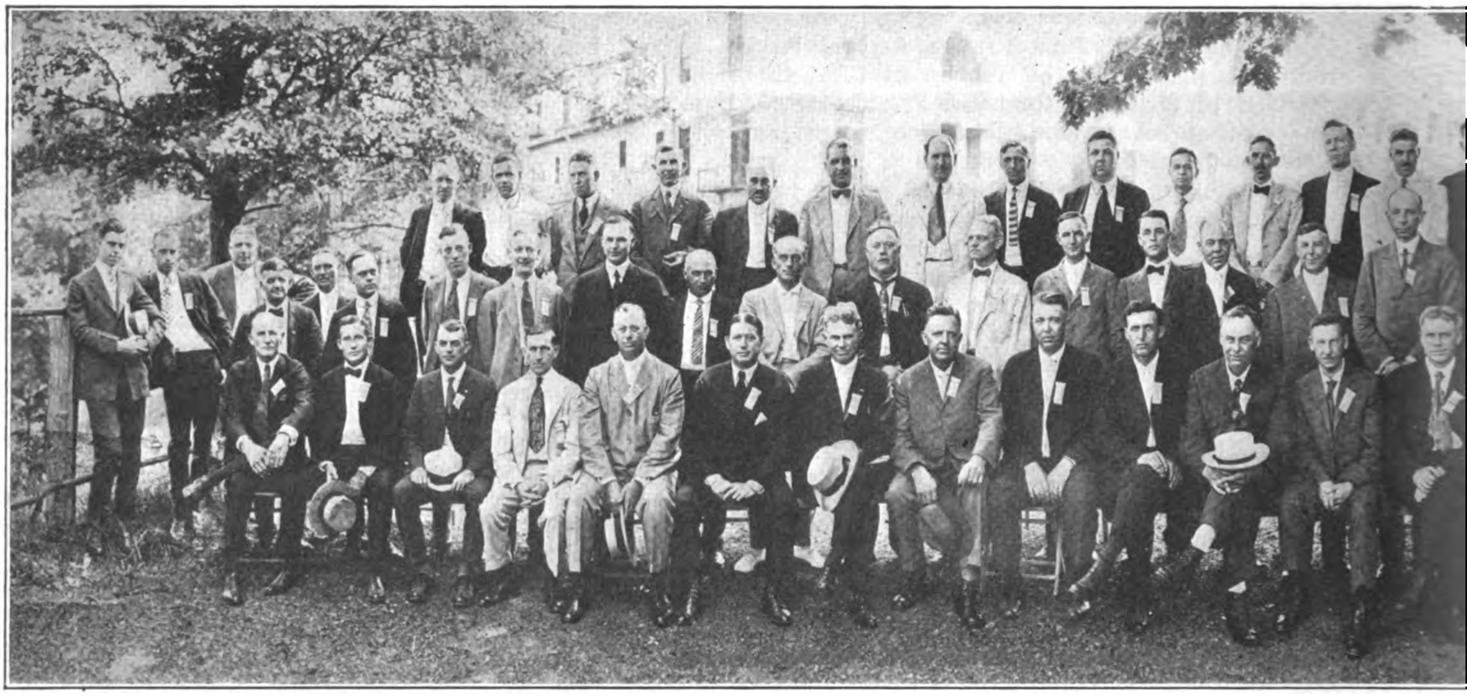
The general discussion on the best paving to be used in connection with street car tracks, with special reference to the advantages of cement, creosote blocks, brick and asphalt, was led by R. J. Smith, superintendent way and structures Tri-City Railway. Mr. Smith said that his experience with creosote block and asphalt had been unfortunate and that he considered asphalt a failure in track paving. In fact, in general, any monolithic pavement should be avoided. Concrete, preferably reinforced, may serve for temporary construction where traffic is light Creosote block makes an excellent pavement as far as the paving itself is concerned provided the blocks are perfectly treated and perfectly laid, both operations under rigid inspection. They should be laid on the green concrete, thus eliminating a grout cushion, and the joints filled with grout.

The standard on his property, said Mr. Smith, is a brick pavement laid in a 1:4 mix grout cushion which is, in turn, placed on the green concrete foundation. The paving joints are filled with grout and no provision is made for expansion. With a bituminous filler the bricks wear at the edges, resulting in "turtle backs." For extremely heavy traffic granite or sand stone blocks on a grout cushion should be used in place of brick. The railway should not be required to put down a fine twenty-year pavement every time paving is done when grade or other changes may be required in a few years.

In the discussion which followed Mr. Smith's remarks O. H. Simonds said that his experience with creosote blocks had been unfortunate; that they were generally spaced too close together and that in replacing or repairing pavement on his property the space was being increased to ¼ in. A mortar cushion with a grout filler is used. Mr. Simonds also prefers the brick pavement from the standpoint of economy.

Speaking of filler blocks Mr. Smith said even with the best construction the rail will vibrate and therefore the pavement should be kept vertically separate from the rail. Of course this allows water to seep in but if the web space of the rail is filled with mortar the seepage will not be serious. Anyway brick cannot be laid under the head of the rail satisfactorily. T-rail construction is the best, with the brick arched at the center of the track and brought down to the head on the rail and the web space filled with grout. J. P. Ingle, E. C. Allen and J. O. Schulze agreed with Mr. Smith in his conviction that brick gives the best pavement and that concrete and creosote blocks are unsatisfactory.

Referring to paving around special work Mr. Smith said that he is using brick, but still experimentally. Perfect special-work construction does not offer any difficulties in paving, but no railway lays perfect special work and constant maintenance is necessary. T. C. Roderick stated that brick gives the most satisfactory results, wood block is very unsatisfactory and asphalt is fairly satisfactory if brick is used against the rail. Nose blocks have not proved satisfactory but where it has been necessary to use them a specially-designed granite block has given the best results. Water-bound macadam makes a fairly satisfactory cheap pavement for very light traffic, but needs constant maintenance although this is not costly. Special work with sharp-angle frogs has been paved with granite blocks cut to fit.



GROUP OF DELEGATES AT CONVENTION OF IOWA ELECTRIC RAILWAY ASSOCIATION

SAFETY CAR A LIVE SUBJECT

Mr. Roderick's paper brought out the most extended discussion of all those presented. In the course of this F. J. Hanlon said that he did not believe that there is a property in Iowa that can afford to operate cars with two men. The one-man car insures faster schedules, and on his property faster loading and unloading are actually obtained. The fare box is equipment essential to the safety car, and passengers will have the correct fare ready. Otherwise caustic remarks about delaying traffic are made by other passengers. With a 9-ft. wheel base the riding qualities of the car are better than those of a double-truck car. Mr. Hanlon did not favor the use of ball bearings.

Some discussion ensued on the necessity for an overhead register and E. C. Allen stated that this is not necessary, that it will never check with the fare box until the men make it do so at the end of the trip. Mr. Allen said that his experience indicates that 95 per cent of the passengers have the exact fare ready. If half-fare and other tickets are in use a register would seem to be necessary. Mr. Hanlon said that his safety cars are equipped with Economy meters and that in spite of a 25 per cent increase in the unit cost of power at the plant the cost of power consumed has been considerably reduced.

Where the standard safety car has been installed an average annual saving of $3,500 per car, including power consumption, platform expense and maintenance, has resulted, according to Nic LeGrand, National Safety Car & Equipment Company. In every case the gross receipts have increased from 12 to 55 per cent. One big feature in favor of the car is the absolute elimination of platform accidents. The loss of fares is also practically eliminated because the men are kept too busy to "knock them down." Mr. LeGrand thinks it desirable that the cars be kept standard and believes that faster loading and unloading will result with a 30-in. door opening than with a wider one. Local conditions can be adjusted to the car better than the car to local conditions, said W. H. Brooks. The cars should be kept standard. W. H. Beattys, Westinghouse Traction Brake Company, explained the safety features of the car such as the "dead man's" handle and foot pedal, the operation of the brakes, sanders and doors, and said that there is nothing else that will give to the railway companies a return on the investment such as is given by the safety car. J. P. Ingle said that three years ago Stone & Webster standardized on the Birney car and that since that time nothing else had been purchased. The only thing the local manager can specify is the number of the car, the color and the destination sign. No property, he said, has a right to ask for an increase in fares until every known saving had been instituted and that means the safety car.

THE AUTOMATIC SUBSTATION ANOTHER IMPORTANT DEVELOPMENT

In the discussion which followed the reading of Mr. Place's paper John M. Drabelle, electrical engineer Iowa Railway & Light Company, said that manufacturers must substitute for the highly refined switchboard relay a more substantial equipment. A little trouble has occurred at the relay on his property but the first year of operation has been very satisfactory. The automatic hydraulic station has in two years developed 6,000,000 kw.-hr. of energy at a maintenance cost of $42.88. C. A. Butcher, Westinghouse Electric & Manufacturing Company, said that he believes that automatic substations will in the future be installed more rapidly than the manual stations. He emphasized the necessity for intelligent inspection. A. P. Jenks said that the automatic substation is not in the experimental stage. The first installation was made several years ago and although of course a few "bugs" have developed the equipment has proved very successful and most reliable. The automatic substation and the safety car go hand-in-hand in relieving the street railway situation. Both are labor-saving devices and this is important as the eight-hour day is coming and manual stations which now operate on two shifts will have to change to three.

The general discussion on reclaiming track and special work by welding and grinding was led by R. J. Smith who said that he was convinced the work pays richly. The welding process is as uncertain as any process in the industry, he said, in spite of the fact that the progress of the art has eliminated much of the uncertainty and will eliminate more. The work should be handled by a separate department. That in Davenport has included building up and grinding old track, bolted special work and manganese centers, putting on welded plates and other special jobs. The arc welded joint is a success but indifferent success has been obtained with welding of special work and manganese centers. With manganese it is somewhat of a hit-and-miss process, as the manganese loses some of its properties when heated.

The foundation upon which the work has been done should be borne in mind in considering any welding failures. Mr. Smith said that as the efficiency of resistance machines is low, it may pay to have more generator sets and fewer resistance machines. The importance of having the work clean before welding was emphasized. Every property, even though small, should have a welder and a grinder. In answer to a question Mr. Smith said that there is no bad effect upon the weld as a result of doing the work under traffic, but if the traffic is heavy it will be better to do the work at night and not delay schedules.

All mechanical joints are being replaced with welded joints on his property, said O. H. Simonds, and the work is being done at night. Grinding is a part of the welding operation and should always follow the building up of joints. It is also a good plan to grind joints on new track before any traffic has passed over them.

AND IOWA SECTION OF NATIONAL ELECTRIC LIGHT ASSOCIATION AT COLFAX, IA.

Germany Electrifying Suburban Lines

The *Electrician*, London, states that Berlin is now falling into line with other large cities in adopting electrification for its network of suburban railways, one section of which has been commenced. The trains are to be composed of twelve coaches each with a double-axle driving truck at each end. The system is so arranged that existing coaches can readily be adapted to it. It is proposed to divide the trains into two portions, each working independently, which will facilitate economical working during the light traffic period.

Iowa State Board of Conciliation

Its Origin, Work and Possibilities Are Described by One of the Members of the Board

BY WILLIAM G. RAYMOND
Dean of Engineering Department, State University of Iowa

THE creation of the Iowa Board of Conciliation was unique in the history of public utility rate settlements. In the early summer of 1918, Hon. Martin J. Wade, Judge in the United States District Court for the Southern District of Iowa, found that his court was about to be swamped with actions brought to secure increases in municipal public utility rates. These actions were growing out of increased cost due to war conditions and the unwillingness of rate controlling bodies,—i. e., city councils—to recognize these increased costs as sufficient cause for increased rates. Seeking relief for his court and the parties concerned, Judge Wade suggested that the utility companies and representatives of the municipalities should get together and create a body of some kind that might act as arbitrator or advisor in such disputes as were arising, a body that might proceed with less formality and more speed than it was possible to realize in court procedure and with less expense to all parties, a body which although without the authority of a court would have the confidence of utilities and municipalities, and by their mutual consent be able to adjust their differences.

BOARD IS TEMPORARY ONLY, HAVING BEEN CREATED AS A WAR MEASURE

As a result of this suggestion a number of meetings were held, and finally on July 26, at a joint meeting of the League of Iowa Municipalities and Owners of Public Utilities in Iowa in Des Moines, a board, called the Board of Conciliation, was named. Its plan of organization provided for a membership of five of which one is to be an engineer and one a lawyer. the members of the board appointed at the meeting mentioned were: Mayor J. F. Ford of Fort Dodge, Dean William G. Raymond of Iowa City, Ex-Judge Clarence Nichols of Vinton, Mayor Truman A. Potter of Mason City and J. H. Ingwersen of Clinton. The rate of compensation fixed for the members was $25 a day and the expenses were to be paid one-half by the municipality and one-half by the utility interested. The board was created primarily as a war measure and it was intended that it should pass out of existence upon the close of the war. It was also provided by the meeting that the same committee of ten that had made the report naming the first board should continue to function as an appointing agency if and when for any reason vacancies should occur on the board.

Mr. Potter, president of the League of Municipalities, called the first meeting of the Board at Des Moines on Aug. 9. At this meeting Mr. Nichols was choosen chairman and Mr. Ford secretary. At a later meeting held at Cedar Falls and attended by a good representation from both the League of Municipalities and the Association of Utilities the following rules were adopted:

RULES RELATING TO JURISDICTION AND PROCEDURE

I

When a dispute shall arise between any of the municipalities of the state and the owner of any public utility in such municipality as to any question of which the State Board of Conciliation shall have jurisdiction, such dispute shall be brought before the board either

1. By an agreement in writing signed by the parties specifying the particular dispute on which the action of the board is desired and a request that the board take jurisdiction and make determination thereof, or
2. On the written application of one of the parties to the dispute consented by and concurred in by the other party, as hereinafter provided for, or
3. On the application of one of the parties to the dispute where the other party thereto fails or refuses to consent that the board act in relation thereto.

II

In cases where the parties invoke jurisdiction of the board as provided in paragraph one above, no further formal application shall be necessary, but in other cases there shall be an application addressed to the State Board of Conciliation and filed with J. F. Ford, secretary of the board, at Fort Dodge, Iowa. Such application need not follow any particular form but it shall be sufficient to specify the particular matter in dispute and the parties thereto and request the action of the board thereon.

III

Upon receipt of an application such as provided for in Rule 2 above, the secretary shall immediately mail a copy thereof to the other party to the dispute and the latter shall, within ten days after the mailing of such copy, file with the secretary of the Board at Fort Dodge, Iowa, a written communication consenting to and concurring in the request of the applicant for a hearing.

IV

In the event the party to whom the copy of application is sent, as specified above, shall fail or neglect within ten days to consent to the Board of Conciliation acting in relation to such dispute and join in the request therefor, the Board shall proceed to hear the matter on the application of the one party, provided the rules hereinafter set forth are complied with.

V

Whenever the board shall obtain jurisdiction in either of the ways herein specified it shall direct which party shall submit its evidence first and the form and manner in which the same shall be submitted, and the time within which the same shall be submitted and shall also fix the time in which the opposite party shall submit its evidence and the manner and form thereof.

VI

There shall be filed with the board six copies of all agreements, applications or other matter required by the board including copies of any showing of facts to the end that the secretary may furnish one copy to the opposite party and one copy to each member of the board.

VII

The expenses involved in the inquiry shall be paid as follows: Each party to the controversy shall pay the expenses made or incurred by such party, but the fees and expenses of the board shall be paid in the manner specified in the report of the committee of ten, adopted by the joint convention of municipalities and utilities held in Des Moines

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*Abstract of paper read at meeting of Iowa Electric Railway Association, Colfax, Iowa, June 18, 1919.

on July 26, 1918, except that where the hearing is on the application of but one party to the controversy the entire expense of such inquiry shall be paid by such party; provided that the party or parties applying to the board, as hereinbefore specified, shall at the time file with the board an agreement duly executed to provide for the expenses of the inquiry, as above stated.

VIII

The time and place of meeting of the board shall be determined by a majority of the members of the board from time to time, except that the chairman shall call a meeting of the board whenever any three members of the board shall request it.

IX

In acting in any controversy the chairman and at least two other members of the board, to be selected by him shall act.

X

In case of the absence or inability of the regular chairman to act, the remaining members of the board shall select a temporary chairman to act in connection with any inquiry.

XI

The board will from time to time formulate such other rules as may appear to be necessary in the conduct of the business of the board.

ADDITIONAL RULES OF PROCEDURE OF THE STATE BOARD OF CONCILIATION

XII

In the absence of a stipulation by the parties to the contrary, the utility company shall submit its evidence to the board first, the evidence to be in the form of affidavits and exhibits, and in no case shall oral testimony be submitted except an order be previously obtained from the board to that effect.

In the absence of objections by one of the parties, the board will assume that the rate existing prior to the war was a fair and reasonable rate, in which case the evidence shall be confined to a showing, on the part of the company, of the reasons why the rate should be increased, to meet changed conditions due to the war.

In the event there is objection to the rate existing before the war, then the utility company shall produce its proof on the following propositions:

a. A statement or estimate of the reasonable investment to create the property as and when it was created, including, (1) franchise cost; (2) financing cost; (3) organization cost; (4) construction of the physical plant cost; (5) engineering cost; (6) legal expenses, not included in Nos. 1, 2, and 3; (7) other overhead costs; (8) development cost; (9) accrued capital consumption or depreciation.

b. The annual cost of operation during the years 1913, 1914, and 1915.

c. The annual cost of operation at prices current at the time of hearing.

d. The annual depreciation or consumption allowance.

e. Actual or estimated present patronage or sales of the commodity produced.

f. Actual sales of the commodity produced in each of the three years, 1913, 1914, and 1915.

g. Such additional evidence as in the given case the board may require or permit. The showing shall distinguish between actual figures and estimates, actual figures to be given where possible.

XIII

In the absence of some direction of the board to the contrary, the utility company shall make its showing as above outlined, within ten days from the date when the stipulation of the parties was filed with the board, or the parties had concurred in the hearing, and serve copy thereof within said ten days on the other party, and file proof of such service with five copies thereof with the secretary of the board.

XIV

The municipality, at any time after service of the showing of the utility company on it shall have the right to inspect the books and papers of the utility company, relating to the service, the rate of which is in controversy.

XV

Within five days after the receipt of the showing by the utility company, the municipality shall serve such interrogatories as it desires the utility company to answer, upon the local manager of the utility company, and file proof of service, including five copies of the interrogatories, with the secretary of the board at Fort Dodge, Iowa.

XVI

Within five days from service of the interrogatories upon the utility company, the utility company shall serve upon the municipality a copy of its answers to said interrogatories, and file five copies thereof with the secretary of the board at Fort Dodge, Iowa, together with proof of service upon the opposite party.

XVII

Within ten days after the service of answers to interrogatories on the municipality, or within fifteen days of service of utility company's showing the municipality shall file its showing in opposition to the utility company, with the secretary of the board at Fort Dodge, Iowa, the same to include five copies thereof, together with proof of service of copy thereof on the utilities company.

XVIII

The board may grant such additional time in either of the matters provided for in Nos. 12 to 17 inclusive as may appear to be proper in the particular case.

XIX

After the parties have submitted the showings as above the board reserves the right to call for or permit such additional testimony as it may deem proper.

XX

If requested by the parties, the board will, at any stage of the proceedings, appoint an accountant or engineer, or both to perform such services in connection with the investigation as the parties may agree upon and the board approve.

XXI

After the showings have been completed as herein provided, in case the board elects to visit the municipality and inspect the utility in question, reasonable notice will be given both parties, of the time when such visit of inspection will be made.

CONTROVERSIES ALREADY SETTLED

On Sept. 4th the board met in Waterloo to determine the order in which it would take up the several questions submitted and to choose an engineer to make a report in the case of one of the controversies in which the city and utility had agreed that the board should make the entire necessary investigation through its own engineer.

At this meeting Mr. Ingwersen had resigned from the board, owing to a change in his business arrangements which took him out of the State.

The board had before it at this time requests for its services from Iowa City, Fort Dodge, Keokuk and Fort Madison. In each of these cities there was a controversy over gas rates. The Keokuk case was the only one in which the board was asked by both parties to make its own investigation with its own engineer, and to this day this is the only case in which such action was taken.

It will be noted that either party to a controversy might secure the service of the board. The board has received and acted on sixteen requests and has received several others that were subsequently withdrawn formally or not pressed, because of other actions taken by the parties. The cases in which both parties joined in asking the services of the board have been six in number, namely, Iowa City, Keokuk and Fort Dodge gas cases, and Grinnell, Marshalltown and Sanborn electric light and power cases. In the ten other cases heard by the board, the utility was the petitioner and the municipality declined to join. These cases were Fort Madison and Mount Pleasant gas cases; Osceola gas and electric light and power case, Chariton, Laurens, Pomeroy, Rolfe and Fonda electric light and power cases and the Des Moines Street Railway rate case. In some of these cases the municipalities declined to recognize the need of the services of the board, standing on their rights under the franchises under which the utilities were operating, claiming that there was nothing to conciliate or arbitrate. In some cases the municipality simply ignored the matter, making no communication to the board.

After the Iowa City, Fort Dodge, Keokuk, Fort Madison and Marshalltown cases had been disposed of the board lost its lawyer member through the resignation of Judge Nichols. This vacancy has not been filled. T. F. Harrington of Sioux City was selected to serve in the place of Mr. Ingwersen and he acted in the Sanborn case, the last one considered. The other cases were heard and passed upon by the three remaining members of the board, Mr. Potter acting as chairman.

In two cases only can the board be said to have acted strictly in accordance with the name—Board of Conciliation. In the Marshalltown case, after hearing the evidence presented by the utility and the questions of the city, the board got the parties together and they agreed on a rate somewhat less than that asked by the utility, and the board proceeded to make an order naming this rate. In the Sanborn case, the company had been charging less than the franchise rate from the beginning of its service, but made a considerable difference between residence lighting rates and rates for power and those of consumers of large quantities. The inequity of the rates rather than the gross earnings of the company annoyed the people, and an ordinance was adopted lowering the rates. From this the company appealed and asked for a maximum a little larger than the franchise maximum. It appeared at the hearing that the company could arrange a step rate within its franchise maximum that would appear more equitable than that in force and that would be sufficient to meet its immediate requirements. The board suggested that this be done at once and submitted to the representatives of the city, and it was done.

In no case did a municipality appear alone asking the service of the board. When only a single interest appeared for the purpose of securing the opinion of the board as to what—on the showing made by the utility—would be a fair rate, this opinion was desired because of the expectation that in subsequent litigation the court would recognize the finding of the board as prima facie evidence of the fair rate to be fixed as the temporary rate pending final settlement of the controversy. This expectation was realized in a number of cases.

RATE OF RETURN GRANTED

Settlements made through the board were probably more favorable to the municipality than settlements through the courts would have been except in those cases in which the franchise rate was held to be a contract rate alterable only at the will of the city councils, because the rate of return used by the board in computing a fair temporary rate was only 6 per cent. Indeed in some cases it was less than 6 per cent. In a court case it would be incumbent upon the deciding authority to prohibit a rate yielding less than a fair return on the fair value of the property. This fair return would not be lessened as a compromise measure for a presumably brief period. It would have to be the going fair rate of return, and in general this would probably have been recognized as not less than 7 per cent or 8 per cent. A property earning enough to pay 6 per cent would probably be granted no relief under a confiscatory rate plea, but most companies were earning less than this, and while the court may say that a rate yielding 6 per cent is not confiscatory, opinions of master and court have quite generally upheld higher rates as fair. Indeed in the Perry gas case in which the writer sat as master, the parties agreed that 7 per cent on the fair value of the property used in the service would be a fair return, and asked that rates be suggested on this basis.

The members of the board on more than one occasion said among themselves that for a long-time regulation under normal conditions, 7 per cent or 8 per cent would be a fairer rate of return than 6 per cent used in their settlements; but that as a matter of compromise, for a short time, and under the conditions existing, a return of 6 per cent ought to be accepted by the utilities and be satisfactory to the public. Apparently the board's findings were satisfactory.

The municipalities also saved money in the greatly lessened cost of the proceedings. In general it is fair to say that the cost of the investigation and settlement has been greater to the utility than to the city. In some cases the cost was shared equally. In other cases of joint action the whole expense was borne by the utility, and of course this was true in all cases in which the utility was the only petitioner. In the Keokuk case in which the board employed the expert, the total cost was $966. In the Iowa City case in which the parties employed their own experts, the total cost to the city and utility was $1,508. In many cases the showing made by the utility was prepared by members of its regular force without either expert or attorney fees.

FUNDAMENTAL PRINCIPLES RECOGNIZED

It may be worth while to record certain principles recognized by the board when determining fair compromise rates.

1. In finding value of property, estimated or known actual reasonable investment was used rather than reproduction costs at present prices or prices averaged over an arbitrary period. Estimated depreciation was deducted Meters, small tools, etc., were carried at full cost.
2. That thing known as going value, business value, going concern value, and pernaps by other names, was recognized as an element of value.
3. Except in one or two cases in which the result would have been rates beyond what the traffic would bear, interest on fair value was computed at 6 per cent.
4. With one or two exceptions rates were determined to cover cost of service only. In cost of service was included all so-called operating expense, depreciation, and interest at 6 per cent on the fair value of the property. In the exceptional cases mentioned the rates advised were less than would have resulted from an allowance of 6 per cent interest as an item in the cost of service. These rates were either agreed upon by the parties themselves, or ordered by the board because a higher rate was judged to be more than the traffic would bear.
5. Rates were ordered generally for a period of six months, or for the duration of the war and six months thereafter. When the result of the application of the ordered rate seemed uncertain the order was for a shorter period.

It is well to note that although differences of opinion sometimes existed on the board, its findings were never other than unanimous.

National Action Can Help Greatly

How the Federal Electric Railway Commission May Be of Assistance to Electric Railways

BY PAUL SHOUP
Vice-President Southern Pacific Company and President Pacific Electric Railway Company

YOU ASK my comments on the Federal Commission appointed to deal with electric railway affairs, and what it can do.

The efficiency of a commission depends upon its personnel and its power. The personnel is one of knowledge of the industry. The appointments are not political. I am much pleased to see my friend Mr. Gadsden on the Board.

The power is not so apparent. What the electric roads need is *action*, not *recommendations*. We need somebody to *do* something, not *suggest* something. The *needs* of the situation have been threshed out in every city of any size in the United States in the last few years.

The Board, then, faces a difficult situation. It must undertake in a national way to accomplish the results which, to a large extent, local effort has failed to accomplish. The industry is manifestly in a very bad way with 15 per cent of the mileage in the hands of receivers and 40 per cent that would be if not sustained by strong stockholdings or banking interests hoping for something better and accepting permanent or temporary plans for reduced interest charges.

The National War Labor Board in its labor decisions has raised wages of employees on an average, I suppose, 50 per cent and even more for the lower-paid employees, due to the increased cost of living, and where cases have not been before the Board, the companies have voluntarily made large increases, or the influence of the War Labor Board's decisions has resulted in like increases in neighboring cities. The cost of materials used in maintenance has increased 60 per cent to 150 per cent.

The War Labor Board has recommended in connection with its labor decisions, increases in fares to meet the increased payroll at least, but what response have the communities served given? The deplorable state of the industry makes answer. In many cases the public has responded favorably. State commissions have acted to meet the situation when within their power, but this is not true to the degree necessary to put the companies in as good a position as they were in 1914—and that was not a satisfactory one.

THE PEOPLE WILL BE FAIR IF THEY UNDERSTAND

Only a local sympathetic understanding of their own relations to the electric railways which give them service, by the people served, will bring about a solution. This can be done by a nation-wide campaign that will give a clear general knowledge of the situation, supplemented by an active and vigorous local and state educational program which shall bring the subject home to every patron as something affecting his interests in which he has a personal concern directly, both because of the service he needs and the effect of its loss upon the community where his interests lie.

Let us not cheer ourselves with the belief that the people of the United States are sitting up worrying about the financial needs of the electric lines. Chiefly they are concerned with problems immediately affecting their own bread and butter, or, if in the upper financial stratum, their own bank accounts, large or small. They take about as much interest in the financial difficulties of an electric line as they do in the receivership of a department store, flour mill, or a lumber yard—we all say "too bad, sorry to hear it" and let it go at that.

But as a whole, the people are eminently fair if the truth reaches them, which largely it does not, because the relations between real education and selfish propaganda are entirely too close.

The real question, then, for this Commission to answer is: How shall each person directly or indirectly concerned be made to know, to heed, to be interested in the true facts affecting the company giving his community service?

The Commission has whatever value a national creation may give it. It will need organization, money to work with, intensive personal effort on the part of every member, and the whole-hearted active and sustained effort of all the electric railways in the United States and all associations directly or indirectly dealing with electric railway affairs. It is not within my province to suggest how it should go about its work; that would be an intrusion. But as things to be done, these suggestions, none of them new, may be of interest:

WHAT MIGHT BE DONE

1. *Ask the Congress to pass a bill creating a 7½-cent coin.* The nickel of 1914 had as much purchasing power as such a coin would have now. Convenience is a great factor in people's lives. Habit follows upon convenience. It will be easier to spend a 7½-cent coin for street car fare than it is a nickel and two or three pennies. Secure by local action substitution of this coin for the nickel fare. If lower fares are necessary, sell tickets, monthly "readiness-to-serve" tickets, or strips of tickets, ten or more.

2. *Carry on a Campaign to*

   (a) Increase urban fares, increase suburban commutation fares and put others on a mileage basis.

   (b) Eliminate or prevent jitney and motor-truck competition where electric railway service is adequate, and everywhere insist that such competitors bear burdens in proportion to business done as heavy as those of the electric lines—taxation and all other public obligations.

   (c) Reduce obligations that are onerous, now exacted by legislation. These subjects will include:

      (1) General taxation which, in California, takes 5¼ per cent of the gross revenue,

      (2) Franchise taxation, taking 1 per cent to 5 per cent of the gross revenue,

      (3) Paving and maintenance, a relic of horse-car days when hoof beats battered the pavements.

(4) Cost of putting wires underground, replacing wooden with iron poles, separating grades, maintaining at the railway's sole expense watchmen that other traffic needs have made necessary.

(5) Free transportation, demanded by franchises, which should be reduced to a minimum.

(d) Amend franchises so that the values of investments will not be automatically destroyed by the passage of time.

(e) Consider wage questions only in connection with income hereafter, a principle to be adopted because of the narrow margin now between operating expenses and taxes and income.

Surely no one is rash enough to suggest that any electric railway of any consequence anywhere in the United States is earning a fair return on the money invested.

Any industry in which capital does not earn a fair return of course attracts no capital. That industry must then, in course of time, disappear as its facilities wear out. Employment of labor then disappears also.

ACTION AWAITED WITH INTEREST

We, in California, await with great interest the action of the new commission. In this State, probably one and possibly two electric roads earned a fair return on capital invested the last year. These two owe their prosperity solely to war business activities. But 90 per cent of the invested capital in that industry in this State received less than 4 per cent and a good many millions none at all. And by invested capital is meant cash actually put in the properties.

Manchester Is Planning to Develop

IN VIEW of the town-planning scheme contemplated by the Corporation of Manchester, which provides for the construction of three new arterial roads upon the southern side of the city and the building of thousands of houses, the tramways committee is giving attention to the transport facilities which will be needed. The *Manchester Guardian* quotes J. M. McElroy, general manager, in regard to the present congested state of the main arteries of the city, owing to the increasing traffic. Parallel thoroughfares, he said, must be provided somehow, so that the flow of traffic to and from the proposed new residential districts might be frequent and efficient. With regard to the arterial roads in the town-planning scheme, Mr. McElroy pointed out that the proposal of the tramways committee was not to put down tram rails right away into virgin country. The motor omnibus would be the pioneer of the tramways. Builders, whether municipal or private, would not put up houses unless they were assured that rapid and cheap transport would be provided, and the ultimate proposal was to have cars running at a high speed upon a specially prepared track somewhat after the manner of an American interurban line.

"The government department," said Mr. McElroy, "recognizes very clearly now that the successful solution of the housing and town-planning problems must include adequate means of transport. The fact that the government has set up a Ministry of Transport shows that the importance of this matter is for the first time being properly recognized in this country. Proper transport has a vitalizing effect upon the whole community."

The Committee of One Hundred Begins Work

Now Is the Time for Unstinted Effort and Unlimited Co-operation to Prepare Electric Railway Case

THE Committee of 100, which was recently appointed by President Pardee to prepare and present the case of the electric railways before the newly created Federal Electric Railways Commission, held its first meeting in New York on June 26. It was the consensus of opinion that the opportunity presented by the creation of the federal body is one of which the industry should not fail to take advantage. Several subcommittees were appointed to work up the various aspects of the case.

Guy E. Tripp, chairman of the committee, after stating the purposes involved in the appointment of the Committee of 100, emphasized strongly the importance of the work and the responsibility of the individual members of the committee. In his opinion, the situation demands extraordinary effort on the part of every individual. President Pardee, P. H. Gadsden and other members of the committee spoke along similar lines and urged hearty support to the committee. In this connection, it was said that the association staff is already working up data, and some companies have offered to loan members of their staff for the furtherance of the committee's work.

The general executive committee consists of the chairman and vice-chairman. The sub-committees, whose personnel will be anounced later, will include a committee on publicity, a committee on presentation and a committee on recommendations. The committee on presentation will supervise the preparing and presenting of data, while the committee on recommendations will work up the concrete suggestions which to the electric railway industry seem to promise the best solution of its problems. Special attention will be given to the matter of publicity by the committee appointed for this purpose.

It is now thought that further hearings will be held by the Federal Electric Railways Commission in Washington at the rare of about two a week, but final plans in this respect have not yet been decided upon. The Committee of 100 expects to complete its work for presentation before the federal commission at the earliest possible date.

Contemplated Electrifications in Japan

According to a Japanese contemporary some important heavy electrification work will soon be undertaken in Japan. The work already decided upon comprises the following: Yokohama to Numazu, 67.4 miles; Ofuna to Yokosuka, 10 miles; Uyeno to Ohmiya, 16.6 miles; Ryogoku to Chiba, 22.7 miles, a total of 116.7 miles. The authorities plan to send engineers into nine provinces surrounding Tokyo in quest of promising water power sites. A part of steam roads entering Tokyo have already been electrified.

On the United Railways of St. Louis, the exhaust from the air-brake cylinders is piped into the flue pipe of the coal stove carried on the cars. In this way a better draft is secured, and as the company burns soft coal, the result has been very satisfactory to passengers.

Sewer Work Puts Extra Tax on Way Department in Brooklyn

Tracks Had to Be Removed and Temporary Routes Provided to Insure Minimum Interference with Passenger Traffic

THE expense incurred by electric railways due to sewer construction is a considerable factor in street railway operation and one which is not generally appreciated. These expenditures mount up to hundreds of thousands of dollars from which neither the railway nor the fare-paying public derives a benefit. In most sections the railways have assumed this burden in order that the flow of traffic may be interrupted as little as possible.

Two very extensive pieces of sewer construction have been taking place in the Borough of Brooklyn, New York, during the past five years. The first is what is known as the "Classon Avenue relief sewer," which was begun in 1913 and required five years to complete. The second is the "Ocean Avenue" sewer, which is now under construction from Avenue O to Sheepshead Bay, a distance of 2 miles. This work was begun in the summer of 1917 and is now about complete.

SEWER WORK IN PROGRESS, TEMPORARY TRACKS AND OVERHEAD WIRES INSTALLED AT SIDE

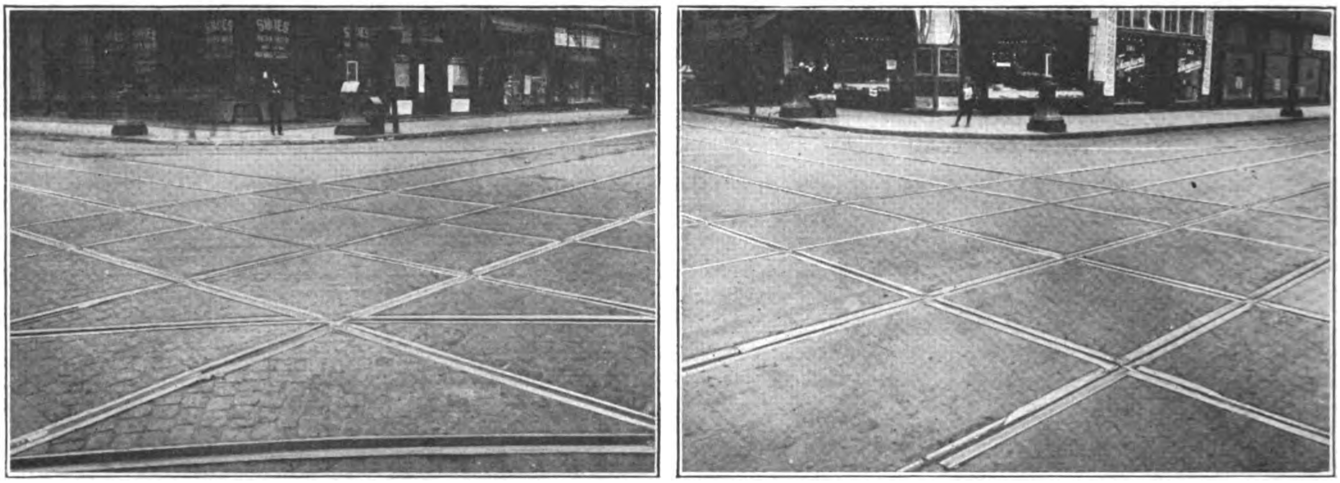
In size the main portions of the Classon Avenue sewer rival the dimensions of a subway tunnel large enough to accommodate railway trains. Many of the streets through which this sewer passes are occupied by surface and elevated lines of the Brooklyn Rapid Transit Company. An expenditure by the railway company of $228,000 has been necessary to care for and protect the tracks and overhead structures and to continue car operation without interruption during the long period occupied by the sewer work. The work done by the railways has included the reconstruction and underpinning of elevated railroad columns and foundations, the installation and removal of temporary tracks, the installation and removal of many portable crossovers, the entire removal of tracks and pavements from the streets in a number of places, the removal and replacement of overhead wires and poles, the purchase and installation of expensive special track work to provide switches and curves for rerouting of cars, and the replacement of tracks and pavements after the work was completed. The work on this sewer extended along or across tracks for a distance of about 4 miles and 2.27 miles of single track was removed and replaced on seven different streets in the course of the work. The cost to the railway company varied from $4.22 to $79.55 per lineal foot of street.

TEMPORARY DOUBLE TRACKS IN PLACE PREVIOUS TO REMOVAL OF MAIN TRACKS ON OCEAN AVENUE, BROOKLYN

During this construction there was a decrease in income on the lines affected of $300 per day and there was no apparent increase elsewhere to indicate that the traffic was being carried by either the elevated service or by other surface lines. The Tompkins Avenue line, though not on a business street, was discontinued and rerouted for two years. There also was one other line on a large sewer project which was without car service for one year and had only a single-track service for two years more.

For the construction of the Ocean Avenue sewer it was necessary that both tracks, approximately 4 miles of single track, be removed and temporary tracks built in the roadway alongside. Fortunately the street was wide enough to permit this. The method of doing the work together with the conditions encountered are suggested in the accompanying illustration. All of the track work was done without interruption to car traffic, as this line is one having a very heavy car service in the summer months. In addition to the removal of the tracks and the building of temporary tracks the original tracks had to be restored following the sewer work.

MAIN TRACKS REMOVED AND TEMPORARY SINGLE TRACK IN PLACE DURING CLASSON AVENUE SEWER CONSTRUCTION



SOME TYPICAL LAYOUTS WITH CONTINUOUS MANGANESE TYPE OF RISERS

This meant the reconstruction of 8 miles of single track to provide 2 miles of sewer work. Naturally the cost of so much track work was high and it is estimated that it will ultimately cost the company more than $40,000. Unfortunately, owing to war conditions, it was necessary to replace the old rails, when in a good many cases it would have been desirable to lay new rails if they had been obtainable.

Risers Increase Life of Frogs and Mates

Different Types of Construction Used by United Railways of St. Louis to Support Wheel Flanges at Crossings

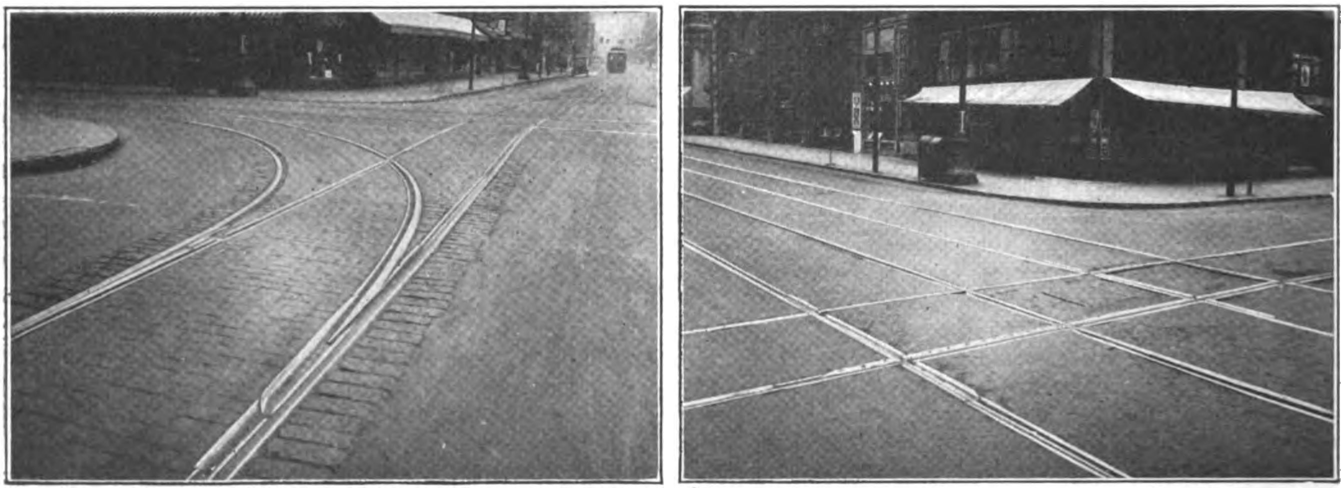
BY C. L. HAWKINS
Engineer, Maintenance of Way, United Railways Company of St. Louis, Mo.

SPECIAL steel risers placed in the rail flangeway of built-up frogs, crossings and mates to prolong the life of such pieces by supporting the wheel flanges at intersectons were in general use upon the tracks of the United Railways of St. Louis in 1904. At that time the risers were so placed that the distance from the top of the rail was equal to the depth of the wheel flange, but in December, 1905, the thickness of risers was increased ⅛ in. This change in construction increased the life of the frogs, as there was practically no wear on the rail at the receiving side of intersections until the upper ⅛ in. of the riser was worn out.

The risers were of intermittent type and were constructed of Black Diamond tool steel riveted or dovetailed into the rail flangeway. The rivets were driven vertically through the riser and the lower portion of the flangeway and when the risers were renewed the new risers were fastened to the rail by screws driven into the rivet holes, which had previously been tapped for the purpose. Wheel flanges passed directly over the countersunk heads of the rivets or screws, and where rivets were used the lower heads of the rivets were countersunk to prevent interference with the joint plates.

In 1910, manganese-steel risers were adopted and the use of tool-steel risers was discontinued. These risers were somewhat longer than the tool-steel risers and they provided more satisfactory approaches. They were attached to the flangeway in the same manner as the tool-steel risers and the wheel flanges were carried directly over the rivets as before. These risers were a substantial improvement over the tool-steel risers.

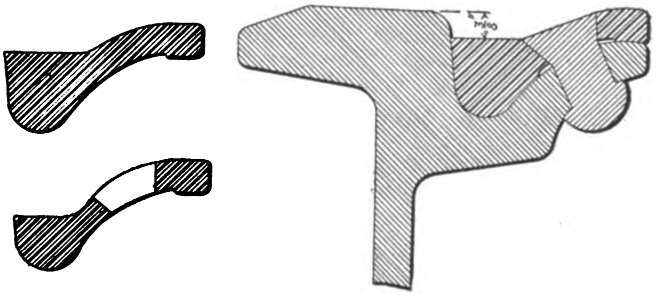
When solid manganese types of frogs, crossings and mates were adopted in 1911, the pieces were cast with raised flangeways or risers of the intermittent type, having approximately the same shape as the flangeways of the built-up pieces formerly protected with the renewable risers. The flangeways of frog points were



RENEWABLE RISERS AND BUILT UP MATES

½-in. deep for ⅝-in. wheel flanges. During 1915, however, the length of risers was increased so that continuous risers extending from one end of the crossing to the other were provided in a double-track crossing installed at Broadway and Washington Avenue. A number of crossings of a similar type were later installed at other locations. These crossings have given very satisfactory service and the additional expense of these changes has been justified.

On account of the excessive prices of solid manganese steel special work during the war period, a renewable continuous riser was adopted in September, 1916, for use on built-up crossings. The first crossings were laid at Seventh and Locust Streets and they are in use to-day. These risers were designed for use with 9-in. 132-lb. Lorain trilby rail, Section 440, and completely cover the flange and groove of the rail. They are attached to the rails by ½-in. standard button-head rivets, driven through the outer portion of the flangeway where they are untouched by wheel flanges. About 100 crossings provided with risers of this type have been installed, the number of locations being about fifty. Some trouble resulted from the use of ½-in. rivets for attaching the risers to the rails and the size of rivets was then increased to ¾-in. The results secured from these crossings have been satisfactory except at a few locations where the rivets have been sheared off and the manganese risers have disintegrated. As the cast manganese risers are rather rough castings, which require considerable grinding before they can be properly seated and surfaced, some of the disintegration can probably be charged to improper seating. By increasing the size of rivets to ¾-in. it is expected that this trouble will be overcome.



SECTIONS OF CONTINUOUS MANGANESE RISERS

The risers are designed for use in 90-deg. crossings, but by means of an oxy-acetylene torch the same risers can be shaped for use in crossings with intersection angles as sharp as 54-deg.

Built-up mates protected with the continuous riser type of construction have given very good service and have greatly reduced the cost of mates used on the lighter lines. The risers are strong enough to assist in tying the rails and the mate together, and have been much more satisfactory than the tool-steel risers used in bolted mates where the risers were so soft that the metal was "squashed" out and acted as a wedge to pry loose the short rail in the built-up mate. About twenty-five built-up mates with continuous manganese-type risers are in use to-day, the first of which was laid at a heavy intersection at Sixth and Locust Streets on July 8, 1918. These mates are especially for use at locations where the heavy run is the straight run.

The accompanying photographs show typical layouts with continuous manganese-type risers.

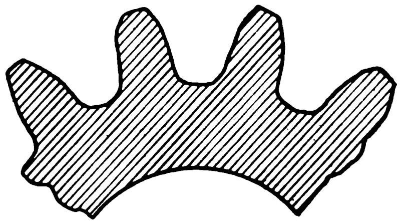
The chilled cast-iron wheels used by the United Railways are equipped with heavy flanges, and only a small portion of the chipping of flanges has been charged to the use of the risers in frogs, crossings and mates.

Shop Notes from Croydon

IN ACCORDANCE with the usual British practice, all wheels used by the Croydon Corporation Tramways, of which T. B. Goodyer is manager, are of the steel-tired variety. They are of 31¾-in. diameter new and the tires are permitted to wear from their original thickness of 2¼ in to a minimum of ⅝ in. The tires as delivered hitherto have given a life ranging from 85,000 to 112,000 miles. Mr. Goodyer, however, was just as prompt in applying to wheel tires the "sorbitic" process of "hardening in place" as he was to rails, and twelve tires were so hardened during the fall of 1918. It is, of course, too soon to draw any conclusions from this experiment, but the process is inexpensive and has already shown happy results in prolonging the life of the track.

Although the Corporation Tramways operate surface cars only and at moderate speeds, Mr. Goodyer uses Cincinnati tool-steel gears and pinions; he was, in fact, the first British operator to use gears and pinions of this kind. The condition of the first pinion, installed on June 27, 1913, as it appeared on Nov. 8, 1917, is shown in the accompanying drawing. At that time this pinion, operating on a GE-52 motor, had run 103,641 miles. It showed on the pitch line a wear of but 0.023 in., or the equivalent of 4506 miles per 0.001 in. At this rate of wear, which has been consistently maintained since the foregoing measurements were made, these pinions will be good from ten to fifteen years.

As for the gears of the same type, they are wearing so slowly that their useful life is figured to approximate a century! Gears of other manufacturers in the same service have never done better than 41,000 miles. The use of split gears is standard in Croydon. Mr. Goodyer believes that what is best is cheapest in the long run, and especially on account of the great war shortage, it was desirable to have pinions, gears and other equipment that could be relied upon to wear safely and long.



CROYDEN GEAR TOOTH PROFILE AFTER GEAR HAD GIVEN MILEAGE OF 103,641

Another Croydon shop practice of interest is the use of oil spindles in place of graphite bushings in the trolley wheels. These wheels are 4 in. in diameter in accordance with the practice of many other British roads. The graphite spindles were not found to be good enough, owing to the excessive side reach of the trolley poles, necessitating the use of from 29 lb. to 30 lb. tension. Another item is in the use of locknuts, as on brake suspensions and motor-case bolts, a little item in which Croydon is ahead of many American lines. The locknuts used are not considered perfect, but they are far better than the ordinary fastenings which soon work loose under vibration. Renewable controller contact fingers, as made by the White Engineering Supplies Company, are used also, affording another evidence of the local attention to economy and reliability in small as well as large portions of car equipment.

AMERICAN ASSOCIATION NEWS

Director of Exhibits Appointed

GEORGE W. WELLS, recently with the Engineering Department of the Bureau of Industrial Housing and Transportation, has been appointed Director of Exhibits of the October convention and will have charge, under the Exhibit Committee, of all details of the exhibits. Mr. Wells for a number of years was manager of the electric lighting and street railway system in Tampa, Fla. He was also superintendent of the mechanical department of the West Penn Railways and president and manager of the Wells Mills Electric Company, which operated among the mills and mines of western Pennsylvania and West Virginia.

Secretary Burritt announced on Thursday that applications had been received for about 34,000 sq. ft. of space, or more than half of the space probably available. This insures the success of the exhibit feature of the convention.

Revision of Electric Railway Fire Code Rules Under Way

THE standing committee of the Electrical Committee of the National Fire Protection Association on cars and railways has under consideration the revision of the requirements of the National Electric Code on wiring of carhouses. In addition to this review attention will be given to the question of formulating rules applicable to railway systems and cars operating at voltages from 600 to 1500 volts. Two special committees of the American Electric Railway Engineering Association are co-operating in this work.

Any person having suggestions or recommendations on the Code rules covering these subjects is invited to communicate with the chairman of the standing committee, Martin Schreiber, Public Service Railway, Newark, N. J.

Engineering Standards Committee Appointed

SECRETARY BURRITT has announced the personnel of the standards committee of the Engineering Association for the current year, as follows: H. H. Adams, superintendent of shops and equipment Chicago Surface Lines, chairman; E. J. Blair, electrical engineer Metropolitan West Side Elevated Railway, Chicago; E. R. Hill, Gibbs & Hill, New York City; C. G. Keen, engineer way and structures American Railways, Philadelphia; John Leisenring, signal engineer Illinois Traction System, Springfield; John Lindall, superintendent of rolling stock and shops Boston Elevated Railway; Norman Litchfield, mechanical engineer American Car & Foundry Company, New York City; H. H. Norris, ELECTRIC RAILWAY JOURNAL, New York City; E. D. Priest, engineering department General Electric Company, Schenectady, N. Y.; Martin Schreiber, chief engineer Public Service Railway, Newark, N. J.; W. C. Starkey, chief engineer Ohio Brass Company, Mansfield, Ohio; A. B. Stitzer, chief engineer Republic Engineers, Inc., New York City; N. W. Storer, general engineer Westinghouse Electric & Manufacturing Company, E. Pittsburgh, Pa.; Robert C. Taylor, superintendent of equipment Michigan Railway, Albion, Mich.; E. B. Trist, Carnegie Steel Company, Pittsburgh, Pa.

Toledo Section Elects Officers

THE annual election of the Toledo joint company section, held on June 9, resulted in the choice of M. H. Somerville for chairman, P. J. O'Neill, Jr., for vice-chairman, W. M. Bergen for secretary, Harry Fowler for financial secretary, and Del. Miller for treasurer. Nine members of the executive council were also selected. An entertainment program was given after the election.

Chicago Section Closes Season

THE final meeting of the section year was devoted by the Chicago Elevated Railways section entirely to entertainment, principally music. It was held on June 17, with seventy-five members present.

LETTER TO THE EDITORS

The Safety Car and the Skip Stop

TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY, TERRE HAUTE DIVISION
TERRE HAUTE, IND., June 23, 1919.

To the Editors:

I read with interest your editorial in the current number of the ELECTRIC RAILWAY JOURNAL, discussing the safety car in connection with the skip stop.

At the time we commenced operating safety cars in our city, we were operating skip stops at the request of the United States Fuel Administration, transmitted to us through the local Fuel Administrator for this county. Just prior to installing safety car service, we advised the County Fuel Administrator, at whose request we had put into effect the skip stop, that coincident with the commencement of safety car operation on our lines we would abolish the skip stop, for the reason that the safety car would save much more power than it was ever hoped to save by skip stops with the larger and heavier types of cars which the safety cars superseded.

Anyone who has had much experience with the jitney bus as a competitor will, I feel sure, readily admit that the "skip stop" is a very fine thing—for the jitney bus

E. M. WALKER, General Manager.

The Birmingham Railway, Light & Power Company, Birmingham, Ala., has started operating its new brass foundry. From now on, brass parts necessary for replacements and for the repair of cars will be cast in the company's own shop. The company has an iron foundry which is equipped to make any necessary emergency castings. The first lot of brakeshoes to be made since the foundry has been in operation were cast recently.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Massachusetts Strike Over

Threat of President Mahon of Amalgamated to Annul Union Charter Ends Walkout of 3500 Men

The strike on the Eastern Massachusetts Street Railway, which began June 16 on the Lowell division and spread to most of the lines north of Boston last Sunday, ended on June 25 as a result of the threat of W. D. Mahon, president of the Amalgamated Association, to annul the charters of the unions involved in the walkout unless the men returned to work on that day. About 3500 carmen were involved. The strike originated in a protest of the Lowell employees against the use of the Rooke fare register on open cars.

On Jan. 8 last some 450 Rooke registers were installed on cars operated by the Bay State Street Railway, the predecessor of the Eastern Massachusetts Street Railway. Additional stocks of registers have since been added until now there are about 750 in use, and there had been no interruption in their use until the strike of the Lowell conductors based on their claim that the use of these registers on open cars was unsafe. In reply the trustees of the company insisted that the registers could be used with safety on open cars, and said that those originally installed by Receiver Donham had proved very satisfactory and hence had been continued.

Union officials ordered the matter to be submitted to arbitration, but the men refused to obey their orders. On the lines south of Boston car service was well maintained except on the Quincy division, where the local union struck in sympathy with the men on the northern lines. In his appeal to the men Mr. Mahon pointed out the loss in death, disability and old-age benefits, which would be sacrificed if the men persisted in defying the officials of the union.

Industrial conditions in northern Massachusetts were greatly upset by the strike. The trustees of the company did not attempt to operate the divisions involved during the walkout, but offered to reinstate all strikers who returned to their work on Wednesday morning.

As the Union Sees It

A recent issue of the *Union Leader*, the official organ of the Amalgamated Association in Chicago, has an editorial in reference to the new federal electric railway commission. In this it says:

> Wherever the trouble lies in the electric railway business the cause should be located and the remedy applied. In its present condition securities are shrinking, service is suffering and the employees are bearing more than their share of the load.
>
> Unlike the steam railroads, which were taken over by the government as a war measure and guaranteed a fixed return on present capitalization—real and intangible—the electric railways have had to meet the continuously rising costs and weather the storm the best they could, without any assistance from the government, though they were virtually compelled to accept cost determinations by a government agency on the biggest item of expense in their business. Bad as the financial organization and methods of some of the electric railways are reputed to be, they cannot be compared with the steam railroads in financial jugglery, the history of which spells scandal and is common knowledge.
>
> Placing the electric railway industry on a sound business basis will not only promote the development of the nation, but prove beneficial to all factors in the business—security holders, public and employees.

Illinois Utilities Plan Campaign

Public utility managers and operators of Illinois held a meeting in Springfield, Ill., on June 13 and laid plans for closer co-ordination of effort in placing the after-the-war case of the industry, as a whole, before the public. To bring about a better understanding of the situation which the electric railway, electric light and power and the telephone and gas companies face, in common with all other lines of business, due to the high cost of materials and labor, managers of all utility companies operating in the various towns and cities of Illinois are to organize to unify their efforts.

Acting through the Illinois committee on public utility information, which is operating under the auspices of the Illinois Electric Railways Association, Illinois Electric Association and the Illinois Gas Association, a program is to be carried on fully to inform the citizens of the State as to the situation of the industry. It was pointed out at the meeting that unless the $1,000,000,000 investment of the utility industry in Illinois is fairly treated and a better understanding of its position brought about, much injury can be wrought, and the services rendered by these companies disrupted. Speakers at the meeting declared that the ramifications of the industry in the State were such that fully one-third of all citizens, directly or indirectly, now have a financial interest in the companies, either as wage earners, security holders or through collateral industries dependent upon the utilities. Of the total of all citizens, 16 per cent are in the employ of the electric, gas, telephone, water and electric railroads. It was particularly insisted that a better understanding be created because of the need for the investment of $450,000,000 of additional capital by the utilities in the State within the next five years.

Seattle Branching Out

Municipal Ownership in Pacific Coast City Growing by What It Feeds Upon

Preliminary steps are being taken by the city of Seattle, Wash., toward opening negotiations for the purchase of the Seattle & Rainier Valley Railroad, including the interurban lines from Seattle to Renton. The utilities committee of the City Council has under consideration a report by Thomas F. Murphine, superintendent of utilities, based on reports by the State Public Service Commission and investigations by the Seattle utilities department, in which Mr. Murphine gives the original production cost of the system as $1,347,498.

OFFER IS REALLY A RENEWAL

Mr. Murphine estimates that under favorable conditions, which the city has authority to assure, the Rainier Valley lines could be operated at a profit on a 5-cent fare. The value to the municipal system of the company's Fourth Avenue tracks is inestimable.

When negotiations for the purchase of the property of the Puget Sound Traction, Light & Power Company were pending, owners of the Seattle & Rainier Valley lines offered that property to the city for $1,800,000. The price was considered too high, and the matter was dropped temporarily. When the Public Service Commission gave the company authority to increase the fares from 5 to 7 cents, the matter again became a live issue, following the petition of the residents of that district for the city to purchase the line.

ESTIMATED WORTH, $1,347,498

While estimating the original cost of the present system at $1.347,498, Mr. Murphine calls attention to a heavy depreciation in the value of the rolling stock, tracks and overhead system. It is claimed that the rolling stock, which originally cost $319,964, would require the immediate expenditure of $100,000 to put it in good condition. The overhead system is said to be worth no more than 50 per cent of the cost of a new system. Tracks are reported to be in such condition as to require the expenditure annually for five years of an amount double the sum spent by the company annually for maintenance.

Authority to extend the operation of municipally owned transportation lines for a distance of 8 miles outside the city limits is provided in a bill passed by the last Legislature. This bill was passed with the understanding that the city would purchase the Rainier lines.

Pittsburgh Arbitration Details

Company There Lost 12,052,011 Passengers in Eleven Months Under Five-Seven Cent Fare

The hearing in the arbitration of the wages of the employees of the Pittsburgh (Pa.) Railways, to which brief reference was made in the ELECTRIC RAILWAY JOURNAL for June 21, developed some very interesting points. One of the most significant bits of information brought out was that the valuation of the properties of the railway, which has been under way for months, is expected to be completed before July 1 and that financial interests are now investigating to ascertain what help is needed to put the company in proper condition. The valuation is being made by a joint commission comprising representatives of the company, the city of Pittsburgh and the Public Service Commission.

AUDITOR'S STATEMENT INTERESTING

Testimony offered by witnesses for the receivers the second day of the hearing, particularly that of J. A. Mead, auditor of the company, was replete with interest. Mr. Mead submitted several sets of figures illustrative of the effect of fare increases upon revenue, and showing the condition and financial history of the company.

Mr. Mead declared that no one could operate the lines of the company at a reasonable profit based upon their value. He said that not a dollar had been paid in dividends upon the stock of the Pittsburgh Railways since the organization of the company in 1902. When asked if the system could be operated profitably if the valuation were cut 50 per cent, Mr. Mead declined to commit himself further than to say that under certain conditions there might be a surplus over fixed charges.

According to Mr. Mead for every dollar of the $1,500,000 the company now has in cash there were claims for $7, aside from the claims of the city. The company was now using up its capital, by reason of not being able to keep up repairs.

AVERAGE FARE 6.23 CENTS

When the company increased fares from 5 cents to 5 and 7 cents, the proportion of riders at each rate worked out in such a way as to make the average fare 6.23 cents, an increase of about 25 per cent. The number of passengers carried, however, fell off 12,052,011 in eleven months. This factor reduced the revenue increase to a little more than 13 per cent.

There was doubt whether even a fare increase would serve to make a wage raise possible, counsel for the receivers declared J. M. Loftis, superintendent of transportation, on the stand, produced a list of railroad stations accommodating territory in which street cars would be unable to compete with the steam lines were fares still further increased. It was shown that at best a higher fare would have to be imposed by areas, with constant consideration for steam railroad competition. Short rides in territory not traversed by steam lines would have to be made more costly than long rides in railroad-served districts.

Witnesses from the employment office of the company testified that there was no labor shortage in Pittsburgh now, and that the company was having no difficulty in keeping its force of 3000 platform men recruited at present wages.

P. N. Jones, general manager of the Pittsburgh Railways, said that every 1-cent increase in wages added about $85,000 to the expenses of the company and that the 12-cent increase asked by the men would cost about $2,000,000 annually, because it would necessitate raises for other than platform employees.

W. D. George, receiver, declared that the receivers felt the receivership "would be broken down if an increase in wages became necessary." C. A. Fagan, receiver, testified that interest and rentals have not been paid for months, that taxes were being defaulted and that the company was unable at present to meet many ordinary operating expenses.

The case presented by counsel for the employees the first day of the hearing was based principally upon the outcome of the Detroit wage dispute and increased living costs. Witnesses testified that rentals in Pittsburgh had gone up 25 per cent in the last year and that other costs correspond. P. J. Ward, business agent of the local union, said that car men working at the present maximum rate of 48 cents an hour, nine hours a day and seven days a week, made $133 a month. Wages being paid workers in the building trades were submitted as a basis of comparison. Counsel for the receivers in cross-examination, brought out the difference in the class of labor involved, especially the difference in the time invested by the building worker to learn his trade.

Developments in St. Louis

President McCulloch Charged with Complicity in Referendum Theft, but Issues Denial

On June 23, Richard McCulloch, president of the United Railways, St. Louis, Mo., handed his resignation as manager to the receiver to Rolla Wells, receiver of the company, after a warrant had been issued by Circuit Attorney McDaniels, charging him with burglary in connection with the theft of the now famous referendum petitions a year ago.

At the same time Bruce Cameron, superintendent of transportation, who for some time has been under indictment on a charge of burglary in the second degree in connection with the same theft, also sent his resignation to Receiver Wells. The latter accepted both resignations and then issued a formal statement announcing that he did so not because he had prejudged the charges made against Mr. McCulloch and Mr. Cameron, but "merely because the iteration of these charges has impaired the efficiency of these gentlemen to perform their respective functions. The determination of the truth or falsity of these charges must rest with the proper judicial forum."

Upon hearing that a warrant for his arrest had been issued, Mr. McCulloch appeared before Judge Krueger in the Court of Criminal Correction, waived reading of the information and pleaded not guilty. A hearing on the charge was set for July 7 and Mr. McCulloch's bond was fixed at $2,500. On the previous Saturday Mr. McCulloch had issued a written denial of the charge that he planned, ordered and directed the theft of the referendum petitions which was made on the witness stand before Special Master Lamm by Julius C. Jackson, former special agent of the company, and James F. Brady, at present confidential agent in the claim department of the United Railways.

The statement issued by Mr. McCulloch follows:

> I have read the statements published in the press, purporting to have been made by Julius Caesar Jackson and James F. Brady as witnesses in the hearing before Judge Lamm as special master. These alleged statements, so far as they relate to anything I am alleged to have said or done with respect to the referendum petitions, are unqualifiedly false.
>
> I did not suggest, direct, authorize or countenance the taking of the referendum petitions by Jackson or anyone else. I have never had any conversation with Jackson or anyone else concerning that matter, and had no knowledge that Jackson or anyone else entertained any such plans. I never had any meetings with Jackson, either at the company's office or anywhere else, and never at any time gave him any instructions, either directly or indirectly, on any matter whatever; indeed, I do not remember ever having seen him but once, which was long prior to the time that the referendum petitions were being circulated.
>
> I did not give any money to Brady to take to Jackson, or authorize or direct him to go to see Jackson or carry or convey any message to him.
>
> I do not intend to go into detail with respect to the various statements made by either Jackson or Brady, except to say that I had nothing whatever to do with the matters mentioned by them.
>
> The fact that both Brady and Jackson told a different story before the Grand Jury which investigated this matter last summer than the story they now tell should of itself convince anyone that their statements are not to be relied upon.

Both Mr. McCulloch and Mr. Cameron had been with the electric railway system of St. Louis for many years, the former since 1893 and the latter since 1900.

Following issuance of the warrant against Mr. McCulloch, Circuit Attorney McDaniels announced that the grand jury would immediately undertake a new investigation of the petitions theft and that among the first witnesses subpoenaed were Jackson, Brady, George W. Baumhoff, former manager of the old St. Louis Transit Company, and Ephrim Caplan, counsel for John W. Seaman in the receivership suit against the United Railways directorate. Mr. Baumhoff on the witness stand also had linked Mr. McCulloch with the plans for the theft of petitions.

Other important developments in the hearings were the following:

Announcement by Special Master Lamm that he probably would not come to a decision in the Seaman suit for a receivership until next fall.

Announcement by Charles W. Bates, attorney for the receiver, on the witness stand that the receiver had ordered discontinued the payment of $1,000 monthly to the North American Company as "fiscal agents" of the United Railways which had been made prior to the appointment of a receiver.

Testimony by David R. Francis, Jr., a former director of the United Railways, that James A. Hooke, director of public utilities for the city of St. Louis, was one of the men who had advised him that the power contracts of the railway with the Union Electric Company, St. Louis, should be approved. The plaintiffs had charged that these contracts were instances of mismanagement on the part of the directors.

Testimony of John I. Beggs, director of the United Railways, that power contracts made by the railway in 1908 were instances of economy as it would have cost $5,000,000 to build plants for making at St. Louis the power brought from Keokuk and that the company could not raise such an amount. The plaintiffs had cited the 1908 contracts as other instances of mismanagement.

Council Acts on Detroit Matters

City Body at Odds with Commission on Referendum, but Approves Railway Agreement—Wage Scale Restated

On June 20 the City Council of Detroit, Mich., voted to postpone indefinitely consideration of a plan for a postcard referendum on the railway question as formulated by the Street Railway Commission, voted to continue the present working agreement with the Detroit United Railway in force until a subway car can be built, and appointed the city's arbitrator with an alternate to act in case the first named declined the appointment.

COUNCIL ACTS PROMPTLY

This action was taken during the absence of Mayor Couzens from the Council chamber. In the opinion of the Mayor the Council acted in too great haste and without considering a greater list of possibilities before appointing James S. Holden and William H. Maybury as arbitrator and alternate. The action taken, however, has been commended by prominent citizens as the most constructive step toward the settlement of Detroit's transportation difficulties in a long time.

At the meeting on June 23 two Councilmen reversed their opinions and held out for further consideration of the matter, thus upholding Mayor Couzens, and as a result the resolution of June 20, originated by Councilman John C. Lodge, was not reported out. Although nearly half of the time named in Judge Marschner's court order has elapsed without an arbitrator being decided upon, one Councilman argued that there was no particular hurry as the railway had not appointed an arbitrator and that the representative of the company should be appointed first.

An amendment providing that the three propositions embraced in the Lodge resolution, the Rapid Transit system, the appointment of an arbitrator and the agreement with the Detroit United Railway Company, should be voted on separately, also failed to pass.

The agreement which Councilman Lodge proposed be drawn up provided that the board of arbitration called for in Judge Marschner's court order be made a continuous body to fix fares annually and was objected to on the ground that it tied the city up with the railway for an indefinite period of time.

Councilman Bradley's new resolution proposing that the board of arbitration shall exist only during the period named in the court order—nine months—and not for an indefinite period as contemplated in the orginal resolution. failed to pass by a tie vote of four to four at the meeting on June 24.

Abner E. Larned, president of the Street Railway Commission, asked the Council for a joint meeting at which New York subway experts could speak on the proper policy to be maintained between the surface and rapid transit lines. This request will probably meet with approval.

SIXTY CENTS IS MAXIMUM

Service has been resumed on all lines, the only difference from conditions before the strike being the absence of workingmen's tickets and the tickets on the 3-cent lines. The use of these tickets ended on June 21.

The employees of the Detroit United Railway are now excluded from the railway controversy and are apparently satisfied with thier new rate of pay. They are paid 50 cents an hour for the first three months, 55 cents an hour for the next nine months, and 60 cents an hour thereafter, instead of 65 cents an hour after one year's service, as was originally stated.

Apparently the Mayor had made up his mind in advance that he would consent to no fare in excess of 5 cents and when the city's investigators, including Barclay Parsons & Klapp, made their detailed reports these were not made public or furnished to the railway. It is believed that had these been published they would have clearly shown that the depreciation allowance finally presented by the accountants, not engineers, were not sufficient. As a matter of fact the company's depreciation charges, or rather estimates were cut for no other purpose than to make it appear that the business could be conducted at a profit on the 5-cent fare. Depreciation was based practically upon the allowance of the company last year, not upon the actual requirements, although President Brooks of the railway had frankly told the city that because of low fares money that should have gone to depreciation had to be used for wages and to meet operating expenses of like nature.

The *Free Press* of June 19 published an editorial under the caption "City Wants Service," which would seem to indicate a change in sentiment among office holders. That paper said in part:

> If the Common Council as a whole is swinging around to the view of the street car question indicated in the letter written by President John C. Lodge to George H. Barbour, it is taking a course that promises solid benefit to Detroit, a course that ought to meet with thoughful public approval.
>
> The Detroit United Railway as a political issue is worn out. The people are heartily tired of the once popular game of "baiting the company," for indulgence in that pastime has brought no benefit, except to politicians, and it has cost Detroit a great deal of money and has hampered progress. Detroit has always been the "goat."
>
> What the residents of this community of a million want now, is reasonable co-operation with the railway by the city government, and in return decent treatment and reasonable service from the company. They made this clear throughout the period of the recent street car strike.
>
> The talk about throwing the company off the streets is nonsensical. The project for a $10,000,000 bond issue for piecemeal building of municipal lines with which to carry on a long drawn-out fight against the railway is impractical and lacks the true constructive element. It savors of spite and Detroit has grown too big to induge in such pettiness. The council ought at once to rescind the bonding resolution it passed under pressure and in a moment of hysteria. Failure to rescind will necessitate a special election that will be an imposition on the patience and pocketbook of the public.

Muskogee Strike Unsettled

The strike of motormen and conductors of the Muskogee (Okla.) Traction Company, which was thought to have been settled two weeks ago, is still unsettled. The company agreed to most of the conditions submitted by the striking trainmen and an agreement was reached for the settlement of the trouble, but when the agreement was placed before the labor council its ratification was refused. The traction company thereupon attempted to operate cars, but strikers stoned the cars and rendered their operation without armed guards impossible.

Owners of the railway have come to Muskogee in an effort to bring the opposing factions together and effect a settlement of the strike. Conferences will be held with the striking trainmen in an effort to reach a temporary agreement under which cars may be kept running while minor differences are threshed out.

Municipal Men Want Raise

Superintendent of Seattle Lines Announces His Opposition to Recently-Formulated Request

Proposing increases in the wage of trainmen and shopmen of the Seattle (Wash.) Municipal Railway amounting to about $1,000,000 a year, representatives of the union have filed with Thomas F. Murphine, superintendent, a new wage scale which the City Council will be asked to make effective, beginning on Aug. 1.

Mr. Murphine has advised the union representatives that he cannot recommend the proposed increase to the City Council, stating that it would be impossible to get the money for the advance asked. In a letter to the trainmen he states that while it is true that an increase of 1 cent in the fare would mean $1,000,000 more a year if everybody now riding would continue to ride, the experience of other cities shows that 20 per cent increase in fares has brought only 10 per cent increase in revenues.

Detailed estimates of the effects of the proposed wage advance on the operating expense of the different departments, show an increase in operating expenses of $751,773 in the transportation division; $108,628 in the road division, and $98,763 in the shop division. With other items of cost, these estimates aggregate more than $1,000,000.

A $6-Day Asked

The proposed schedule provides for a wage of $5.50 for conductors and motormen during the first six months service, and $6 a day thereafter, operators of one-man cars and gripmen on cable cars receiving an additional 50 cents a day. When the city took over the lines on April 1, trainmen were being paid 46, 48 and 50 cents an hour. The wage was immediately raised to $4.25, $4.50 and $4.75 a day, the present scale. Operators of one-man cars and cable cars received an additional 5 cents an hour. Under the new schedule, extra men would be guaranteed a monthly wage of $110 instead of $90, as at present; trainmen breaking in students would be paid $1 a day additional instead of 25 cents now paid; all trainmen would be required to take one day off in every eight days; and time and a half would be allowed for Sundays and holidays.

The new schedule further provides an eight-hour day; that employees in the train service working regular runs shall be guaranteed not less than eight hours for each day's work, with the exception of Sunday. Runs of seven hours or more are to be considered regular runs. Time and a half is to be paid for all work in excess of 8½ hours. Fifteen-day vacation is also asked. Substantial advances in the pay of shopmen are also requested. In his letter to the men Mr. Murphine said, in part:

> We shall not enter into a discussion of the merits of this proposed increase, nor of the cost of living, but shall confine our statement to the question of where the money is coming from to pay such increase.
>
> At the present time the amount derived from a 5-cent fare is sufficient to meet operating and other expenses such as interest, bond retirement, etc. If all passengers now riding were to pay an additional 1-cent fare it would mean an increase in revenue of approximately $1,000,000 a year, but experience in other cities has shown that the law of diminishing returns operates as soon as the fare is raised, so that a 20 per cent increase in fare in very few instances has increased the gross receipts more than 10 per cent, and any corresponding increase shows correspondingly diminishing returns.
>
> We do not believe that any fare charged at this time would bring in $1,000,000 additional revenue, and in order to pay this additional amount it would be necessary for the railway department to receive a subsidy or bonus from somewhere. As this is a matter that would require an entire change in policy in the operation of the city railway and is a matter primarily for the legislative body of the city, we at this time express no opinion.
>
> We answer your question in regard to the proposed increase negatively. We shall not recommend the same to the City Council.
>
> As you know, our only means of revenue is the fare obtained from passengers, which has been established and it has been the aim of this department to maintain it at 5 cents. The fact, we believe, of maintaining a 5-cent fare was the controlling factor of the purchase by the city of the railway system formerly owned by the Puget Sound Traction, Light & Power Company.

Strike in Manila

A strike on the part of the employees of the Manila Electric Railroad & Light Company, at Manila, P. I., has been in progress during the past three weeks. The power plant workers were the first to go out. They were followed by about one-half of the trainmen and part of the shop and carhouse force.

During the early part of the disturbance 50 per cent of the regular cars were successfully operated under local police protection. Later on Acting Governor General Charles E. Yeater placed a detachment of the constabulary force of the Islands on duty in Manila as a precautionary measure against any possible trouble. Following this action the full regular car service was put on and has been effectually maintained since. Power house operation has been continuous, the work being handled by recruits from other departments.

There have been only slight evidences of violence, as the authorities have been watchful and have succeeded in suppressing any serious disturbance. The company's property has not suffered any damage.

No demands or grievances were presented by the employees to the company. The strike was put into effect without warning on advice of political labor agitators, whom the company refused to recognize. The general public and the press are unqualifiedly supporting the company in the position taken by it. Indications point to an early cessation to the strike as it is not meeting with the success anticipated.

This strike of the employees of the railway and light company is a reflection of the general labor unrest that has been in evidence in Manila recently, which made its appearance in the form of strikes on the part of dock workers and cigar makers.

Rhode Island Men Ask More

Want War Labor Board to Reopen Case in Which They Were Granted Increase Last July

The demand of the employees of the Rhode Island Company, Providence, R. I., for an increase in wages amounting to 62 per cent, which threatened to result in a strike, culminated in the union officials applying to the National War Labor Board for a decision in the case. This action was taken after the receivers of the Rhode Island Company had flatly refused to consider any demands for an increase in wages, insisting that the condition of the company financially precluded the possibility of an increase being granted. The receivers also refused to submit the subject to arbitration, stating that they were merely acting under orders of the Superior Court of Rhode Island and had no authority to resort to arbitration.

The National War Labor Board set June 23 as the date of the hearing, and on that day Examiner Charlton Ogburn of the board heard the attorney for the employees at a hearing in the City Hall, New York City. John J. Fitzgerald, attorney for the men, insisted upon a reopening of the case against the Rhode Island Company, a decision in which had been rendered last October. Examiner Ogburn expressed a doubt as to the authority of the War Board to reopen the case inasmuch as the case originally was against the Rhode Island Company whereas the property is at present being operated by receivers. Mr. Ogburn stated that he would forward the testimony with his recommendations to the War Board.

The receivers of the Rhode Island Company were not represented at the hearing, claiming that they had not been invited and expressing the opinion, further, that had an invitation been received they doubted their authority to appear without specific instructions from the court.

In the meantime, the employees have stated that there will be no strike pending the decision of the War Labor Board.

Windsor Wages Adjusted

Employees of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., have accepted the terms suggested by the Ontario Railway Board. The board acting on the findings of the auditors who examined the financial status of the company, recommended the wage increase demanded by the men, and the 5-cent fare rate asked by the company.

The minimum wage provided is 40 cents an hour with a maximum of 50 cents and provides for 20 cents extra an hour for overtime. Formerly 6 cents extra an hour was paid for overtime.

Although Mayor Winter was hopeful that the border system would be purchased by the city and operated by the

Ontario Hydro-Electric Commission, negotiations which have been pending for about a year appear to be halted by the action of the Councils of Windsor and Walkerville in allowing the by-law to go to a vote of the people.

Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission, is quoted as saying that the vote on increased fares to be taken on July 5, makes more valuable the franchises now held by the railway. Mayor Winter claime that the by-law if passed by the people will be binding for only one year and that the border cities are willing to hear any proposition the commission cares to make concerning the purchase of the lines before July 5.

Railway Will Operate Buses

The Public Service Commission of Massachusetts has approved the petition of the Connecticut Valley Street Railway, Greenfield, Mass, to acquire and operate motor vehicles for the transportation of passengers between Greenfield and Montague. As explained previously in the ELECTRIC RAILWAY JOURNAL the proposed new service will be in addition to and will supplement the company's present car service. The rate of fare on the buses will correspond with the rate at present in effect on the cars of the railway, a minimum fare of 6 cents with a rate of 3 cents per mile. The company looks forward to this service as a means of preserving to the railway its legitimate business between these two points.

A Tidbit

Here is delicious bit of verbal horseplay from a daily newspaper editorial:

> Of course, we know we're just an ordinary darn fool, with no knowledge of big business and no experience in handling large sums of money. Nobody credits us with having money or expects us to know anything about it, and in both instances the guess is good. We haven't and we don't.
>
> But being an ordinary darn fool, we've got the hunch that since a lot of other darn fools, ordinary and fancy, have tackled the street car problem and messed it up, we've a right to offer a solution.
>
> The other day, while playing golf we gave considerable thought to the local transportation problem, and its present pitiable plight. We dubbed several shots in consequence, but we are glad to make that sacrifice for the public welfare. We have several methods whereby the local railway may be driven off our streets forever; not just temporarily, but forever!
>
> First, if everybody, for the glorious good name of the city will agree to walk to work, there will be no need of street cars. All the workmen will have to do is to get up two or three hours earlier in the morning and set their evening meal two or three hours later in the day, and the trick is done. Why pay an extra cent for a transfer, when you can walk 8 miles and change from the shady to the sunny side of the street as often as you wish, without charge?
>
> But it occurs to us that there may be many weak-kneed, spineless, subservient and timid citizens, willing for the sake of their own comfort and convenience to knuckle down to the local railway and actually ride on its trolley cars if they have the opportunity. Shame on them for their lack of devotion to a high ideal and their city's welfare. Cowards and poltroons are they who must have trolley transportation to their daily toil! Why, we wonder, were they given legs and feet?
>
> For them, however, we have a splendid plan. We shall have no more dickerings with the railway. We shall establish an airship system.

News Notes

Youngstown May Increase Operating Allowance.—Following a request from the Mahoning & Shenango Railway & Light Company for an increase in operating allowance from 22 to 31 cents a mile, Street Railway Commissioner W. L. Sause, of Youngstown, Ohio, has recommended an increase to 27 cents.

Lake Shore Men Granted an Increase.—Employees of the Lake Shore Electric Railway, Cleveland, Ohio, were granted an increase in wages on June 5. Those on the interurban line will receive an advance of 3 cents an hour and those on local lines, 2 cents an hour. The new schedule becomes effective at once.

Reno Men Want More.—An increase in wages from a basic pay of 28 cents an hour to 40 cents an hour and a ten-hour day, with time and a half for overtime, are demanded by the trainmen of the Reno (Nev.) Traction Company in a petition handed Manager R. C. Leeper by a committee of the men. The shopmen and the road men have handed in a similar petition asking for an increase of 50 cents a day for each employee.

Beaver Valley Men Ask Wage Inquiry. — The Beaver Valley Traction Company, operating in Beaver Falls, Pa., and its employees have presented a joint petition to the War Labor Board, asking that it investigate conditions and decide if there should be an advance in the scale of wages paid the employees, from May 1, 1919. The company at present is paying 39, 41, 43 and 47 cents. The board has announced it will send an examiner to Beaver Falls about July 6.

Will Arbitrate Matter of Extensions.—The Cincinnati (Ohio) Traction Company has agreed to arbitrate its differences with the Interurban Railway & Terminal Company, which are causing a delay in the extension of the local line to Kennedy Heights and Pleasant Ridge. It is understood that arbitration is satisfactory to the Interurban Railway & Terminal Company. The matter will be taken up as soon as C. W. Culkins, street railroad commissioner, is officially notified to this effect by the company.

Wage Arbitration in Little Rock.—Rev. Hay Watson Smith has been accepted by the Little Rock Railway & Electric Company, Little Rock, Ark., as the third arbitrator to complete the arbitration committee to make a settlement of the demands of the employees for a flat rate raise of 20 cents an hour. The men are at present receiving a maximum of 35 cents an hour and a minimum of 30 cents. The raise was asked by the men on April 14, 1919, to become effective May 22. The company denied the request, offering a raise of 4 cents an hour. This was promptly turned down. A strike ultimatum was delivered to the company as the last means to effect a settlement.

Completing Hydro-Electric Plans.—The Ontario Hydro-electric Commission of Canada will start construction work soon on the proposed hydro-radial line between Port Colborne, Ont., and Bridgeburg, Ont., a distance of about 25 miles. This line will skirt the Canadian shore of Lake Erie, touching all of the popular summer resorts. The line would connect with Buffalo via the bridge across the Niagara River at Bridgeburg. It is proposed to start the work at the Bridgeburg end and rush the building of the line to Fort Erie and then to Crystal Beach before work is attempted between Crystal Beach and Port Colborne. The work will be done by the Dominion government under the direction of Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission.

Paving Controversy Settled. — The long-standing controversy between the city of Pittsburgh and the Pittsburgh (Pa.) Railways over the paving of Chartiers Avenue and West Carson Street has been settled. At the conclusion of a hearing during the week ended June 21 before Referee W. R. Blair, serving as master for the United States District Court, under which a receiver is operating the Pittsburgh lines, it was announced that the paving will be done. The company will spend, as its share of the cost, $103,614, subject to the approval of the federal court. The matter has been contested bitterly for a long time, the company contending it did not have the money to pay for its proportion of the cost. Finally the argument centered about the quality of construction to be used, the company standing firm for the cheapest way out. This was compromised.

Co-operative Course in Electrical Engineering.—A co-operative course in electrical engineering, conducted by the Massachusetts Institute of Technology and the General Electric Company, established in 1917 but dropped last year, has been revived with the close of the war. The course covers a period of five years, of which the first two are identical with the established course in electrical engineering at the institute, and the last three are divided between instruction at the institute in Cambridge and experience associated with instruction at the West Lynn and other works of the General Electric Company. The work of the final year of the course is of advanced nature, with emphasis laid on the problems of administration, the design and development of engineering projects, and in creative work, such as research. The course leads to the degree of Master of Science and the number of men admitted each year is limited to forty.

Financial and Corporate

Segregation Seems Likely

Court Announces New York Leased Lines Will Be Returned to Owners if Rental Is Unpaid

Judge Mayer in the Federal Court in New York announced on June 25, after a long discussion by lawyers representing various interests, that if the New York Railways could not pay its rentals for the Eighth and Ninth Avenue lines, they would be returned to their owners. That the company cannot pay the rentals and interest on bonds due on July 1, and have capital enough left to carry on the business, was announced by Job E. Hedges, the receiver, in an application asking the court for instructions in the matter.

Morgan J. O'Brien, representing the Eighth and Ninth Avenue lines, complained of the default in rental payments, and asked that the lines be turned back. The owners, he said, would accept the rentals if they were offered, but as the amount grows larger each day, with the prospects of payment remaining stationary, he thought the owners should have their properties. An effort would be made to operate them at a profit.

COURT EXPLAINS ISSUES INVOLVED

Under the lease to the New York Railways a rental of $215,000 a year was to be paid for the Eighth Avenue line. This, with other costs, would bring the annual payments up to $265,675. Rent on the two lines is due for the first quarter of the year.

In reply to a question by Judge Mayer, Mr. O'Brien said he thought there would not be much difficulty in arranging for transfers between the Eighth and Ninth Avenue lines and several crosstown lines. Judge Mayer told him that if he would submit a plan by July 8 showing that the interests of the public would be safeguarded he would instruct the receiver to turn over the lines. Judge Mayer said:

> The time has come when we must have more action and less talk. The court wishes to keep the system intact, but it has no right to destroy property. The New York Railways is running at a deficit every day. There is no doubt about that. Public Service Commissioner Nixon has indicated that he will take up the matter of transfers, and I presume he will give an answer at an early date. I believe the solution of the transfer problem will mean the solving of the problems we have been considering.
>
> As for the Eighth and Ninth Avenue lines, we know we cannot pay the rentals, and we have no right to keep the property running at a loss. The owners promise to run the cars in a way that will serve the public if we return them. The responsibility of breaking up the property cannot be charged to the court, which is not going to take money out of the pockets of the owners of the lines. If Judge O'Brien will present to me by noon on July 8 a satisfactory plan of operation I will instruct the receiver to return the lines.

Receiver Hedges also asked for instruction as to what action he should take regarding the payment of interest due on July 1 on the first real estate and refunding mortgage 4 per cent bonds, which amounts to $361,225, and the interest on the 5 per cent underlying bonds, as well as those of the leased lines. He said the system had been operating cars over the Williamsburg Bridge since Sept. 1, 1915, on temporary permits, and that during the six months ended March 31 last it had fallen short $1,210,011 of earning the interest on its bonds.

Joseph Cotton, in behalf of a committee of the first mortgage bondholders, who have $18,000,000 of the bonds, said he represented 1600 bondholders, each owning less than $10,000 of bonds. Their holdings, he said, represented their chief source of income. He said that a default in payment of interest would make it necessary to begin foreclosure proceedings. Asked by Judge Mayer if he would foreclose if the interest was paid, he replied that if offered the payment it would be accepted and marked "on account." Judge Mayer said:

> It seems inadvisable to instruct the receiver to pay this interest under the circumstances, since nothing will be gained. There is no course left to the court but to instruct the receiver not to pay it.

Abandonment Approved

The Public Service Commission, for the Second District of New York, on June 17 approved the declaration of abandonment by the Syracuse, Lake Shore & Northern Railroad, now the Empire State Railroad Corporation, of that part of its route on the East River Road, commencing at Riverside Cemetery in Scriba and running southerly to its present terminus.

The Syracuse, Lake Shore & Northern Railroad in 1911 asked the commission for approval of a declaration of abandonment of that part of its road on the east side of the Oswego River at Riverside Cemetery and running southerly to the bridge at Minetto. The declaration of abandonment relating to that part extending upon private right-of-way to the Minetto bridge was approved and abandonment of the remainder was disapproved.

The Empire United Railways, Inc., successor of the Syracuse, Lake Shore & Northern Railroad, in 1914 made application for approval of the declaration of abandonment as to the remainder of the route proposed to be abandoned in 1911. The commission refused approval without prejudice to renewal of the application and the Empire State Railroad Corporation filed the petition upon which the commission acted on June 17. There were hearings by Public Service Commissioner Irvine.

Contests Receiver's Plan

Trustee of B. R. T. Refunding Mortgage Objects to Displacement of Existing Liens

Arguments were begun during the week ended June 21 in the United States Circuit Court of Appeals on an appeal made by the Central Union Trust Company, New York, as a trustee under a first refunding mortgage of the Brooklyn Rapid Transit Company. The appeal is from an order issued by Judge Julius M. Mayer in May, 1919, authorizing the issuance of $20,000,000 of receiver's certificates in the interest of the Brooklyn Rapid Transit lines. The arguments upon which the trust company's appeal are based are as follows:

> 1. That the Brooklyn Rapid Transit Company is a private business corporation and no authority exists to displace existing liens upon its property by the issue of receiver's certificates without the consent of said lien holders.
> 2. That no authority exists to issue receiver's certificates in aid of the power plant project.
> 3. That no authority exists to issue receiver's certificates for the purpose of maintaining, rehabilitating, constructing or equipping the properties of other corporations controlled by the Brooklyn Rapid Transit Company.
> 4. That no authority exists to issue receiver's certificates at the expense of the first refunding mortgage bondholders for the purposes of benefiting the note holders.

The order authorizing the issuance of the certificates, against which appeal has been taken, was given on the basis that the money was to be expended for power facilities and other purposes, to the limit of $16,000,000.

The trust company objects to priorities granted, and it is further contended that the power equipment of the Brooklyn Rapid Transit Company is sufficient, and that the expenditure is contemplated so that the Brooklyn Rapid Transit Company may supply the power and other facilities which the subway company, the New York Municipal Railway Corporation, must furnish in order to perform its contracts.

Lindley M. Garrison, receiver, and Carl M. Owen for the company argued that unless the contract work of the New York Municipal Railway Corporation is completed its rights under the agreement of the company with the city of New York in connection with the operation of the new rapid transit lines will be voided. Mr. Garrison went into detail on the necessity of the money for the preservation of the property:

> If the Brooklyn Rapid Transit Company should cease its activities, it would be weeks and perhaps months before the surface lines and the elevated lines would be able to find substitute sources of power and find new agencies for the carrying on of their repair and maintenance work. In the meantime the public confusion and the public loss would be extreme.
>
> Unless this construction work is proceeded with, there is a possibility of serious default of the New York Municipal in the performance of its obligations under contract. The failure to complete this construction will jeopardize the vast investment of the Brooklyn Rapid Transit Company and the refunding bondholders in the New York Consolidated and the New York Municipal situation.

The court reserved decision.

Net Income Cut in Half

Twin City Lines Suffer from Higher Costs and Lower Transportation Revenues

The operating ratio (including taxes) of the Twin City Rapid Transit Company, Minneapolis, Minn., was 81.77 per cent for the calendar year 1918 as compared to 74.84 per cent for 1917, upon the basis of the total railway operating revenue and non-operating income. This big jump was due to the increased cost of labor and materials and to the decrease in traffic.

The transportation revenues during 1918 declined $501,255 or 4.9 per cent. The causes assigned by the company were the exodus of young men for military service, the lack of community prosperity based on large war contracts, and the influenza epidemic. The operating expenses rose $280,455, or 4.2 burdens caused the next income to drop $846,748, or 55 per cent.

More ground was lost through a slight increase in taxes, through a decrease in non-operating income and through larger deductions from gross income. The combination of all these burdens caused the net income of the company to drop $846,748, or 55 per cent during 1918.

The company has paid dividends upon its common stock since 1899 and has, from time to time, increased the rate until it reached 6 per cent in 1909. This rate, however, had to be reduced to 2 per cent in 1918. The profit and loss balance carried forward at the end of the year was $1,180,078, as compared to $1,285,804 the year before.

The expenditures for additions and replacements during 1918 totaled $188,981. The only large expenditures were for necessary reconstruction of track, some additional street paving, and the purchase of certain competing motor buses. Upon the purchase of these buses, competing bus lines were discontinued, and the company is now operating some of them in the northern part of the city of Minneapolis on a newly opened and paved street on which street cars are not operated.

The revenue passengers carried in 1918 numbered 188,930,268, as compared to 199,621,160 in 1917. The transfers redeemed in the two years were 67,985,059 and 73,678,873, respectively.

INCOME STATEMENT OF TWIN CITY RAPID TRANSIT COMPANY FOR YEARS ENDED DEC. 31, 1917 AND 1918

	1918 Amount	1918 Per Cent	1917 Amount	1917 Per Cent
Revenue from transportation	$9,618,500	99.2	$10,119,755	99.4
Revenue from other railway operation	77,479	0.8	62,111	0.6
Total railway operating revenue	$9,695,979	100.0	$10,181,866	100.0
Way and structures	$1,005,629	10.3	$1,031,215	10.1
Equipment	823,048	8.5	781,664	7.6
Power	1,132,335	11.7	1,047,484	10.3
Conducting transportation	3,142,150	32.4	3,031,123	29.8
Traffic	37,422	0.4	57,138	0.6
General and miscellaneous	873,961	9.0	816,845	8.0
Transportation for investment — credit	10,572	0.1	41,950	0.4
Total railway operating expenses	$7,003,974	72.2	$6,723,519	66.0
Net operating revenue	$2,692,005	27.8	$3,458,347	34.0
Taxes assailable to railway operation	936,451	9.7	916,196	8.0
Operating income	$1,755,554	18.1	$2,542,151	25.0
Non-operating income	15,215	0.2	25,846	0.2
Gross income	$1,770,769	18.3	$2,567,997	25.2
Rent for leased roads	$3,000	0.0	3,000	0.0
Interest on funded debt	1,034,428	10.7	989,724	9.7
Net loss miscellaneous physical property	27,333	0.3	25,586	0.3
Miscellaneous debits	14,706	0.1	11,636	0.1
Total deductions	$1,079,467	11.1	$1,029,947	10.1
Net income	$691,302	7.2	$1,538,050	15.1

Larger Loss in Boston

May Returns Show Largest Deficit So Far in 1919, Although Cost per Passenger Decreased Slightly

The financial report for May, made public by the trustees of the Boston (Mass.) Elevated Railway, shows a deficit of $324,002 for the month, as compared with $316,392 in April and $285,124 in February, the worst preceding months in 1919. As in April, one of the reasons for the larger deficit was the excess of track and car repair work above a fair monthly average. The details appear herewith.

The revenue passengers in May totaled 29,967,223, and the total receipts from all sources were $2,453,191. Of this amount $2,385,156 was received from fares. The total cost of service was $2,777,194, of which $1,316,416 was expended for wages. The cost of labor per revenue passenger was 4.393 cents.

The total cost of service per revenue passenger for May was 9.267 cents, as compared with 9.328 cents in April, 8.923 cents in March, 9.304 cents in February, 8.970 cents in January and 9.026 cents for the eleven months ended May 31, 1919.

Receipts per revenue passenger in May were 8.186 cents. The receipts under the 8-cent fare in May, 1919, as compared with the 5-cent fare in May, 1918, showed an increase of $738,177, or 44.82 per cent. This compared with an increase of 45.96 per cent in April, 42.32 in March, 44.91 per cent in February and 43.77 in January.

RECEIPTS AND COST OF SERVICE OF THE BOSTON ELEVATED RAILWAY FOR MAY, 1919

Receipts:	
From fares	$2,385,157
From operation of special cars, mail pouch service, express and service cars	9,243
From advertising in cars, on transfers, privileges at stations, etc	24,949
From other railway companies for their use of tracks and facilities	4,187
From rent of buildings and other property	6,193
From sale of power and other revenue	11,613
Total receipts from direct operation of the road	$2,441,343
Income from deposits, income from securities, etc	11,848
Total receipts	$2,453,191
Cost of service:	
Maintaining track, line equipment and buildings	$487,612
Maintaining cars, shop equipment, etc	226,514
Power (including 22,778 tons of coal at $5.633 or $128,314)	194,096
Depreciation	167,000
Transportation expenses (including wages of car employees, carhouse expenses, etc.)	835,904
Salaries of administrative officers	7,583
Law expenses, injuries and damages, and insurance	102,556
Other general expenses	71,696
Total operating expenses (of which $1,316,416 represents wages)	$2,092,961
Taxes, proportion	80,762
Rent for leased roads (exclusive of subways)	215,969
Proportion of rent of subways and tunnels, to be paid to the city of Boston, exclusive of Cambridge Subway, owned by company	125,934
Interest on Boston Elevated bonds and notes	140,009
Miscellaneous items	4,561
Proportion of dividends under acts of 1918	116,998
Total cost of service	$2,777,194
Net loss	$324,003

Abandonment Petition Denied

The Public Service Commission of New Hampshire has denied the application of the Portsmouth Electric Railway for permission to abandon permanently its North Hampton branch and to discontinue temporarily during certain months of each year the so-called North Beach branch, saying:

> Nothwithstanding the poor financial showing of this road we have seen that it did not ask for an increase of rates until August, 1918, when it increased the fares from 5 cents to 6 cents and put into effect a 2-cent transfer charge. In February, 1919, it further increased the fares from 6 cents to 7 cents, retaining the 2-cent transfer charge. These new rates obviously have not been in effect long enough to tell with any degree of certainty just how they will affect the revenue. To allow the road to take up its tracks before it has been ascertained for a fact that the road would not pay would be unjust to the public. If, however, under the present rates, or even higher rates, the road cannot be made to pay what its owners are legally entitled to receive, then the road can renew this petition.

Finances Before Commission

Some Details Made Public of Readjustment Plan of the United Railroads of San Francisco

The plan for the readjustment of the finances of the United Railroads, San Francisco, Cal., has been agreed upon by the different interests involved and is now before the California Railroad Commission for approval. Approval by the commission will complete efforts toward a financial readjustment, which has been a matter of negotiation for more than four years.

Under the plan now agreed upon, the total bonded indebtedness of the company will amount to approximately $15,000,000, less than half of the present funded debt. Of the $15,000,000 funded debt proposed in the new plan, approximately $10,500,000 will be in the form of 5 per cent Market Street Railway bonds. There are now outstanding $7,098,000 of these bonds and it is proposed to issue about $3,525,000 additional. Following the bond issue will be a note issue of approximately $5,000,000. There will be issued about $11,750,000 first preferred stock. Second preferred and common stock will also be authorized and issued.

There are outstanding $23,500,000 of 4 per cent sinking fund bonds of United Railroads and it is around these and the question of what provision will be made for them that interest centers. There are also underlying bonds amounting to $12,298,000 which will have to be taken care of. These include $7,098,000 Market Street Railway 5 per cent bonds. These bonds will remain a lien on the property and, as stated above, approximately $3,525,000 additional will be issued. Of the remaining $5,200,000 underlying bonds, the majority are in default as to principal though interest is being paid regularly. It is believed that the short-term notes will be sold and that proceeds will be used to retire the $5,200,000 underlying bonds.

Under the plan as now drawn up, holders of the sinking fund 4 per cent bonds will receive 15 per cent of the par value of their holdings in the new Market Street Railway 5 per cent bonds to be issued. First preferred stock to the extent of 50 per cent will be given to holders of the 4s, and the balance, amounting to 35 per cent, will be made up by second preferred and common stock.

Arranging Sale of Grafton Property

The trustee in bankruptcy of the Grafton (W. Va.) Traction Company and associated companies, Dr. T. F. Lanham, Grafton, has filed a petition in the United States District Court for the Northern District of West Virginia, praying for an order authorizing the sale of the electric railway property and the property of the affiliated companies, either at public auction or by private sale.

It seems to be a recognized fact that the Monongahela Valley Traction Company, which operates in Marion and Harrison Counties, will in all probability be a bidder for the property in the event of a sale. This would undoubtedly result in joining Grafton with Clarksburg and Fairmont in an interurban railway loop that would prove most convenient and desirable for each of the cities mentioned.

The petition for the sale of the property will be heard at a creditors' meeting to be held in the office of I. E. Wyckoff, referee in bankruptcy, on June 30.

Change in Ownership at Sistersville

Ownership of the Union Traction Company, Sistersville, W. Va., and the Sistersville Electric Light & Power Company has passed to Boston capitalists. The business will be conducted under the name of two companies, the Sistersville & New Martinsville Traction Company and the West Virgina Power Company.

The power plant in Sistersville will be moved to Paden Park early next year, and important improvements are being worked out for Paden Park, which will make it one of the most popular and convenient pleasure resorts in that part of the Ohio Valley.

The extension of the road above New Martinsville to Clarington, or better still to Moundsville, where connection could be made with roads to Wheeling and other points, is one of the improvements that will vastly increase the revenue of the road and will be a great benefit to New Martinsville.

The Sistersville & New Martinsville Traction Company, the successor company, has been incorporated with a capital stock of $500,000 by R. Broadwater, W. J. McCoy, Nell Burns McCoy, W. R. Reitz and E. C. King, all of Sistersville.

Change in Control

The controlling interest in the Pittsburgh, Harmony, Butler & New Castle Railway changed hands during the week ended June 21, when David McCahill, Pittsburgh attorney, purchased the holdings of R. H. Boggs. The properties involved in the deal, which include control also of the Pittsburgh, Mars & Butler Railway, the Harmony Electric Company and the North Pittsburgh Realty Company, all affiliated concerns, are appraised officially at between $8,000,000 and $9,000,000. Mr. McCahill and Mr. Boggs declined to state what the consideration in the transaction had been.

Mr. McCahill has been elected president of all the companies, succeeding Mr. Boggs in that office. The latter will remain on the directorate, however. The new president has taken personal charge of the properties and has announced that he will improve service and may purchase new equipment.

The lines involved in this sale were built in 1905-1906. Mr. Boggs, who is one of the proprietors of the Boggs & Buhl store in Northside Pittsburgh, headed the movement which resulted in their construction, as a matter of public spirit. The cars pass the doors of the store and undoubtedly have extended the Pittsburgh shopping radius to include thousands to whom the city stores otherwise were unavailable. While never much of a success financially, the railways have always served the public well and have contributed greatly to the development of a great area north of Pittsburgh. Mr. Boggs has retired from the public utility field because of poor health and the claims of his other business interests.

Deficit for Calgary in 1918

The 1917 surplus of the Calgary (Alta.) Municipal Railway, amounting to $21,493, was during the calendar year 1918 turned into a deficit of $7,118. The comparative report for these two years follows:

	1918	1917
Car earnings	$606,188	$556,375
Miscellaneous earnings	10,926	7,686
Bank interest	20,465	18,493
Total	$637,579	$582,554
Operating expenses	$419,682	$356,096
Fixed charges, etc	225,015	204,965
Total	$644,697	$561,061
Deficit	$7,118	....
Surplus	....	$21,493
Car-miles	2,735,264	2,739,923
Car-hours	279,109	279,584
Fare passengers	12,928,882	13,606,663
Transfers	3,796,960	3,830,702
Total passengers	16,725,482	17,437,365
Average fare, revenue passengers (cents)	4.687	4.023
Average fare, all passengers (cents)	3.696	3.139
Average daily receipts	$1,954	$1,596
Average daily operating expenses	$1,203	$975
Average daily total expenses	$1,820	$1,537
Percentage of operating expenses to revenue	71.2	61.1
Cost of power per car-mile	3.368c	3.253c

The report states that all taxes were paid and that allowances were made for sinking fund and depreciation. During 1918 unlimited tickets were sold six for 25 cents, and twenty-five for $1; workmen's tickets, good 6 to 8 a.m., eight for 25 cents; school children's tickets, ten for 25 cents. In consequence of the deficit, fares were raised May 14.

The new schedule provides for a 5-cent cash fare. Tickets are sold five for 25 cents, or twenty-two for $1. Workmen's tickets have been abolished. Children's tickets are sold eight for 25 cents.

A Question of Control

The Ministry of Ways and Communications bill is slowly struggling through the committee stage in Parliament. As regards tramways, the only important point made is that the government has promised to consider whether it will accept a modification which will put municipally-owned tramways to a certain extent under the control of the new ministry. As the bill at present stands, such tramways—unlike all other public means of locomotion—are not brought under control. In reference to the supply of electricity, which in addition to means of transportation it is proposed should come under the new ministry. The government has accepted an amendment deleting electric supply from the subjects in regard to whether the existing powers of government departments should be transferred to the ministry. The government, however, has not abandoned its intention. The provision as to supply of electricity had been included in the bill on the assumption that by this time the question would have been largely settled under another bill to be introduced for the purpose of setting up a national electric power supply. The latter bill has, however, been delayed owing to the illness of the president of the Board of Trade (Sir Albert Stanley). The government now intends that the bill will make provision for the whole subject, including the transfer of existing powers to the Ministry of Ways and Communications.

Financial News Notes

Co-Receivers for Atlantic City Line.—Stern & Silverman, Philadelphia, Pa., will probably be named as co-receivers with A. J. Purington, receiver of the Atlantic Shore Railway Company, Atlantic City, N. J., who succeeded former Judge Clarence L. Cole in that office.

Abandonment Threatened.—It is reported that the North Coast Power Company may abandon electric railway service between Centralia and Chehalis, Wash. The action was threatened if steps are not taken by the two cities to relieve the jitney competition, which has made it impossible to operate the electric railway at a profit.

Boise Road Sold.—The property of the Boise (Ida.) Railway, including the city electric line in Boise, subject to a $75,000 mortgage on the Natatorium, has been sold under hammer. The railway company's equipment was sold to S. F. Watts of Independence, Kan., for $100. It is understood the new owner plans to improve and restore the property.

Providing Municipal Railway With Funds.—Ordinances have been introduced in the City Council of Seattle, Wash., providing for two loans aggregating $500,000 to the Seattle Municipal Railway betterment fund, for the purpose of speeding up improvements and extensions to the municipal railway system. One ordinance provides for borrowing $250,000 from the general fund, and the other $250,000 from the street railway fund. The loans are to be repaid in September from the proceeds of the $790,000 bond issue recently voted for betterments to the railway system.

Receiver's Appointment Made Permanent. — Cornelius S. Sweetland, treasurer of the United Traction & Electric Company, Providence, R. I., who was named temporary receiver of the company on petition of the Central Trust Company, New York, was made permanent receiver of the company in the Superior Court of Rhode Island by Presiding Justice Tanner, on June 23. The developments leading up to the filing of the petition by the Central Trust Company were detailed in the ELECTRIC RAILWAY JOURNAL for June 21. Mr. Sweetland was instructed by Justice Tanner to take over the affairs of the company. and operate it under instructions from the court.

Columbus Notes Offered.—Stone & Webster, Boston, Mass., are offering for subscription $1,750,000 of three-year 6 per cent gold coupon notes of the Columbus (Ga.) Electric Company, which is under the direction of the Stone & Webster Management Association. The notes are dated July 1, 1919, and are due July 1, 1922. They are in the denomination of $1,000, $500 and $100. The proceeds from the sale of the notes will be used to retire the present $1,500,000 of 6 per cent notes due on July 1 and also to take up the floating indebtedness of the company, now amounting to $170,000, which has been incurred for additions and extensions to the company's plant. The present net earnings are almost double all interest charges.

Notes to Pay for Cars.—Public Service Commissioner Lewis Nixon of the First District of New York has announced that he will shortly approve an order to permit the surface line companies of the Brooklyn Rapid Transit system to issue lease warrants or notes for 80 per cent of the value of 200 of the 300 new cars which the company must buy, by order of the commission. Before his approval is granted the company must submit schedules of the principal and interest amounts which are involved. The companies are to pay 20 per cent of the value of the cars in cash, each car to cost $5,600. The total cost, including interest and discount, it was stated by A. M. Williams, of counsel to the Brooklyn Rapid Transit companies, would amount to $1,245,696.30.

Electric Railway Monthly Earnings

BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$27,371	*$17,402	$9,969	$3,474	$6,495
1m., Apr., '18	20,816	*10,403	10,413	3,279	7,134
12m., Apr., '19	299,786	*172,751	127,035	42,116	84,919
12m., Apr., '18	237,946	*124,390	113,556	38,616	74,940

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$46,455	*$33,316	$13,139	$5,354	$7,785
1m., Apr., '18	37,674	*27,986	9,688	5,255	4,433
12m., Apr., '19	542,625	*408,776	133,849	63,674	70,175
12m., Apr., '18	480,141	*333,326	146,815	63,221	83,594

COLUMBUS (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$100,248	*$46,657	$53,591	$30,443	$23,148
1m., Apr., '18	94,223	*39,514	54,709	28,200	26,509
12m., Apr., '19	1,189,571	*614,382	575,189	352,125	223,064
12m., Apr., '18	1,149,762	*454,419	695,343	318,767	376,576

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$109,133	*$67,384	$41,749	$12,969	‡$28,905
1m., Apr., '18	89,317	*51,409	37,908	11,811	26,097
12m., Apr., '19	1,220,183	*733,725	486,458	153,368	‡335,115
12m., Apr., '18	975,911	*545,543	430,368	132,633	‡322,306

EL PASO (TEX.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$124,652	*$86,766	$37,886	$7,411	$30,475
1m., Apr., '18	102,665	*69,344	33,321	6,441	26,880
12m., Apr., '19	1,329,995	*944,033	385,962	82,819	303,143
12m., Apr., '18	1,274,797	*823,650	451,147	70,561	380,586

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$247,480	*$178,453	$69,027	$38,027	$31,000
1m., Apr., '18	205,083	*136,577	68,505	29,564	38,941
12m., Apr., '19	2,860,162	*2,044,651	815,511	366,405	449,106
12m., Apr., '18	2,265,272	*1,482,279	782,993	339,181	443,812

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$24,629	*$17,003	$7,626	$6,065	$1,561
1m., Apr., '18	25,900	*16,396	9,504	6,119	3,385
12m., Apr., '19	310,281	*213,076	97,205	73,396	23,809
12m., Apr., '18	340,899	*217,869	123,030	73,827	49,203

JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$85,353	*$82,231	$3,122	$14,217	†$11,095
1m., Apr., '18	74,329	*50,116	24,213	14,130	10,083
12m., Apr., '19	1,003,103	*829,108	173,995	178,026	†4,031
12m., Apr., '18	749,634	*512,744	236,890	168,781	68,109

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$259,594	*$164,454	$95,140	$24,845	‡$79,877
1m., Apr., '18	267,913	*157,422	110,491	25,277	‡94,797
12m., Apr., '19	2,886,615	*1,911,250	975,365	300,847	‡789,517
12m., Apr., '18	2,932,282	*1,646,832	1,285,450	309,852	‡1,042,681

PENSACOLA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$42,935	*$34,941	$7,994	$8,005	†$11
1m., Apr., '18	35,008	*24,138	10,870	7,077	3,793
12m., Apr., '19	550,955	*417,395	133,560	90,239	43,321
12m., Apr., '18	391,640	*238,931	152,709	82,012	70,697

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$115,286	*$96,855	$18,431	$24,512	$6,079
1m., Apr., '18	92,579	*62,704	29,875	23,079	6,796
12m., Apr., '19	1,251,005	*966,065	284,940	288,357	†3,417
12m., Apr., '18	1,035,134	*694,962	340,172	274,204	65,968

TAMPA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '19	$98,578	*$61,143	$37,435	$4,546	$32,889
1m., Apr., '18	84,863	*48,347	36,516	4,264	32,252
12m., Apr., '19	1,124,069	*664,653	459,416	52,540	406,876
12m., Apr., '18	997,955	*574,859	423,096	49,761	373,335

* Includes taxes. † Deficit. ‡ Includes non-operating income

Traffic and Transportation

New York State Study

Commission Calls for Statistics on Which to Base Inquiry into Results with Increased Fares

The Public Service Commission for the Second District of New York is taking steps to ascertain the effect of revenue changes in the operation of electric railroads in the second-class and third-class cities of the State, following permission by the commission to make increases in fare. It has asked railroads upon which fare rates have been advanced to furnish comparative monthly statements of passenger revenue, revenue passengers carried and car-miles operated each month since an increased tariff has been in effect, compared with the corresponding months of the prior year and in which lower fares prevailed. The commission has asked that this information be segregated between city and other operating divisions.

MORE THAN FIFTY INCREASES

Passenger fares have been increased in more than half of the fifty second-class and third-class cities in the State, either by an advance from 5 to 6, 7 and 8 cents per passenger or by shortening of zones and increasing revenue in that manner. Petitions for authority to increase fares are pending in several cities. Increases in a number of instances have been granted for a period of one year because of the stipulations in local franchise amendments. There are longer periods in other cities while in some municipalities the increased fare is to prevail until its necessity no longer exists.

Increased rates have been permitted by the commission where thorough investigation has demonstrated that higher fares and more revenue were required to preserve public service and where local franchises and agreements stipulating a maximum fare were amended and authority given the commission to allow the increased fare upon proof of necessity.

WANTS TO LEARN EFFECTS

The commission is seeking the information to learn the general effect of the increased fares upon the revenue and financial conditions of the roads where fare rates have been advanced and what decrease, if any, in the volume of travel has followed with the higher fares.

Roads operating outside municipalities have been permitted to increase fares by increased mileage rates and shortening of the fare zones. All increases permitted by the commission have been after a thorough study of general operating conditions of each individual line and the increased cost in operating conditions, including wages and materials, to electric roads during the war. The study it is proposed to make should prove extremely helpful, particularly at this time.

Louisville Fares and Service

It is reported that a new ordinance to curtail service and reduce operating expenses for the Louisville (Ky.) Railway will be introduced at the next session of the General Council. Since the Council killed the original ordinance Mayor Smith has washed his hands of the entire affair. He was instrumental in introducing the original ordinance in favor of economies in operation rather than an increase in fares, but this was killed because a few scattered residents on the West Chestnut and Madison and one or two other lines had friends in the Council. It is said that under the new ordinance to be introduced the Chestnut-Madison and the Liberty-Bank lines will be continued, with a few of the short lines eliminated. Mayor Smith is quoted as stating that he was in favor of aiding the railway, but after being blocked in his efforts he is through.

T. J. Minary, president of the company, is quoted as having made the statement that the only hopes now are something unforeseen or help from the government.

In spite of franchises it is held that the railway is entitled to an increased fare, inasmuch as the question of wages was taken out of the company's hands.

Independent Audit Shows Loss

The Tri-City Railway, Davenport, Iowa, operated at a loss of $35,029 for the first four months of 1919, according to the report of the David G. Fisher Company, auditors and utilities engineers, which has just completed a survey of the company's books.

The report shows that the company's profits for the year 1918 were $11,168, and that a dividend of 2 per cent was paid on the outstanding stock, which is listed at $250,000. The report was made at the expense of the company, the auditors being engaged by the Davenport City Council.

When the officials of the company appeared before the Aldermen a number of weeks ago and announced that they were operating at a loss and that it would be necessary for the people to vote an increase in fares, the Council agreed to lend its moral support to the matter if a survey of the books showed that the increase was justified.

While the fare charged by the company on all city lines is 5 cents, the average fare was slightly above 4 cents.

Jersey Hearing Resumed

Municipalities Begin Presentation of Testimony Drawn from Studies of Foreign Zone Practice

The hearings in regard to the proposed zone plan of fares for the Public Service Railway on its lines in New Jersey were resumed on June 23. The company and the commission had previously completed the presentation of their testimony. On the date mentioned the municipalities began their case.

The first witness called in their behalf was Walter Jackson, former associate editor and business manager of the ELECTRIC RAILWAY JOURNAL. His testimony had largely to do with practices with respect to zone fares in general, zone fare distances and zone fare collections, based on knowledge obtained by him in visits to Europe, the most recent one made during the past winter as the basis for articles which have appeared previously in this paper.

Mr. Jackson made it plain that he was a strong advocate of the zone fare. He also praised the Public Service Railway highly for the work that it had done in preparing the elaborate report on which its case for zone fares is predicated.

At the hearing on June 24 he asserted that jitney competition with the Public Service Railway could probably be abolished very largely by the installation of one-man safety cars with low rates of fare and more frequent service. In this connection he made a strong plea for close co-operation on the part of the commission and the many cities with the electric railroad. Asked by Commissioner Slocum if the installation of one-man cars would not necessitate a heavy capital expenditure, Mr. Jackson said that aside from the proved high rate of return it would be easy to raise capital for safety cars because they can be used wherever the gage is standard width whereas the old-time big car was of special length and width.

The witness argued in short for a flexible plan of zone fares made out from the standpoint of increasing short distance traffic rather than from the viewpoint of convenience in collecting fares and in bookkeeping. He also pointed out that an inflexible zone fare made no provision for changes in zone lengths to correspond with changes in cost of operation. In much of what Mr. Jackson said he reiterated statements made previously in articles in this paper, written over his name, to acquaint American electric railway managers with what has been done in Great Britain, where zone fares have been in use for many years.

Among the witnesses on June 25 were Robert H. Whitten, formerly with the Public Service Commission for the First District of New York, Mr. Jackson and Ralph S. Bauer, Lynn, Mass., merchant and a student of electric railway affairs. Mr. Bauer said electric railway operators lack the merchandising sense.

Ten Cents in Pittsburgh

New Rate Announced on June 23 Provides, However, for Tickets at Seven and One-Half Cents

A 7½-cent fare will be started in Pittsburgh on or about Aug. 1, the receivers of the Pittsburgh Railways announced on June 23. This rate is good only upon payment by tickets. Cash fare will be 10 cents. Present fares in Pittsburgh are 5 cents within an area of a radius of approximately 2 miles from the center of the city, and 7 cents for a ride of any length, any part of which is outside that area.

TWO-AREA SYSTEM A FAILURE

City officials have announced they will oppose the proposed increase before the State Public Service Commission, but this will not prevent its taking effect. Under the law of Pennsylvania a public service corporation may change its rates upon thirty days notice to the commission. If there are objections these must be heard by the commission, but the new rates go into effect pending a decision. The decision of the commission may then be carried before the courts upon appeal. So to all intents and purposes announcement of intention by the receivers makes it certain the new charge will be levied.

A prominent feature of the announcement of the receivers is their declaration that the two-area system has proved a failure in Pittsburgh. In explanation of their abandonment of it, in the formal statement carrying the announcement of the new fare, they say that it is complex, difficult and expensive in administration. It has failed to produce the revenue the lines need and further, the receivers declare, it is unjust under Pittsburgh conditions.

Pittsburgh, they explain, was built up under the flat fare system. Adoption of the two-area plan thus was tantamount, in a way, to a breach of contract, in that it altered realty values, to the loss of many owners in the 7-cent area, who had paid for their property at a time when no one had any reason to expect there would ever be any fare differential against it. The receivers also take the stand that although congestion within a small area is to be desired from the standpoint of company profits, it makes better living conditions impossible and is ruinous public policy.

CONCESSION ON TRANSFERS

A slight extension of the transfer privilege will accompany the new fare. Passengers boarding a car anywhere within the present 5-cent area, and paying a cash fare, will receive a transfer to any other line, good as far as the present 5-cent limit. This means transfers across the downtown district, something for which the Pittsburgh public has clamored for years. The only thing of that nature in effect now is a crosstown line, from the Northside business district through the downtown district, just across the Allegheny River, to which transfers are issued from all connecting lines.

Absolute necessity of more revenue is adduced by the receivers as justification for the increase. It is the cheaper alternative, in the long run, they argue. No bond interest payments or lease rentals have been made since last fall. As a result disintegration of the whole fabric of Pittsburgh transportation is threatened. One of the underlying companies of the Pittsburgh Railways, the Southern Traction Company, already has instituted proceedings looking to foreclosure of its mortgages on certain lines, the way having been opened for this by a recent decision of the Federal Court, under which the receivers operate the lines, that the right to such action cannot be denied. Since that decision the receivers have foreseen a time when each of the dozen or more underlying companies might attempt again to operate their lines independently. This, they set forth, would prove more costly to the public than the 7½-cent fare.

Rebate slips will be attached to tickets sold under the new rate and given to payers of cash fares. These will call for the return of difference between fare paid and the old 5-cent fare, the last rate which has the approval of the Public Service Commission, if the new rate is disallowed finally. Since 5 cents was the rate in Pittsburgh, a 5½-cent fare and the present 5 and 7 cents have been charged. Protests against these rates are still pending with the commission.

One reason for the early announcement of intention to increase—no declaration was necessary until the first of next month for an increase Aug. 1—was a desire to play absolutely fair with the platform employees, whose demands for a raise were scheduled to come up for argument before the War Labor Board in Washington on June 25, the receivers said. A fare increase was necessary whether or not the men got their raise, and the receivers did not wish to embarrass them in their effort.

St. Louis Fare Hearings Resumed

The Public Service Commission of Missouri will resume its hearing of the United Railways fare case the latter part of the present month and will then take up the question of wages.

At a hearing held at Hotel Statler, May 20, the commission took up the question of increased revenue for the company, and at the request of the city's representatives the cross-examination of Richard McCulloch president of the company, was continued for two weeks. When the case was called on June 5, the hearing was continued until June 24, in St. Louis.

The 6-cent fare which expired on June 1 was continued for sixty days on the city lines without opposition from the city counselor, who stated that if increased revenue is necessary the county lines, which still have a 5-cent fare, should bear their proportion of the burden. The commission announced that it would not fix a permanent fare until the revaluation of the company's property is completed, and this probably will not be before November. In the meantime the commission may make temporary changes in the rate of fare to meet the situation.

Arranging for Windsor Fare Vote

The action of the Council of Sandwich, Ont., in refusing to submit the by-law granting the Sandwich, Windsor & Amherstburg Railway increased fares has caused a break in the negotiatons started at the end of the recent strike of the railway employees. As the proposed by-law for Windsor as originally published was conditional upon the favorable vote on similar by-law by the voters of Sandwich and Walkerville, the action of Sandwich officials makes revision of Windsor's by-law imperative.

After members of the Council of Sandwich had decided that the proposed by-law would meet with certain defeat at the special election, and after a proposed amendment was defeated which provided for submitting the bill to the voters on condition that the company presented a statement of earnings to the municipalities, it was discovered by Mayor Winter of Windsor that the railway was already entitled to collect 5-cent fares in Sandwich under present franchise agreements. It was also found that the franchise provided for a one-fare zone for Sandwich passengers extending only as far as the Windsor Ferry docks.

It is believed that the Councils of Windsor and Walkerville will submit amended by-laws to the people at a later date than first planned, to fulfill agreements which caused the termination of the strike. The amendment to the Windsor by-law will withdraw the clause which states that the effect of the by-law is contingent upon passage of a like bill in Sandwich.

The original by-law as drafted for Walkerville provided that the right to vote was restricted to property owners and tenants with leases extending over the period of time covered in the financial obligation considered. This will be amended to give all voters a voice in the fare settlement.

The management of the railway has agreed to use any increase in fares granted by the people in meeting the demands of the men for higher wages. The company officials will be asked to attend the next meeting of the Council of Windsor and it is understood that the question of charging 1 cent each for transfers will be discussed with the view of getting the company to omit this charge from the increased fares asked.

Watching Spokane Results

Fares in Spokane, Wash., will not go above 6 cents, but there is not much hope for a reduction until the lines of the Spokane Traction Company and the Washington Water Power Company are merged and the expense of operation reduced. This is the opinion of State Public Service Commissioner A. A. Lewis. Mr. Lewis is reported to have said:

> The commission fixed the ninety-day period for the 6-cent fare, first to give the companies and the city a chance to get together on the merger of the lines, and also to see what effect the increased fare would have on the returns of the companies.
>
> This ninety-day period will end on July 6, and I imagine the commission will grant a continuance if the interested parties need more time to carry out consolidation. The unification of the two systems, with the consequent elimination of competing lines and a reduction of the overhead expense, is the only solution of the situation, as the Public Service Commission sees it.
>
> It is safe to say, however, that no increase of fare above 6 cents will be granted by the commission, hence it is up to the railway companies to expedite the merger as much as possible. It is likely that the Public Service Commission will meet again to take the matter up some time before July 6.

J. S. Simpson, auditor of the Washington Water Power Company, has announced that the May report under the 6-cent fare shows an improvement over April.

Ohio Commission Wants Facts

The Public Utilities Commission of Ohio has issued an order that all public utilities which have been granted increases in rates for service since May 1, 1918, must submit with any new schedules for further increases statements showing what improvements have been made to properties or service since the previous advances and what new conditions have developed to warrant the new rates proposed.

If these statements do not indicate that increased rates are warranted the commission will take steps to prevent their going into operation. It is said that a number of companies were preparing to file schedules of increased rates, although they were granted increases last year. The commission does not believe that operating expenses have increased since the armistice was signed. If anything, the members think they have diminished slightly. Therefore, they want the facts in all cases where additional increases are asked.

Relief Committee Quits in Tacoma

Unable to see any solution to the electric railway problem in Tacoma, Wash., under present conditions, leaders in the committee of twenty-five have taken steps to close up the work of the committee and quit, passing the issue to the City Council and the company. Scott Z. Henderson tendered his resignation as chairman and also submitted a resignation from the committee he had sent to the Mayor, declaring that he saw no prospect of a possible settlement and that he had not the time to give to the problem. His resignation was accepted and H. G. Rowland elected in his place as chairman. Maurice Langhorne, one of the committee, said:

> This situation, in my judgment, calls for long and hard application on the part of somebody competent to work out a solution. Personally I believe the city has treated the company outrageously and that no company treated as this one has been by the city could ever make a success. It is for the City Council, the constituted authorities responsible for action, to take up the problem and settle it.

L. H. Bean, manager of the Tacoma Railway & Power Company, objected to the committee quitting without at least offering some recommendation to the Council. He said:

> We have been operating the lines under an agreement with the committee for ten months, and part of that agreement was that the committee, as the result of our furnishing it with all the information we could, make some recommendation for a final solution of the problem.

Recent Women's Laws Not Oppressive

Miss Mary Van Kleeck, director of the woman-industry service of the Department of Labor, expects to file with the New York Industrial Commission a statement of the recently enacted law in New York state fixing the hours of labor of women which has been working to the detriment of employees of the Brooklyn Rapid Transit Company and its application based upon the results of investigations conducted by experts of the Federal Woman's Bureau in co-operation with the State Commission. The argument sets forth conditions in Chicago where women ticket agents have been successfully employed, on day shifts only, ever since the present transit system was established. Miss Van Kleeck points out that the plan in use in Chicago exists in a State where there is no law prohibiting night work for women. Miss Van Kleeck's statement in brief is as follows:

> Women have been successfully employed as ticket agents in Chicago since the establishment of the present transit system. They work shifts of eight hours with the prohibition of night work voluntarily adopted by the company in agreement with the trade union. The women's work is limited to two shifts falling within the hours of a day. The seniority rights of all the workers which give the privilege of choice of shifts are maintained by the establishment of one list for men and another for women. The men are entitled to select their shifts as their length of service permits, and the only difference between their seniority rights and that of women is that the women are not permitted to select the night shift.
>
> On the other hand, the prohibition of night work for women does not compel the men to work exclusively at night, since within the men's list the choice of day shift becomes possible. That this plan should have been adopted as a practical working scheme, when the Illinois law would have permitted night work, is very significant in showing the practicability of adjustment to comply with a night work law while retaining women in the position of ticket agents.

Governor Smith was waited upon on June 16 by twenty women railway employees from New York City in an effort to have him recommend that the special session of the Legislature repeal the Lockwood law regulating the hours of labor and working conditions of women employees. The Governor told the delegation that he would make no such recommendation. The women then appealed to the Republican leaders, who are said to have told them that members of the Legislature were helpless unless the Governor sent a special message to that body. This the Governor has refused to do.

Statement About Cleveland Depot Promised

In response to a request of the City Council of Cleveland, Ohio, for a report on the status of the new depot plan, O. P. Van Sweringen, in an interview, stated that the railroads had one year in which to file declaration of intention to use the new depot and the year does not expire until Jan. 6, 1920. He expressed the belief that the railroads will not consume the year in making their intentions known. He said that considerable progress has been made in the development of the plans.

Some other railroad men said that in a proposition of this magnitude, involving the expenditure of $50,000,000 and the complete rearrangement of the city's steam and interurban systems, there are almost innumerable details to be worked out before all parties are satisfied. Some of the negotiations are of a very delicate nature and premature publication of reports might prejudice the best interests of both the city and all other parties concerned.

Those in charge of the promotion say they have taken the city authorities into their confidence as far as they consistently could.

Transportation News Notes

Increase of Fare in Cincinnati.—Announcement was made by Street Railway Commissioner Caulkins on June 14 that the rate of fare on the lines of the Cincinnati (Ohio) Traction Company will be increased from 6 cents to 6½ cents on July 1.

Hearing Set on Niagara Falls Fares.—Chairman Hill of the Public Service Commission for the Second District of New York will hold a hearing on June 30 on the petition of the International Railway, Buffalo, for permission to charge a 7-cent fare in Niagara Falls.

Fare Changes Not Determined—Hearings in local communities served by the Eastern Massachusetts Street Railway will begin in the near future upon the rates of fare to be established by the public trustees of the road. Estimates of the revenue requirements of the company and probable earnings under different rates of fare were outlined at a recent hearing in Boston by Chairman Homer Loring, but no decision has been reached as to the fare schedule to be installed.

Improvement in Reading Traffic.—Ideal summer weather has resulted in a large amount of traffic over the lines of the Reading Transit & Light Company, Reading, Pa., to the several parks located in and about Reading. Carsonia Park, which is owned by the company and is located within a fifteen-minute ride of the business section, retains its leadership in popularity as the city's principal recreation place. Rining Rocks Park has also become more popular than ever under new management.

Tacoma Company Wants Increase. The Pacific Traction Company, Tacoma, Wash., has applied to the Public Service Commission at Olympia for permission to increase its fares outside the city limits, from 2 to 6 cents. Where 5-cent fares are now charged, the company proposes to ask 7 cents; 14 cents where 10 cents is charged; and 21 cents where 15 cents is the present tariff. Arthur R. Warren, Tacoma attorney in opposing the increase, states that a 42-cent round-trip from Steilacoom to Tacoma is prohibitive.

Would Do Away with Charter Cars.—The receivers of the Pittsburgh (Pa.) Railways are trying to arrange with city authorities for an agreement whereby the company may cease to operate "charter cars." Its franchises require continuous service over the lines covered, the penalty being nullification. For years cars have been run over abandoned lines once a day, to keep the franchises alive. As a measure of economy, the receivers wish to be relieved of this necessity, without forfeiture of franchise.

Chicago Fare Matter in Court.—The fight of the Chicago (Ill.) Surface Lines for a 7-cent fare has been taken into the courts. On June 19 an appeal from the ruling of the Public Utilities Commission was filed in the Sangamon County Court on a petition that the question be reopened. It is expected that the question of valuation will enter largely into the final outcome and the Chicago Surface Lines management is satisfied that an investigation will show that this exceeds the amount of the capital account.

Accident on Brooklyn Elevated.—Many persons were injured, two of them seriously, in a rear-end collision on the Broadway elevated line of the Brooklyn (N. Y.) Rapid Transit Company in Brooklyn, at 11:30 o'clock p.m., on June 23. A Canarsie-bound train made up of steel cars crashed into a Lexington Avenue train made up of wooden cars.

Competing Bus Not Allowed.—Holding that the Visalia Electric Railroad, Exeter, Cal., is capable of taking care of the traffic between Visalia and Lemon Cove, the Railroad Commission of California has denied the application of the Sequoia National Park Stage Company for a permit to operate an auto stage line between the two points. The stage company, however, may operate between Lemon Cove and the Sequoia National Park line during the months that the park is open and between Lemon Cove and Kaweah the rest of the year.

Conditions Unbearable in Tacoma.—It is reported that the Tacoma Railway & Power Company of Tacoma, Wash., plans to reduce wages, decrease the number of employees and curtail railway service, with possible abandonment of cars to outlying districts. The statement was made after the City Council had laid aside without action a report from the committee of twenty-five citizens appointed to investigate railway conditions. Louis Bean, manager, states the company is under unbearable pressure, and cannot hold out much longer.

Permission to Renew Petition Reserved.—The Public Service Commission for the Second District of New York has closed the petition of C. Loomis Allen and H. S. Holden, Syracuse, receivers, for permission to increase fares on the former Empire United Railways, Inc., in Auburn with permission to the Empire State Railroad Corporation, successor, to renew the application when it shall deem such renewal desirable. The application was not pressed before the commission because of franchise restrictions in Auburn and the decision in the Quinby case in Rochester.

Rule of the Road Established.—Corporation Judge Felix D. Robertson of Dallas, Tex., has ruled that automobiles and other vehicles must not pass cars while the latter are stopped for the purpose of taking on or letting off passengers, and that arrests for violations of this law can be made under the State highway law. It was generally believed that arrests could not be made under the State laws, but that only the city ordinance covering this practice applied. The holding of Judge Robertson will cause a curtailment of this practice, because the penalties under the State law are much more severe than under the city ordinance.

Massachusetts Has Model Road.—In the course of its lengthy finding which the Public Service Commission of Massachusetts has just made public and in which it upholds the fare schedule submitted by the Union Street Railway, New Bedford, in eliminating the transfer privileges on the Dartmouth & Westport division of the company the commission at the same time pays the management of the company the compliment of having the best managed electric railway property in the State. "Unique" is the word which the commission uses in referring to the efficient operation of the road.

New Fares in Hull.—The Hull (Que.) Electric Railway has announced a new fare tariff calling for a 5-cent increase to all points outside of Hull proper. The new tariff provides for a 20-cent fare from Ottawa to Deschenes, Aylmer and Queen's Park, or three tickets for 50 cents, forty-six tickets for $6; the trip to Red Gate or Rivermead and intermediate points will cost 15 cents, or two tickets for a quarter; the fare to Royal Ottawa Golf Club is placed at 10 cents straight, no commutation tickets. To Tetreauville and Bisson's Creek, which is inside the limits of the city of Hull, will be 10 cents straight. The fares from Ottawa to Hull remain unchanged, as do the special workmen's and school children's tickets.

Suburban Increase Denied. — Announcement of the decision of the Public Service Commission of West Virginia on the application of the West Virginia Traction & Electric Company for a raise in rates, has been made. The commission declined to raise the rates of the company from 10 cents to 15 cents. The towns of Edgewood, Woodsdale, Pleasant Valley and Elm Grove had protested, along with the city of Wheeling. The company wanted an additional fare zone in the territory served by the railway, and claimed inadequacy of return. The protestants contended the raise in rates is discriminatory and unreasonable. The Wheeling to Elm Grove line was the one on which the rate increases were desired.

Interurbans Play Up Their Facilities. — The Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind., are calling the attention of merchants in the territory which they serve to fast freight service from Chicago to points in Indiana, Ohio and Michigan by interurban railway and Great Lakes boats. By arrangement with connecting lines first-day delivery is made to and from Indianapolis and first-day delivery to and from Chicago, through cars operating daily. Same day delivery to and from Michigan City, La Paporte, Rolling Prairie, New Carlisle, South Bend, Mishawaka, Elkhart, Goshen, Niles, Berrien Springs and St. Joseph is announced. The companies are operating express-freight service which means express service at freight rates.

Six-Cent Fare Repealed.—The newly-installed City Commission of Galveston, Tex., has repealed the 6-cent fare ordinance enacted by the former administration, under the terms of which the Galveston Electric Company was authorized to collect 6 cents for adult fares and 3 cents for children and students' fares. Before the 6-cent fare ordinance was repealed, the commission held a hearing at which representatives of the railway appeared and presented arguments tending to show that the higher fares were needed to pay the operating cost of the company, and that if the old fares were reinstated, the company would be forced into bankruptcy. Luke C. Bradley, Houston, district manager for Stone & Webster, in charge of all properties in Texas, presented an exhaustive financial report showing earnings and operating costs. A statement made by him previously to the Mayor was reviewed in the ELECTRIC RAILWAY JOURNAL of June 14, page 1192.

Legal Notes

FEDERAL COURTS—*Under Laws of Ohio Franchise Is a Contract*

Under the laws of Ohio, the ordinances of Columbus granting street railway franchises for a fixed term of years, which were accepted by the grantees, constitute a binding contract, the obligation of which the company cannot avoid on the ground that the increased operating expenses, due to the war and the higher wages fixed by the War Labor Board, make it unprofitable, especially in the absence of a showing that further operation under the contract was impossible, or even that operation thereunder for the entire term of the franchise would be unremunerative. [Columbus Railway, Power & Light Co. *vs.* City of Columbus, Ohio, et al., 39 Supreme Court Rep., 349.]

FEDERAL COURTS—*Under California Law City Has Power to Build Competing Municipal Road*

Civ. Code Cal., Sec. 499, prohibiting two street railroads from using the same street for over five blocks, and a San Francisco city franchise containing similar provisions, held inapplicable to a municipal street railway system.

The establishment of a municipal street railway system, which was not prohibited by plaintiff street railway's franchise, did not constitute a taking of its property requiring a resort to eminent domain.

San Francisco City Charter, Art. 12, Sec. 2, requiring the municipality to consider offers to sell existing public utilities before constructing new ones, held sufficiently complied with where a general solicitation of offers for the sale of any existing street railway was sent to plaintiff street railway and others. [United Railroads of San Francisco *vs.* City and County of San Francisco et al., 39 Supreme Court Rep., 361.]

INDIANA—*Ejection of Passenger With Improperly Marked Ticket*

Where passenger who purchased a through ticket was required to change cars and boarded the proper train, she was entitled to passage thereon, though the conductor had given her a defective ticket. [Union Traction Company of Indiana *vs.* Smith, 123 Northeastern Rep., 4.]

INDIANA—*Failure of Wagon to Carry Tail Light Not Necessarily Negligence*

A wagon driver's failure to have a tail light on his wagon as required by city ordinance will not defeat recovery for personal injuries upon being struck by street car while driving along tracks, unless such negligence proximately contributed to the injury. [Indianapolis & Cincinnati Traction Company *vs.* Senour, 122 Northeastern Rep., 772.]

GEORGIA—*Power of State over Rates*

Under Const. Art. 4, Sec. 2, Par. 2 neither the Legislature nor any municipality can, by ordinance or contract, abridge the exercise of the State's police power. In the case in question, the city of Atlanta was without authority to pass an ordinance fixing the rates of fare upon the lines of the street railway constructed within the limits of the municipality, and any attempt by the municipality to pass such ordinances was nugatory. But where the State has not exercised, and is not seeking to exercise, its police power as to street railway fares, a municipality and a street railroad may enter into valid contracts on such subject. (Georgia Ry. & Power Co. *vs.* Railroad Commission of Georgia et al., 98 Southeast. Rep. 696.)

MISSOURI—*Obligation to Stop Car During Ejection*

Where a street railway's motorman knew a boy whom he was telling to leave the car was on the front steps, he should have stopped the car to give the boy opportunity to alight, and in failing to take such means to prevent injuries to him after knowing his peril, he was negligent, and the company was liable for injuries when the boy slipped under wheels. (Quirk *vs.* Metropolitan Street Railway, 210 Southwest. Rep. 103 and 106.)

NEW YORK—*Indemnity for Accident from Construction in Street Even with Negligence*

A surface street railway company had a right, as a condition of consent that the work of constructing an elevated railroad might be done over its tracks, to exact an agreement from the elevated railroad to protect it against any accident incident to the construction work, though contributed to or caused solely by the negligence of its own employees because the construction work presented additional dangers of accidents which the street railway was not required to assume. (Post & McCord, Inc., *vs.* New York Municipal Ry. Corp., 175 New York Sup. 392.)

VIRGINIA—*Powers of Municipal Corporations to Exempt from Taxes*

Municipalities of a State have no power to exempt property from taxation, except as they are expressly authorized by the State. (City of Richmond *vs.* Virginia Ry. & Power Co., 98 Southeast. Rep. 692.)

WISCONSIN—*Motorman Not Always Negligent When He Fails to Use Best Method to Avoid Accident*

A street car motorman, observing a pedestrian in danger, must use all reasonable care to avoid striking him, but if a sudden emergency arises without his negligence, and there are different ways to avoid collision, he is not negligent because he fails to select the best course. [Williams *vs.* Duluth Street Railway, 171 Northwestern Rep., 939.]

New Publications

The Turnover of Factory Labor

By Sumner H. Slichter. D. Appleton & Company, New York, N. Y. 460 pages. Cloth, $3 net.

The basic idea back of this book is that a definite plan and specific responsibility for creating and executing the plan are as necessary in dealing with labor as in controlling manufacturing operations. Not only does the book study the labor-turnover problem, but it also analyzes methods of handling men in order to guide employers to the adoption of proper means to reduce the turnover with its hugh expense. The work is timely, informative and constructive.

Efficient Railway Operation

By Henry S. Haines, formerly vice-president and general manager "Plant System" and ex-president American Railway Association. 709 pages, the Macmillan Company, New York, N. Y., $4.

In this book on railway operation in general, the electrification of steam railroads is covered both historically and in connection with the railroad of to-day. It will be of value to electrification enthusiasts in showing the conservative point of view of an experienced steam railway operator. On page 32 Mr. Haines says:

> It is finally to be recognized that after more than ten years of experimental practice on an extensive scale by a number of important corporations, electric traction has superseded steam on less than 700 miles out of the 250,000 miles in the railway system of the United States. Taking all these matters into consideration, there need be no apprehension of steam being replaced by electric traction to such an extent as to affect the existing capitalization of our steam railroad system.

It is interesting to note that he avoids the term "electric locomotive," using in its place "electric tractor."

Opportunity Monographs

Prepared by the Federal Board for Vocational Education, Washington, D. C.

These pamphlets are prepared by the Bureau mentioned to aid disabled soldiers, sailors and marines in choosing a vocation. Two have recently appeared of interest to the electric railway field. The first is No. 30 and covers opportunities for work on steam railroads and street railways. The suggestion is made that certain physical defects do not disbar a person from the position of motorman or conductor, although both occupations are mentioned as requiring a high degree of responsibility. Other branches of electric railway service in which disabled men, if skilled, could work to good advantage are as machinists, electrical workers, armature winders, carpenters, car repairers, linemen, track foremen and inspectors. The duties in these occupations are given in the pamphlet. The second pamphlet describes the occupations in the electrical manufacturing industry.

Personal Mention

Percy L. Radcliffe has been named night superintendent of the city lines of the Detroit (Mich.) United Railways.

D. A. Smith has been appointed to succeed Leo Reynolds as superintendent of the Michigan, Gratiot, Mack, Brush, Davison, North Detroit and Leesville lines of the Detroit (Mich.) United Railways.

J. P. S. Lyles has been appointed counsel for the Columbia Railway, Gas & Electric Company, Columbia, S. C., to succeed William Elliott, whose resignation is announced elsewhere in this department.

Leo Reynolds has been appointed division superintendent of the Woodward, Hamilton, Victor and Northwestern belt lines of the Detroit (Mich.) United to succeed James Bullen, who has resigned after many years of service with the company.

Leon Snyder, who has been acting as night superintendent of the city lines of the Detroit (Mich.) United Railways, has resumed his duties as assistant division superintendent of the Woodward, Hamilton, Victor and Northwestern belt lines of the company.

P. C. Reinhardt has been promoted to the position of treasurer of the International Railway, Buffalo, N. Y., to succeed the late George W. Wilson. Mr. Reinhardt has been with the company for twenty-eight years, starting as a receiving clerk. He was later assistant paymaster, assistant cashier, cashier and assistant treasurer.

William Elliott has resigned as counsel for the Columbia Railway, Gas & Electric Company, Columbia, S. C. Mr. Elliott was general manager of the company from 1906 to 1910, when he became general counsel, in which capacity he has since continued. He remains as a member of the board of directors of the company and will continue as counsel for the company in the so-called canal litigation.

John Paul Lucas has been appointed director of publicity for Southern Public Utilities Company to succeed Leake Carraway, who resigned a month ago to become connected with the Virginia Railway & Power Company, with headquarters at Norfolk, Va. Mr. Lucas entered the service of the Charlotte *Observer* in 1901 as a reporter. In 1905 he went to Trinity College to take a special course, returning to the *Observer* at Charlotte as assistant city editor and has since been engaged continuously in newspaper work. When the federal government established the food administration with Henry A. Page as State administrator in North Carolina he called Mr. Lucas to become executive secretary, and in this position he directed the activities of a number of the divisions of the commission, including that of publicity, and while he did not carry that title he was to all intents and purposes the assistant State food administrator.

James E. Gibson, general manager of the Kansas City (Mo.) Railway since 1916, has resigned from the company. It is understood that Mr. Gibson has under consideration plans to enter the banking business, but that he may decide to continue in electric railway work. Mr. Gibson was born in Kansas City on Aug. 28, 1881. He is the son of James F. Gibson, formerly judge of the Circuit Court. He was educated in the public schools of Kansas City and at the University of Missouri, from which institution he was graduated with the class of 1902. In the same year he was appointed secretary to Congressman W. H. Cowherd. After serving under Mr. Cowherd from 1902 to 1904 he resigned to enter the service of the Metropolitan Street Railway, Kansas City, the predecessor of the Kansas City Railways, as a clerk in the accounting department under J. A. Harder, then auditor of the company. In December, 1905, he was advanced from the auditing office to the position of assistant to President Corrigan of the company. He entered the transportation department of the company in 1909 as superintendent of the forty-eighth and Harrison division, where he remained until June, 1910, when he was appointed to the office of general superintendent of the company. He served in the capacity of general superintendent through the receivership of the Metropolitan Street Railway and the reorganization of the company as the Kansas City Railways.

J. E. GIBSON

J. McMillan, general manager of the Pacific Electric Railway, Los Angeles, Cal., retires from active service on July 1. Mr. McMillan has rounded out nearly forty-five years of railway service with the Southern Pacific lines and the Pacific Electric Railway, having during the last sixteen years faithfully served the Pacific Electric Railway in an official capacity. Though no longer in active service, Mr. McMillan will in a sense remain with the company for the vacant position will not be filled. Mr. McMillan began his railroad career with the Houston & Texas Central Railway in the capacity of telegraph messenger. He soon became an operator and later was made station agent. In 1878 he entered the employ of the Galveston, Harrisburg & San Antonio Railway. Subsequently Mr. McMillan went to San Antonio as freight agent and later he was made commercial agent and district freight and passenger agent and finally division passenger agent. Early in 1903 Epes Randolph, vice-president and general manager of the electric railways which H. E. Huntington planned for Los Angeles and southern California, selected Mr. McMillan as chief clerk. When Mr. Randolph retired, Mr. McMillan was appointed traffic manager and since the retirement of General Manager Schindler, who succeeded Mr. Randolph, Mr. McMillan has handled both the traffic and transportation interests of the Pacific Electric Railway and Los Angeles Interurban Railway. "Joe" McMillan, as he is generally known in Los Angeles and the territory served by the lines with which he was connected, is admired for his sterling qualities and good fellowship, for his mastery of his profession and for his loyalty to his friends and to the interests intrusted to him.

Obituary

W. R. Kerschner of W. R. Kerschner & Company, Inc., New York City, died of plural pneumonia on June 21 at the age of forty-seven years. Before coming to New York City in 1910 Mr. Kerschner was in the electric railway supply business in Allentown, Pa. In 1915 he organized W. R. Kerschner & Company, Inc., and arranged to handle the products of the Keyes Products Company, Cincinnati Car Company, Albany Car Wheel Company, Charles I. Earll and the Columbia Machine Works & Malleable Iron Company. Mr. Kerschner was vice-president of the Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., with which he had been closely associated for twenty-two years. Mr. Kerschner's presence at conventions and at other electric railway gatherings will be missed. He was well known in the industry and popular because of his loyalty to his friends, readiness to do his share in anything which came up and unfailing good humor.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Steel Market Steady Under Increasing Buying

Stability Reflected in Little Price-Cutting Being Done, with Upward Tendency Apparent

The iron and steel market is showing a much better tone than it did a month ago. Orders have been coming through in much better volume for structural steel, and the steam railroads have considerable proposition work and also have begun to make better purchases. The electric roads have confined most of their activity to proposition work, of which much is in the hands of track material manufacturers. This is particularly true of frogs, crossings, etc., inquiries on which are naturally expected to turn into orders eventually. How long that eventuality can be put off it is difficult to say.

The whole condition of the steel market shows much more stability than at other times this year. The railway orders, while not for large quantities of rails, special work, bolts, nuts, spikes, plates, etc., have increased in an encouraging manner. Prices have as a whole remained steady since the change of the latter part of April. Some cases have been found where price cutting has been practiced, but this in general seems to be because certain smaller dealers want to realize on some material bought under large contracts or because a mill has been running slow and the producer is willing to cut prices in order to get business and keep his force together. But that time is about passed now, and most price cutting seems to be on resales.

Small Quantities of Rail Being Bought

Stocks of track specialties laid in by the steam railroads in the last two years have not been entirely exhausted and where they can be used on other lines they are transferred as needed. But it will not be long before these are used up and new ones must be purchased. Several railroads came into the market a few weeks ago with inquiries for spikes, but later reported that they had been able to secure some from other roads and would not buy for the present. The general inquiry for spikes is very light. Electric roads have been purchasing small quantities of high T and girder rails and special work, but rather for repairs and replacements than for new work. It is expected that little new work will be started this year.

The special track work which the electric roads have been buying has been less and less in the line of solid manganese pieces and tends more toward manganese inserts at the places of wear. Some roads have found they could get along well with only the inserts and may not go back to the more expensive solid specialties. The price for manganese is fluctuating considerably, so no set price holds on special work. Besides, almost every piece of work is different, due to curves, angles, etc., so that again no set price is laid down. Taken all in all, steel prices are at present steady and little immediate change is anticipated, although indications are that the tendency will be upward rather than downward.

Transformer Stocks Now Practically Normal

Producers Stand Ready to Build Machines for Continuous Pressures Up to 225,000 Volts

During the period of low sales volume which followed the midwinter relaxation of war material production, manufacturers of transformers utilized the opportunity to build up stocks, and these are now practically normal. Prompt deliveries can be made on distribution transformers of standard design. On power transformers deliveries are now about as good as can be expected in view of the painstaking care necessary in building high-class units.

Generally speaking, the higher-voltage equipments require increased time in the factory for the proper handling of the insulation problem, and from two to three months is still requisite for the shipment of transformers of this class or of the larger sizes designed to meet special conditions and not ordinarily carried in factory stocks. Rush orders are now and then put through in shorter periods, but the design and construction of transformers which will withstand severe over-potentials due to surges and other causes is a problem requiring such technical skill that the time allowances above outlined represent conservative practice and should not be curtailed except for extreme needs.

While development work is not specially active at this time, it is noteworthy that transformer builders stand ready to produce equipment capable of continuous operation at pressures up to 225,000 volts. Line difficulties appear to be the limiting factor in present transmission engineering, decided advances having been accomplished within the last three or four years in dissipating the effects of excessive voltage peaks and interwinding strains in transformer equipment itself.

Power Tools Selling Fairly Well

A Number of New Electric and Pneumatic Devices Are Coming in the Market

The amount of shop work being done in repairing electric railway equipment and rebuilding cars has caused somewhat better sales in this field of electric and pneumatic tools. Lack of new line building has of course kept down heavy sales.

Track drills have sold fairly well, considering the amount of work that is being done in rebuilding of roadbed. Sales are expected to increase considerably when the roads begin to extend or relay their rails.

Several new types of both pneumatic and electric tools have recently made their appearance in the market, and manufacturers have sufficient capacity and supplies to take care of the business they feel will come their way when the building on a large scale really gets under way.

Prices have been steady but the tendency, manufacturers say, is upward, if anything.

Journal Box Packing

More Attention Being Paid to This Material as Necessity for Substitutes for Wool Waste Arises

Journal box packing has in the last few years been getting more and more attention, and particularly now that there is a scarcity of wool the need for substitutes arises.

In the past wool waste was the factor which gave the packing the necessary resiliency. Although offering less capillarity to the oil than did cotton, wool was used sometimes entirely for the packing and sometimes mixed with varying amounts of cotton—the wool providing the resiliency and the cotton the oil carrier. The scarcity of wool waste during the war and at present, and its high price, required the use of a substitute which would provide resiliency and keep down packing costs.

Several waste mixtures are on the market. Among the substitutions used for wool are animal and vegetable fibers, sponges, steel and brass springs and steel turnings. The use of these has cut the wool content from 25 to 100 per cent, for in one packing no wool was used. These foreign materials must be correctly and uniformly mixed with the wool and cotton, of course, in order to give the right packing required for the duty to be done. Besides saving wool these mixtures, it is claimed, save oil, as greater resiliency and better oil capacity are said to result per pound of packing. Also some roads have found much less labor necessary for repacking and reoiling with the compounded wastes.

Some wool wastes are costing from 30 to 40 cents a pound; cotton waste is about 13 cents, with a tendency upward. This is because of the large quantities of cotton waste being bought by England for respinning, as it costs them less than raw cotton does. The source of wool waste is diminishing. The best grade, it is stated, is found from old carpets, and the demand for floor coverings to-day is for rugs rather than carpets. Rug waste is of little value as wool waste. The cost of the compounded wastes is nearer 15 and 20 cents a pound.

There is sufficient supply of these substitutes so that orders can be shipped in quick time. There is already more interest being shown in the packing by electric roads although it is the larger roads which have been more active.

Insulating Materials Selling Better

Prices Steady Just at Present, but There Are Indications of Higher Prices to Come

Manufacturers of insulating compounds and materials state that sales are coming through in better shape than they were a month or so ago. This better buying movement is traced to the amount of repair and rewinding work that is being done. Regardless of the amount of work done in keeping in touch with prospective customers, one producer finds solicited business picking up in a satisfactory manner.

Inquiries also are more active, with requests for samples and prices. Prices are at present steady, but with cotton advancing and a heavy export demand anticipated after peace is settled, it would not be surprising if prices on tapes and cloths advanced further. At the same time there is no reason to believe that prices on insulating varnishes and other compounds are due for a drop.

Rolling Stock

Murphysboro Electric Railway, Light, Heat & Power Company, Murphysboro, Ill., is trying to get two trailers for early delivery. A new interurban car is expected on early July delivery.

The Connecticut Company has received four new city and interurban cars for operation on the New Haven (Conn.) lines. The others of the eleven ordered are due to arrive soon from the Brill factory and will be placed in service on other runs.

Eastern Massachusetts Street Railway, formerly the Bay State Street Railway, Boston, Mass., announced recently that it had voted to spend $125,000 immediately to rebuild thoroughly 100 cars, which will soon be in operation. The work has already been started at the Lowell car shops.

Track and Roadway

Galesburg Railway, Lighting & Power Company, Galesburg, Ill.—The lines of the Galesburg Railway, Lighting & Power Company throughout the city of Galesburg will be improved and an extension will be built of the West Main Street line to Linwood Cemetery, where a loop will be constructed.

United Railways & Electric Company, Baltimore, Md.—A contract has been awarded by the United Railways & Electric Company to the Price Construction Company, Baltimore, for building a reinforced concrete two-story signal tower at Sparrows Point.

Butte (Mont.) Electric Railway.—The Butte Electric Railway will begin at once paving the tracks on West Granite Street, from Montana to Henry. This is in preparation for work of bitulithing the street. The present 4-in. rails will be replaced by $5\frac{3}{8}$-in. rails, and new ties will be laid. The cost will be about $25,000.

Interborough Rapid Transit Company, New York, N. Y.—Announcement has been made that the extension of the dual system between Atlantic Avenue and Utica Avenue on the Eastern Parkway subway will be ready for operation about Feb. 1.

Ohio Traction Company, Cincinnati, Ohio.—The County Commissioners of Hamilton County voted a bond issue of $500,000 to defray the expenses of lowering the tracks of the Ohio Traction Company within the village of Wyoming to conform to the new grade of the Carthage-Hamilton pike. The County Commissioners will do the work and will charge the expense to the Ohio Traction Company.

Cleveland (Ohio) Railway. — Improvements planned by the Cleveland Railway include the construction of three new lines and two extensions of existing lines at a cost of about $640,000. The three new lines to be constructed are the East Thirtieth Street line from St. Clair Avenue to Broadway, about 2 miles; the West Seventy-third Street line from Denison Avenue to the West Park cemetery, about 8000 ft., and the Broadview line, from West Twenty-fifth Street to Schaaf Road, about 5300 ft. Extensions will be built of the Kinsman Road line from East 140th Street to East 156th Street, 3300 ft. and the Union Avenue line from East 112th to East 131st Streets, 7500 ft.

Portland Railway, Light & Power Company, Portland, Ore.—An application has been filed by the Portland Railway, Light & Power Company for the storage of 40,400 acre-feet of water from the Oak Grove Creek for development of power along the Clackamas River. The construction of a storage reservoir is estimated to cost $300,000.

Hull (Que.) Electric Company.—The Hull Electric Company is reconstructing 1.5 miles of track, using 85-lb. rails in place of 56-lb. rails.

Quebec Railway, Light & Power Company, Quebec, Que.—A 1-mile extension will be built by the Quebec Railway, Light & Power Company on the Beauport Road in Limoilou Ward, between the Canadian Railway tracks at Mastai Village to the city limits.

Houston, Richmond & Western Traction Company, Houston, Tex.—Plans are being made by the Houston, Richmond & Western Traction Company to begin work at once on the construction of its proposed interurban line from Houston to San Antonio. A proposition has been submitted to the citizens of Eagle Lake to bring the line through that city and a committee of five was appointed to secure the right-of-way for the line through Colorado County. Ed. Kennedy, general manager. [Oct. 6, '18.]

Power Houses, Shops and Buildings

Boston (Mass.) Elevated Railway.—Plans are being prepared by the Boston Elevated Railway for the installation of two new multi-stage, turbine centrifugal pumping units, each of 3000 gal. per minute capacity in the power station at Lincoln Street.

Interborough Rapid Transit Company, New York, N. Y.—Transit Construction Commissioner John H. Delaney has instructed the engineering staff under his direction to prepare plans for and estimate the cost of the construction of a new station on the Interborough subway at 122nd Street and Broadway, application for which has been made in the form of numerous petitions recently filed with him by the Harlem Board of Commerce and by individuals on Morningside Heights.

Pittsburgh (Pa.) Railways.—The receivers of the Pittsburgh Railways Company have petitioned the federal court, under which they operate the lines, for permission to spend enough money to put the South Eleventh and South Twelfth Street inclines into condition for reopening. They were closed several months ago, so that electric motors might be installed to replace the old steam motive equipment.

Philadelphia & Western Railway, Upper Darby, Pa.—The Philadelphia & Western Railway is offering for sale a fully equipped power plant, at present in operation, of 4000-kw. rated capacity, generated through two Curtis vertical turbo-generators of 2000-kw. capacity each. The plant is supplied with superheaters, boilers, transformers, rotary converters, with auxiliary apparatus, and is situated within a few miles of Philadelphia.

Hull (Que.) Electric Company.—It is reported that the Hull Electric Company will purchase two 60-kva. oil-cooled, single-phase transformers, 10,000 volts to 2300 volts.

Dallas (Tex.) Railway.—A contract has been awarded to the Fred A. Jones Construction Company for the construction of a six-story addition to the present Interurban Building at a cost of about $125,000.

North Coast Power Company, Vancouver, Wash.—The North Coast Power Company will reconstruct its transmission line from Kelso to Kalama. The line now carries a load of 6600 volts and will be built for a load of 22,000 volts. The improvement will cost about $30,000.

Pacific Northwest Traction Company, Seattle, Wash.—A new station has been completed by the Pacific Northwest Traction Company at Sixth Avenue, between Pine and Olive Streets, for the use of the Everett interurban line.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—The city of Seattle is negotiating with the Puget Sound Traction, Light & Power Company for the purchase by the city of the traction company's surplus electric power.

Trade Notes

Arthur Power Recording Company, New Haven, Conn., announces an order received recently for 400 power-saving recorders, and several smaller orders.

Detroit Insulated Wire Company announces that R. S. Wakefield has recently been appointed representative for Texas with offices at 13,123 Great Southern Life Building, Dallas.

B. A. Wesche Electric Company, Cincinnati, Ohio, manufacturer of electrical apparatus, announces change in address of its Eastern sales agent to 110 West Fortieth Street, New York City.

Railway Audit & Inspection Company, Inc., Philadelphia, writes that the correct title of Charles H. Dennis, mentioned in a recent issue as formerly operating head of the company, was general superintendent of employment.

H. L. Garbutt, for the last six years manager of the line material section of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been appointed manager of the supply division of the Westinghouse San Francisco office.

Bound Brook (N. J.) Oil-Less Bearing Company, announces a new machine shop and office building of concrete and steel construction, 100 ft. x 180 ft., two-story, being built for its use on Lincoln Boulevard, adjoining the present foundry and the Nigrum Impregnated Wood Works. By this move the company will have its entire factory located at one point.

William B. Schaife & Sons Company, Pittsburgh, Pa., announces the opening on July 1 of a Chicago sales and engineering office at 38 South Dearborn Street, with Charles F. O'Hagan, formerly chief engineer of the company at Pittsburgh, as resident engineer and manager. This company was founded in 1802 and makes, among other equipment, the We-Fu-Go and Scaife water softeners and filtering equipment.

British Westinghouse Electric & Manufacturing Company, Ltd., Manchester, England, through its committee on the Westinghouse War Relief Fund, raised, up to the end of December, 1918, nearly £66,000. Of this amount, approximately two-thirds had been subscribed by the employees and one third by the company. The company reports that the present balance is sufficient to cover for a period of at least ten years the relief of the disabled and the dependents of those who have made the supreme sacrifice. There are 207 relatives and 382 children of deceased workers, in addition to many disabled soldiers and sailors for whom responsibility has been incurred.

National Conduit & Cable Company, according to the *Wall Street Journal,* showed a deficit of $219,694 in the first quarter this year, compared with a deficit of $292,413 in the corresponding quarter of 1918. The stagnant condition which prevailed throughout the brass industry over the first three months of this year, it was stated, resulted in few companies earning sufficient to cover overhead, depreciation, etc. Companies which manufacture brass and copper products are not working at more than 50 per cent of capacity. Some of them are only handling one-third the business transacted in normal times. However, it is expected that June will witness a good buying movement.

R. H. Beaumont Company, 315 Arch Street, Philadelphia, manufacturer of conveying and hoisting systems, is expanding its business to take in complete boiler houses under one contract covering the entire job. R. H. Frost, formerly with John W. Cowper, Buffalo, N. Y., has been engaged to take charge of all matters pertaining to this branch of the business. He will co-operate with the company's engineering department in the design of a standard boiler-house structure. The company has opened an office in Cleveland, Ohio, with H. B. Mosley, formerly with the home office, as manager. The Canadian Fairbanks-Morse Company, of Montreal, is representing the Beaumont company in Canada.

Mitchell-Rand Manufacturing Company, after extensive alterations to the building at 18 Vesey Street, New York City, has brought together its general offices, laboratory and warehouses under the one roof at this address. Founded over thirty years ago, the firm until quite recently dealt exclusively in waxes, asphaltum and compounds manufactured therefrom—sealing waxes, waterproofing and roofing cements, etc.; later electrical insulating compounds were produced, and to these were added insulating paints, varnishes, soldering paste, varnished tubing, manufactured mica, varnished materials and papers. As Eastern representatives of the Hope Webbing Company the Mitchell-Rand Company carries an extensive stock of tapes.

General Electric War Service Record—The enviable war record of General Electric employees at the Schenectady plant was summarized on a large display board located at the head of Works Avenue, Schenectady, to stimulate interest in the Victory loan. In effect, this display board is a large and handsome poster showing the complete war work of the Schenectady employees in the Liberty loan drives, the various fund campaigns and a record of local General Electric men in the army and navy service. Surmounted by the American eagle and the motto "The U. S. A. Our Country," this board shows the number of bonds sold in all the loan drives, including the record for the Victory loan. It gives the amounts raised for other campaigns, including war savings stamps. The total loans amount to $8,791,250 and the total war gifts to $339,313. The works' honor roll contains 3278 names, and there are thirty-five gold stars on the works' service flag. This bulletin board is in colors, with the emblems of various war relief organizations on either side, and is really a wonderful piece of work.

New Advertising Literature

Strauss & Buegeleisen, New York City: "Handbook of Eye Protection for the Industries."

Mitchell-Rand Manufacturing Company, New York City: Form No. 227, a folder on paints and varnishes for electrical insulation.

John C. Dolph Company, Newark, N. J.: A chart showing specific gravities of its insulating varnishes and also a solvent chart.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.: Bulletin No. 1096-A on "Direct Current Motors and Generators."

Joyce-Cridland Company, Dayton, Ohio: Catalog "G" on "Lifting Jacks." This is a general catalog and its price lists supersede previous lists.

Westinghouse, Church, Kerr & Company, New York City: Folder entitled "Every Phase Work" containing pictures of construction work of great variety.

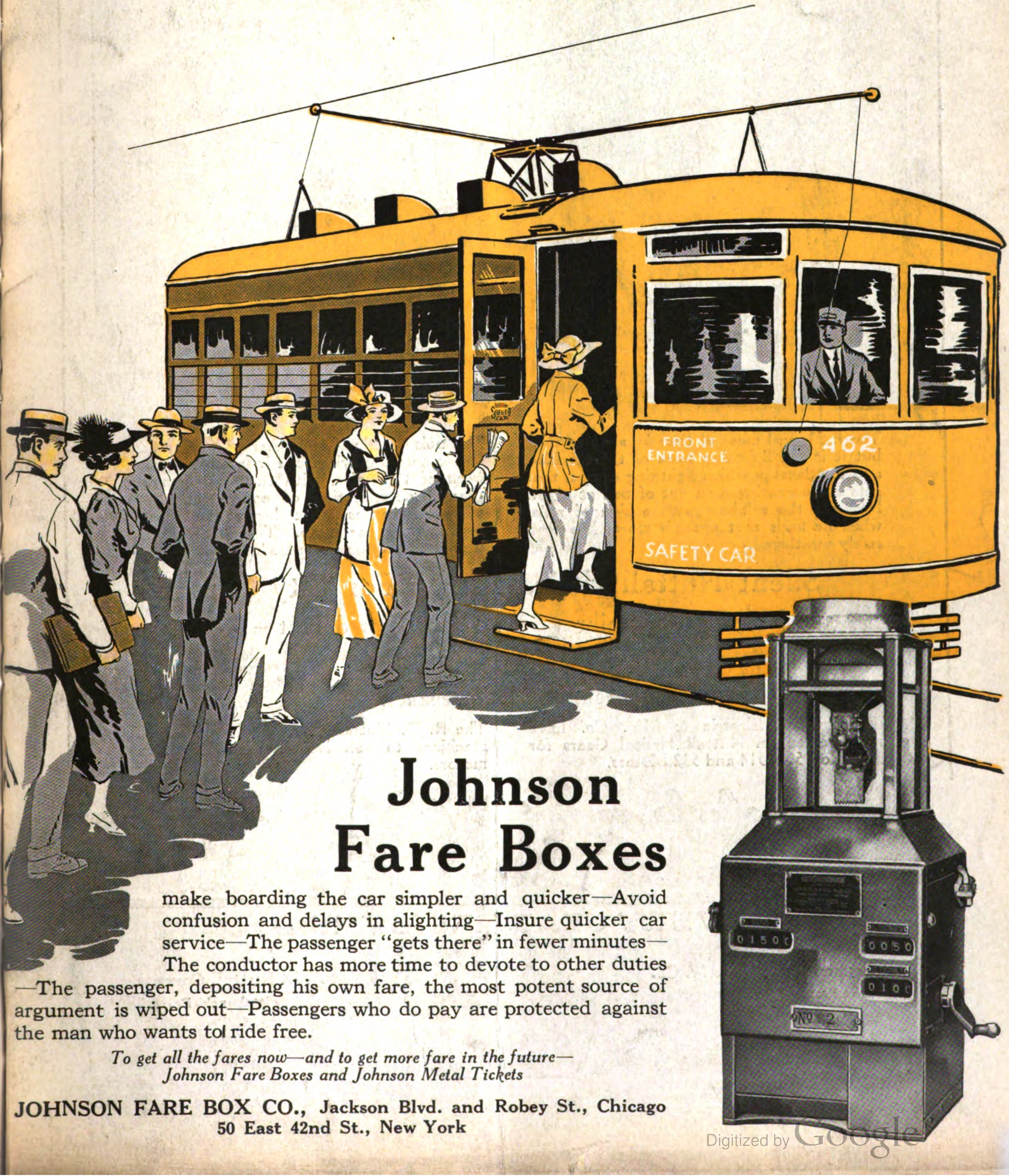
Humphryes Manufacturing Company, Mansfield, Ohio: Bulletin on drainage pumps, bulletin No. 250 on "Hand and Power Pumps" and No. 251 on "Horizontal Double Acting Force Pump."

Locomotive Superheater Company, 30 Church Street, New York City, and People's Gas Building, Chicago: An eight-page bulletin, T-2, which sets forth the advantages of the Elesco stationary superheater.

McGraw-Hill Company, Inc. June 21, 1919 Fifteen Cents Per Copy

Special Mechanical and Engineering Edition

ELECTRIC RAILWAY JOURNAL



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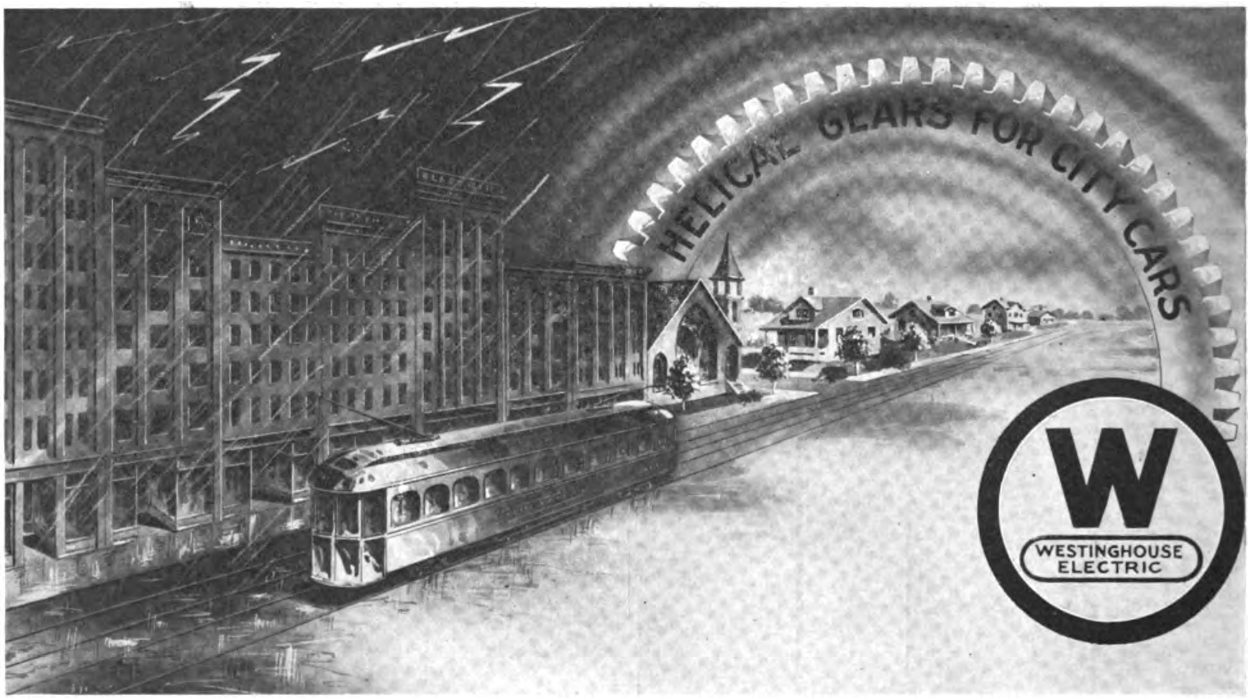
HELICAL GEARS FOR CITY CARS
W
WESTINGHOUSE ELECTRIC

The rattle and crash of thunder are alarming, but it is the lightning back of the thunder, and the damage which lightning causes, that gets the operating man out of bed at night. He hails the rainbow with a sigh of relief when he finds that another storm has been safely weathered.

The noisy rattle of spur gearing on city cars is not only annoying, but it is the vibration back of the noise, with the accompanying general deterioration of equipment which vibration causes, that keeps the master mechanic on the jump. This is the reason why he welcomes the introduction of—

Silent Nuttall Helical Gears For City Cars

Long Trials in Railway Service Have Proved That—
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Helical Gears Operate Silently.
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Westinghouse Electric & Mfg. Co. have standardized on Nuttall Helical Gears for their Nos. 506, 514 and 532 Motors.

The R. D. Nuttall Company have installed machines to hob Helical Gears for these motors.

Nuttall Gears

EVERY GEAR REGISTERED

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

R. D. Nuttall Company
Pittsburgh, Pa.

Vol. 53, *No.* 25 New York, June 21, 1919 *Pages* 1201 *to* 1254

Electric Railway Journal

H. W. BLAKE, *Editor*

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United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines, $4 per year; Canada, $5.50; elsewhere, $7. Single Copy, 15c.

No back volumes for more than one year and no back copies for more than three months.

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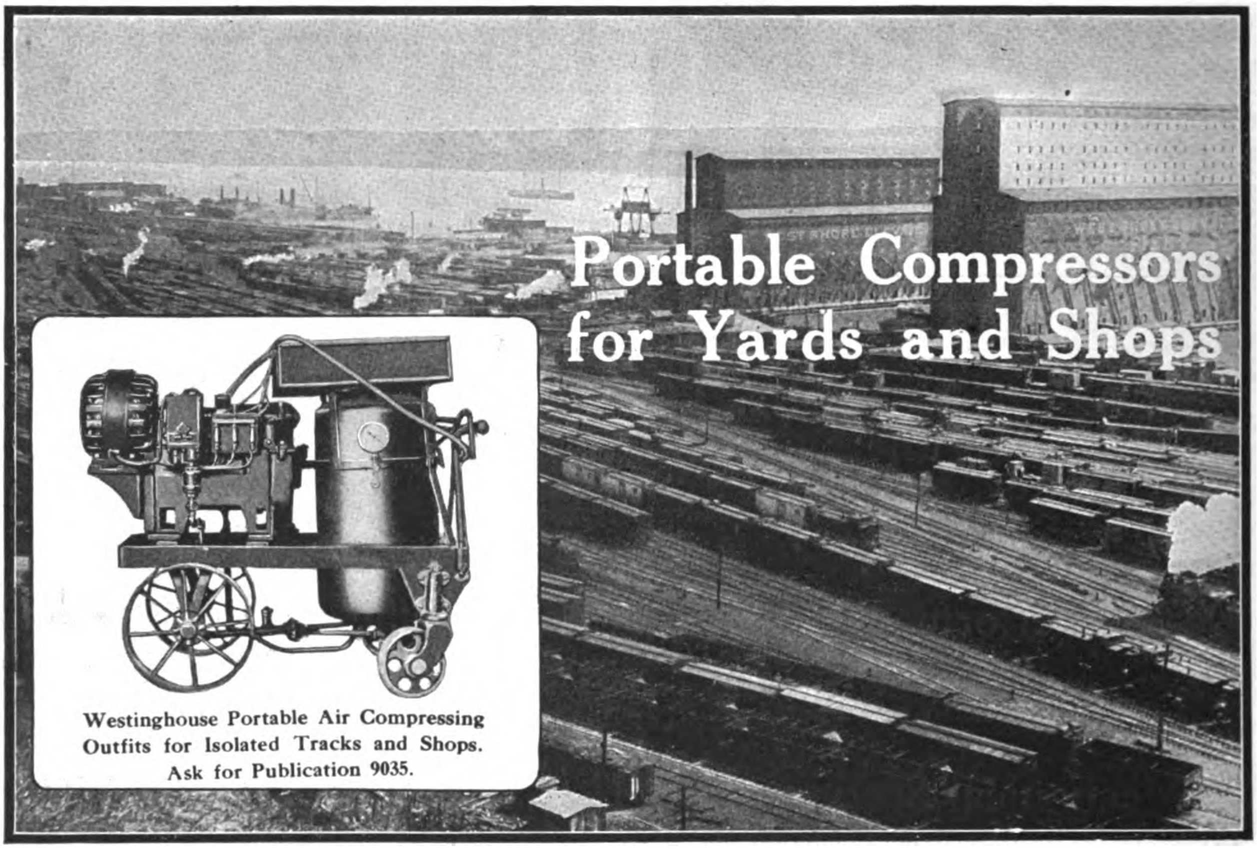
Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, under the Act of March 3, 1879.

Member Audit Bureau of Circulations. Member Associated Business Papers, Inc.

Circulation of this issue, 7900 copies

Advertising Indexes—Alphabetical, 84; Classified, 78, 80, 82; Searchlight Section, 74, 75, 76, 77



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Westinghouse Portable Air Compressing Outfits,

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Brake Building our Business for a Lifetime.

Westinghouse Traction Brake Company

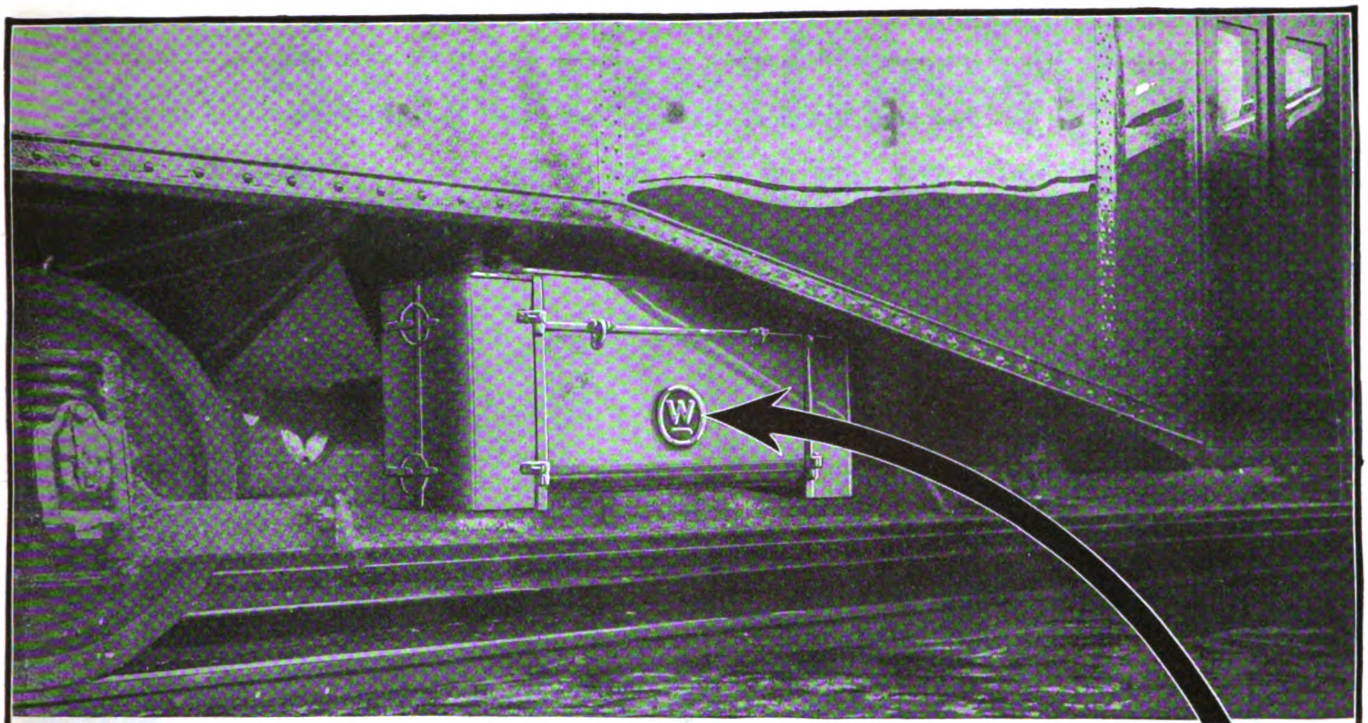
General Offices and Works, Wilmerding, Pa.

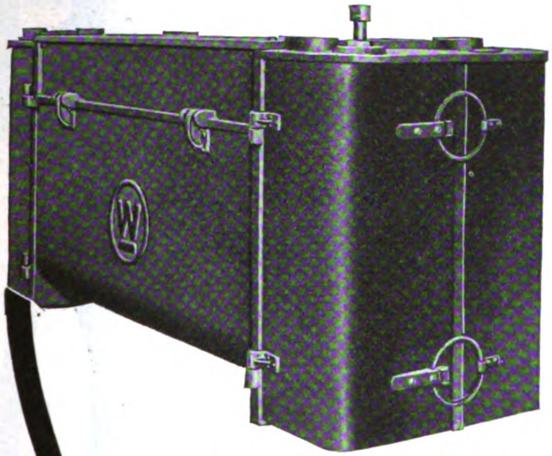
Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.

Denver, Col.
Houston, Tex.
Los Angeles, Cal.

Mexico City
New York, N. Y.
Pittsburgh, Pa.

San Francisco
Seattle, Wash.
St. Louis, Mo.
St. Paul, Minn.





HL

"THE" Control

The Trade Mark Guarantees
Durability and Reliability in Service

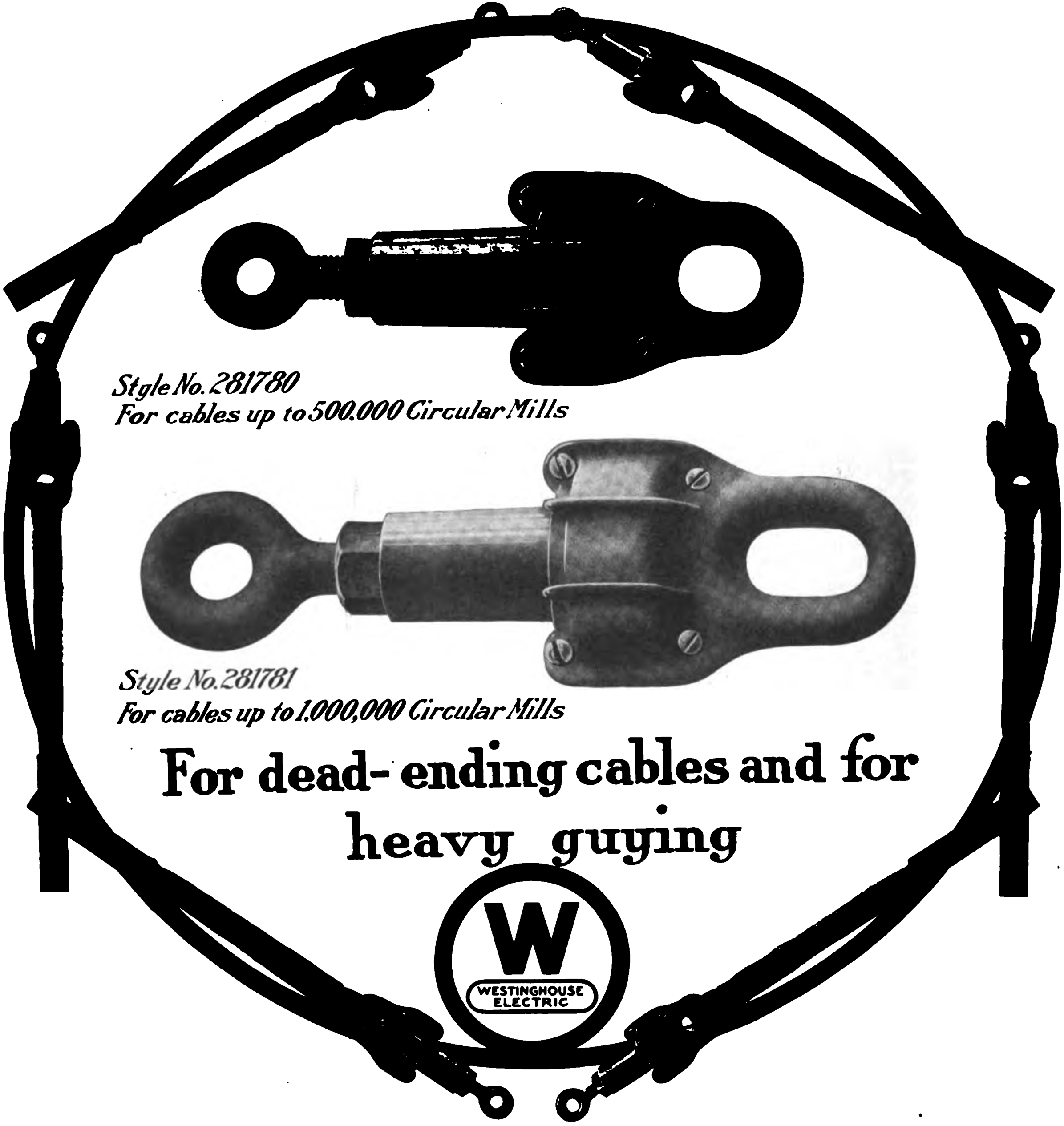
Nine new center-entrance, all steel interurban cars, of the Wheeling Traction Company, Wheeling, W. Va., have just been equipped with HL Control and quadruple Westinghouse No. 532 motors.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.
Sales Office in All Large American Cities

W
WESTINGHOUSE ELECTRIC

Westinghouse

Westinghouse Brooklyn Strain Insulators



Style No. 281780
For cables up to 500,000 Circular Mills

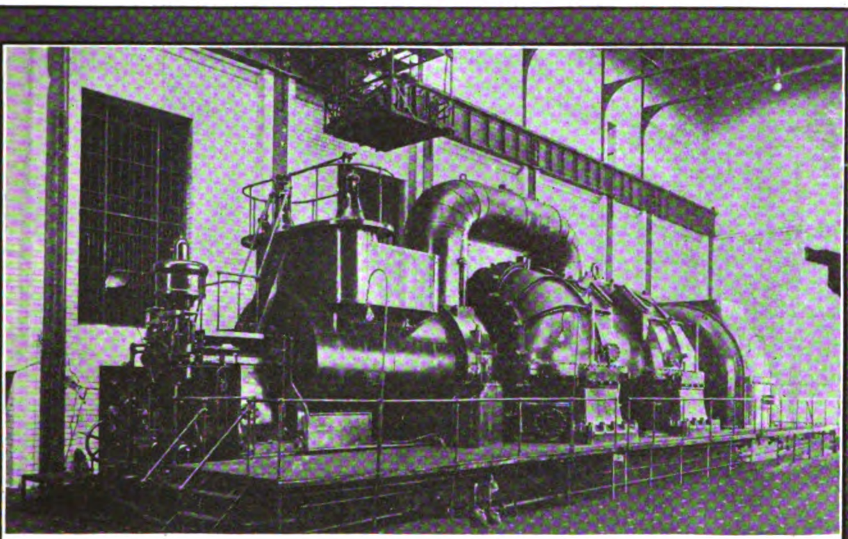
Style No. 281781
For cables up to 1,000,000 Circular Mills

For dead-ending cables and for heavy guying

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

Operating History of Westinghouse Turbine Units of 30,000 Kw. and Higher



A 35,300 Kva. Westinghouse Tandem Compound Turbine-Generator Unit at the Northwest Station of the Commonwealth Edison Co., Chicago, Ill.

This space will be used to give the operating history of our steam turbine-generator units which have been installed in sizes of 30,000 kilowatts and larger. The series will cover a record to date of their performances, of any troubles they have had, and perhaps some interesting features connected with their use. There will be eight articles, embracing eleven of these large units.

ARTICLE NO. 2

Operating History

This is a 60-cycle, 3-phase, 12,000-volt unit, the turbine having separate high and low-pressure cylinders arranged in tandem. Operating conditions 220 pounds steam pressure, 200° superheat and 29" vacuum. The machine has reaction blading throughout.

Capacity Availability

This unit has been running about 90 per cent of the total hours from date of starting, September 14, 1917, to the present time. It ran from October 24th, 1917, to January 1st, 1918, without shutting down, when it was taken off to clean condensers. Ordinarily it is shut down at week ends for eight to ten hours for condenser cleaning. It has carried up to 39,000 Kw., but is usually operated near its most efficient point of about 25,000 Kw. The maximum guaranteed safe operating temperature of the generator is 150 degrees C. Under conditions of maximum load and highest summer heat, the operating temperature does not exceed 132 degrees C. Air washers are installed for cleansing and cooling the inlet air.

Outages

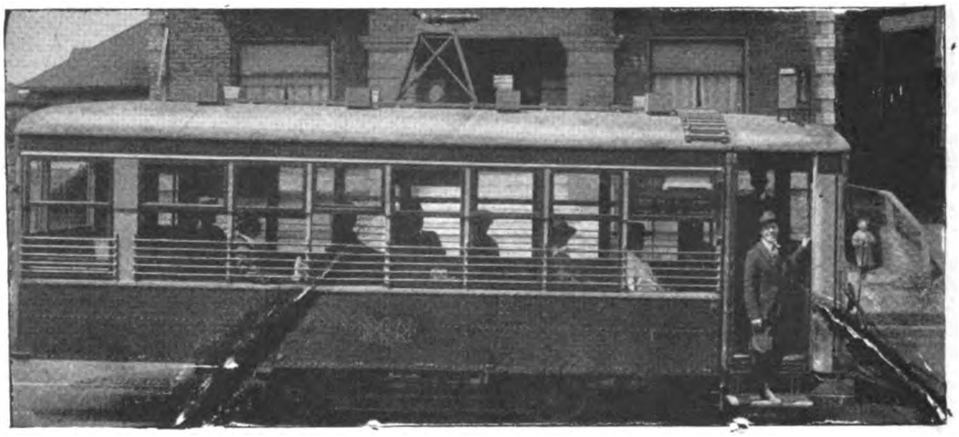
A few hours after unit was put into service the labyrinth packing on the low-pressure element failed. We believe it was caused by buckling of turbine cylinder due to rigid piping connections between the two surface condensers, preventing the condensers translating with the turbine as the temperature increased. The machine being urgently needed, temporary repairs were made, the packing being removed, also the spindle holding ring, the stationary ring being trued up for temporary use. The machine has been operating in this condition ever since, at slightly less efficiency, the permanent repair parts of an improved design being on the ground to be put in when the unit can be spared.

A duplicate of the above unit has since been installed in the same station. This will be covered in a later article.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

W
WESTINGHOUSE ELECTRIC

Westinghouse



High Spots of Safety Car Experience from a City of 23,000—

"We find that the schedules are being maintained better than formerly, when heavier, two-man equipment was used." Car for car, too!

"Our receipts have been considerably increased, owing to the better schedule and the use of fare boxes."

"The increased receipts together with the decreased costs have had a very favorable effect on our net earnings."

"Some men have given up day runs on two-man cars in order to get night runs on one-man cars."

Don't say "That's all right in a small town, but it wouldn't go here."

There's no town too big for SAFETY CAR operation.

IT IS A SAFETY CAR ONLY

When equipped with automatic, laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air-brakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the air-brakes must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES CO.

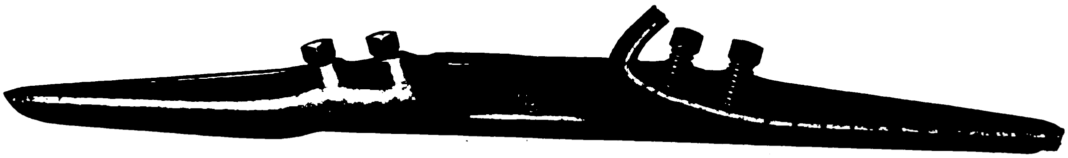
Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO	NEW YORK	PITTSBURGH
Railway Exchange Building	City Invest. Building	Westinghouse Building

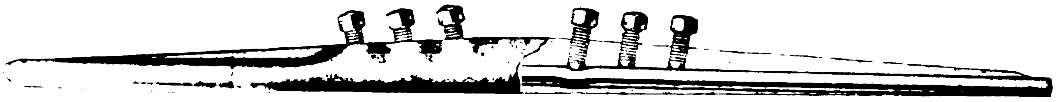
CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

OB PRODUCTS

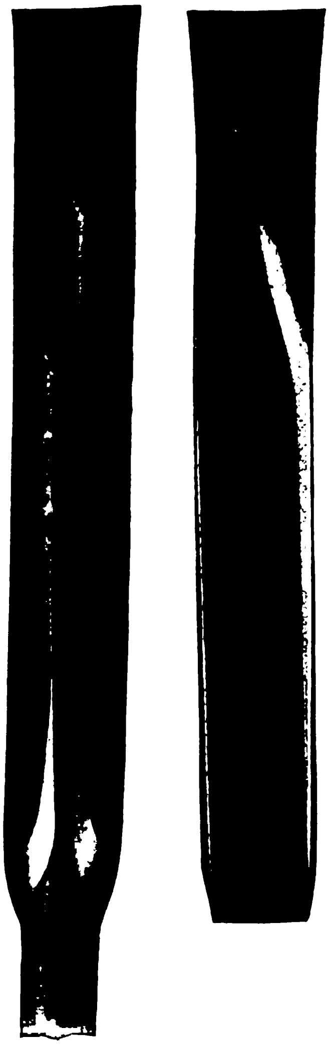
Quality First



O-B Type D Splicer, 20 inches long—Patented. Also made with boss. For heavy duty. Especially recommended for Phono-electric and steel trolley.



O-B Type C Splicer, 20 inches long—Patented. Also made with boss. Much used to keep worn trolley wire in service. Essentially a city type of splicer.



The Lily Approach—Patented. The lips are designed like a split tube—when clinched on the wire they fit.

Long Wire Life
Long Splicer Life

Trolley wire lasts longer with O-B Type C and Type D Splicers. The wire enters practically in a straight line and so avoids sharp bends which lead to crystallization and rapid wear.

The life of the wire is still further lengthened by the "Lily" approach—an exclusive O-B feature. The lips fit snugly around the wire and provide a smooth, arc-reducing path for the wheel.

Because of the smooth approach and arcless underrun, because of their tough, strong bodies—O-B Type C and Type D Splicers endure.

THE OHIO BRASS COMPANY
Mansfield, Ohio

New York **Philadelphia** **Pittsburgh**
Chicago **Los Angeles** **San Francisco**

Phono-Electric

Doesn't Mind the Grind

Whether it is on tangents or on curves, Phono-Electric withstands best the grinding of the trolley wheel.

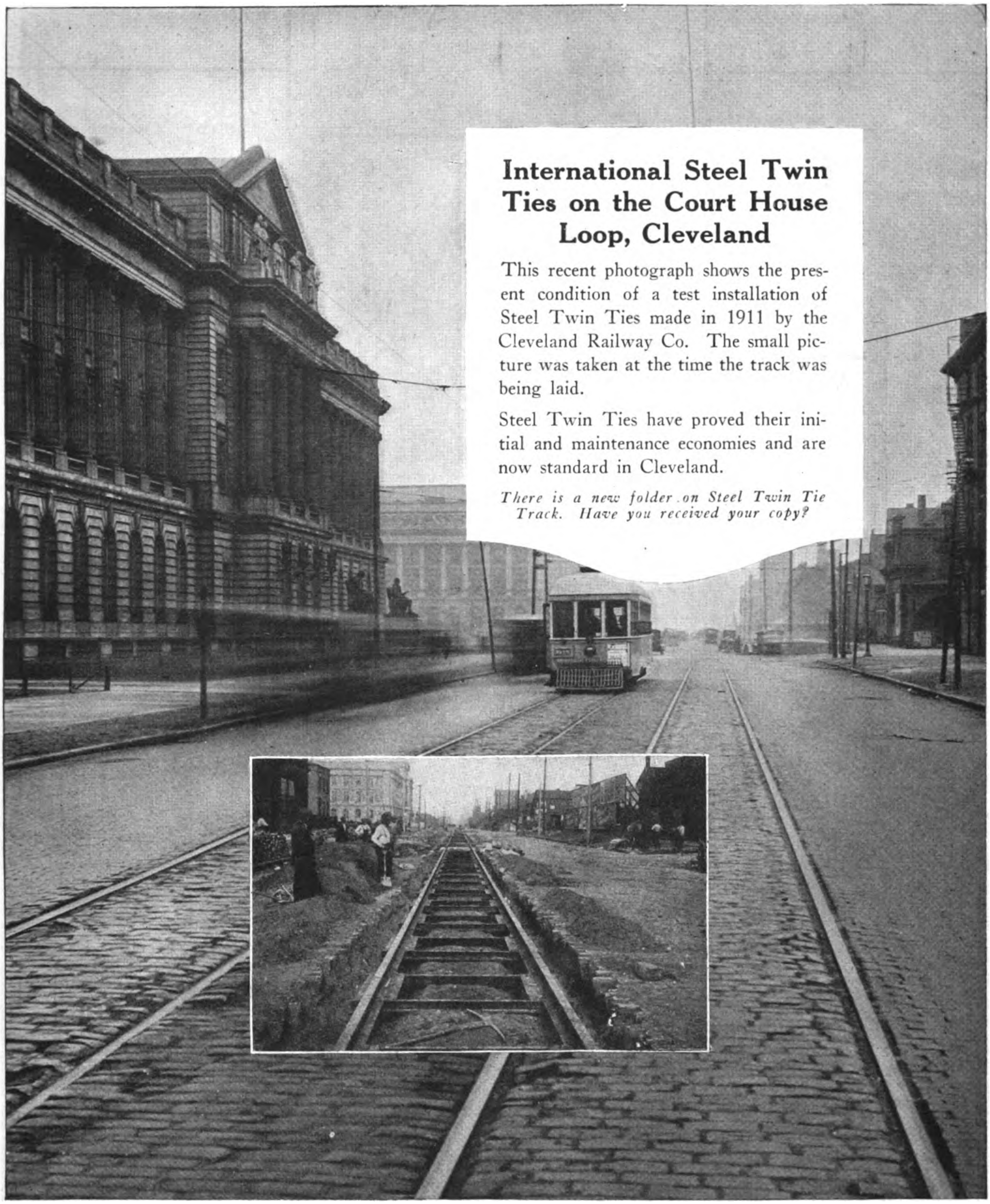
The Portland, Oregon, Railroad, Light & Power Company thinks so, evidently, for it has Phono-Electric on many curves and also on 8 miles of double track.

Variations in alignment and in the positions of the trolley base may not look big to the eye, but just ask the line foreman why he wants something that will meet the conditions best—in short why he wants

Phono-Electric

Bridgeport Brass Company

Bridgeport Connecticut



International Steel Twin Ties on the Court House Loop, Cleveland

This recent photograph shows the present condition of a test installation of Steel Twin Ties made in 1911 by the Cleveland Railway Co. The small picture was taken at the time the track was being laid.

Steel Twin Ties have proved their initial and maintenance economies and are now standard in Cleveland.

There is a new folder on Steel Twin Tie Track. Have you received your copy?

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations.

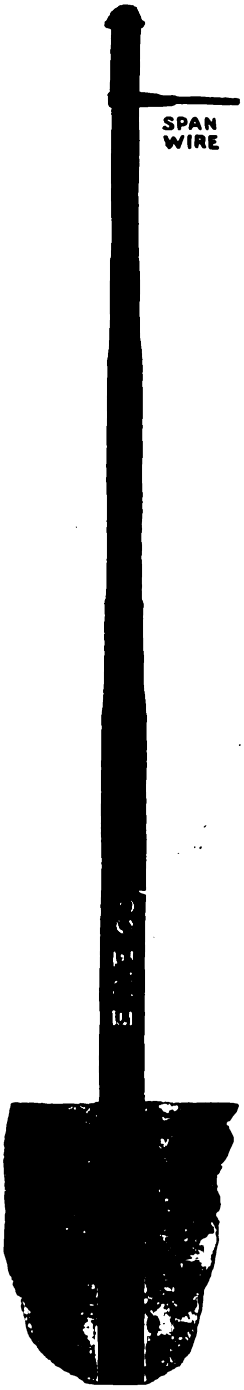
General Sales Office and Works: Cleveland, Ohio

Elreco Tubular Poles combine

Lowest Cost **Lightest Weight**

Least Maintenance **Greatest Adaptability**

The ELRECO Tubular Pole Is the strongest Practicable Pole



ONE of the most efficient structural shapes known to engineers is the I-beam. But in utilizing an I-beam due care must be given to its installation with respect to the maximum strength of the section and the load to be carried.

The impracticability of such a structure for withstanding strains in all directions is self-evident.

The only shape that combines the highest limit of efficiency in unit weight for all-around strength is the circular tube.

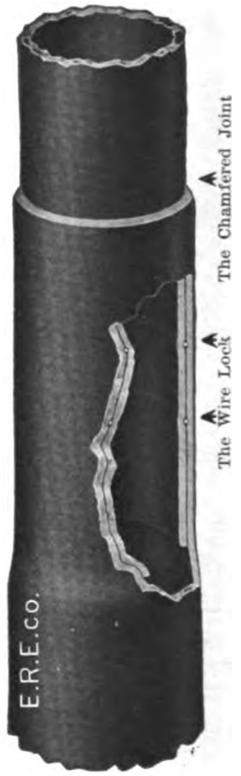
As the circle is the symbol of perfection in geometry, so is the tube the symbol of perfection in poles.

For solid proof consider this case. A 30-ft. Elreco Tubular Pole made up of 6-in., 5-in. and 4-in. sections, will weigh about 50 lb. lighter and cost about $1.00 less than any other form of metal pole of the same all-around strength.

Elreco Tubular Poles are not in use by hundreds of thousands because they were the only ones available in the past, but because they were and are the best.

Elreco Tubular Poles have made good at all times as the best poles, against every other form, style and shape of pole conceivable.

In the City of Chicago more than 50,000 Elreco Poles are in service. Other cities throughout the world have their proportionate share.



Observe the WIRE LOCK

Electric Railway Equipment Company

Cincinnati, Ohio

New York, 30 Church Street

For Interurban Service

For Interurban Service

"Golden Glow"

Ideal for Interurban Service

The various types of "Golden Glow" Headlights for interurban service all project powerful, penetrating, steady, non-blinding beams of "Golden Glow" light—a volume of light actually greater than the average arc headlight projects.

The secret lies in the high efficiency of "Golden Glow" greenish glass reflectors and the general make-up of the headlight through and through.

Therefore when you adopt "Golden Glow" on your cars you are buying headlights correct in principle and design.

Place your order now, and soon your cars will be headed by beams of cheery "Golden Glow."

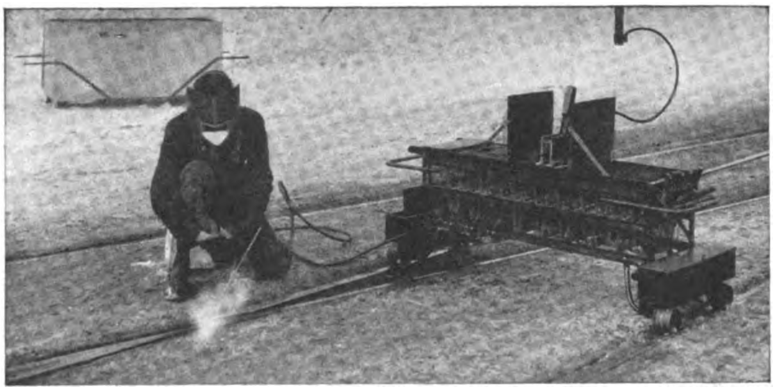
ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA	NEW YORK	CHICAGO
17th and Cambria Streets	50 Church Street	Monadnock Building

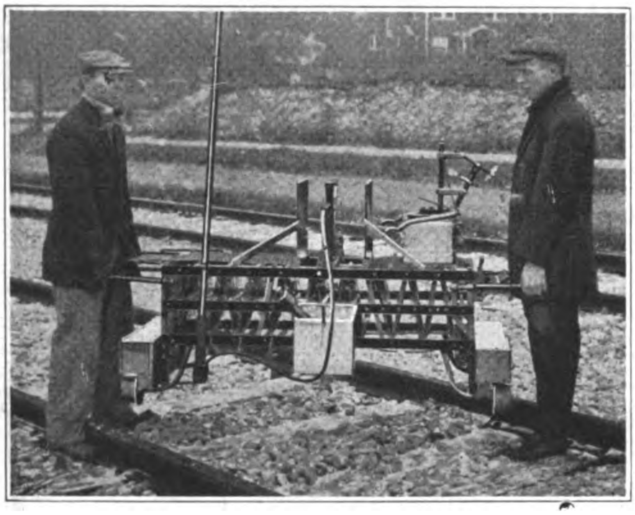
Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg

The
ERICO Portable Welder



for
Building Up Broken Switch Points

for
Welding Rail Bonds



for
Convenience
—two men can easily handle it

for
Maintaining Schedules

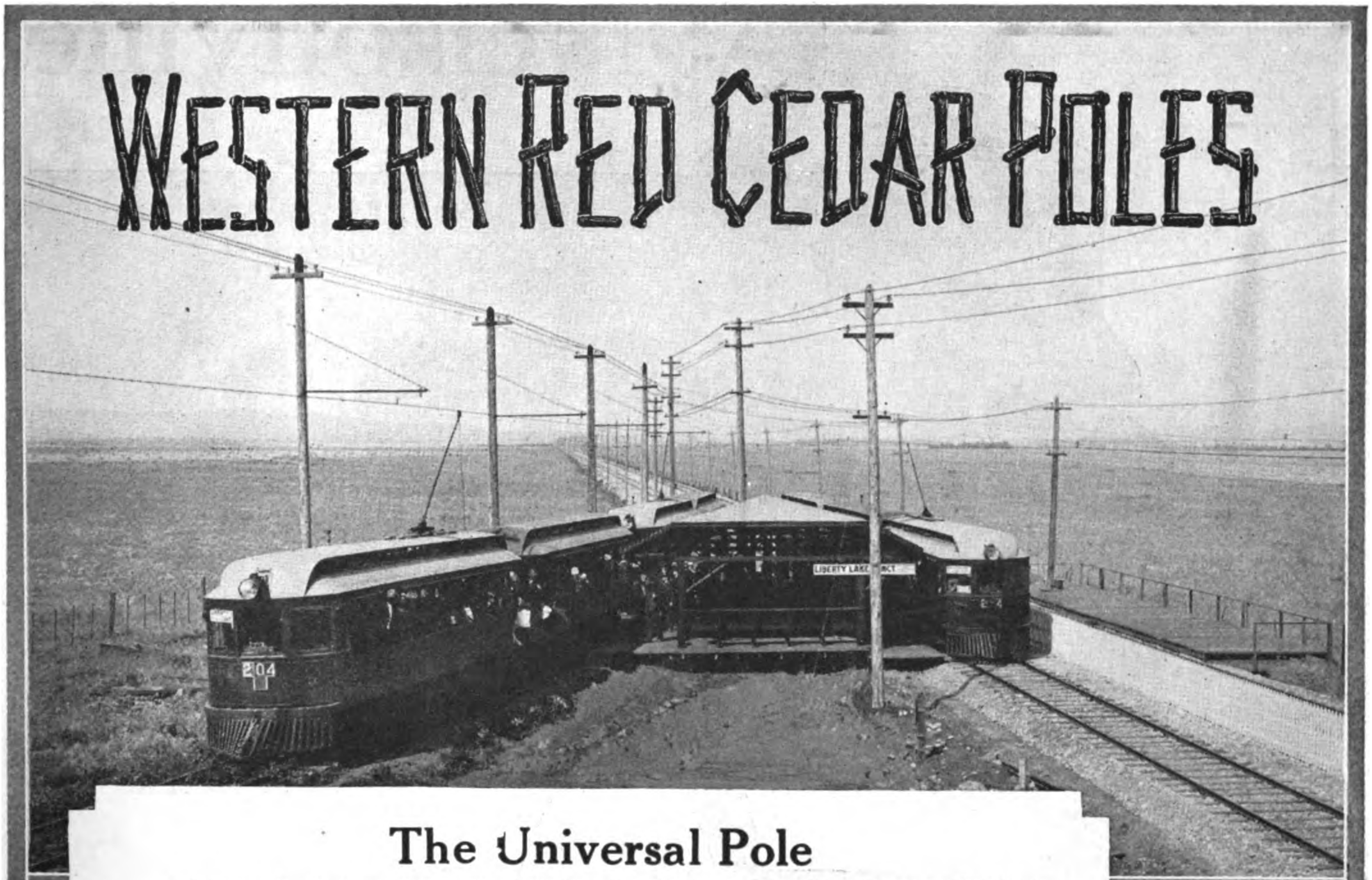
Write for complete information.

The Electric Railway Improvement Co.
Cleveland

British Representative:
The Forest City Electric Services Supply Co.
39 Chapel Street, Salford England

Representative for Australia and New Zealand:
MR. CHAS. WRIGHT
Box 251, G. P. O., Melbourne, Australia

WESTERN RED CEDAR POLES



The Universal Pole

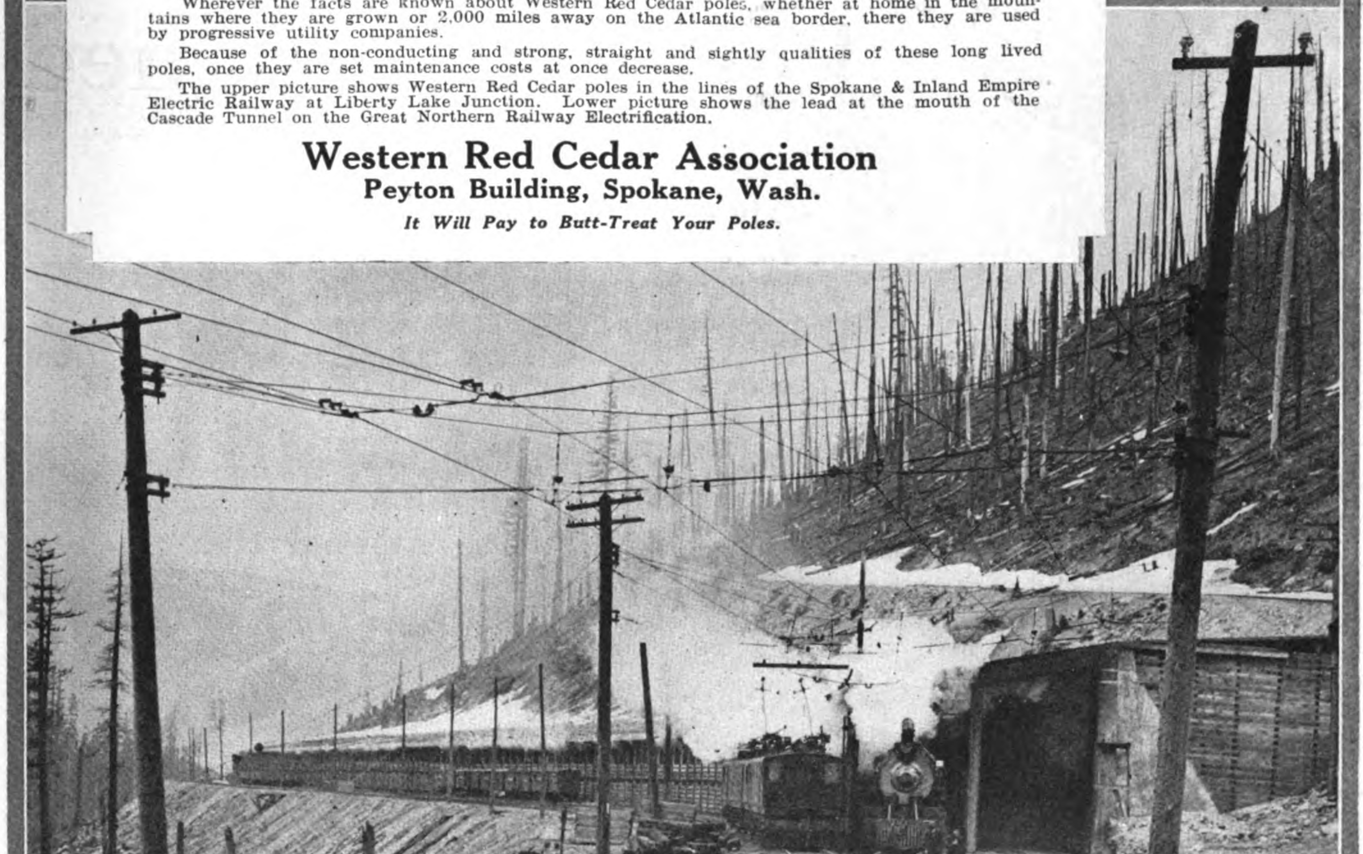
Wherever the facts are known about Western Red Cedar poles, whether at home in the mountains where they are grown or 2,000 miles away on the Atlantic sea border, there they are used by progressive utility companies.

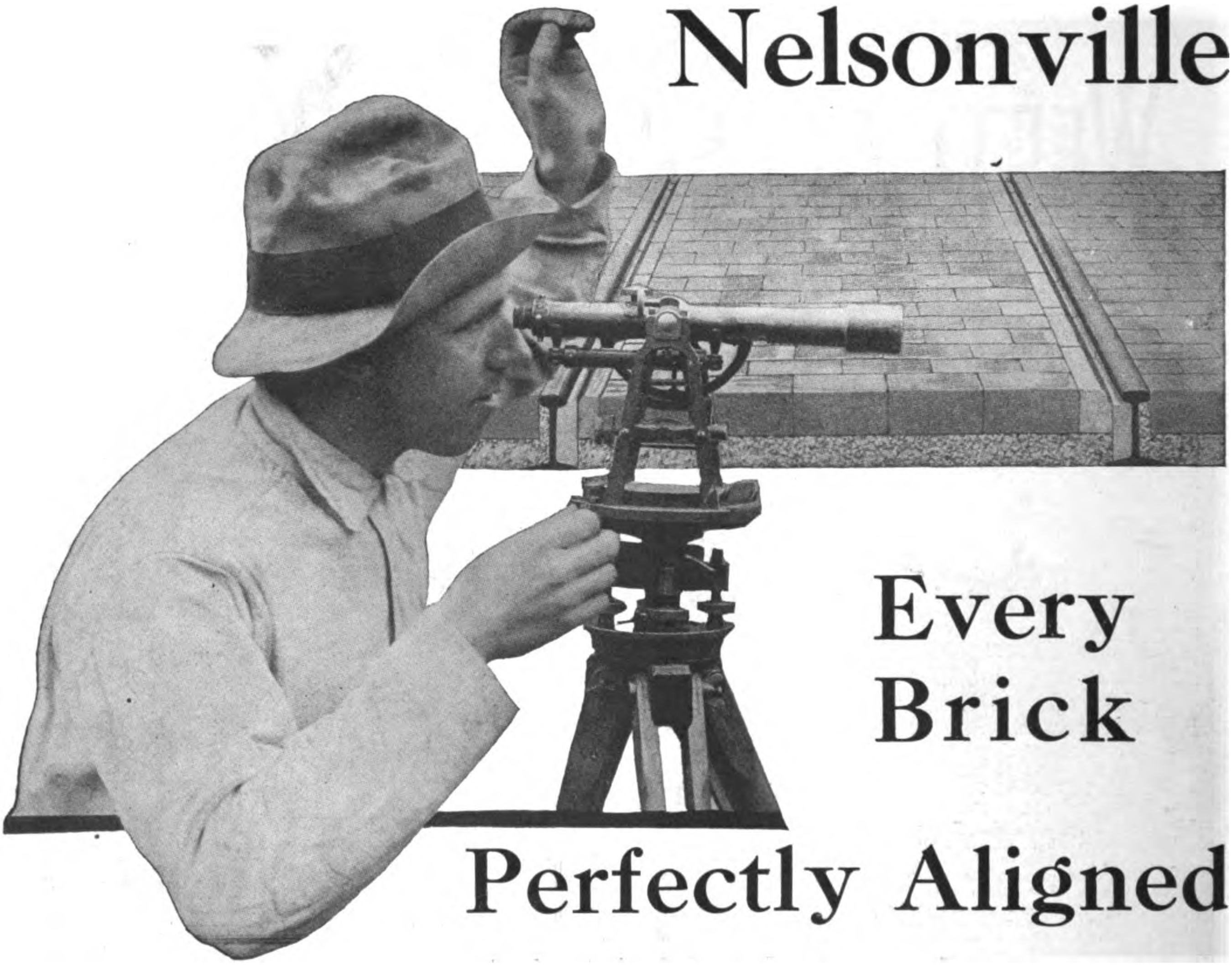
Because of the non-conducting and strong, straight and sightly qualities of these long lived poles, once they are set maintenance costs at once decrease.

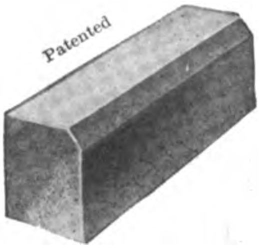
The upper picture shows Western Red Cedar poles in the lines of the Spokane & Inland Empire Electric Railway at Liberty Lake Junction. Lower picture shows the lead at the mouth of the Cascade Tunnel on the Great Northern Railway Electrification.

Western Red Cedar Association
Peyton Building, Spokane, Wash.

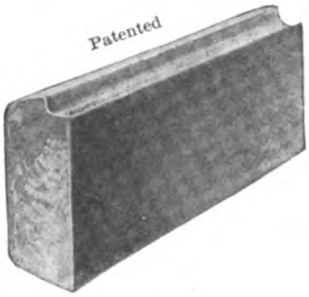
It Will Pay to Butt-Treat Your Poles.




Nelsonville
Every Brick
Perfectly Aligned



Nelsonville Stretcher Brick



Nelsonville Filler Brick

These bricks are laid *without grouting.*

They positively absorb vibration and shock.

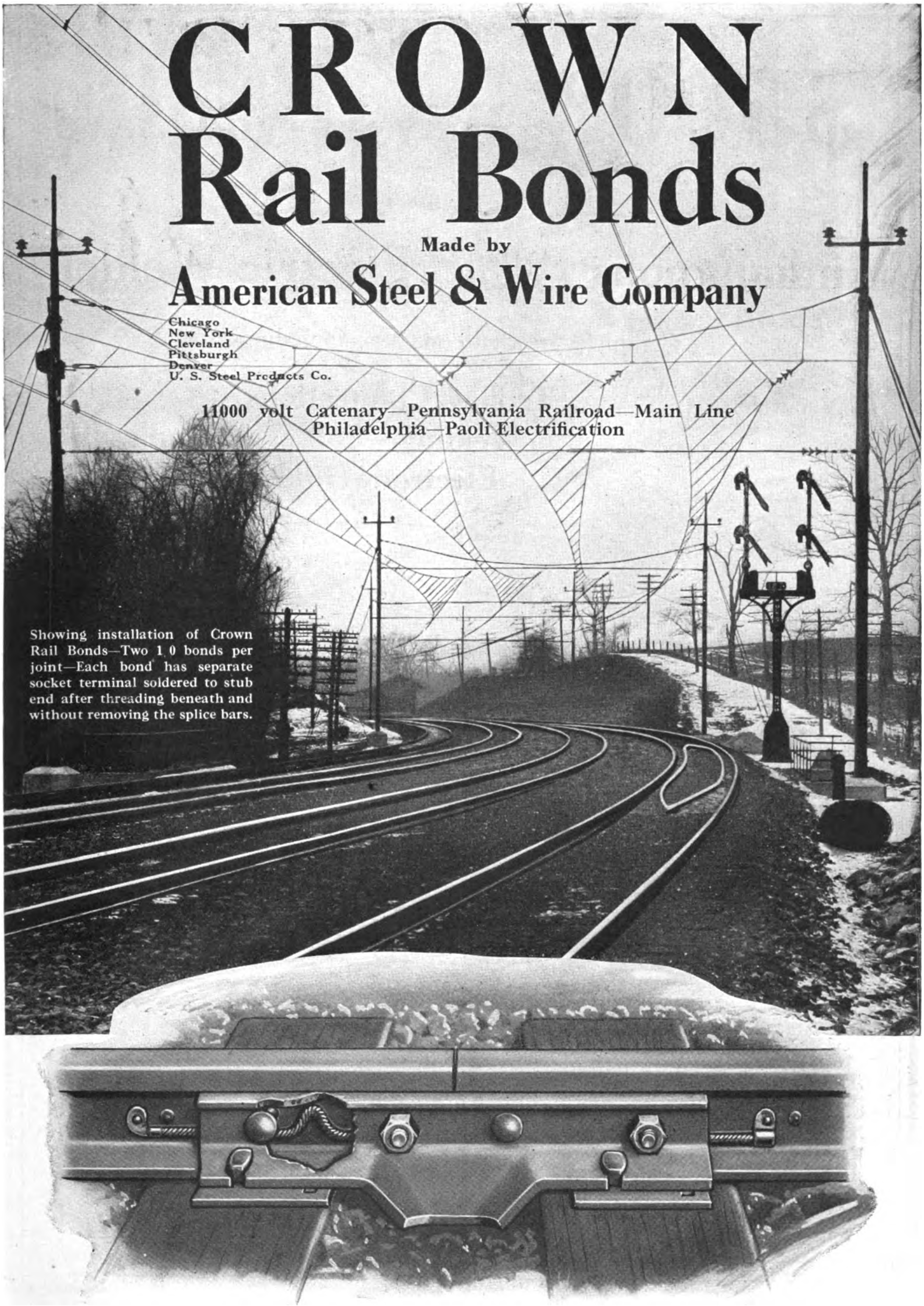
They are the shortest way of obtaining a permanent, tight, level pavement with the minimum of paving repairs.

They permit the use of the old reliable, economical T-rail in street-car tracks, without the danger of "Kick-ups."

***THE PROOF** of all our claims is in our booklet, "Rail Brick of the Right Sort"—shall we send it?*

THE NELSONVILLE BRICK CO.

Nelsonville, Ohio



CROWN Rail Bonds

Made by

American Steel & Wire Company

Chicago
New York
Cleveland
Pittsburgh
Denver
U. S. Steel Products Co.

11000 volt Catenary—Pennsylvania Railroad—Main Line
Philadelphia—Paoli Electrification

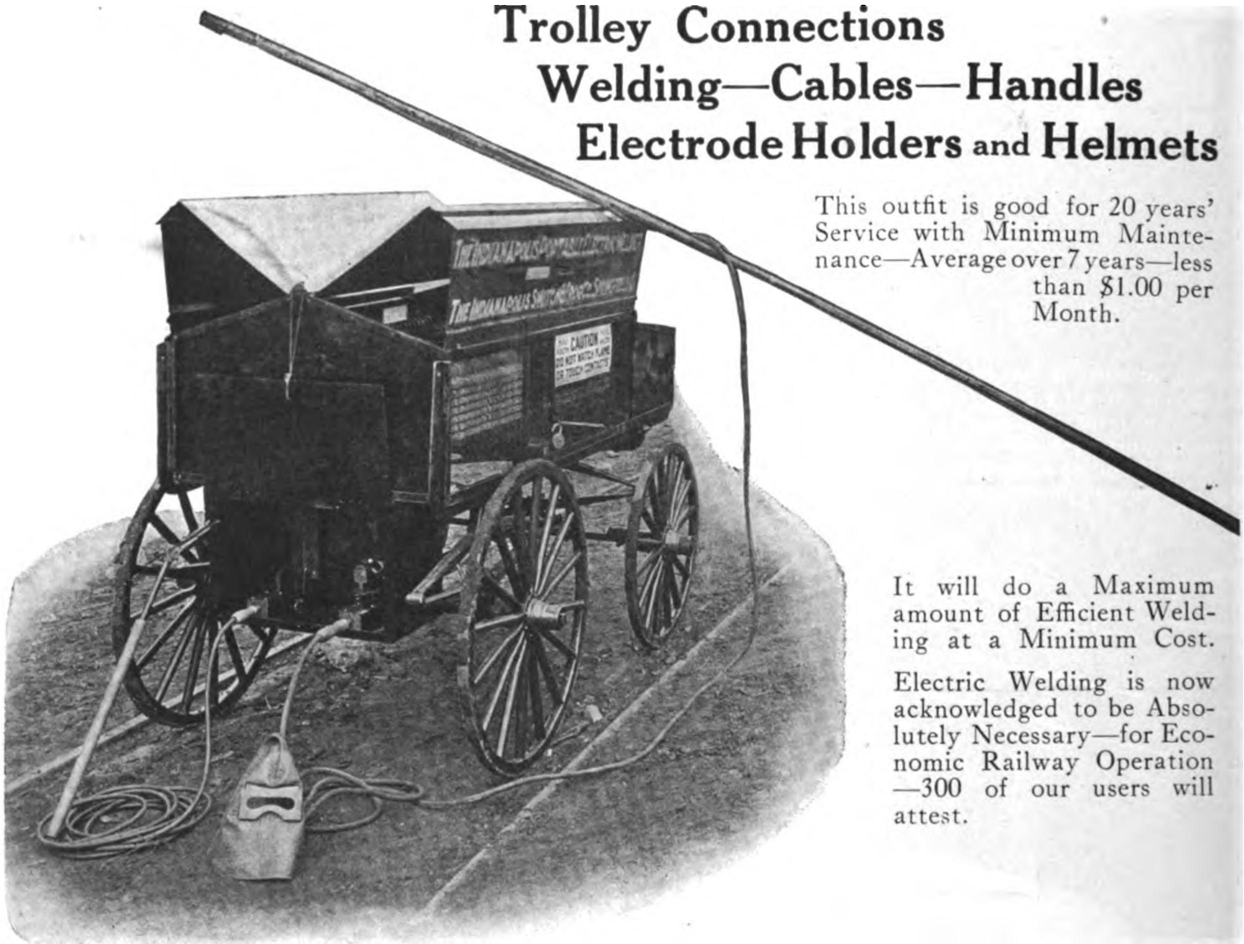
Showing installation of Crown Rail Bonds—Two 1 0 bonds per joint—Each bond has separate socket terminal soldered to stub end after threading beneath and without removing the splice bars.

$500.00 Pay-as-you-Save

Will equip your road with an

Indianapolis PATENTED PORTABLE Electric Welder

Complete—ready to operate—including



Trolley Connections
Welding—Cables—Handles
Electrode Holders and Helmets

This outfit is good for 20 years' Service with Minimum Maintenance—Average over 7 years—less than $1.00 per Month.

It will do a Maximum amount of Efficient Welding at a Minimum Cost.

Electric Welding is now acknowledged to be Absolutely Necessary—for Economic Railway Operation—300 of our users will attest.

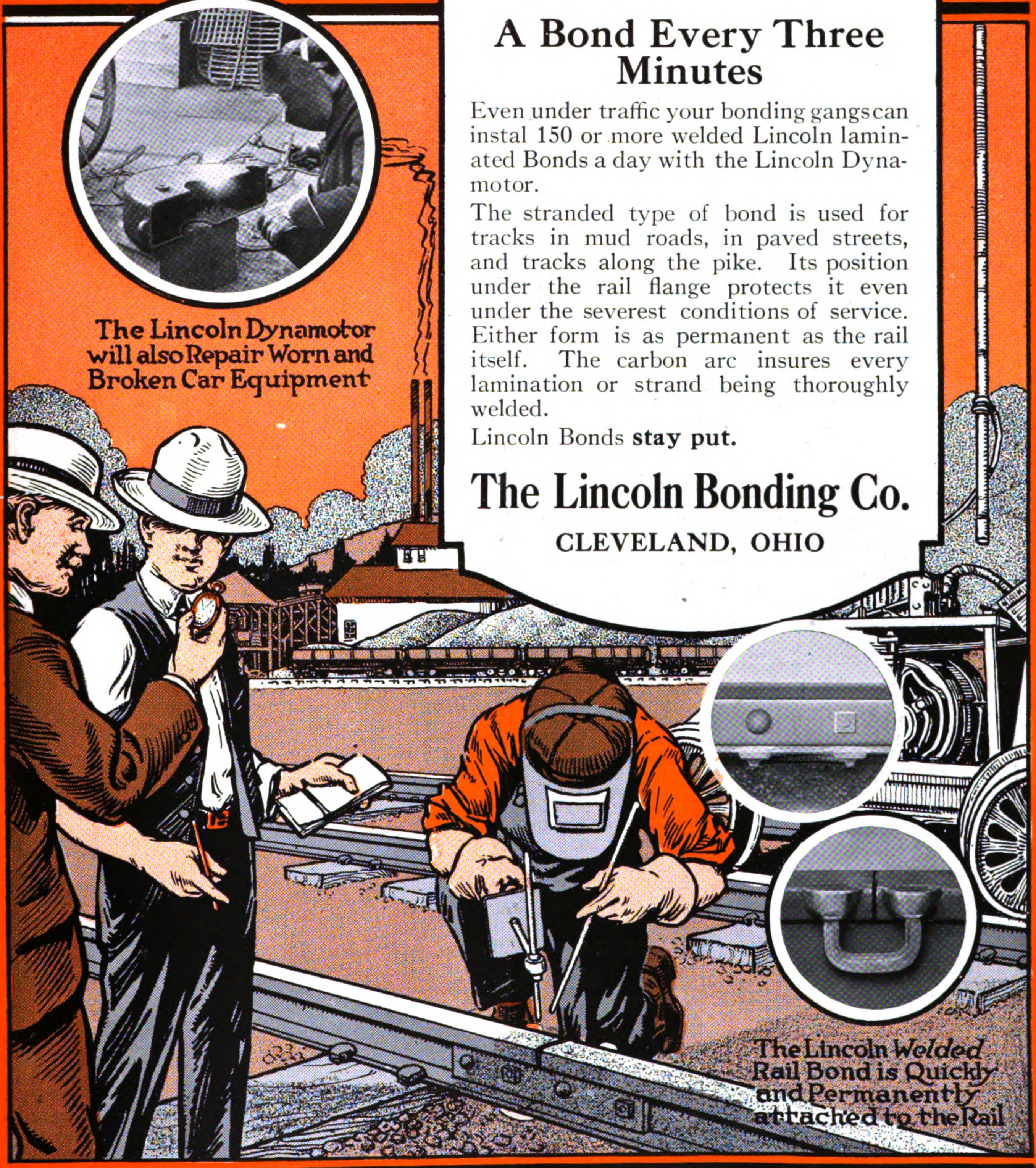
Get our Book on Welding—Joints—Reclaiming Track Special Work and Rolling Stock Equipment

Indianapolis Switch & Frog Co.

Springfield, Ohio

Lincoln Dynamotor

Portable Bonder and Welder


The Lincoln Dynamotor will also Repair Worn and Broken Car Equipment
The Lincoln *Welded* Rail Bond is Quickly and Permanently attached to the Rail

A Bond Every Three Minutes

Even under traffic your bonding gangs can instal 150 or more welded Lincoln laminated Bonds a day with the Lincoln Dynamotor.

The stranded type of bond is used for tracks in mud roads, in paved streets, and tracks along the pike. Its position under the rail flange protects it even under the severest conditions of service. Either form is as permanent as the rail itself. The carbon arc insures every lamination or strand being thoroughly welded.

Lincoln Bonds **stay put.**

The Lincoln Bonding Co.

CLEVELAND, OHIO

OVER

Bonding under 3-Minute Schedule

WITH THE LINCOLN DYNAMOTOR

So short is the time required for welding a Lincoln Bond to the rail that any traffic schedule is entirely practicable. These photos show the method of installation.

Car Has Just Passed. The helper fits the clamp which holds the carbon mold containing the Lincoln Bond in place on the rail.

45 Seconds Later. The welding operator has welded the bond solidly to the rail by means of the carbon arc by the Lincoln Dynamotor. The carbon mold retains the molten metal thus building up the head of the bond and welding it to the rail.

The Bond is Now Installed. It only remains to remove the clamp from the rail and the trolley pole from the wire and the track is cleared.

Let us speed up your bonding. Write us today for a demonstration of the Lincoln Dynamotor and Lincoln Bonds.

Not only does the Lincoln Dynamotor give you a perfectly continuous and permanently bonded track, but it is a motor-generator arc welding set in one which will repair worn or broken frogs, crossovers and turnout points, and reclaim 90% of the damaged car and shop equipment you are now scrapping.

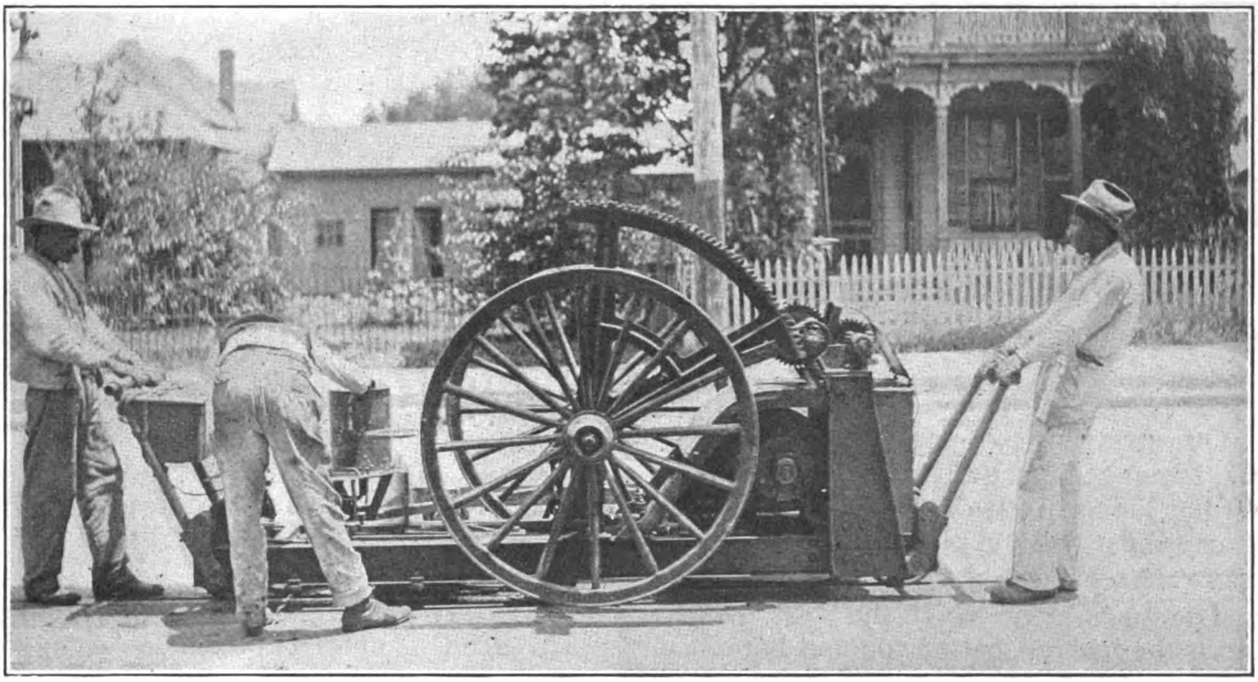
The Lincoln Bonding Co., :: 636 Huron Road Cleveland, Ohio, U. S. A.

LINCOLN BONDING COMPANY, 30 Church Street, New York City.
LINCOLN BONDING CO., - - - Fisher Building, Chicago, Ill.
RAILWAY TRACK WORK COMPANY, 30th and Walnut, Philadelphia, Pa.
ELECTRICAL ENGINEERING & MFG. CO., First Nat. Bank Building, Pittsburgh, Penn.

CHATTANOOGA ARMATURE WORKS, - - Chattanooga, Tenn.
W. L. ROSE EQUIPMENT COMPANY, LaSalle Building, St. Louis, Mo.
BURTON R. STARE COMPANY, - - Yesler Way, Seattle, Wash.
A. A. WIGMORE, 441 Pacific Elec. Bldg., - - Los Angeles, Calif.
CHARLES N. WOOD COMPANY, 14 Federal Street, Boston, Mass.

Two Savings—

15 to 40 per cent increase in life of track + Saving in cost of repairs



Reciprocating Track Grinders

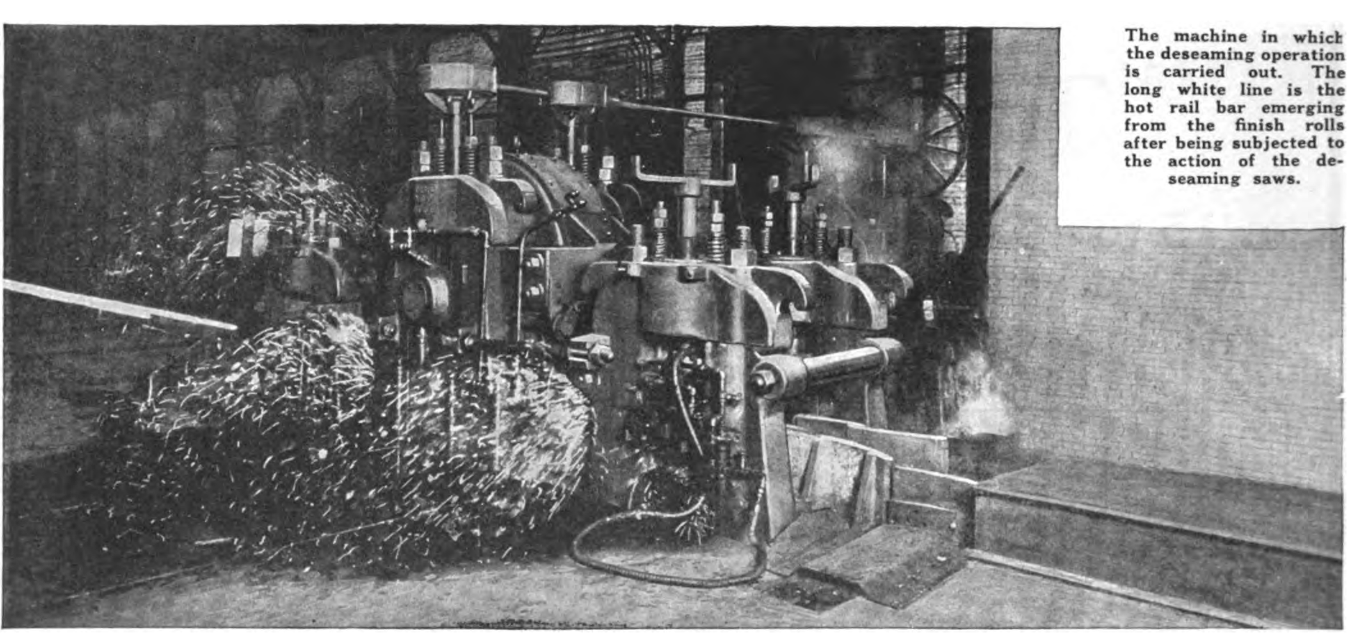
are heaping up savings for scores of electric railways throughout the country.

Rails will last almost twice as long if they are properly cared for *from the time of installation.* Immediately after laying they should be ground to a perfect condition of smoothness at the joints to prevent disastrous "cuppings," and corrugations must be ground out *as they appear.*

Reciprocating Track Grinders answer the demand of every condition. They do the work efficiently, cheaply and thoroughly. The savings of one will soon pay for another.

Let it sell itself on your own track.
If not satisfactory, return to us without obligation.

RAILWAY TRACK-WORK COMPANY
30th and Walnut Streets, Philadelphia

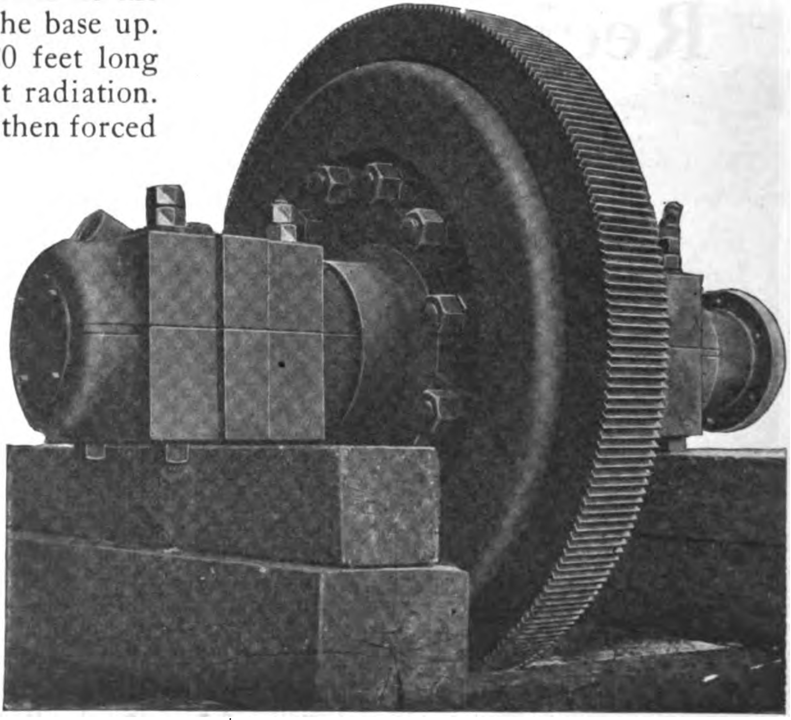


The machine in which the deseaming operation is carried out. The long white line is the hot rail bar emerging from the finish rolls after being subjected to the action of the deseaming saws.

This is the Lackawanna Deseaming Machine, which cuts off the weak metal that ruins running surface and starts cracks in rails made in the ordinary way.

Our previous two-page advertisements have made plain the necessity for removing the weak, laminated, partially decarburized metal at the head and base of rails, in order to secure a harder, longer-lived running surface and a greater safety from cracking and fracture. This announcement will explain how the desired metal improvement is accomplished in the Lackawanna Process.

The machine by which the weak metal at the location of the rail head and base is removed subjects the hot rail bar on top and bottom surfaces to cutting action from teeth on two opposed rotating saw discs, just after the hot bar comes down the mill table from the last roughing pass. During this stage of travel a collar roll turns the rail bar so that its head is down and the base up. The bar then enters a tunnel about 20 feet long and lined with fire brick to check heat radiation. (See diagram on opposite page.) It is then forced between the saw discs by a pair of driven pinch rolls, adjustable to bars of various sizes and having guides for the top, bottom and sides of the bar. Adjustment of the saws is made for a cut 1/8 inch or at the extreme 3/16 inch deep. A second set of driven pinch rolls, on the delivery side, helps to force the bar against the cut of the saw teeth and similarly a second set of guides here helps to hold the bar rigidly and firmly during passage through the saw. From the delivery set of pinch rolls the bar travels through about 40 feet more of tunnel similar to that on the



Upper saw disc taken from the machine.

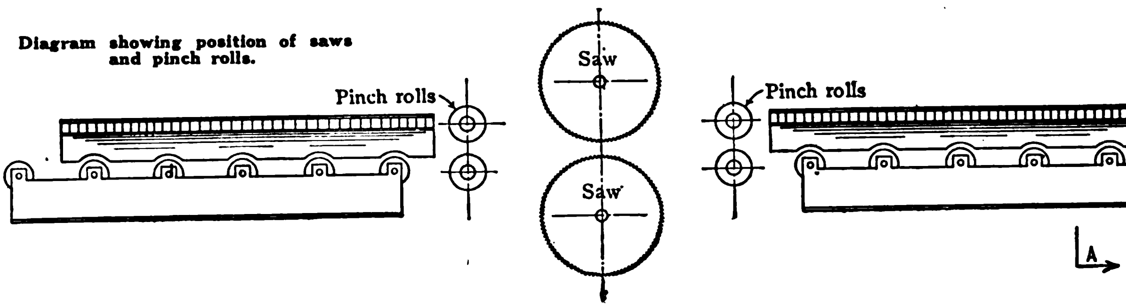


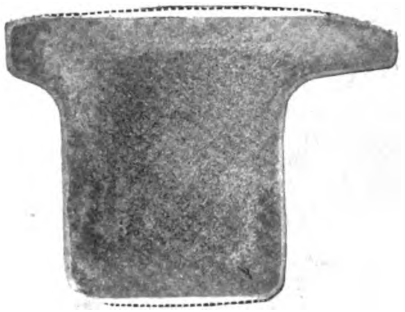
Diagram showing position of saws and pinch rolls.

entering side and then goes on its way to the stand of finishing rolls. The hot bar enters the saw at a speed of about 350 feet per minute, is slowed down by the cutting operation to about 79 feet per minute, and on leaving the saw rapidly picks up speed until it enters the finishing stand, at about 500 feet per minute.

The upper saw disc (operating on the base of the bar) has an 8-in. and the lower (operating on the head) a 6-in. face. Both are driven from belted motors, are 5 ft. in diameter and run at a peripheral speed of 25,000 ft. per minute, or, in other words, both discs together make 800,000 tooth contacts with the bar per minute. The capacity of the machine is 170 tons of rails per hour.

All Lackawanna Rails of 50 pounds per yard and heavier are now deseamed by this process, which in connection with high chemical purity makes the Lackawanna product unquestionably superior to any rails that have ever been offered.

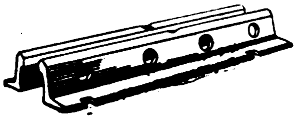
Watch for our following announcements which will give interesting data on rail performance, and send for our book "The Lackawanna Deseaming Process."


Showing the position in which the partially finished rail bar travels between the saws, and the extent to which soft metal is removed at the head and base.

All Lackawanna Rails Are Deseamed

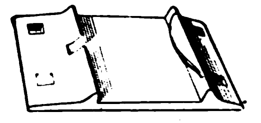
Other Lackawanna Aids to Better Track

The Lackawanna Safety-Head Angle Bar



overcomes liability to wear and fracture by preventing cutting of the bar at the top from back action or upward thrust of the rail ends. This is accomplished by a slight depression in the head of the angle bar for a short space at the center where the rail ends meet.

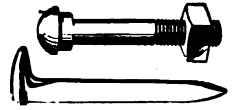
The Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

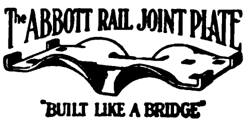
Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.

Lackawanna Track Bolts and Spikes



Our track bolts and spikes of all standard sizes for light or heavy rails, enjoy an enviable reputation for careful, accurate workmanship and finish.

The Abott Rail-Joint Plate


THE ABBOTT RAIL JOINT PLATE
"BUILT LIKE A BRIDGE"

strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars, and protects the rail ends from battering and breaking down.

The hard steel and combination of reversed flanging within the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in types especially suitable for ordinary steam railway service for use in paved streets and for welding to the rail base and may be held with either screw or ordinary spikes.

Write for our booklet
"Improved Track Appliances"

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York

SPEED

"Blaw" Speedster Buckets

Always live up to their name & rating.

Picking up an overload at every bite, coupled with its speed in operation, this 1½ cu.yd. "BLAW" SPEEDSTER is giving excellent service at the plant of the Northwestern Consolidated Milling Co., Minneapolis, Minn., where the fast rehandling of loose bulk materials is an essential factor.

Your plant would also benefit by the installation of a "BLAW" Bucket. Inform us of your requirements, and our engineers will help solve your problems.

BLAW-KNOX COMPANY

605 Farmers Bank Bldg., Pittsburgh, Pa.

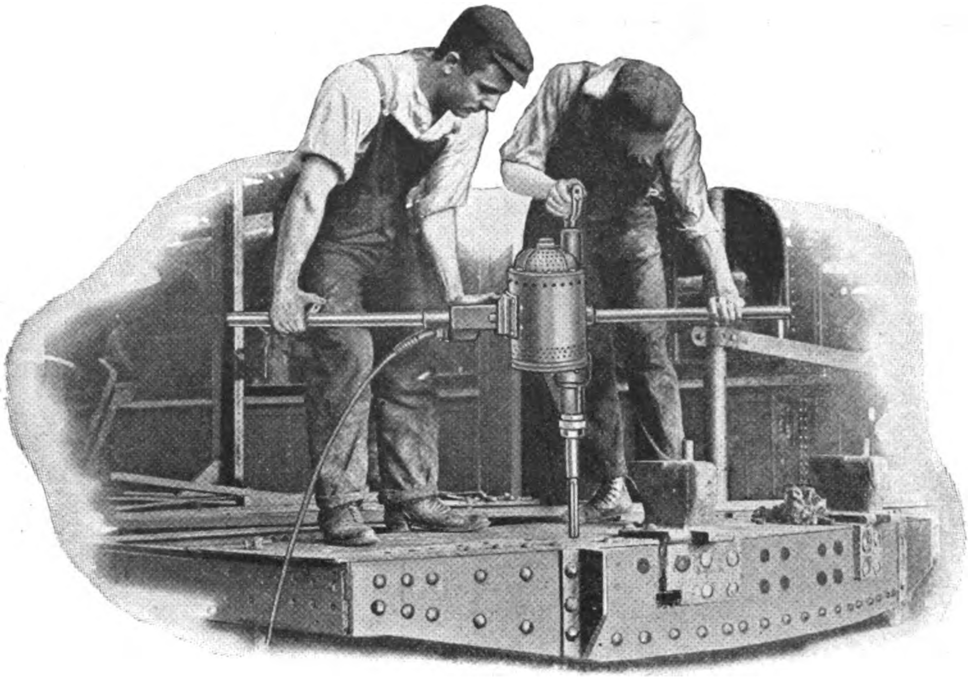
New York, 165 Broadway
Chicago, Peoples Gas Bldg.
San Francisco, 630 Monadnock Bldg
Foreign Sales Representatives:
Gaston, Williams & Wigmore, Inc.
39 Broadway,
New York City

PRODUCTS

"BLAW FORMS"
"BLAW BUCKETS"
FABRICATED STEEL
TRANSMISSION TOWERS
FURNACE EQUIPMENT
"BLAW MIXERS"
PLATE WORK

LITTLE GIANT

Portable Electric Tools



Does your shop use Portable Electric Tools?

POWERFUL, speedy, vibrationless, dependable — and equipped with the most ruggedly built electric motors to be found in any line of portable electric Tools made!

That's what users say about Little Giant Portable Electric Drills (and Grinders too).

Little Giant Electric Tools incorporate features of construction the result of twenty-five years experience. Judge their superiority on your work by actual test. Test them for efficiency, pulling power, and low temperature rise; test them for drilling speed, operating economy and ease of control, maintenance and inspection.

Then, with the figures at hand, remember your decision to standardize on "Little Giants" will be substantiated by the fact that they are by far the most extensively sold and used line of portable electric tools in the world!

Made in a complete line for A. C., D. C., or Universal service.

Do you have the new bulletins?

Chicago Pneumatic Tool Company
1062 Fisher Building, Chicago, Illinois
Branches all over the world

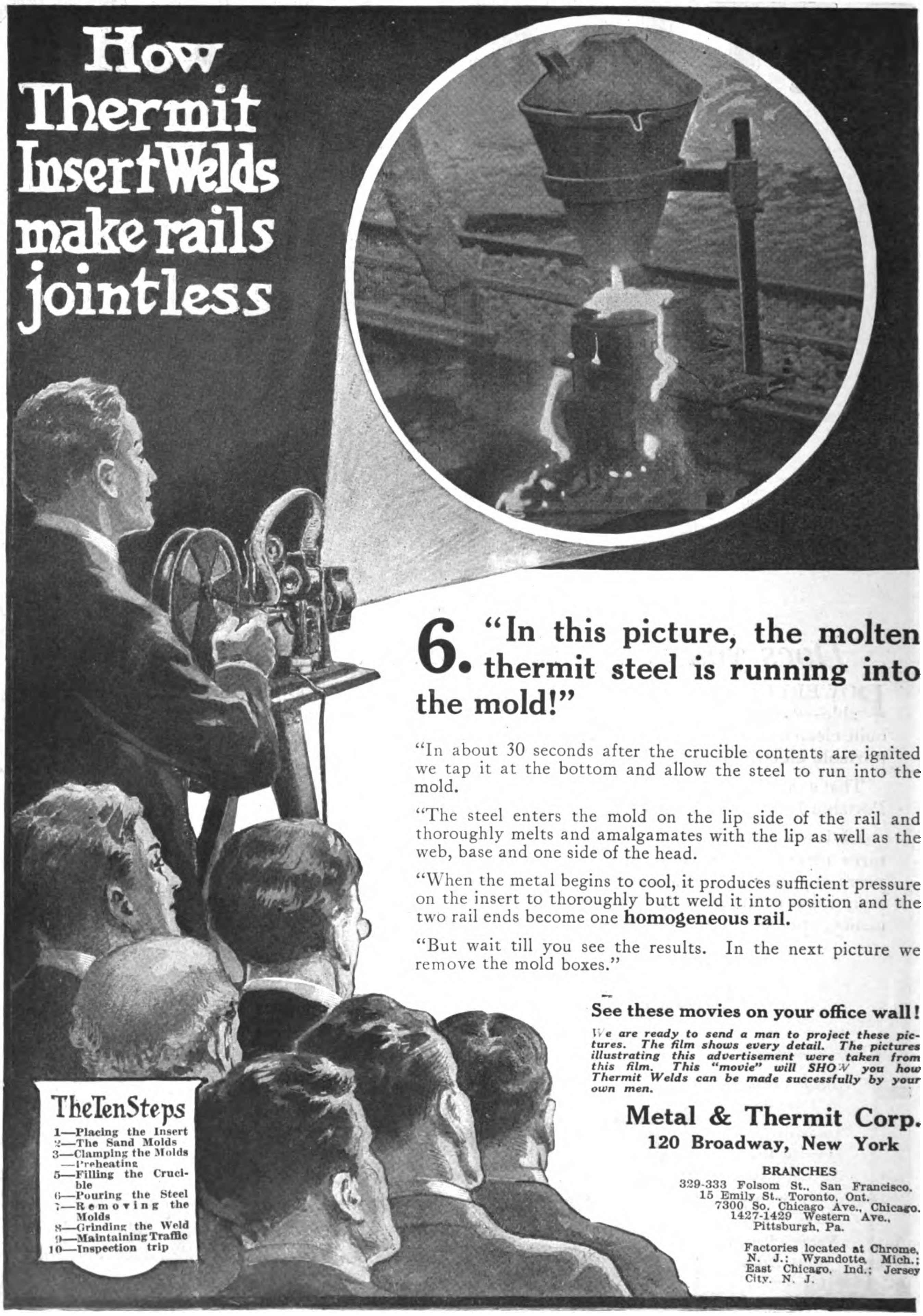
"Chicago Pneumatic"
Products

Pneumatic Tools
Electric Drills
Air Compressors
Oil, Gas and
Steam Engines
Vacuum Pumps
Rock Drills

CL-4

"CHICAGO PNEUMATIC"

Depend upon that name



6. "In this picture, the molten thermit steel is running into the mold!"

"In about 30 seconds after the crucible contents are ignited we tap it at the bottom and allow the steel to run into the mold.

"The steel enters the mold on the lip side of the rail and thoroughly melts and amalgamates with the lip as well as the web, base and one side of the head.

"When the metal begins to cool, it produces sufficient pressure on the insert to thoroughly butt weld it into position and the two rail ends become one **homogeneous rail.**

"But wait till you see the results. In the next picture we remove the mold boxes."

See these movies on your office wall!

We are ready to send a man to project these pictures. The film shows every detail. The pictures illustrating this advertisement were taken from this film. This "movie" will SHOW you how Thermit Welds can be made successfully by your own men.

Metal & Thermit Corp.
120 Broadway, New York

BRANCHES
329-333 Folsom St., San Francisco.
15 Emily St., Toronto, Ont.
7300 So. Chicago Ave., Chicago.
1427-1429 Western Ave., Pittsburgh, Pa.

Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

The Ten Steps

1—Placing the Insert
2—The Sand Molds
3—Clamping the Molds
—Preheating
5—Filling the Crucible
6—Pouring the Steel
7—Removing the Molds
8—Grinding the Weld
9—Maintaining Traffic
10—Inspection trip

twelve years ago—

these 36-inch **ARMCO IRON** Culverts were placed in this little stream. Through every extreme of heat and cold that twelve summers and winters have brought, they have stood up staunch and sturdy, unaffected by rust, showing no sign of deterioration.

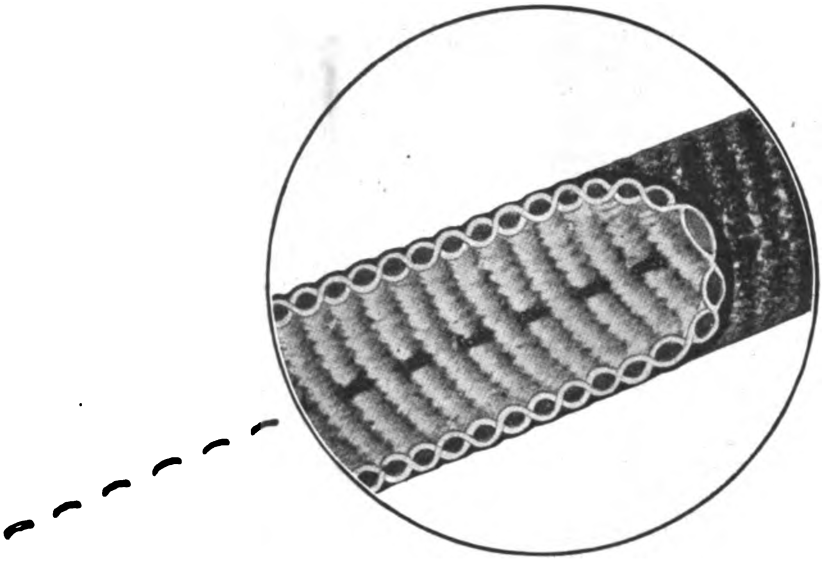
Installations such as this, made years ago in all parts of the country, have established the fact that **ARMCO IRON** Culverts are permanent improvements.

AMERICAN ARMCO INGOT IRON

LOOK FOR THE TRIANGLE TRADE MARK

There is a manufacturer in nearly every state and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO IRON CULVERT & FLUME MFRS. ASSN.
TRANSPORTATION BLDG. CHICAGO



Be sure it's

DURADUCT

(Reg. U. S. Patent Office)

before you go ahead

In order that you may easily identify Duraduct, we weave a black thread along the white interior "roller bearing" wire way.

This is your guarantee that you are getting the best.

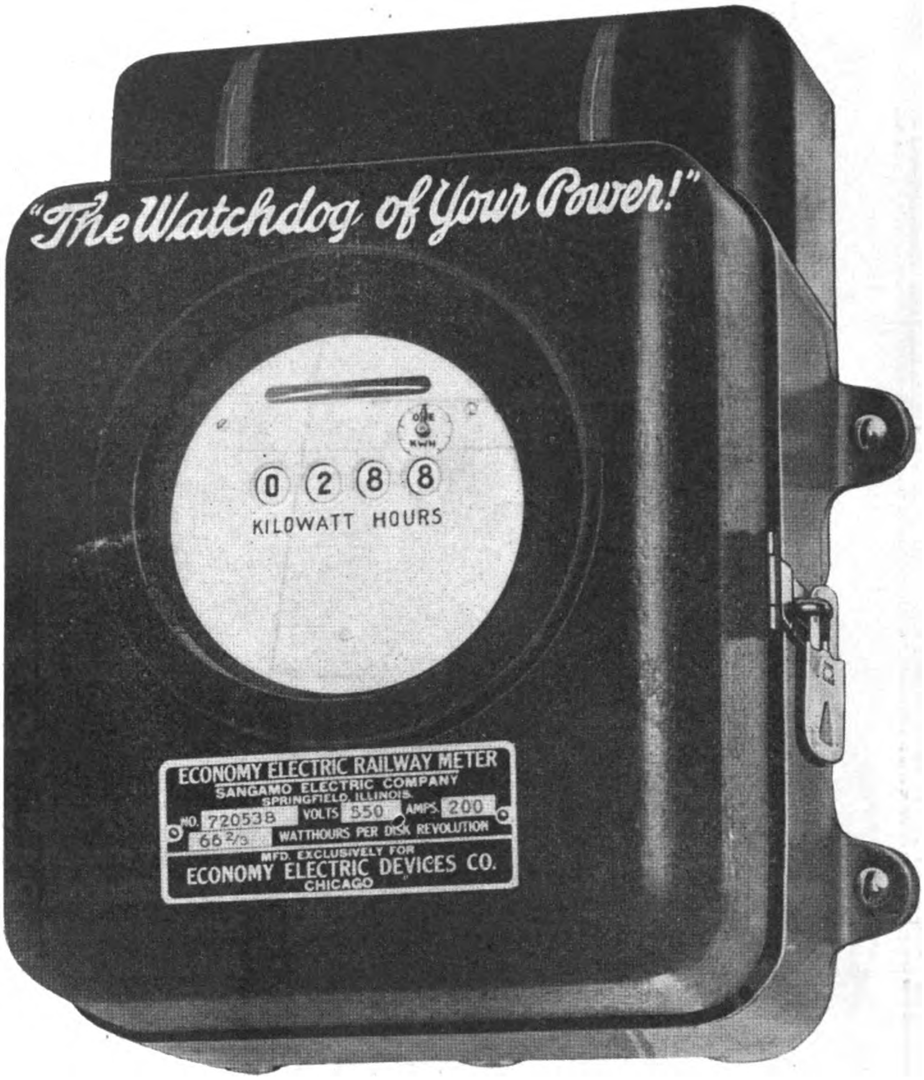
All good jobbers sell Duraduct.

TUBULAR WOVEN FABRIC COMPANY
MANUFACTURERS • PAWTUCKET • R. I.
A. HALL BERRY • GENERAL SALES AGENT
71-73 Murray Street, New York   9 So. Clinton Street, Chicago
WENDELL & MACDUFFIE CO., 61 Broadway, New York City
Distributors for all foreign countries except Canada
Northern Electric Company, LIMITED Distributors for Canada

THE BLACK DOTTED LINE IS THE MARK OF
--------DURADUCT--------

SCRANTON INSTALLS

Economy Railway Meters


"The Watchdog of Your Power!"
0288
KILOWATT HOURS
KWH
ECONOMY ELECTRIC RAILWAY METER
SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS.
NO. 720538 VOLTS 550 AMPS. 200
66 2/3 WATTHOURS PER DISK REVOLUTION
MFD. EXCLUSIVELY FOR
ECONOMY ELECTRIC DEVICES CO.
CHICAGO

They meter the *ENERGY* and that's what the management wants to save

The Scranton Railway Co. is equipping all its cars with Sangamo Economy Meters.

This was done after full consideration of the excellent results obtained by another American Railways property, the Chicago & Joliet Electric Ry. This property has been operating *Economy Meters* for several years and is, in fact, one of the pioneers in the adoption of this power-saving device.

The dial of the ECONOMY Meter shows the motorman just how much energy he uses.

He knows that by saving energy he saves money and few men are wilfully wasteful.

Because the ECONOMY Meter measures what he is trying to save, the motorman can satisfy himself as to the most economical methods of operation.

His interest is held and he does save.

These fundamentals underlie the success of the ECONOMY Meter.

This device on your cars will speedily pay for itself in the savings it effects.

Let us send you our illustrated booklet describing it.

Economy Electric Devices Company

General Sales Agent

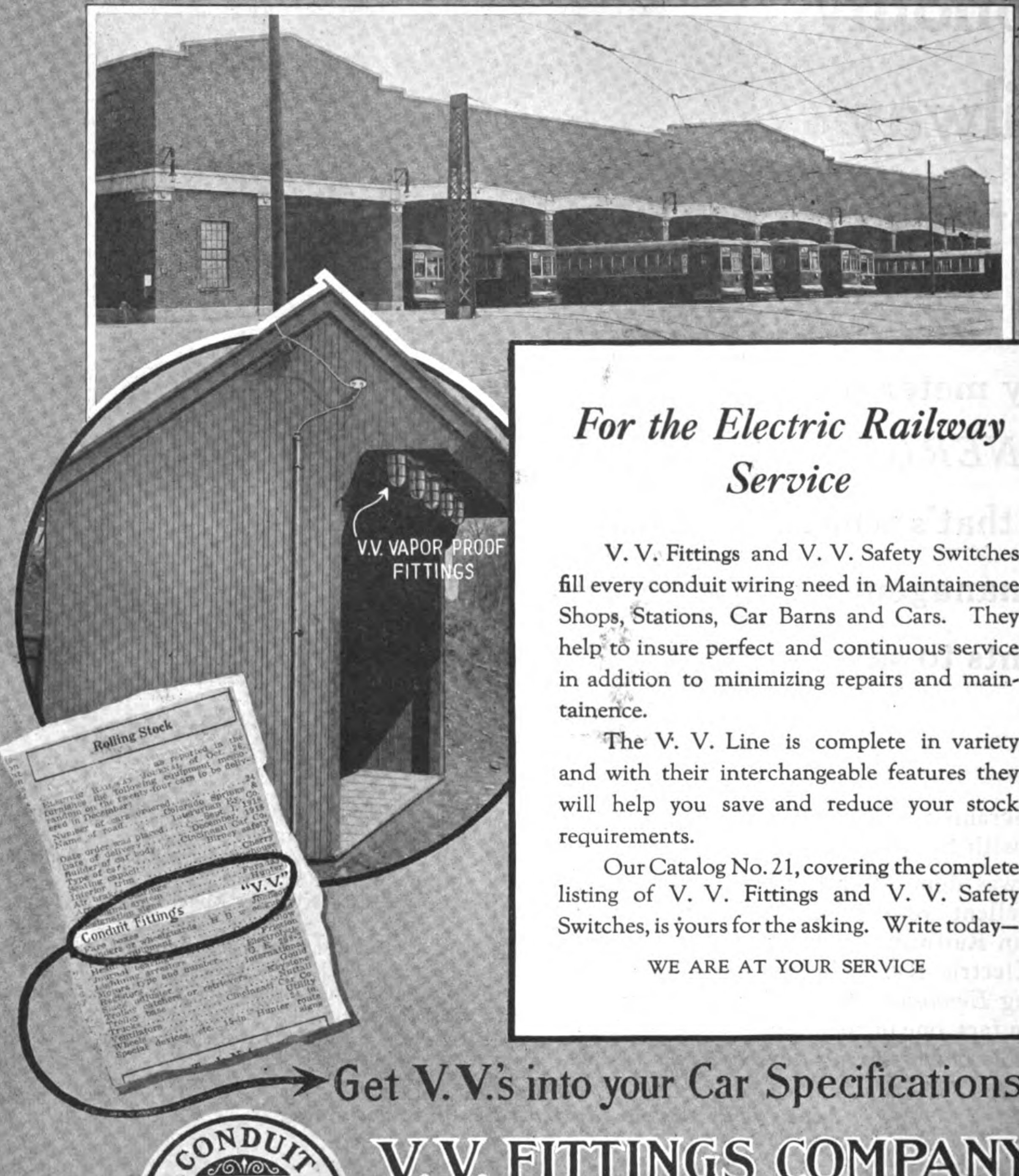
Sangamo Economy Railway Meter

Old Colony Bldg., Chicago

National Railway Appliance Co., New York
Burton R. Stare Co., Seattle
Ludwig Hommel & Co., Pittsburgh
L. A. Nott, San Francisco
J. G. Monahan, Los Angeles

V. V. FITTINGS

FOR CARS, STATIONS, REPAIR SHOPS AND BARNS



For the Electric Railway Service

V. V. Fittings and V. V. Safety Switches fill every conduit wiring need in Maintainence Shops, Stations, Car Barns and Cars. They help to insure perfect and continuous service in addition to minimizing repairs and maintainence.

The V. V. Line is complete in variety and with their interchangeable features they will help you save and reduce your stock requirements.

Our Catalog No. 21, covering the complete listing of V. V. Fittings and V. V. Safety Switches, is yours for the asking. Write today—

WE ARE AT YOUR SERVICE

Get V.V.'s into your Car Specifications

CONDUIT
V·V
FITTINGS

V. V. FITTINGS COMPANY
MAIN OFFICE AND WORKS
PHILADELPHIA PA. U.S.A.
BRANCH OFFICES
NEW YORK CHICAGO

7 Reasons

why you should choose Arthur Power-Saving Recorders

"He can check it with his own watch"

First—Because it talks the language of the motorman. It measures the power-on time—and (note this for it is important) it measures it in terms that the motorman understands—minutes. If you want to save power, encourage the motorman to shut it off by recording the minutes he has the power on.

Second—It encourages legitimate coasting without holding off the brakes until the last second each time.

It encourages the motorman to run with the power shut off—the natural way to save power and also the safest method of operation.

Third—The motorman has faith in the Arthur Recorder for the reason that he understands it easily. If necessary he can check it up with his own watch at any time. Because of this his cooperation is more easily obtained and better power-saving results are produced than where the motorman is more or less working in the dark.

Fourth—It requires but little clerical work to follow up the records.

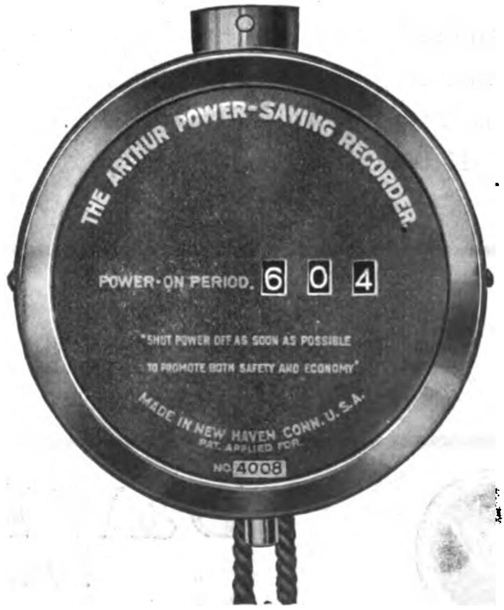
Fifth—Where desired its figures can be used as a basis for arriving at car inspection intervals, so doing away with the cost of obtaining individual car mileages. Cars can be inspected on a "service" rather than on a mileage or daily basis.

Sixth—Since it costs comparatively little and saves a great deal, it follows that it will pay for itself on any property in a very short time.

Seventh—You don't have to buy Arthur Recorders. If desired we rent them on easy terms and allow the full amount of the rental payments to apply on the purchase price.

The advantages of Arthur Recorders are substantiated by the solidest kind of facts, by hard cash saved on large scale properties.

The Arthur
Power-Saving Recorder Co.
New Haven, Conn.


THE ARTHUR POWER-SAVING RECORDER.
POWER-ON PERIOD. 6 0 4
"SHUT POWER OFF AS SOON AS POSSIBLE
TO PROMOTE BOTH SAFETY AND ECONOMY"
MADE IN NEW HAVEN CONN. U.S.A.
PAT. APPLIED FOR.
NO 4008

"It Talks the Language of the Motorman."

"D & W" RENEWABLE FUSES

The New "Jacketed" Expulsion Link is the Greatest Improvement since the Renewable Element was Introduced

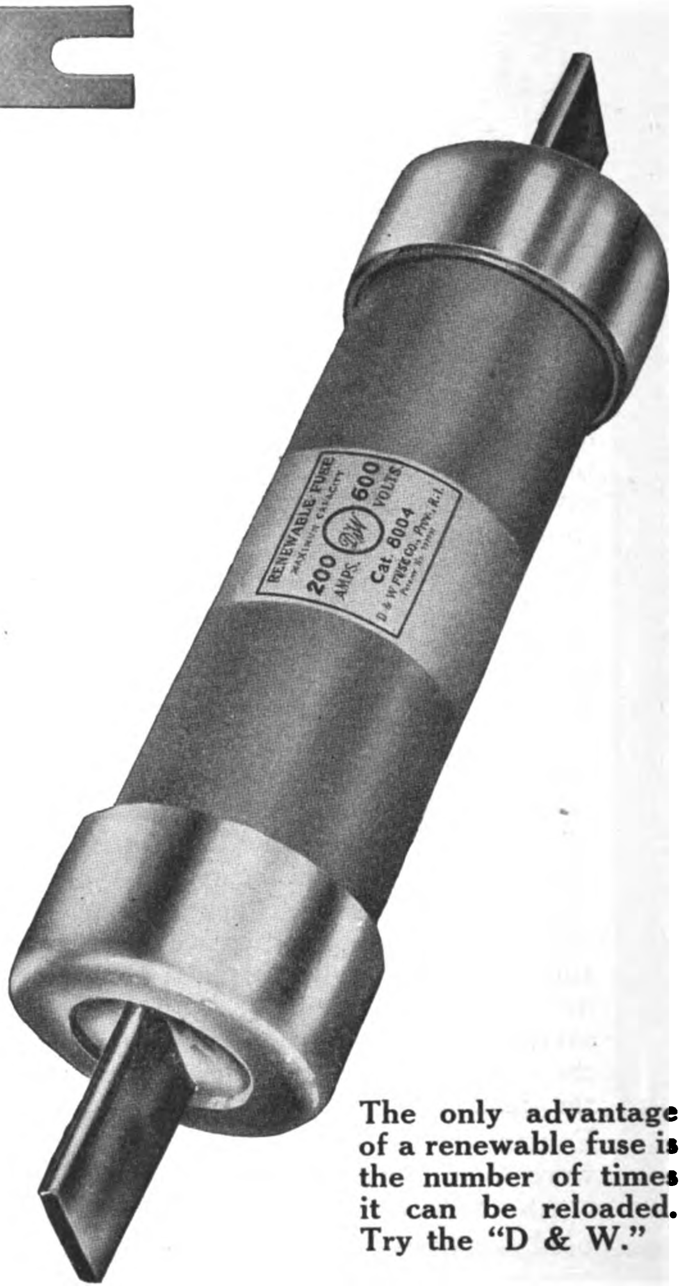
D & W
200 A. 600 V.

The new "Jacketed Expulsion Link" consists of a flat strip of special alloy metal with the central portion enclosed by a jacket of specially treated asbestos which is unaffected by high temperature.

This "Jacketed" Link, by its explusion action, greatly reduces the arc and insures longer life to the fuse casing.

"D & W" Renewable Fuses with the "Jacketed" Links will meet the extreme short circuit tests imposed by the Underwriters' Laboratories, Inc., which subject *one fuse at a time* to full rated voltage at 10,000 amperes.

For Complete Description send for the Supplement to Catalog No. 16.

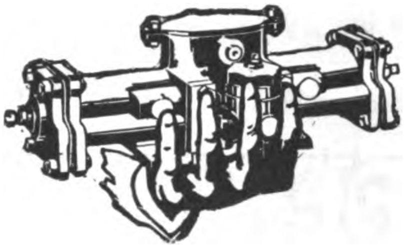


The only advantage of a renewable fuse is the number of times it can be reloaded. Try the "D & W."

D & W Fuse Company
Providence R.I.
U.S.A.

REG. U.S. PAT. OFF.

CAR
COSTS
EARNINGS
25c. per car mile
Platform Expenses
90c. per car hour



CAR
COSTS
EARNINGS
25c. per car mile
Platform Expenses
50c. per car hour

The Way Out

"We're not short of cars, but we simply can't afford to run them at a platform cost of 90 cents an hour when we are earning only 25 to 30 cents a car mile."

"Could you afford to run them at 50 cents an hour?"

"Oh help, yes. But how can we get men to work at that rate now?"

"You can't get *men* but can get *A Man* for that rate. Just

"Put National Pneumatic Door and Step Control

On Your Laid-Up Cars

"And you will be surprised at the way both your traffic and your former employees will be glad to come back."

NATIONAL PNEUMATIC COMPANY
INC.

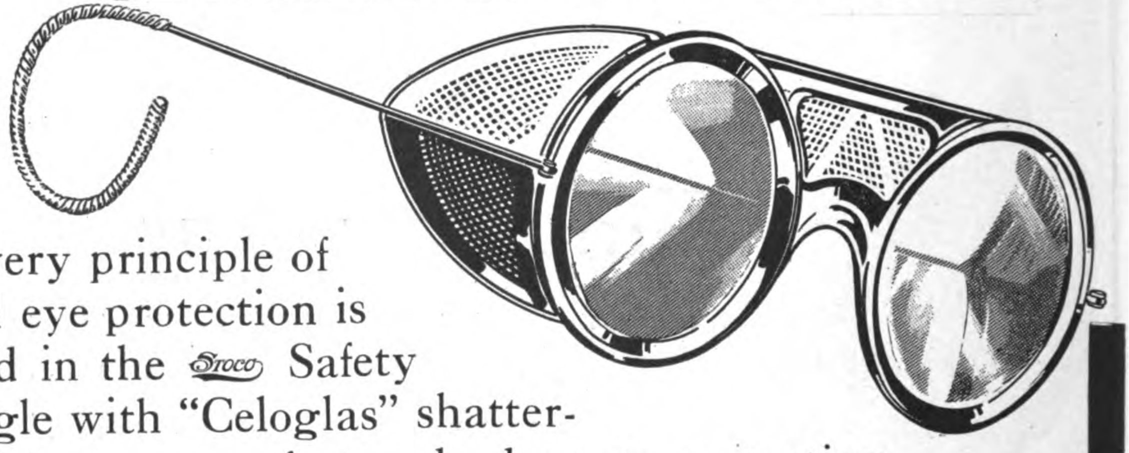
50 Church St., New York **Edison Bldg., Chicago**

Works: Rahway, N. J.

STOCO "CELOGLAS"

SHATTER-PROOF LENS

SAFETY GOGGLES



Every principle of good eye protection is found in the Stoco Safety Goggle with "Celoglas" shatter-proof lenses—comfort and adequate protection.

"Celogas" lenses are the greatest eye protection devices of the age. They will withstand tremendous blows from missiles of all descriptions without leaving the goggle frame and, even though they may fracture under some conditions, no glass will fly into the wearer's eyes.

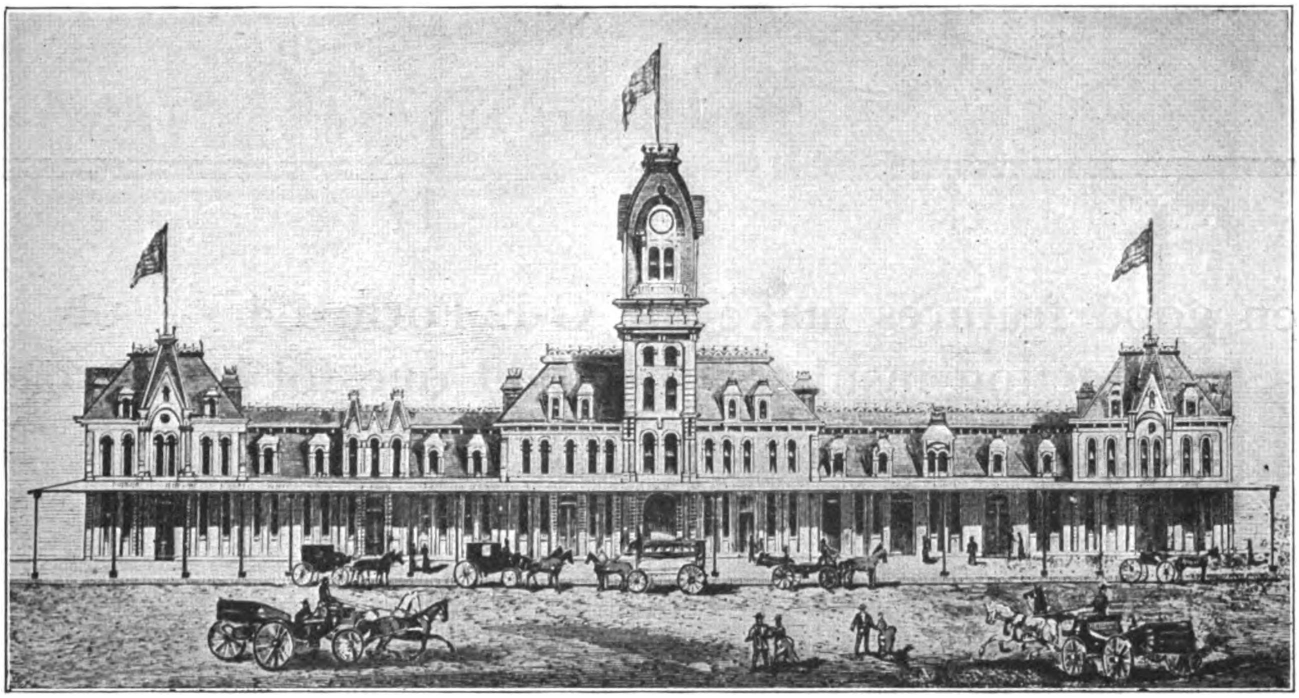
The frames for Stoco Safety Goggles are a perfect combination of strength and comfort. Your men will wear them with a sense of security. Made with easy cable temples, as illustrated, or with elastic headbands.

Any safety engineer or superintendent will be sent a 'Celoglas" lens without charge. Test it with a hammer or any other weight. It will not shatter.

STANDARD OPTICAL Co

GENEVA, N.Y.

The "Jumping-Off Place" to the Gold Fields



Kansas City was that in '49 and the early fifties because it was then the last completely equipped outpost of commerce west of the Mississippi.

To the men of that generation Kansas City was a busy center of commerce and from that day to this it has been a "starter" of many things for the greater service of the people of the Middle West.

It was one of the first cities in this country to develop and put into service the idea of a "Union" station for all the railways entering its gates.

The picture shows that early union terminal as it appeared forty years ago. Kansas City was the first community equipped with the overhead trolley system for street railways.

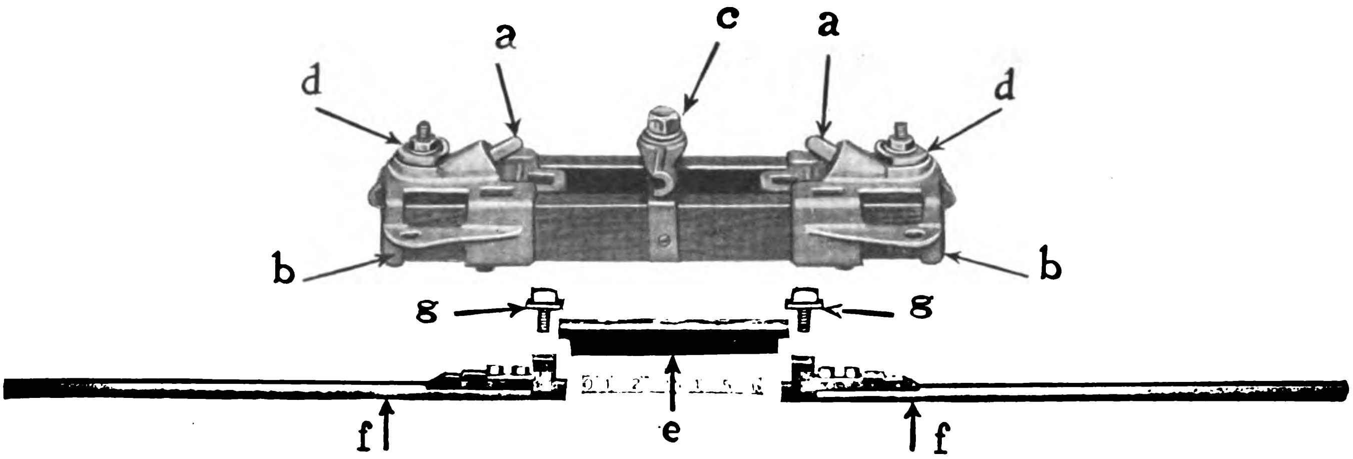
The impetus which rapid transit gave the city's growth was quickly appreciated and other communities throughout the country rapidly developed the same methods.

Galena Oils *and* Galena Service

gave an impetus to the art and science of lubrication that has enabled that art to keep in step with the constantly growing and changing needs of the railway industry, and have always retained their positions in the forefront of the lubricating industry.

Galena-Signal Oil Co.

Franklin, Pa.



Ten good features make the G-E Form L4 section insulator the right one for your road

1. The body is permanently wired into the overhead but all wearing parts can be easily and quickly renewed at less than 15% of the cost of a new insulator.

2. Sturdy steel wedges (aa) hold the trolley wire with a grip more powerful than the wire itself.

3. Strain eyes (bb) are provided in the castings for anchor wires.

4. The span holder (c) is adjustable to any position of the span wire.

5. The side bars are of impregnated hard wood.

6. Each end casting is equipped with a feeder clamp (dd).

7. The 7-in. hard wood runway (e) is renewable.

8. Eighteen-inch renewable flexible approaches (ff) fit around the trolley wire closely and protect it from wear.

9. Two stud bolts (gg) secure all wearing parts to the body.

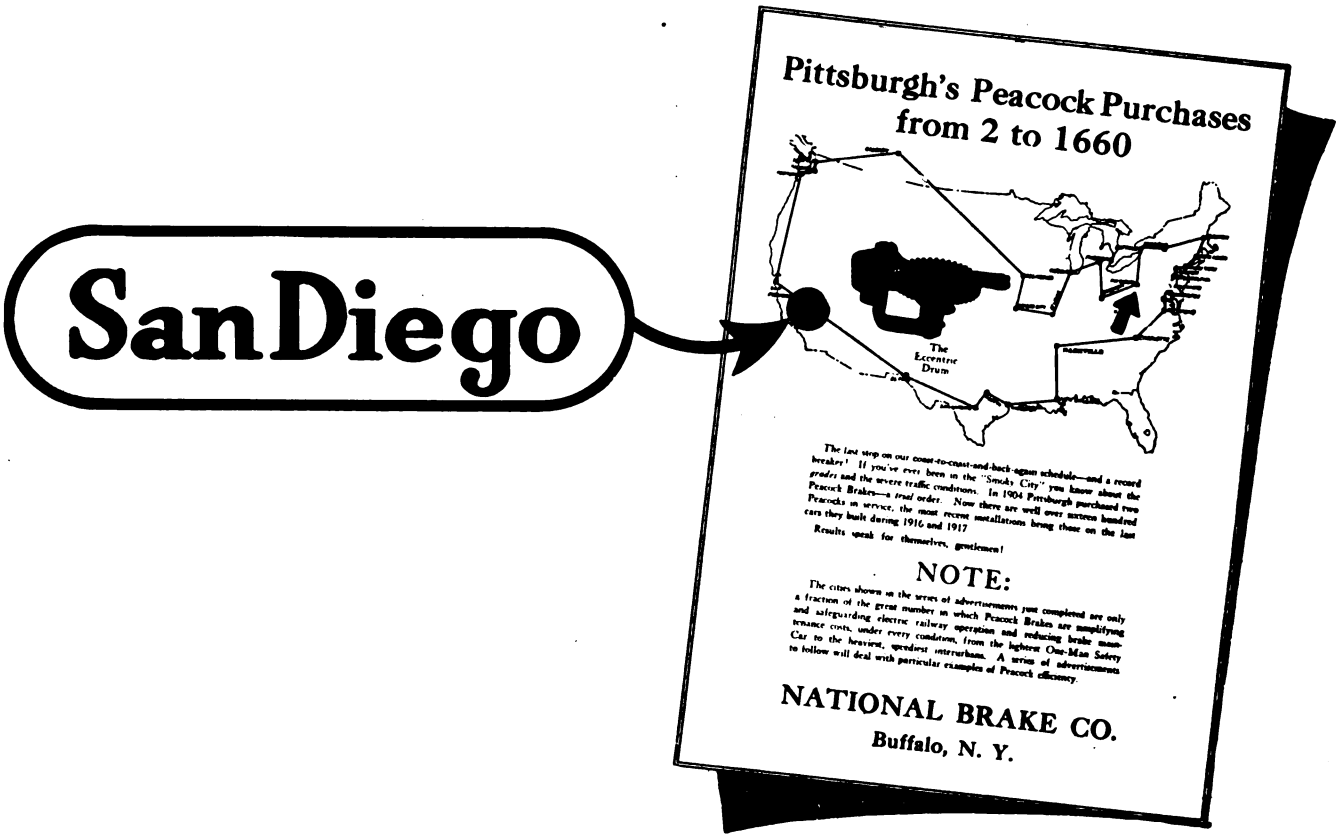
10. All malleable iron parts are electric oven sherardized.

G-E LINE MATERIAL
can be shipped promptly from stock

General Electric Company

General Office Schenectady, N.Y.

40-71


SanDiego
The Eccentric Drum

Pittsburgh's Peacock Purchases from 2 to 1660

The last stop on our coast-to-coast-and-back-again schedule—and a record breaker! If you've ever been in the "Smoky City" you know about the *grades* and the severe traffic conditions. In 1904 Pittsburgh purchased two Peacock Brakes—a *trial* order. Now there are well over sixteen hundred Peacocks in service, the most recent installations being those on the last cars they built during 1916 and 1917.

Results speak for themselves, gentlemen!

NOTE:

The cities shown in the series of advertisements just completed are only a fraction of the great number in which Peacock Brakes are simplifying and safeguarding electric railway operation and reducing brake maintenance costs, under every condition, from the lightest One-Man Safety Car to the heaviest, speediest interurbans. A series of advertisements to follow will deal with particular examples of Peacock efficiency.

NATIONAL BRAKE CO.
Buffalo, N. Y.

It's Mighty Glad We Are to Add San Diego

—the coming New York of the Pacific Coast, which we omitted in our recent series entitled "Peacock Brakes from Coast to Coast." We can't understand how we ever overlooked this wonderful city of Southwest California.

There are between 250 and 300 sets of our brakes on the cars of the San Diego Electric Railway, and Mr. Homer MacNutt, Supt. of Motive Power, says "they are giving good satisfaction."

NATIONAL BRAKE COMPANY
Buffalo, N. Y.

Bankers and Engineers

Ford, Bacon & Davis,
Engineers.
115 BROADWAY
New Orleans NEW YORK San Francisco

STONE & WEBSTER
Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
NEW YORK BOSTON CHICAGO

SANDERSON & PORTER
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

THE ARNOLD COMPANY
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

DWIGHT P. ROBINSON and COMPANY
Incorporated
Design — Construct — Finance — Manage
UTILITIES INDUSTRIALS
1 Broadway, New York

A. L. DRUM & COMPANY
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT
OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

Scofield Engineering Co. Consulting Engineers
PHILADELPHIA, PA.
POWER STATIONS GAS WORKS
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS

THE P. EDW. WISH SERVICE
Suite 1710 DETECTIVES *Suite* 1102
Park Row Bldg., New York Board of Trade Bldg., Boston

THE J. G. WHITE COMPANIES
ENGINEERS CONTRACTORS
FINANCIERS OPERATORS
43 EXCHANGE PLACE . . NEW YORK
LONDON CHICAGO

JOHN A. BEELER
OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
MANAGEMENT - CONSTRUCTION - APPRAISALS
DIFFICULT WORK EXECUTED
52 VANDERBILT AVE., NEW YORK

REPUBLIC ENGINEERS, INC.
CONSULTING AND CONSTRUCTING ENGINEERS
Valuations Reports Investigations
Designs Construction Management
60 BROADWAY, NEW YORK
CLEVELAND, OHIO YOUNGSTOWN, OHIO
Illuminating Bldg. Mahoning Bank Bldg.

WOODMANSEE & DAVIDSON ENGINEERING CO.
ENGINEERS
MILWAUKEE CHICAGO
First National Bank Bldg. 784 Continental & Commercial National Bank Bldg.

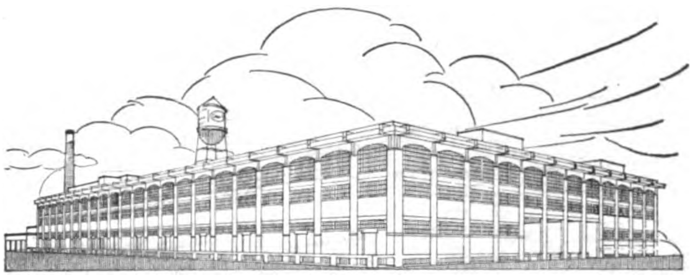
ENGELHARDT W. HOLST
Engineer
Reports, Appraisals, Reorganizations
683 Atlantic Ave., Boston, Mass.

E. W. Clark & Co. Management Corporaton
Engineers
Power Plants, Electric Power Transmission
and Industrial Application
Huntington Bank Buiilding, Columbus, Ohio

H. M. Byllesby & Company, Inc.
NEW YORK CHICAGO TACOMA
Trinity Bldg. No. 208 So. La Salle St., Washington
Purchase, Finance, Construct and Operate Electric Light
Gas, Street Railway and Water Power Properties
Examinations and reports Utility Securities Bought and Sold

ELECTRICAL TESTING LABORATORIES
Electrical, Photometrical and
Mechanical Testing.
80th Street and East End Ave., New York, N. Y.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



AMERICAN CAN CO., FACTORY, MAYWOOD, ILL.

INVESTIGATE BEFORE

YOU INVEST

No matter how efficient in its own business, no organization can dispense with competent advice on its plant extensions, anymore than a lawyer can dispense with a doctor when he is sick or a doctor dispense with a lawyer when he sues a client for his bill.

And pursuing the simile further, merely hiring any organization of engineers or contractors that makes plausible claims, without scrutinizing its credentials of ability, is as dangerous as hiring a lawyer or a doctor without regard to his record.

The Thompson-Starrett Company is not only competent to undertake your plant extensions, but its advice is constantly solicited and followed in the investigative stages of construction problems, by organizations which want specialized advice before they commit themselves to a contract.

Our Advice is as Good as Our ***Service***

THOMPSON-STARRETT COMPANY
INDUSTRIAL CONSTRUCTION
NEW YORK
CHICAGO **PITTSBURGH**

More electric railways

are right now *thinking* about and making plans for improvements, expansion and reconstruction than ever before in the history of the field.

When the hampering hand of unwise public restrictions is lifted these new developments that electric railway men are now thinking about will be made effective and *quickly*.

That heavy hand is shortly going to be removed. No man who studies the situation can doubt that. The time to sell your goods is when the buyer is *thinking* about what he will do. Not after he has *made up his mind* what, when, and where to buy. *Now* is the time to *advertise* electric railway commodities.

The Electric Railway Journal covers all departments of the industry—north, east, south and west. Circulation figures open to all and backed by A. B. C. statements.

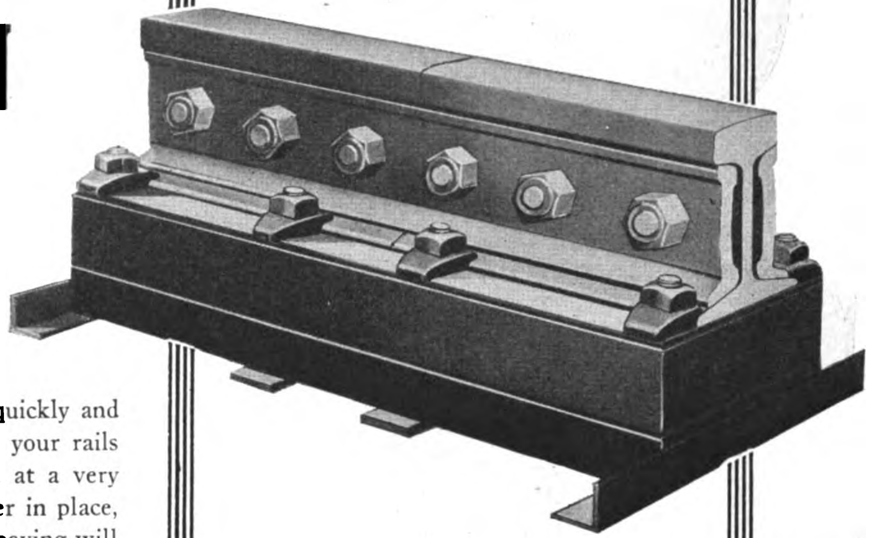
Electric Railway Journal
Member Audit Bureau of Circulations
Member Associated Business Papers, Inc.
Tenth Ave. at 36th St., New York

The MECHANICAL RAILWAY TIE

Correct Those Uneven Joints Without Interrupting Schedules

Do it with a

DAYTON Rail Joint Booster



The Dayton Rail Joint Booster will quickly and automatically correct uneven joints in your rails without the least delay to traffic and at a very slight cost. With the rail joint booster in place, the track will *always* be level and the paving will not buckle.

Installation is simple and inexpensive. Excavate the track bed around the joint to a depth of about fourteen inches below the rail base. Cut the old tie in two and remove the ends supporting the joint. Clamp the booster into place and weld it full length, draw up the bolts and jack the track to its proper level. Replace the pavement and the job is finished.

Big results with little cost.

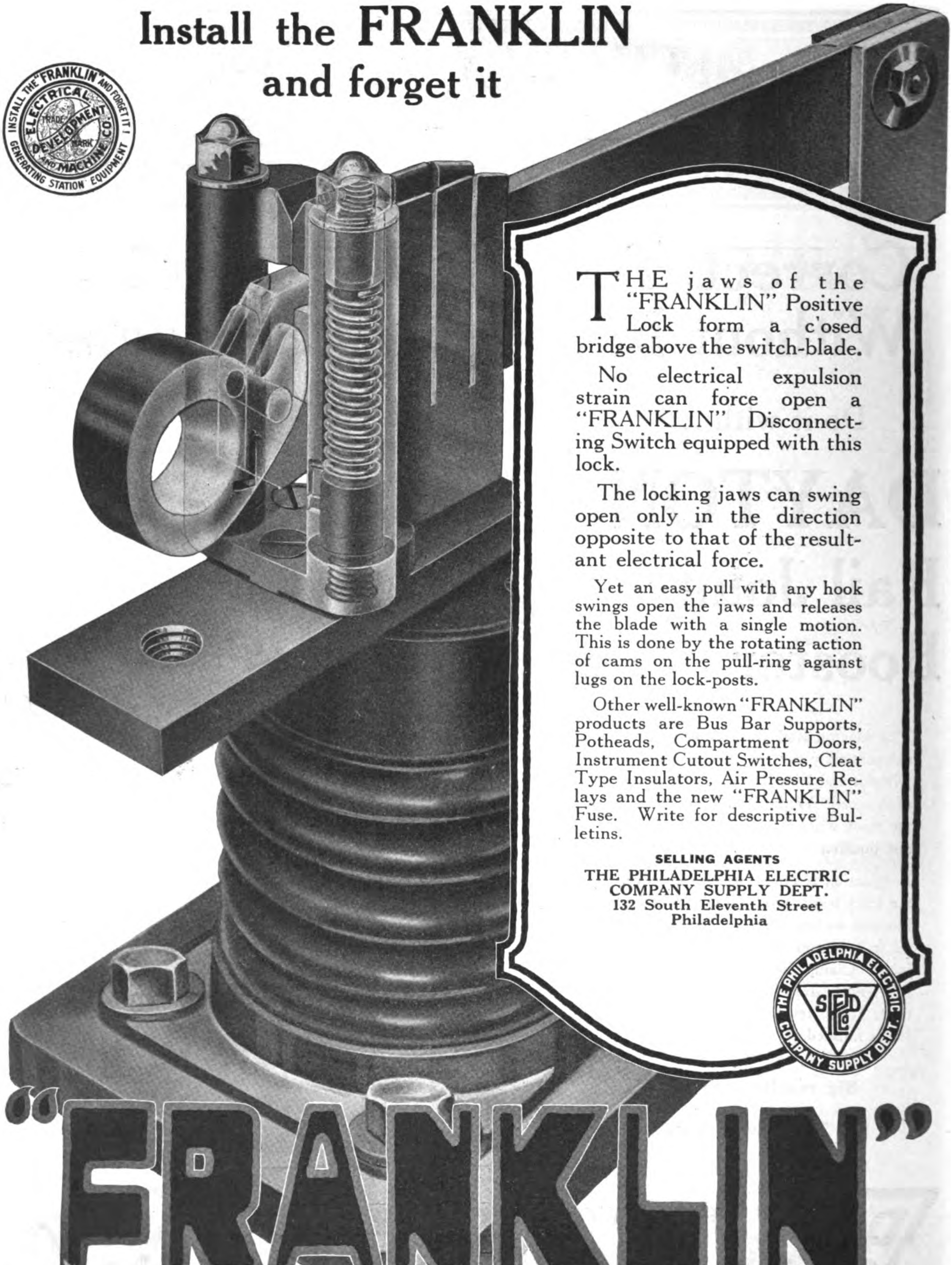
Write for full details.

DAYTON Rail Joint Booster

THE DAYTON MECHANICAL TIE CO.
704 Commercial Bldg.
DAYTON, OHIO

Install the FRANKLIN and forget it

INSTALL THE "FRANKLIN" AND FORGET IT!
ELECTRICAL DEVELOPMENT AND MACHINE CO.
TRADE MARK
GENERATING STATION EQUIPMENT



THE jaws of the "FRANKLIN" Positive Lock form a closed bridge above the switch-blade.

No electrical expulsion strain can force open a "FRANKLIN" Disconnecting Switch equipped with this lock.

The locking jaws can swing open only in the direction opposite to that of the resultant electrical force.

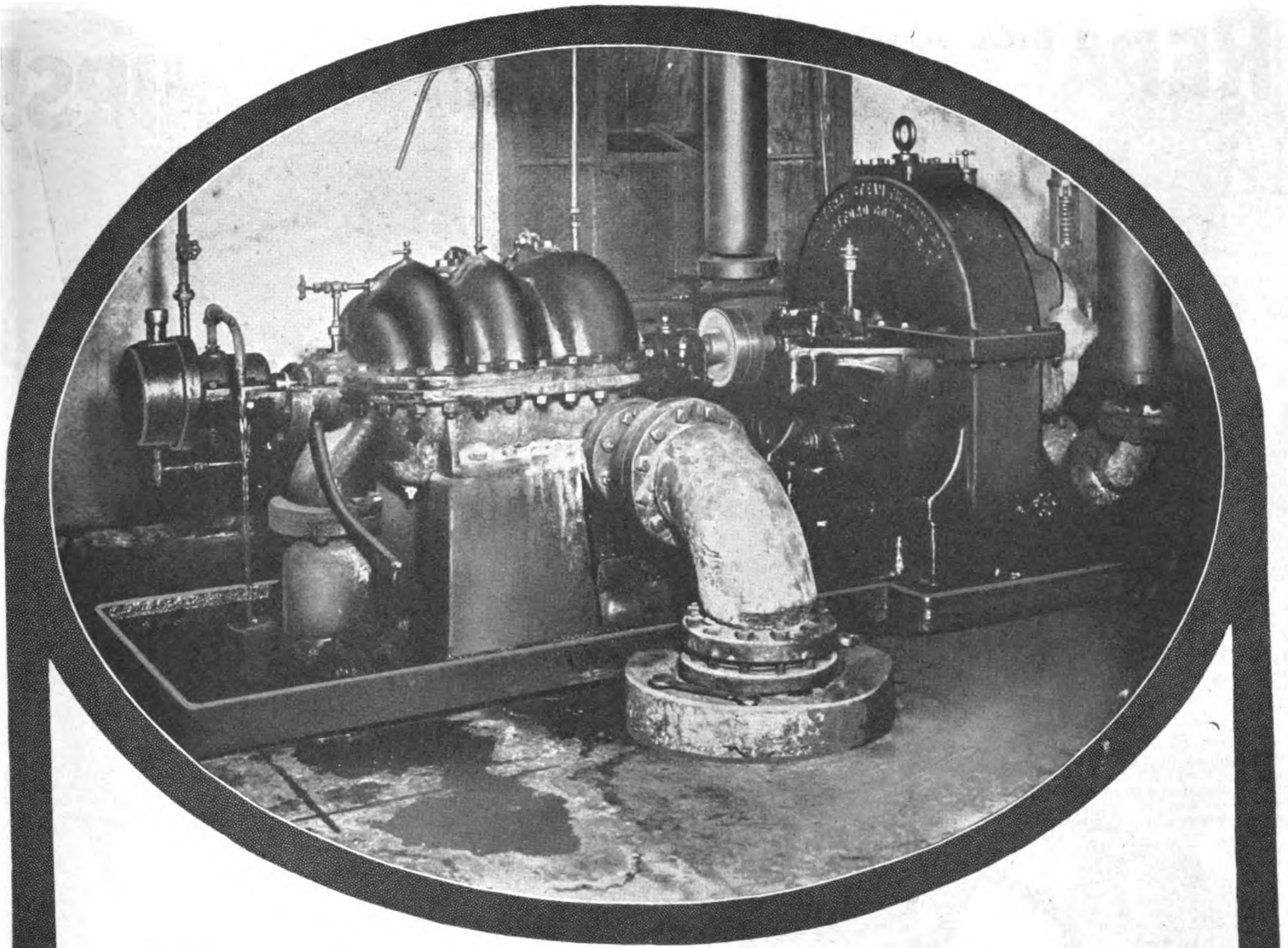
Yet an easy pull with any hook swings open the jaws and releases the blade with a single motion. This is done by the rotating action of cams on the pull-ring against lugs on the lock-posts.

Other well-known "FRANKLIN" products are Bus Bar Supports, Potheads, Compartment Doors, Instrument Cutout Switches, Cleat Type Insulators, Air Pressure Relays and the new "FRANKLIN" Fuse. Write for descriptive Bulletins.

SELLING AGENTS
THE PHILADELPHIA ELECTRIC COMPANY SUPPLY DEPT.
132 South Eleventh Street
Philadelphia

"FRANKLIN"

GENERATING STATION EQUIPMENT



Idle 30 Days in 5 Years—
But It Wasn't the Terry's Fault

The Memphis Street Railway Company, Memphis, Tennessee, installed a Terry Turbine in 1913. It is direct connected to a three-stage centrifugal boiler feed pump. The pumping head is 580 feet, r.p.m. 2000, steam pressure 200 lbs.

January 24, 1919, the Chief Engineer of the Power Station wrote: "The turbine has been idle but about 30 days from installation to date—this time being consumed in repairing the pump. The repairs on the turbine consisted of two new bearing bushings."

Then the Chief Engineer adds: "It is performing very satisfactorily, as the above statement will verify."

Many electric railway companies are now getting the advantages of Terry Reliability and low upkeep cost, but that's not all. Write for Bulletin 2511 for the *many* reasons why you should

Specify Terry for driving your auxiliaries.

The Terry Steam Turbine Co., Hartford, Conn.

TERRY TURBINE DRIVE

T-605

REPAIR OF THE GERMAN SHIPS!
W W & M Co
Plastic-Arc

This shows the manner in which the Huns damaged a great pump on one of the seized ships.

This shows the almost irreparable damage done to important machinery on another seized German ship.

No Burnt Metal—No Voids

Constant Heat Control

WILSON Plastic-Arc WELDER
and Certified Welding Metal

When the United States Government set about making QUICK repairs on the ships wantonly damaged by the Huns, they used the Wilson **Plastic-Arc** Welder—and the ships sailed! Electric Railways who want to make quick, economical repairs by welding will do well to follow the Government's lead. The Wilson **Plastic-Arc** Welder, together with **Plastic-Arc** Certified Welding Metal (Patented) will successfully and quickly weld any metal any thickness or any bulk, IN PLACE, without preheating, distortion, dismantling, or annealing.

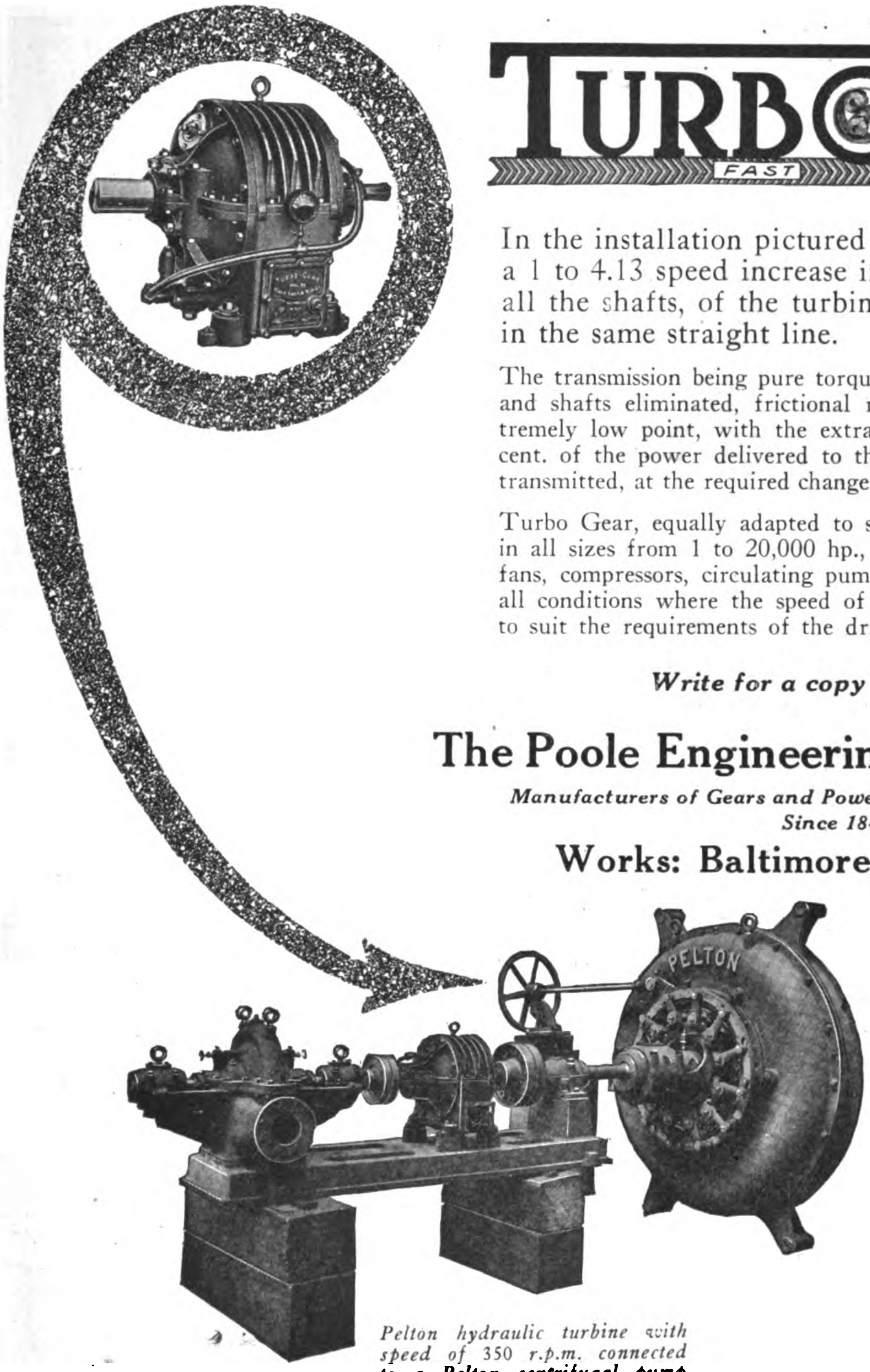
Certified Metals insure permanent welds. Their use gives far more satisfactory results than you can get with *ordinary* welding metals.

There are eight grades of **Plastic-Arc** Certified Welding Metals. Each grade has been carefully developed to give maximum results in a definite line of work. For instance, Grade 6 for steel shafts and boiler flues; Grade 9 for cast steel parts, frogs, crossings, switch points, etc. And so forth through all the grades.

Wilson Welder & Metals Company, Inc.
5 Rector Street, New York

Every foot of **Plastic-Arc** Certified Welding Metal (Pat.) is guaranteed perfect and uniform for its particular use.

How a Low Speed Water Wheel Drives a High Speed Pump—



TURBOGEAR

FAST PATENTS

In the installation pictured below, Turbo Gear effects a 1 to 4.13 speed increase in a limited space and with all the shafts, of the turbine, Turbo Gear and pump, in the same straight line.

The transmission being pure torque, with all side strain on bearings and shafts eliminated, frictional resistances are reduced to an extremely low point, with the extraordinary result that over 98 per cent. of the power delivered to the driving shaft of the turbine is transmitted, at the required change of speed, to the pump.

Turbo Gear, equally adapted to step speed up or down and made in all sizes from 1 to 20,000 hp., forms an ideal drive for stokers, fans, compressors, circulating pumps, condensors, conveyors, and in all conditions where the speed of a driving unit must be modified to suit the requirements of the driven machine.

Write for a copy of Bulletin 101.

The Poole Engineering & Machine Co.

Manufacturers of Gears and Power Transmission Machinery
Since 1843

Works: Baltimore, Md., U. S. A.

General Sales Office
50 Church St.
New York

Pelton hydraulic turbine with speed of 350 r.p.m. connected ***to a Pelton centrifugal pump through at 35 hp. Turbo Gear with a capacity of 800 g.p.m. at 1450 r.p.m.***

TOLEDO
TOLEDO CRANE CAPACITY 15 TONS
CRANES

Serving the Milwaukee Railway and Light Company

typical Toledo installation in a progressive Electric Railway where *handling efficiency* is recognized as of vital importance.

Toledo Cranes will serve you quickly, smoothly and *for years* without delay or more than normal maintenance.

Their scope is limitless—they will lift one moment a motor—the next a piece of special work—the next an entire car frame—and so forth.

Capitalize *now* the care and experience that put the name Toledo foremost in its field today.

The Toledo Bridge & Crane Co.

Toledo, Ohio

OFFICES:

New York
52 Broadway

Philadelphia
2013 Market St.

Pittsburgh
203 Oliver Bldg.

Chicago
549 Washington Blvd.

Cleveland
725 Citizens Bldg.

San Francisco
Rialto Bldg.

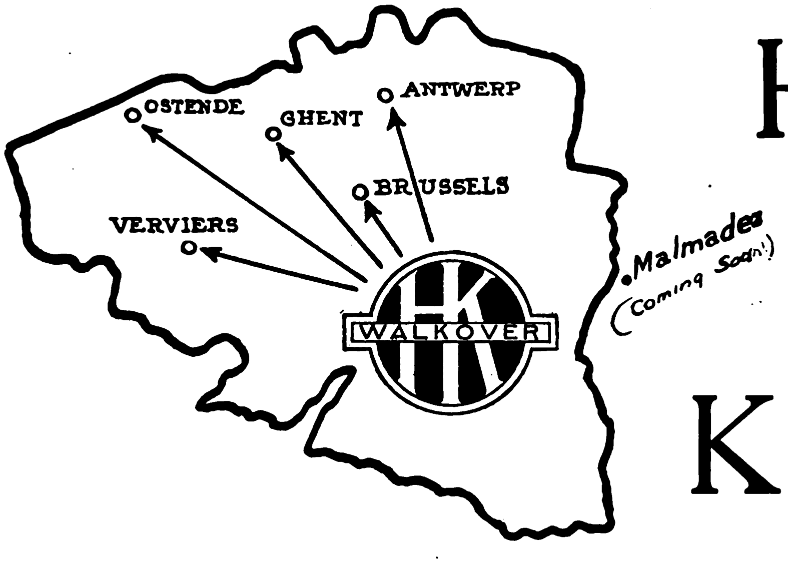
Buffalo
610 Iroquois Bldg.

Boston
141 Milk St.

Seattle
Hoge Bldg.

St. Louis
Federal Reserve Bank Bldg.

Kansas City, Mo.,
Finance Bldg.



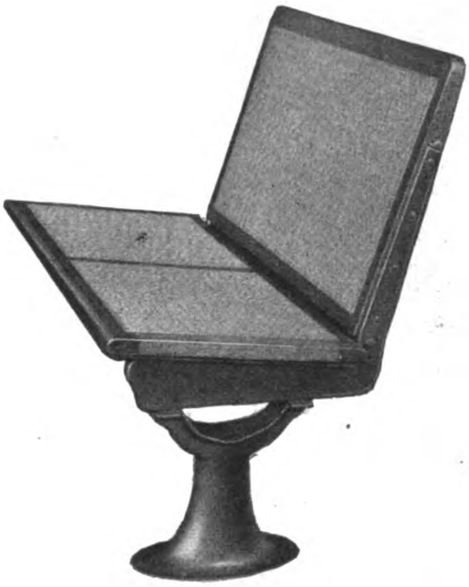
Hale and Kilburn In Belgium

Before Belgium—not for the first time in its history—became the cockpit of Europe, it had one of the best networks of tramways and light railways in the world. We don't know what has been left of the equipment, but—

As an American proud of your country's achievements in peace as in war, you will be pleased to learn that thousands of the car seats on these lines were the product of Hale and Kilburn!

Yet Belgium has always been a great manufacturing country which did not have to go far afield for railway car seating unless that equipment was as famous in its line as Pears is for soap and Gillette for razors.

But **you** don't have to send across the seas for Hale and Kilburn seats. They are at your very door for the asking in any style and for any service—whether for interurban, suburban or city cars right down to the last word in light-weight safety cars.



HALE & KILBURN
No. 108-AV Stationary Seat
For One-Man Safety Cars

This unmatchable H&K Seat beats the world for strength and lightness. Every Safety Car should be equipped with it.

Next time Hale & Kilburn Seats in France

Hale & Kilburn Corporation

Philadelphia	New York	Chicago	St. Louis	Detroit
Washington	Atlanta	San Francisco	Dallas	Louisville

LONDON—G. D. PETERS CO., LTD., 15 DEANS YARD, WESTMINSTER

Compare the Cost!

Ordinary Trolley Wheel

.0014 Cent

per set per car mile.

MILLER
TROLLEY SHOES

.0005 Cent

per set per car mile.

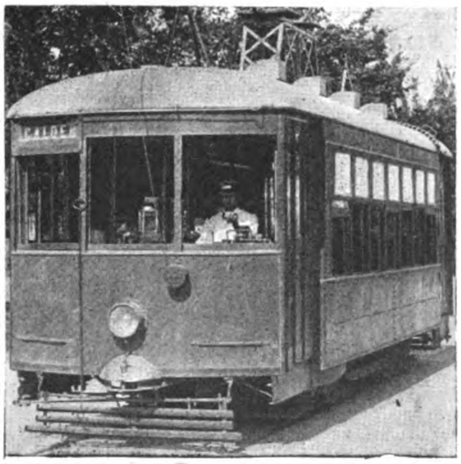
About 50 per cent. of the Berkshire Street Railway cars are equipped with Miller Trolley Shoes. The cars are 28-ton interurban.

The company has been using Miller Shoes since July, 1917. They purchased 200 sets. A recent test of two Miller Shoes gave 7000 miles each—while the ordinary trolley wheel was ready for scrap at the end of 2500 miles. The Miller Shoes only cost .0005 cent per set per car mile—the wheels .0014 cent per car mile. 200 sets of Miller Shoes give 1,800,000 more miles than 200 sets of wheels.

You can equip *your* cars with Miller Trolley Shoes without changing present poles or bases. Today hundreds of cars on scores of railways of every character of service are equipped with them—and in every case the user reports a life far in excess of the trolley wheel and a wire wear that is much less than it would be with a higher tension contact that does not *hug the wire as tenaciously as the Miller Trolley Shoe.*

Give the Miller Shoe a chance to prove itself on *your hardest line.*

MILLER TROLLEY SHOE CO.
West Newton, Mass.



When You Begin to Operate the Safety Car

All eyes will watch you, from trolley catcher to wheel guard

You know that Safety Car operation doesn't simply mean locking up the back platform; or just adding a coat of paint or giving the interior another dash of whitewash.

It means giving the public more, better and SAFER service than it had before.

That's the kind of service that you are going to give; and to make that service SAFE beyond criticism in all respects you will want to assure yourself that that Safety Car will have as good protection **under** the platform as **on** the platform.

To get that protection you will insist upon the life-saving device that has already made good for you and for others on many thousands of cars, namely,

The H-B Life Guard

The Standard Guard for the Standard Car

The Consolidated Car Fender Co.
Providence, R. I.

General Sales Agents:
Wendell & MacDuffie Co.
61 Broadway, N. Y.

Columbia-Made Trolley Poles Are Made Right

Your Overhead Expenses
Will Show a Marked Reduction
If Your Overhead Equipment Is

COLUMBIA-MADE

Thousands of

Columbia Trolley Poles

are ready for immediate shipment

For 1½-inch and 2-inch Base Harps and for lengths
11 feet to 15 feet.

Columbia Machine Works & Malleable Iron Co.

Atlantic Avenue and Chestnut Street, Brooklyn, N. Y.

Here's a list of other Columbia Products

TOOLS

- Armature and axle straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Co., Ltd., Toronto, Ont.

CAR EQUIPMENT

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

They may both *look* alike—*but* what about the *Metal Quality?*

One is an ordinary trolley wheel—nothing more. The other is a *specialized product,* worked out by expert chemists and metallurgists, in cooperation with Mechanical Officials of various roads, and made by a special method, of only pure new metal.

Maximum conductivity and full wheel mileage depends wholly on the quality and texture of the metal. Wheels made from scrap material, or those very hard, produce disastrous results. What is needed is a comparatively *soft, yet very tough metal*—the kind that is used in V-K Oilless Trolley Wheels. Our laboratory worked out the alloy—and our foundry developed methods of casting whereby absolute fidelity to design and proper balance are secured.

Tests and service records have proved the V-K Oilless Trolley Wheels give more mileage, show higher efficiency, and a lower net cost than any other wheels, save the wire, and reduce current waste. Their use spells economy all along the line.

We invite your inquiries and investigation.

More-Jones Brass & Metal Company
St. Louis, Mo., U. S. A.

V-K

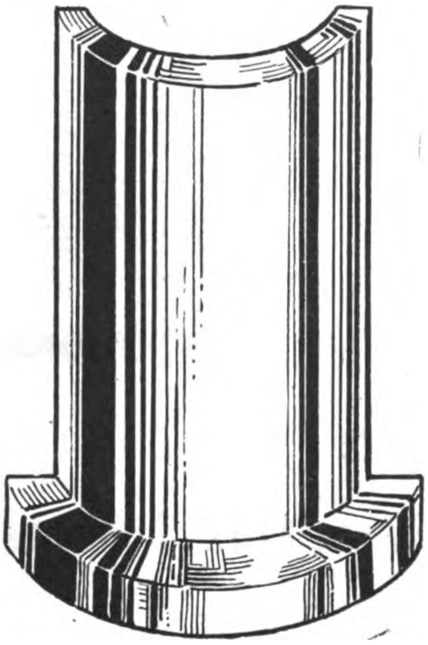
Vim Bronze Bearings

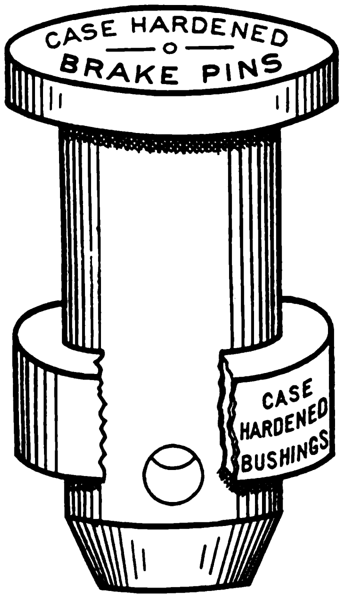
for Trucks and Motors

Guaranteed
Against Breakage

Boyerized Pins and Bushings

They are
Case Hardened





Boyerize Your Line!

There are three reasons why you should Boyerize your line: Safety—Economy—Mileage.

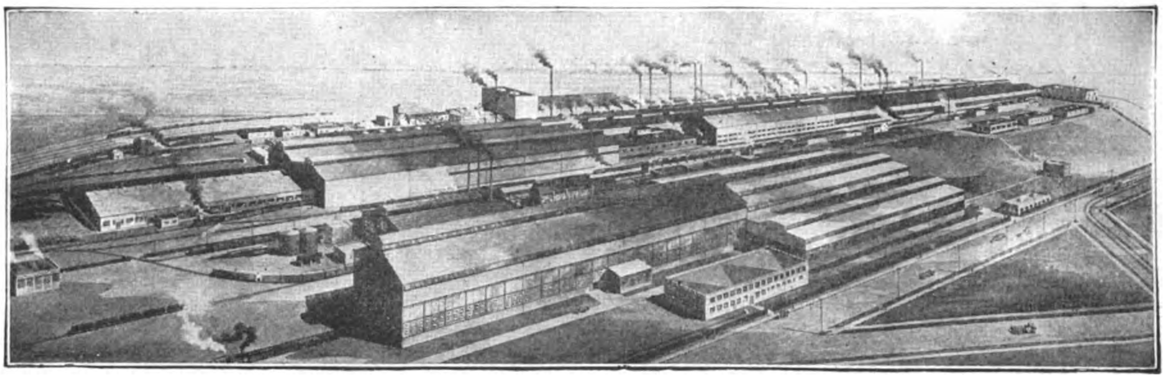
Whether you operate city cars or high-speed interurban cars; whether your load is light or heavy, these Boyerized Products will keep your cars out on the road, giving safe, continuous service and low maintenance.

Boyerized Products

Boyerized Brake Hangers.
Boyerized Brake Lever Pins and Bushings.
Boyerized Wearing Plates between the Bolster and Bolster Carrier.
Boyerized Wearing Plates between the Pedestal Straps and the Journal Box.

ELECTRIC RAILWAY SUPPLIES
Bemis Car Truck Company
SPRINGFIELD MASS

Plant of the Standard Forgings Company, Indiana Harbor, Indiana



HEAVY FORGINGS

Car Axles Tender Axles Truck Axles Driving Axles Trailer Axles Side Rods Piston Rods Crank Pins Center Plates Journal Wedges

Shafts, Connecting Rods and Heavy Forgings for Ships
Stationary Engines
Power Transmission Machinery
Saw Mill Machinery
Sugar Mill Machinery

Heavy Forgings in Other Lines

Forgings Supplied in Carbon or Alloy Steel—Either Open-hearth or Electric Furnace Products

Facilities for Analyzing, Testing and Heat Treating

STANDARD FORGINGS COMPANY

Offices: Railway Exchange Building, Chicago, Ill.
Works: Indiana Harbor, Indiana

BRANCHES:
NEW YORK—111 Broadway
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Merchants National Bank Bldg.
DENVER
1617 Blake Street
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Commonwealth Trust Bldg.
LOS ANGELES
241-243 Los Angeles Street
MILWAUKEE
First National Bank Bldg.
SAN FRANCISCO
69-71 First St.
PORTLAND—46-48 Front Street
SALT LAKE CITY—117 West Second South St.
HOUGHTON, MICH.—96 Shelden St.

In 1918

10 large Elec. Ry. Co's. operating 15,529 cars

previously using exclusively or in part
special quenched" gearing

SWITCHED OVER

and bot "Tool Steel" gears & pinions exclusively

Their total purchases were

17,323

"Tool Steel" gears + pinions

Advertisement

Study the Comparative Results of Open Hearth and Electric Steel Armature Shafts for Electric Railway Service

Here they are

(Columns showing results obtained in test)

Properties	Open Hearth Steel	Electric Steel General Steel Co.
Ult. Strength, lbs. per sq.in.	91,200	107,700
Elastic Limit, lbs. per sq.in.	46,000	69,950
Elongation in 2 in.	22.2%	23.5%
Reduction of Area	44.8%	50.0%
Fracture	Silky, small cup.	Silky, full cup.
Elastic—Torsion, lbs. sq.in.	16,750	33,700
Shearing Strength, lbs. sq.in.	62,400	76,000

The comparative results given here were obtained from tests taken from an ordinary Open Hearth steel armature shaft, and one taken from a high-grade steel, made in a "Pittsburgh" electric furnace. Both were the normal product. Heat treated in each case.

We are equipped to handle the forging of axles and armature shafts from our own manufactured electric furnace steel.

We Solicit Your Inquiries

GENERAL STEEL CO.

Public Service Building, MILWAUKEE, Wis.

Rights!

"Taint economical to build cars to last forever. We agree with Electric Railway Journal.

A car is a production unit.

Less money in dead metal—more money in equipment to speed acceleration, braking, economical operation.

Fact looms up that this matter of light weight Safety Cars is food for Specialists.

Cars from "Quality Shops" last as long as you want them to.

St. Louis Car Co.,
St. Louis, Mo.

"STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

S BRAND *"The 'Standard' Brand on your material is an assurance of eventual economy."* S BRAND

STANDARD STEEL WORKS CO.

GENERAL OFFICES:

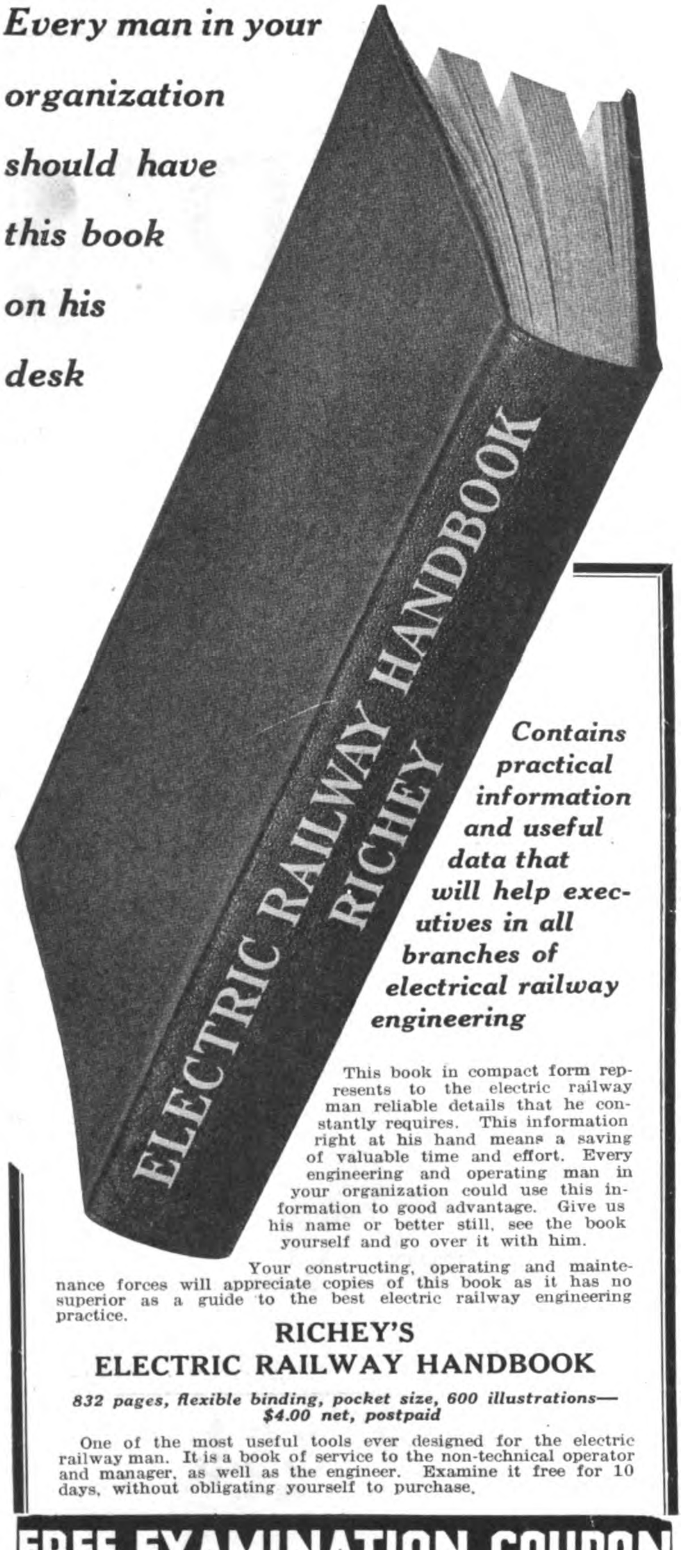
MORRIS BUILDING, PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
HAVANA, CUBA

RICHMOND
SAN FRANCISCO
NEW YORK
MONTEREY, MEX.

MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

Every man in your organization should have this book on his desk



Contains practical information and useful data that will help executives in all branches of electrical railway engineering

This book in compact form represents to the electric railway man reliable details that he constantly requires. This information right at his hand means a saving of valuable time and effort. Every engineering and operating man in your organization could use this information to good advantage. Give us his name or better still, see the book yourself and go over it with him.

Your constructing, operating and maintenance forces will appreciate copies of this book as it has no superior as a guide to the best electric railway engineering practice.

RICHEY'S
ELECTRIC RAILWAY HANDBOOK

832 pages, flexible binding, pocket size, 600 illustrations—$4.00 net, postpaid

One of the most useful tools ever designed for the electric railway man. It is a book of service to the non-technical operator and manager, as well as the engineer. Examine it free for 10 days, without obligating yourself to purchase.

FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 239 West 39th St., New York, N. Y.

You may send me on 10 days' approval **Electric Railway Handbook, $4.00 net.**

I agree to pay for the book or return it postpaid within 10 days of receipt.

Regular subscriber to the Electric Railway Journal?..........
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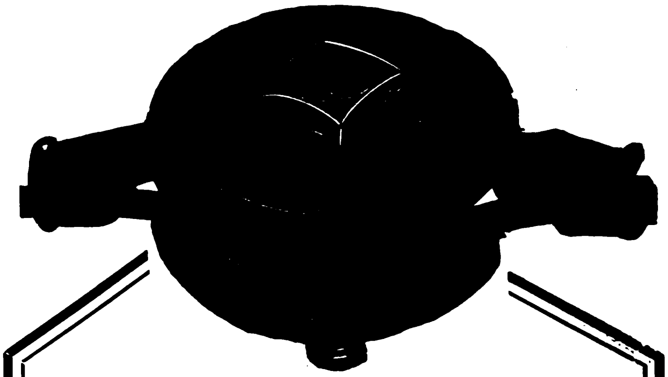


Easy to Assemble and Align—

It doesn't deteriorate

That's the big story of White's Porcelain Trolley Hanger.

Composed of three simple parts—that make hanging and aligning on the span wire a quick and easy job with

WHITE'S
Porcelain
Trolley Hanger

The glazed porcelain insulation is built heavy—to stand the knocks when the trolley jumps—the insulation doesn't "break down."

The sherardized malleable iron yoke don't rust—it lengthens the service life of the hanger.

The bolt is a standard—we can furnish it in sherardized steel or bronze—or you can use a stock bolt.

Send for a sample. You then will *see* what we mean by economy and long service. Let us quote you on complete hangers or parts for

Immediate Delivery

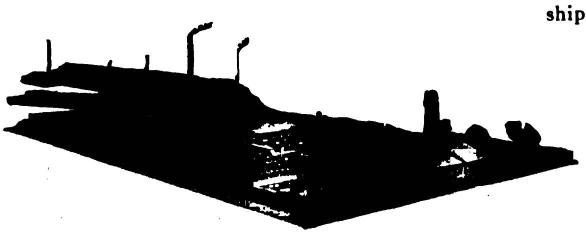
T. C. White Electrical Supply Co.
1122 Pine Street, St. Louis, Mo.

Each Type of Rome Wire Designed to Fill a Definite need

TO get the best results you must have materials suited directly to your requirements—Rome Wires and Cables are each and all designed to meet a specific demand.

For instance—Rome Car Wire presents a perfectly clean surface when stripped. It is also very flexible to allow for the conditions met in car wiring.

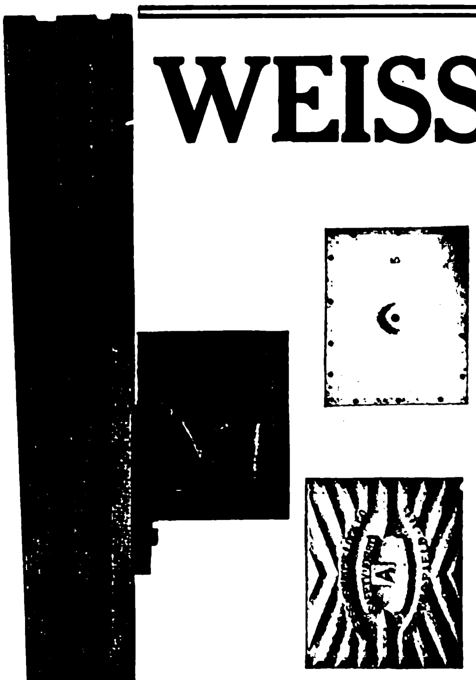
Trolley wires, feeder cables, magnet wires, etc., all of the high standard of quality that the name ROME exemplifies. Our facilities enable us to have an order on the way in a mighty few hours after we get it—that's ROME service—in keeping with our friends' expectations—prompt shipment.



Rome
Wire Company
Rome, N. Y.

All operations from wire bar to finished product in this plant.

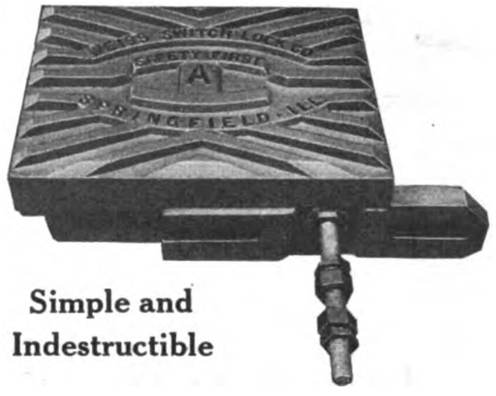
WEISS SWITCH LOCK



No More Split Switches

A safety necessity for street and interurban railways. Locks both right and left—no *chance* of a split switch—few parts—safe, dependable, simple in construction and easily installed. Fits any rail section. Used by many prominent roads. Send us a trial order and put them to the test.

Watertight
Non-Freezable
Mud-Proof
Sand-Proof



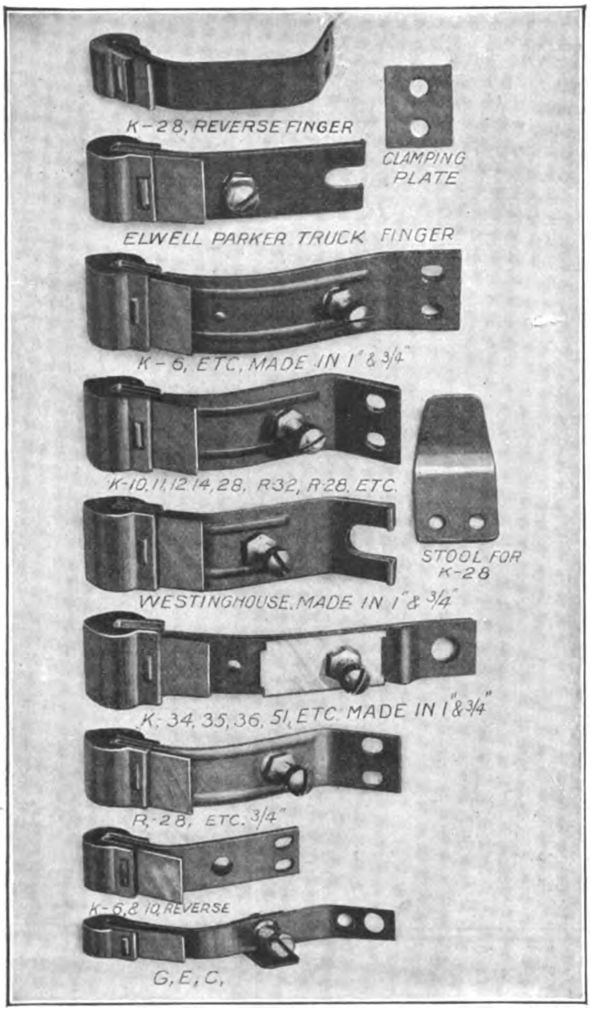
Simple and Indestructible

This switch lock is exceedingly simple in design, having very few parts, none of which is complicated. The box is absolutely tight, to prevent loss of oil, with which it is filled. It has a stuffing box where the connecting rod passes through to prevent the entrance of water or dirt.

The heaviest traffic will not interfere with or damage the Weiss Switch Lock.

You can install one on approval, for 30 days' trial, but be sure to give measurements from top of rail to center of bolt holes.

WEISS SWITCH LOCK CO., 600 E. Capitol Ave., Springfield, Ill.


K-28, REVERSE FINGER
CLAMPING PLATE
ELWELL PARKER TRUCK FINGER
K-6, ETC, MADE IN 1" & 3/4"
K-10, 11, 12 14, 28, R32, R-28, ETC.
STOOL FOR K-28
WESTINGHOUSE, MADE IN 1" & 3/4"
K, 34, 35, 36, 51, ETC. MADE IN 1" & 3/4"
R, -28, ETC. 3/4"
K-6, 8 10, REVERSE
G, E, C,

Trigger-Lock
Reversible Controller Fingers
Save
Time, Labor and Money

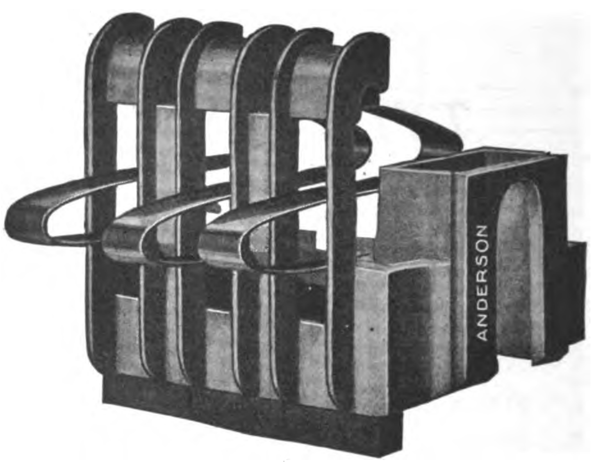
They save time because the renewable tip can be snapped on to the finger in place of the worn tip without removal or adjustment.

They save labor because anybody of ordinary intelligence can do the replacing. No labor needed to keep them in repair.

They save money because the renewable tip is long wearing, reversible and eliminates the scrapping of the entire finger.

Half of the large electric railways in America are using Trigger-Lock Reversible Controller Fingers.

Trigger-Lock
Reversible Controller Finger
814-18 Bath Ave., Niagara Falls, N. Y.
557 King St., West, Toronto, Canada



Consider these five points of
LINDALL
Brush Holder
Superiority

1. Brushes are easily inspected and renewed..
2. Brushes need not be recessed.
3. Constant brush pressure is provided.
4. There are no screws or nuts to work loose.
5. Pig-tails are not used.

Lindall Brush Holders have been in service for several years on some of the largest roads in the country—with attendant reduction in brush holder maintenance costs.

Write for bulletin and prices.

Albert & J. M. Anderson
Mfg. Co.
Established 1877
289-293 A St., Boston, Mass.

BRANCHES:
New York, 135 Broadway
Chicago, 105 So. Dearborn Street
Philadelphia, 429 Real Estate Trust Bldg.
London, E. C., 48 Milton Street

WORKS
NORTH EAST PA

Eureka Trolley Wheels

There's a good solid reason why Eureka Trolley Wheels wear: They're made from new, tough, durable bronze (no scrap used in any Eureka product). Machining is done on machines designed for this special purpose, assuring perfect balance, which gives greatest possible mileage with least wear and tear.

**Bulletins on Eureka Controller Parts, Commutators
Brushholders, Trolley Wheels and Line
Material gladly sent on request.**

THE EUREKA CO. NORTH EAST, PA.

Safety—Economy—Efficiency

GRIFFIN F. C. S. WHEELS

**Maximum
Mileage**

**Minimum
Cost**

For Street and Interurban Railways
We have adequate facilities at each foundry for mounting wheels on axles

GRIFFIN WHEEL COMPANY

McCormick Building, Chicago, Ill.

Chicago Detroit Boston Los Angeles Denver St. Paul Tacoma Kansas City

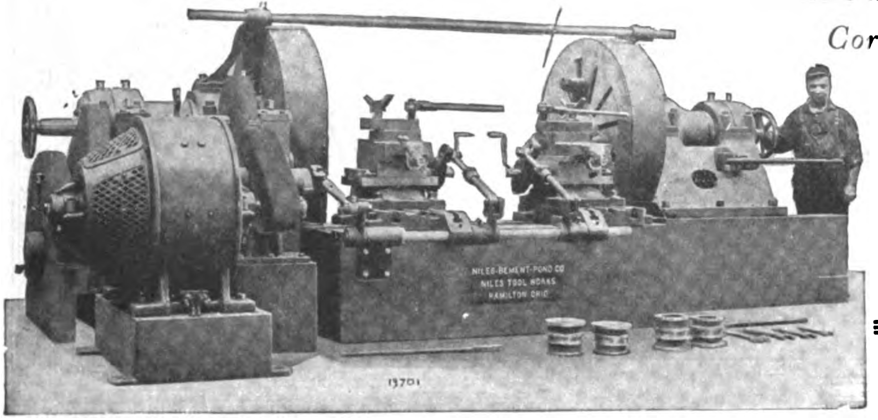
NILES-BEMENT-POND CO.
GENERAL OFFICES, 111 BROADWAY, NEW YORK

MACHINE TOOLS
For Electric Railway Repair Shops

We are in a position to furnish complete machine tool equipment for electric railway repair shops, including steam hammers and electric traveling cranes.

Correspondence Invited.

Standard
Car Wheel
Lathe



Our Line Includes

Axle Lathes, Car Wheel Borers, Hydraulic Wheel Presses, Shapers, Planers, Drills, Slotters, Bolt Cutters, Milling Machines, etc.

We "Standardize" on Catchers and Retrievers
So That You Will Standardize on

EARLL

Because we have devoted our years of experience to the manufacture of trolley Catchers and Retrievers exclusively—the only concern in America who has—we are able to produce the kind of catchers and retrievers that will satisfy your demands of service and maintenance.

Many roads all over the country have not used any other catcher or retriever since they installed the first EARLL on their cars.

We will gladly send you samples to try out in actual service if you will describe your equipment, speed, trolley tension, etc. No cost—no obligations.

C. I. EARLL, YORK, PA.

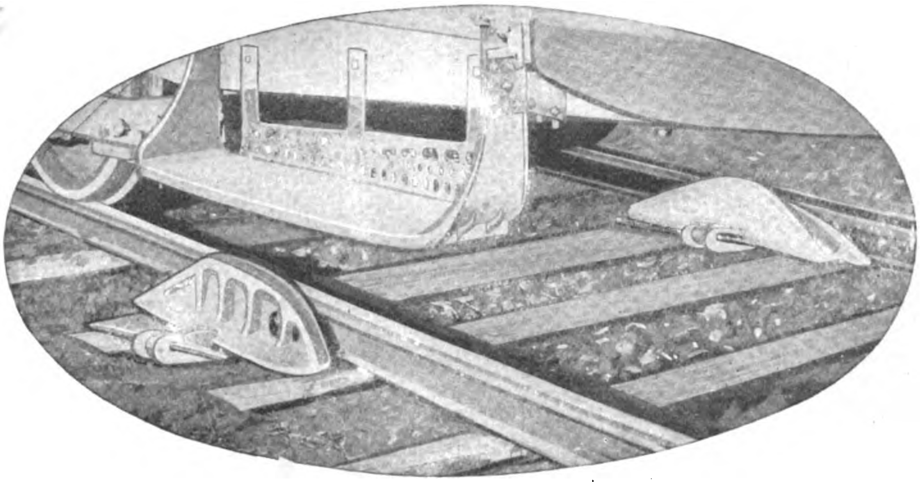
EARLL
PATENTED
MADE BY C. I. EARLL

READING

TYPE B REPLACER AND CLAMPS

FOR SUBURBAN TROLLEY SERVICE

NO SPIKING REQUIRED—CLAMPS HOLD REPLACER



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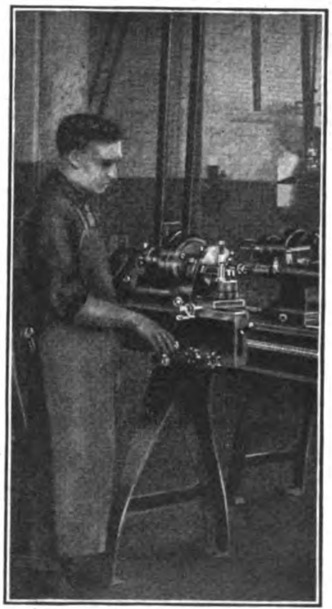

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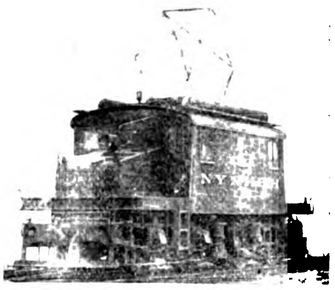

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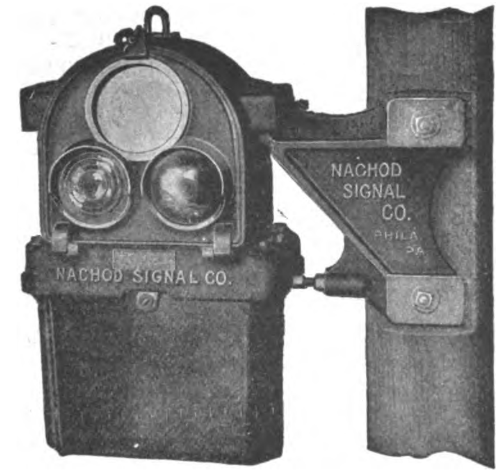

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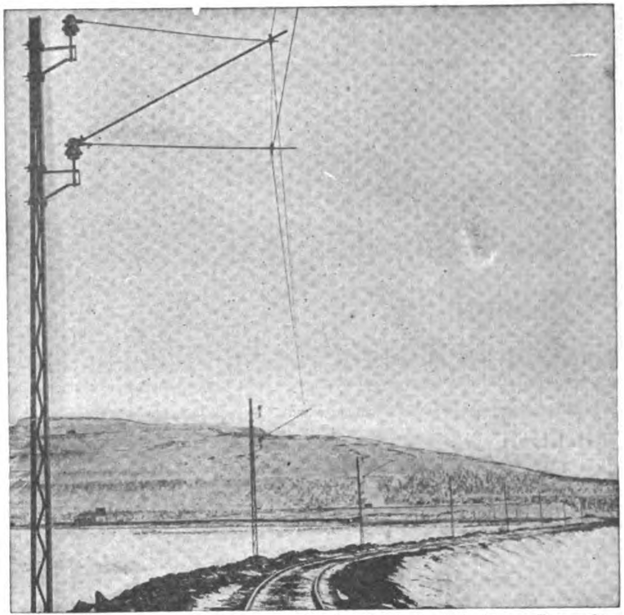

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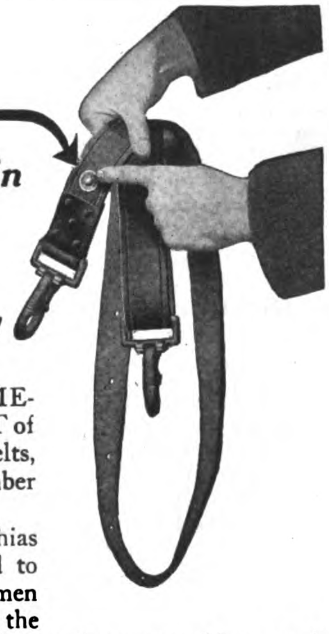

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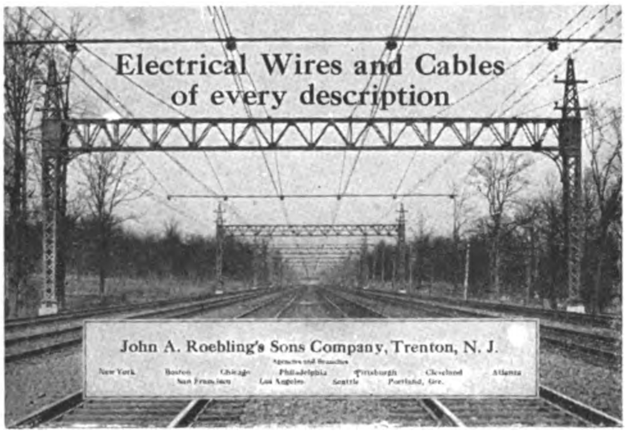

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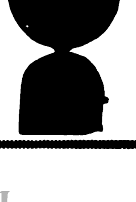

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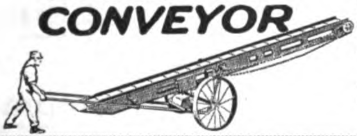

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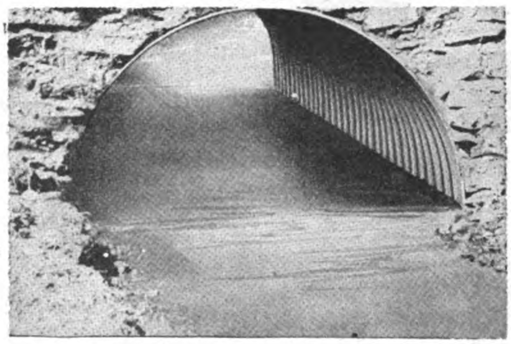

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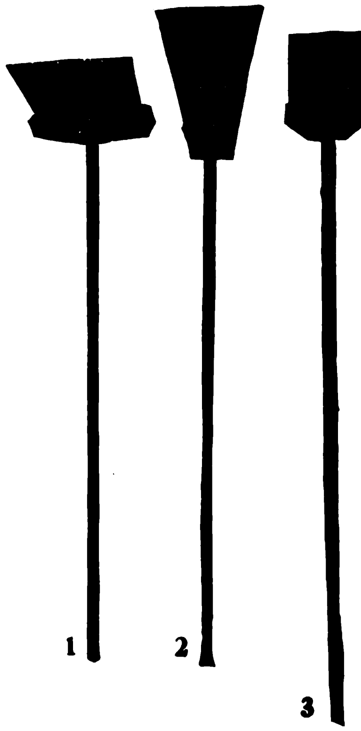

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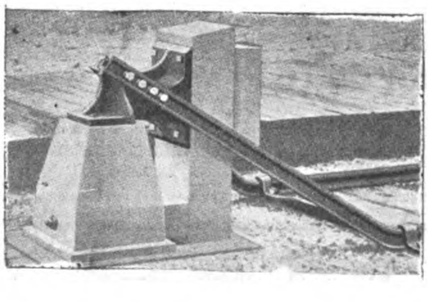

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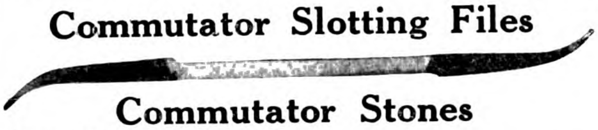

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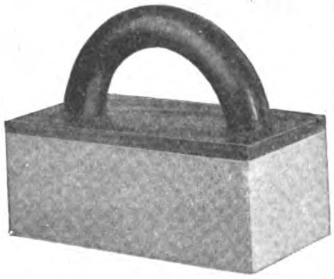

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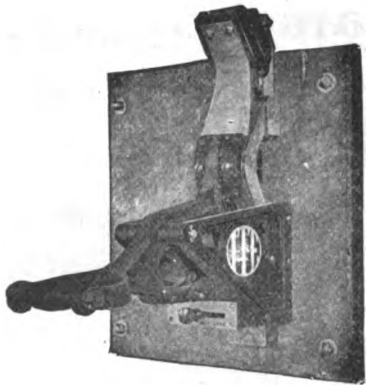

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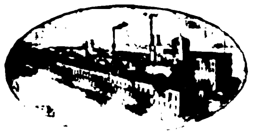

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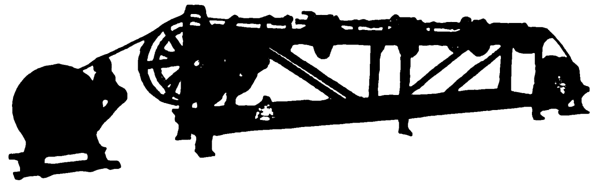

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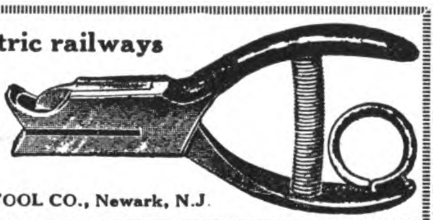

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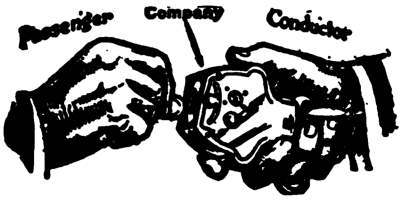

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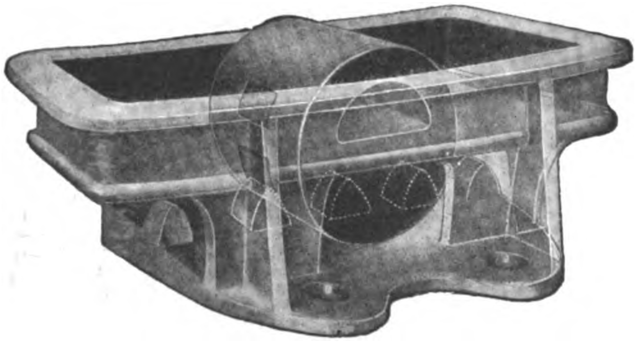
Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
1725 Mt. Elliott Ave., Detroit, Mich.



STUCKI
SIDE BEARINGS

have neither springs nor axles nor levers nor other delicate parts.

Simply a cage and one roller made of Tropenas steel. Roller is eccentrically loaded.

A. STUCKI CO.
Oliver Building, Pittsburgh, Pa.

Smith-Ward
Brake Slack Adjusters

Promote Braking Safety

That means that they work practically 100% efficient. That is as near perfect as any mechanical device can be made. When your cars are equipped with Smith-Ward Adjusters there are no "ifs" about their operation. They are "safe" all the time. Hundreds of cars equipped with our adjusters now in daily operation are proofs of that statement.

Can you say that of any other Adjuster?

Smith-Ward Brake Co.
Bush Terminal Bldg. No. 1
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WE CAN CUT YOUR COST OF
HEATING CURRENT
Write for THERMOSTATIC CONTROL INFORMATION

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS
Gold Car Heating & Lighting Co., 17 Battery Pl., New York

THE KALAMAZOO
Nº 5

The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

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KALAMAZOO, MICH., U. S. A.

Holden & White Inc.

Electric Railway Sales Distributors for:

Anderson Brake Slack Adjusters.
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Wasson Air-Retrieving Trolley Bases (U. S.).
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Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

CONSOLIDATED CAR HEATING CO.
ALBANY, NEW YORK, CHICAGO

Use them in your terminals—
PEREY TURNSTILES
or PASSIMETERS
Faster than the ticket seller
Perey Manufacturing Co., Inc.
30 Church Street, New York City

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CARBON BRUSHES

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Carbon Brushes are uniform. They talk for themselves.

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BRAKE SHOE STANDARDS

SAVE MATERIAL
SAVE LABOR
SAVE TIME
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Ask Us?

American Brake Shoe & Foundry Co.
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332 S. Michigan Ave., Chicago
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"Zero" for Axle and Journal Bearings

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"Motor" for Armature Bearings

STANDARD for a THIRD of a CENTURY

The Mileage Babbitt

Post's ZERO and MOTOR metals have been standard for a third of a century in shops where mileage records are attained. Nothing but highest grade of virgin raw materials used.

Write us for details.

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are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

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Sole Manufacturers
"HONEYCOMB" AND "ROUND JET" VENTILATORS
for Monitor and Arch Roof Cars, and all classes of buildings;
also ELECTRIC THERMOMETER CONTROL
of Car Temperatures.

141-151 WEST 22D ST.
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Write for Catalogue

1328 BROADWAY
New York, N. Y.

32,680 MILES

was the distance covered before this set of brushes was inspected. Even then they were in excellent condition and good for several thousand additional miles. Other brushes delivered 18,000 or less.

U S G Brushes

are especially designed for the service in which they are to operate.

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POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

FOREMAN wanted for city car house. 150 cars. Middle West. First-class pay. Eastern man preferred. Address P-431, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

POSITIONS WANTED

ENGINEER maintainance of way and structures desires change; expert on special track work; Eastern location preferred. PW-434, Elec. Ry. Journal.

MASTER mechanic or general foreman. Age, 37; married; will be open for position after June 15; over 18 years with one company; the last three years as master mechanic. Willing to go anywhere. Best references. PW-422 Elec. Ry. Journal.

POSITION as claim agent wanted. Have had 20 years' experience as head of department with present company. Reason for desiring change want larger property and broader field. Can give best referenecs and can deliver the goods. Am 40 years of age and married PW-429, Elec. Ry. Journal, Philadelphia.

SUPERINTENDENT of construction would like to take hold of transmission line or catenary construction; have had 12 years' experience as superintendent on this class of work; at present employed; minimum salary, $3000 and expenses, if a camp job. Address PW-427, Elec. Ry. Journal, Philadelphia.

MASTER mechanic wants position; have had 15 years' experience in all lines of maintenance and construction; can handle men and get results. A-1 references furnished. PW-435, Elec. Ry. Journal, Philadelphia.

SUPERINTENDENT wants position; 21 years' experience as dispatcher, chief dispatcher, trainmaster and superintendent of one of the largest interurban railroads in the country; 42 years old; can furnish A-1 references. PW-425, Elec. Ry. Journal, Chicago.

EXTRA WORK WANTED

Appraisal and Rate Engineer
Wants part time work. Central and Southern states. Complete reports; analyst. EW-432, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

In Replying to "Blind" Ads

be careful to put on envelope the key number in the ad. and also local address of office to which reply is sent.

10th Ave. at 36th St., New York.
935 Real Estate Trust Bldg., Phila.
657 Leader-News Bldg., Cleveland.
1570 Old Colony Bldg., Chicago.
501 Rialto Bldg. San Francisco.

Important

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents—send copies.

AGENTS AND SALESMEN

Do You Want Representation in Manchuria? Advertisers are invited to communicate with Messrs. Fukusho Company, Dairen, Manchuria, who are interested in all kinds of machine tools, engineering requirements and railway materials. If not already represented in Manchuria, Fukusho Company invite correspondence with this end in view. Advertisers are requested to forward catalogues, prices and terms offered.

Salesmen Wanted
With technical training in electrical line by large electrical manufacturer to specialize on electric railway and industrial plant sales Give age, past experience as well as present salary. AS-433, Elec. Ry. Journal, Philadelphia.

FOR SALE

GENERATING UNIT

1—425-Kw. G. E. Continuous Current Generator, Type M.P., 80 R.P.M., 500-550 volts, 773 amperes, full load, direct-connected to Hamilton-Corliss Engine, cylinder 28 in. x 48 in., S.P. 100 pounds, floor space 29 ft. x 7 ft. 6 in.

Price on application.

ELECTRICAL CONSTRUCTION CO.
2035 Washington Ave., Philadelphia, Pa.

Get your Wants
into the Searchlight

EMPLOYERS

Send us your inquiries for men of technical training and experience. We are obtaining employment for soldiers, sailors and marines released from the service.
Re-Employment Bureau of New York City for Soldiers, Sailors and Marines, 505 Pearl Street, north of Municipal Building, Professional Section, Worth 9250.

WANTED

OIL SALESMAN

A large corporation has need for an oil salesman to handle lubricating oils in the steam and electric railway trade.

He should be preferably a graduate engineer, who has had practical experience in locomotive and car shops, or at least has a good knowledge of shop conditions.

He must have had previous selling experience or be able to demonstrate sales ability. State qualifications in detail as to education and experience.

AS418-Electrical Railway Journal
935 Real Estate Trust Bldg., Phila., Pa.

Let the "Searchlight" Carry Your Message to South America

and to Spanish-speaking Engineers and Industrial Executives everywhere. Through the Searchlight Section of the new McGraw-Hill paper

INGENIERIA INTERNACIONAL

advertisers can now get in direct touch with Employment, Business and Professional Opportunities in

South America Cuba Philippines and Central America Porto Rico Spain

"Searchlight" advertisements will be printed in Spanish—same as the rest of the paper. No charge for translating copy. Get your copy in *now* for the next *issue*.

ADVERTISING RATES:

Undisplayed Advertisements, 5 cents a word—minimum charge $1.50 an issue. Discounts for consecutive insertions.

Displayed Advertisements at $5.00 or less per inch per insertion, depending on the number of inches used. 30 inches to a page.

LOOK OVER THE FOLLOWING

Don't you need to BUY or SELL some of these items?

WRITE US ABOUT IT NOW

AND MENTION THIS PAPER

Cars
  Passenger
  Freight
  Industrial
Car Equipment
  Ry. Motors
  Air Brakes
Locomotives
Cranes
Steam Shovels
Buckets
Rails
Lock Washers
Bolts, Spikes, etc.
Bridges

Cable-ways
Crushers
Derricks
Hoists
I-Beams
Pipe
Steel Piling
Steel Towers
Tanks
Air-Compressors
Blowers
Boilers
Condensers

Engines
Fans
Generators
Heaters
Motors
Pumps
Transformers
Turbines
Accumulators
Axle Lathes
Bolt Cutters
Boring Bars
Boring Mills

Bulldozers
Cutters
Cut-off Machines
Drilling Machines
Drills—Twist
Files
Forging Machines
Gear Cutters
Gear Hobbers
Grinders
Grinding Wheels
Hammers
Jacks, Hydraulic

Joggling Machines
Keyseaters
Lathes
Milling Machines
Nut Machines
Pipe Machines
Planers
Presses
Profilers
Punches
Riveters
Saws
Screw Machines

Rolling Mills
Rolls
Shapers
Shears
Shipyard Mchy.
Slotters
Stacks
Steel Buildings
Testing Machines
Tin Plate
Wheel Borers
Wheel Lathes
Wheel Presses

AIR-COMPRESSORS

1200 ft. I-R, 2-stage motor drive, with receiver.
1190 ft. I-R 22-13 x 16 Duplex motor drive.
1000 ft. Norwalk, 2-stage steam.
960 ft. Laidlaw-Dunn Gordon, 12-20 x 18 duplex steam.
599 ft. I-R 10-16 x 14, motor drive.
550 ft. Laidlaw-Dunn-Gordon, 12-20 x 18 duplex steam.
489 ft. I-R, 14-16 x 18, steam.
400 ft. Rand Drill, 16-10 x 12, duplex belt.
350 ft. I-R 10-16½ x 10½ steam.
200 ft. Chicago Pneumatic, 10-10 x 10 steam.

BOILERS

508, 500, 300-hp. B. & W., WT, 160-lb. working pressure.
250-hp. Erie City, 140 lb.
250-hp. B. & W., WT, 160 lb.
150-hp. B. & W., 125 lb.
100-hp. Ames Locomotive, 125-lb. stack.
50-hp. O. & S. Locomotive, 100-lb. stack.

BOLT AND NUT MACHINES

3-in. Acme Bolt Cutter, with 6-spindle nut tap.
1-in. Landis Bolt Cutter, 7 sets chasers.

BORING MACHINES

5 -in.Barrett type, bar 12 ft., 40-in swing.
5 -in. Beaman & Smith Boring, Drilling, Milling.
4 -in. Beaman & Smith Bar Cylinder Borer.
3 -in. Sellers, knee type, 40-in. swing.
2½-in. Bement, knee type, 54-in. swing.

BORING MILLS

51-in. Bridgeport, 2 heads.
38-in. Baush, 2 heads.
40-in. Brown & Sharpe Nó. 2, vertical turret
30-in. Niles, also Bridgeport.
2-head Baker, vertical.
No. 5 Moline, 4-spindle.
42-in., 48-in. Gisholt—stand. equip.

DRILLS—UPRIGHT

42-in , 36-in. Gould & Eberhardt, Blaisdell.
24-in. Fitchburg. Also electric drills.

DRILLS—RADIAL

5-ft. Prentice, plain taper attachment.
4-ft. Prentice, plain swing arm type.
42-in. Prentice, plain.
2½-ft. Mueller square swing table.

DRILL PRESSES

1, 2, 3, 4, 5, 6, 8, 9, 12, 16, 18-spindle Natco, Foote-Burt, Henry & Wright, Sipp, Leland & Gifford, Pratt & Whitney, Taylor & Fenn. Sigourney, Dwight-Slate, Prentice, Finn-Sadler, Baush, Avery, Allen, Fairbanks, horizontal and rotary.
23 and 28-in. Rockford.

State your requirements.

ELEVATORS

4000-lb. freight.

GEAR CUTTERS

54-in. Sellers, auto spur and bevel.
48-in. Hewes & Phillips, spur and bevel.
22-26-in. Bilgram System Bevel Generator, 8-26 in

GEAR HOBBER

No. 1 Adams, complete, new.

GRINDERS

Blanchard 20-hp., No. 3 Wilmarth & Norman, No. 60, 70, G. Heald, No. 1 and 2 Morse, No. 2 and 11 B & S, Nos. 2, 3 Union, No. 1 Universal, 14 x 36. Bridgeport, Landis, Walker, Diamond, Cincinnati, No. 2 Oakley, Gisholt, Norton, P & W, Thompson, Van Norman plain, universal, surface, internal, cylindrical.

All styles and sizes new—state requiremen

HAMMERS

6000, 7000, 8000-lb. steam forging.
4500-lb. Bement Forging.
1600-lb. Billings & Spencer, drop.
1100-lb. Erie, drop.
600-lb. Merrell, board lift drop.
500-lb. Miles, steam, 500-lb. Sellers.
100, 125, 150, 200-lb. Beaudry.

80,000-lb. Riehle Testing Machine
8000-lb. steam forging hammer
54-in. slotter massive type.
36-in. shaper massive type foundry
1¼-yd. shovel Marion model 20
5-ton EOT crane 3 motors
15-ton Brownhoist stdg. 40-55-ft.
No. 60 Heald cylinder grinder.
No. 2 Cincinnati HP. Miller
No. 2 Brown & Sharpe Plain Miller
42 in. x 48 in. Gisholt Boring Mill, two heads

KEYSEATERS

No. 0 Baker Bros., 1 x 9, full equipment, 18-in. compound table.

LATHES

92 x 31½-in. Stoever, triple geared.
42-64-in. x 19-ft. Fitchburg, triple geared.
38-44-in. x 14-ft. Fitchburg.
40-in. x 13-ft. Putnam, triple geared
26-in. x 18-ft. Bullard, rapid production, 20-hp. motor.
25-in. x 14-ft. Reed, Q.C.
24-in. x 20-ft. New Haven, also 14-in. x 5-ft. and others.
26-in. x 9-ft. Bridgeford.
30-in. x 14-ft. LeBlond, loose gear.
24-in. x 12-ft. New Haven, loose gear.
20-in. x 10-ft. Hamilton, D.B.G., complete.
20-in. x 8½-ft. Lodge & Shipley, Q.C.G.
18-in. x 8-ft. Whitcomb-Blaisdell, Q.C.G.
8 x 60 Lo-Swing.
16-in. x 6-ft.
14-in x 6-ft. Fay & Scott.
11-in. x 5-ft. Prentice.
No. 3 Ames Bench.
No. 3½ Rivett Bench.
No 4 Prentiss Bench.

TURRET LATHES

3¼ x 4½-in. National-Acme Gridley, 4-spindle.
3¼-in. National-Acme Gridley, single spindle.
20-in. Simplex auto Potter & Johnston.
20-in. Cleveland, 5-spindle, turret chuck.
20-in. x 6-ft. Bullard, friction, B.G.
2 x 24 Jones & Lamson, cone feed.
13, 21, 24, 28, 34-in. Gisholt, 1½, 3½, 5, 6½-in. spindles.
No. 3-A, No. 4 Warner & Swasey, universal, new.
36-in. Bullard, 3-jaw, 5 face, new.
4 3/16-in. Bardons & Oliver.

IF YOU DON'T SEE IT — ASK FOR IT. WE HAVE IT— WRITE US.

Our immense stock changes daily —too big to print everything.

MILLING MACHINES

48 x 36 x 14-ft. Ingersoll, 4-spindle, adjustable
Nos. 4, 5 Brown & Sharpe, plain.
No. 4 Smith & Garvin, plain.
No. 2 Lodge & Davis, plain.
No. 2 Hilles & Jones, vertical.
Brainard Slab, table 7 ft. x 20 in.
No. 2 Cincinnati Universal.
No. 2-B Hendey & Norton.
No. 2½ Rockford Universal
No. 1 Kempsmith, plain, also Universal.
Type A Briggs, Gooley & Edmund.
Nos. 12, 15, 21 Garvin.
No. 8 P. & W., automatic.
Nos. 0, 11, 12 Brown & Sharpe No. 2 vertical.
Nos. 2A, 4B, Vertical, Becker
Nos. 2B, 3B, Milwaukee Plain
Nos. 7, No. 25 Becker.
Nos. 1½ and 6 Pratt & Whitney hand
No. 2 Lincoln, hand.
Newton upright duplex adjustable, with motor.

PIPE MACHINES

2-in. Merrell Pipe and Nipple Cutter.
6-in. Curtiss & Curtiss Dies, 1½ to 6 in.
6-in. Saunders.
8-in. Merrell Dies, 2½ to 8 in.
8-in. Jarecki Dies, 2½ to 8 in.
12-in. Williams Tool Co., belted.

PLANERS

60 x 60 x 12-ft. Pond, 3 heads
54 x 54 x 12-ft. Pond, 4 heads.
48 x 48 x 16-ft. Powell 4 heads.
42 x 42 x 12-ft. H. & P., 2 heads.
34 x 34 x 10-ft. P. & W., 1 head.
32 x 32 x 8-ft. Pond, 2 heads.
32 x 32 x 8-ft. New Haven
30 x 30 x 8 ft. Cincinnati
24 x 24 x 6-ft. Cincinnati

PRESSES

Nos. 19, 77½, 78½ Bliss.
No. 501-D Ferracute.
No. 666 Toledo 1000-ton.
No. 3 Stiles & Parker.
No. 1 Bliss, 14-in. stroke, straight side.
No. 540 Max Ams, 8-in. stroke.
No. 2 Bliss, 7-in. stroke.
Nos 3, 4, 5 and 6 Farrell.

And others—state requirements

PUNCHES AND SHEARS

No. 2 Thomson, bevel plate, 1 in.
No. 2 H. & J., guillotine bar, 8½-in. knives.
26-in. Cleveland SE, punch 1 in., 1 in.
14-in. throat SE, portable punch, hand or power.
No. 4 Long & Alstater double end Punch and Shear.
No. 13 10-in. Williams & White single end Punch and Shear.

SCREW MACHINES

B & S, W & S, P & W, Fox, Ames, Gates, Automatic, Cleveland, Garvin. All sizes, large assortment, mostly new. State your requirements.

SHAPERS

36-in. Wetherill massive type foundry, 30,000 lb.
16, 20, 24-in. Cincinnati.
16, 20-in. Kelley.
20-in. Rockford, 20-in. Smith & Mills.
16-in. Ohio, 16-in. Gould & Eberhardt, 15-in. Stockbridge.

SLOTTERS

54-in. Hewes & Phillips, massive type.
8-in. Newton, cone drive.

TAPPING MACHINES

¾-in. Hubbell.
No. 1-X, No. 2-X Garvin
Hercules, Harbey Hubbell, Rickert & Shafer.

RAILROAD EQUIPMENT

LOCOMOTIVES

50-ton, 6-wheel switcher.
55-ton, 6-wheel switcher.
67-ton, 6-wheel switcher.
40-ton saddle tank.
25-ton saddle tank.
35-ton saddle tank.
60-ton, 10-wheel.
60-ton Mogul.
72-ton, 8-wheel.
40-ton, 4-wheel switcher.
20-ton, 36-in. saddle tank.

PASSENGER CARS

50-ft. combination.
47-ft. combination.
52-ft. 7-in. passenger.
50-ft. workmen.

FLAT CARS

25-ton wooden.
30-ton steel center sill.
40-ton wooden.
40-ton steel under frame.

GONDOLAS

40-ton wooden.
40-ton steel underframe.
50-ton steel hopper.

BOX CARS

30-ton wooden.
30-ton steel center sill.

TANK CARS

8000-gal. steel underframe.

RAILWAY & POWER EQUIPMENT COMPANY

1321 Woolworth Building

Cable Address: "JOHNSCAR"
Code: Western Union

New York, N. Y., U. S. A.

ROTARY CONVERTERS

1—500-kw. Westinghouse Rotary Converter, 6-ph., 600-v. D.C., 430-v. A.C., 600 r.p.m.
1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

TURBINE

1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

ARCHER & BALDWIN, INC.
114-118 Liberty St., New York, N. Y.
Telephone 4337-4338 *Rector*

IMMEDIATE DELIVERY

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4 G. E. Co.'s 247 Motors and G. E. Co. Air Brakes.

McGUIRE-CUMMINGS MANUFACTURING CO.
111 West Monroe Street, Chicago, Ill.
Cars and Trucks, Snow Sweepers, Electric Locomotives

Turbo-Generator Units

60 CYCLE

10,000 Kw. Westinghouse Parsons Horizontal Turbo Generator Unit, 3-phase, 60-cycle, 13,800 volts, 1800 RPM. Can be reconnected for any other standard voltage. Absolutely new. Suitable surface condenser and condenser auxiliaries. Send for full details and specifications.

25 CYCLE

6500 Kw. Allis-Chalmers Horizontal Turbo Generator Unit, 3-phase, 25-cycle, 6600 volts, 4 pole, 750 RPM. Send for full details and specifications.

We have these units in stock for immediate shipment. We own them and are not acting as brokers.

MACGOVERN & COMPANY, Inc.
114 Liberty Street, New York, N. Y.
Pittsburgh Office, 498 Union Arcade Building

S EARCHLIGHT
S ERVICE
S ECURES
S ATISFACTORY
S ITUATIONS
S ALES

816

NEW RAILS

650 tons 100-lb., 175 tons 90-lb., 600 tons 60-lb. A. S. C. E.

SWITCH TURNOUTS

5—70-lb. A. S. C. E., and frog Manganese. New.
1—60-lb. ARA-A 4½ L.H. Good as New.
500 Kegs 9/16 x 5½-in. New Spikes.
1500 70-lb. Rail Braces. New.

Track Accessories, All Kinds.
Prompt Shipment

ZELNICKER IN ST. LOUIS
Get Bulletin 250 (88 pages of Bargains)
A Big Money Saver

RAILS

15,000 TONS—NEW and RELAYERS
NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb. 40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85 lb., 90 lb.
RELAYERS—30 lb., 35 lb., 40 lb., 45 lb. 56 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.

Fastenings, New Bolts, Nuts and Spikes, New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.

L. B. FOSTER COMPANY
Park Building, Pittsburgh, Pa.

FOR SALE

RAIL BONDS

260—New 4/0 Flexible Copper Protected Type P-4—⅞ x ⅞ inch press terminal 32 inches long. A bargain, apply to

LYKENS VALLEY RAILWAY CO.
417 East Market St., Williamstown, Pa.

RAILS FOR SALE WIRE

For Immediate Shipment

MATERIAL and EQUIPMENT

OF THE

Friendly and Sistersville Railway Company

SISTERSVILLE, W. VA.

This material is in excellent condition, consisting of 70-lb. A.S.C.E. Steel Rails, Ties, Steel Bridges, Copper Feed Wire, Copper Trolley Wire, I Beams, Bridge Timbers, Poles, Brackets, etc., etc.

Also offer New and Relaying Rails, any weight, located at our various yards.

THE WILKOFF COMPANY
FIRST NATIONAL BANK BLDG., PITTSBURGH, PA.
WOOLWORTH BLDG., NEW YORK CITY

WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc Remember our initials stand for our product.

CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.
EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND INC. 1918

Government Sale of (New) Machine Tools

SEALED BIDS will be opened **10 A. M., July 1, 1919,**

at War Department Surplus Property Division, Munitions Building, Washington, D. C., for any of following Tools, f.o.b. points of storage, where they may be inspected:

5—**Double Punch and Shears,** No. 3A Royerford, with motors.

10—**Punches,** 24-in. throat, New Doty, Mfgrs., with motors.

2—**Hack Saw Machines,** No. 7, E. C. Atkins Co., Mfgrs., with motors.

2—**Planers,** 30 in. x 30 in. x 10 ft., with 2 heads on cross rail, Whitcomb-Blaisdell, Mfgrs., with motors.

9—**Hollow Hexagon Turret Lathes,** Warner & Swasey Universal No. 2A, with motors.

2—**Standard Lathes,** 18 in. x 22 ft., Whitcomb-Blaisdell, Mfgrs., with motors.

4—**Motor Head Pattern Makers' Lathes,** Oliver No. 25A, 16 in., with motors.

4—**Portable Floor Cranes,** No. 6 Canton, capacity 3 tons.

1—**Drill Grinder,** American Style, E. W., with motor.

2—**Grinding Machines,** Type SS, Cincinnati Elec. Co., Mfgrs., with motors.

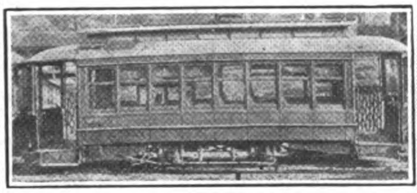
5—**Power Grindstone Machines,** 36 in. x 4 in., with motors.

2—**Pipe Threading and Cutting-off Machines,** 300A, Oster Co., Mfgrs.

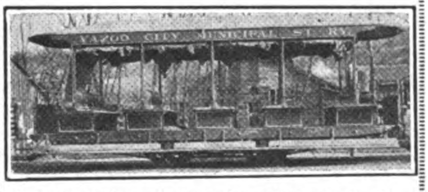
1—**Pipe Cutting and Threading Machine,** Curtis No. 69.

Full particulars and special bid forms may be obtained at above Office and Zone Supply Offices: Boston, New York, Philadelphia, Baltimore, Newport News, Atlanta, Jeffersonville, Ind., Chicago, St. Louis, New Orleans, San Antonio, Omaha, El Paso, San Francisco. **Refer to S. P. D. No. 5205 M. E.**

FOR SALE



4-32 ft. semi-convertible American Car Co.'s cars, Brill 21-E single truck, seating capacity 32, G.E. type 78, 35 H.P. motors, G.E. form K-10 controllers.



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Standard O-36 Trucks
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Motors K-36 Control

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Gary, Indiana

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Deck Equipment
Galley Equipment

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

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Collier, Inc., Barron G.

Air Pressure Relays
Philadelphia Electric Company Supply Dept.

Air Rectifiers
Holden & White, Inc.

Ammeters
Weston Elec'l Instrument Co.

Anchors, Guy
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Anti-Climbers
Railway Improvement Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

Automobiles and Buses
Brill Co., The J. G.

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Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
General Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Storage
Electric Storage Battery Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
Post & Co., E. L.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
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Stucki Co., A.

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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
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St. Louis Car Co.

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Niles-Bement-Pond Co.
Reading Specialties Co.
Zelnicker, Walter A., Supply Co., Inc.

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Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.
Lincoln Bonding Co.

Bonding Apparatus
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Electric Railway Improvement Co.
Electric Service Supplies Co.
Lincoln Bonding Co.
Ohio Brass Co.

Bonds, Rail
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Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

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McGraw-Hill Book Co.

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Niles-Bement-Pond Co.

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Bates Expanded Steel Truss Co.
Electric Ry. Equipment Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

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Holden & White, Inc.
Smith-Ward Brake Co.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

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Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Westinghouse Traction Brake Co.

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Lincoln Bonding Co.

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Thompson-Starrett Co.

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Zelnicker, Walter A., Supply Co., Inc.

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Jeandron, W. J.
Morgan Crucible Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

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United States Graphite Co.

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Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Buckets
Blaw-Knox Company

Bumping Posts
Mechanical Mfg. Co.

Bushings, Case Hardened & Manganese
Bemis Car Truck Co.

Cables. (See Wires and Cables.)

Cable End Bells
Philadelphia Electric Company Supply Dept.

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

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Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Wason Mfg. Co.

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Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

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Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.

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Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

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Earll, C. D.
Electric Service Supplies Co.
Holden & White, Inc.
Kerschner Co., Inc., W. R.
Ohio Brass Co.
Wood Co., Chas. N.

Circuit Breakers
Cutter Electrical & Mfg. Co., The
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Philadelphia Electric Company Supply Dept.

Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)
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Ohio Brass Co.
Van Dorn & Dutton Co.

Cleat Type Switchboard Insulators
Philadelphia Electric Company Supply. Dept.

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General Electric Co.

Coal and Ash Handling—(See Conveying and Hoisting Machinery.)

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Railway Improvement Co.

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Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

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Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Rome Wire Co.
Westinghouse Elec. & M. Co.

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General Electric Co.
Westinghouse Elec. & M. Co.

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International Register Co., The
Johnson Fare Box Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.
Wood Co., Chas. N.

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Handy Supply Co.

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General Electric Co.

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Eureka Co.
General Electric Co.
Mica Insulator Co.
Westinghouse Elec. & Mfg. Co.

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Handy Supply Co.

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Westinghouse Trac. B. Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Thompson Starrett Co.

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Eureka Co.
Trigger Lock Reversible Controller Finger

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Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Elec. Service Supplies Co.

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Westinghouse Elec. & Mfg. Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Portable Machinery Co.

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Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

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Samson Cordage Works.

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Samson Cordage Works.
Electric Service Supplies Co.
Wood Co., Chas. N.

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Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

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Crossings, Track. (See Track, Special Work)

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Canton Culvert & Silo Co.

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St. Louis Car Co.

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Electric Equipment Co.
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Griswold Machine Co., Geo. M.
Hyman Michaels Co.,
MacGovern & Co., Inc.
Zelnicker Supply Co., Inc., Walter A.

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Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Die Blocks
General Steel Co.

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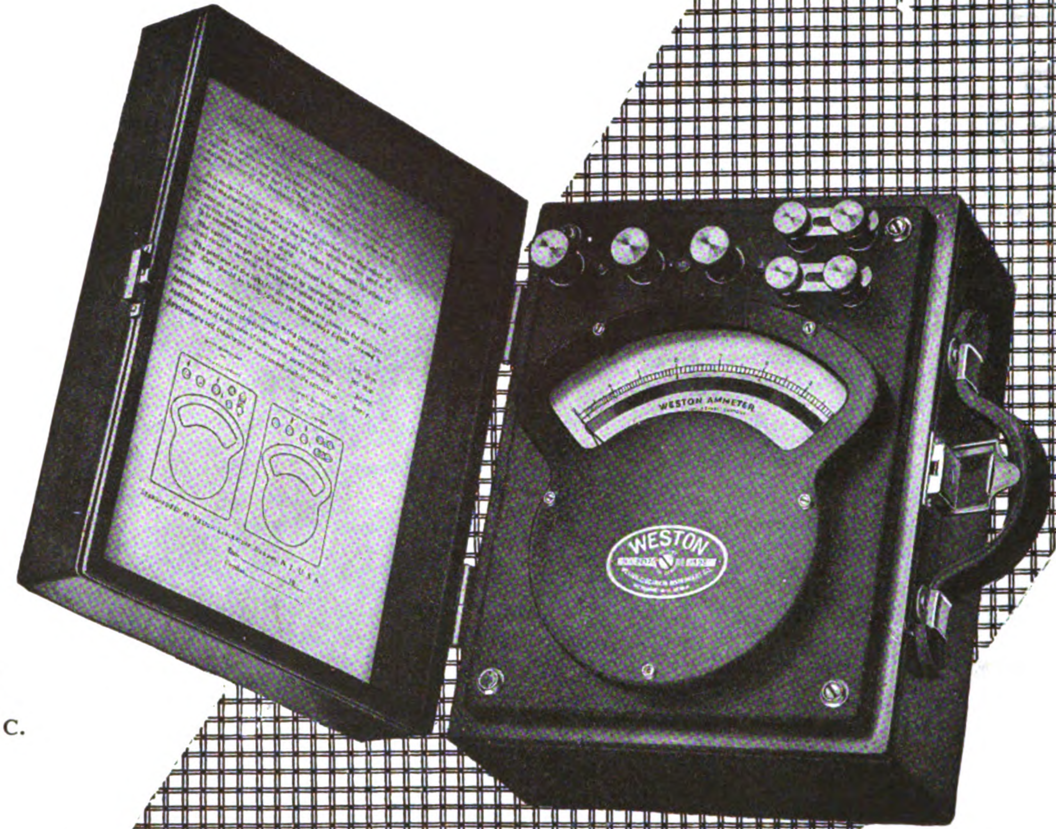
Philadelphia Electric Company Supply Dept.



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National Pneumatic Co., Inc.
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Ohio Brass Co.

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Zelnicker Supply Co., Walter A., Inc.

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Byllesby & Co., H. M.
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Ford Bacon & Davis
Holst, Englehardt W.
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Stone & Webster
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

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Johnson Fare Box Co.
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Page Steel & Wire Co.

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Cleveland Fare Box Co.
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Star Brass Works.

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Eureka Co.
Standard Forgings Co.
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General Electric Co.

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Railway Track-work Co.
Indianapolis Frog & Switch Co.

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Railway Track-work Co.

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Ohio Brass Co.

Harps, Trolley
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More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

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General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

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Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
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Smith Heater Co., Peter

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Cooper Heater Co.
Holden & White, Inc.
Smith Heater Co., Peter

Heaters, Car (Stove)
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Holden & White, Inc.
Smith Heater Co., Peter

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Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The
Van Dorn & Dutton Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic and Fire
Westinghouse Traction Brake Co.

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Niles-Bement-Pond Co.

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Inspection
Electrical Testing Lab's.

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Philadelphia Electric Company Supply Dept.

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Economy Electric Devices Co.
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Weston Elec'l Instrument Co.

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Freyberg Bros., Inc.
Mica Insulator Co.
Standard Paint Co.
Standard Underground Cable Co.
Standard Woven Fabric Co.
Westinghouse Elec. & Mfg. Co.

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Drew Electric & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Freyberg Bros., Inc.
General Electric Co.
Holden & White, Inc.
Mitchell-Rand Mfg. Co.
Westinghouse Elec. & Mfg. Co.

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General Electric Co.
Locke Insulator Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.
White Electrical Supply Co., T. C.

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National Ry. Appliance Co.
Templeton, Kenly Co., Ltd.

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Lackawanna Steel Co.
Rail Joint Co., The
Reading Specialties Co.
Zelnicker Supply Company, Inc., Walter A.

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Bemis Car Truck Co.
Brill Co., J. G.

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Westinghouse Elec. & Mfg. Co.

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Seneca Falls Mfg. Co.

Lathes, Car Wheel
Niles-Bement-Pond Co.

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Milburn Co., The Alex.

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General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Drew Electric & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Locke Insulator Co.
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.
White Electrical Supply Co., T. C.

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General Electric Co.
McGuire Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

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Economy Electric Devices Co.

Meters (See Instruments)
Electric Service Supplies Co.
Wood Co., Chas. N.

Mica
Mica Insulator Co.

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Drew Elec. & Mfg. Co.

Motors, Electric
Westinghouse Elec. & Mfg. Co.

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Weston Elec'l Instrument Co.

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Power Specialty Co.
Westinghouse Traction Brake Co.

Paints and Varnishes. (Insulating)
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Mitchell-Rand Mfg. Co.
Standard Paint Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Paints and Varnishes (Preservative)
Standard Paint Co.

Paving Bricks, Filler and Stretcher
Nelsonville Brick Co.

Paving Material
Am. Brake Shoe & Fdy. Co.
Nelsonville Brick Co.

Pickups, Trolley Wire
Electric Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions. (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe
National Tube Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

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Pliers, Insulated
Electric Service Supplies Co.

Pole Reinforcing
Hubbard & Co.

Pole Sleeves
Drew Elec. & Mfg. Co.

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Massey Concrete Products Co.

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Valentine-Clark Co.

Poles Metal Street
Bates Expanded Steel Truss Co.
Electric Ry. Equipment Co.
Hubbard & Co.

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Carney & Co. B. J.
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.
Western Red Cedar Assn.
White Marble Lime Co.

Poles Trolley
Columbia M. W. & M I. Co
Electric Service Supplies Co
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Electric Ry. Equipment Co.
National Tube Co.

Porcelain Bushings
Philadelphia Electric Company Supply Dept.

Post Type Insulators
Philadelphia Electric Company Supply Dept.

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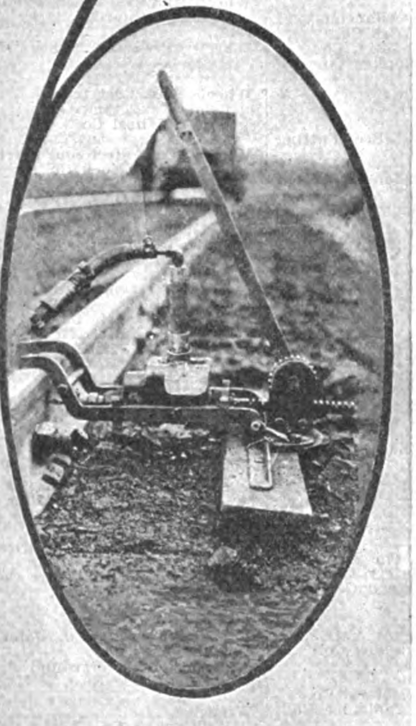

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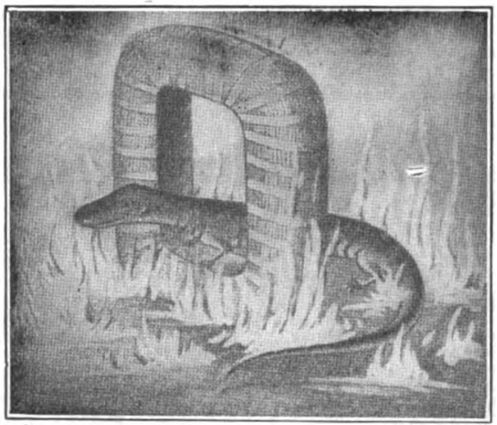

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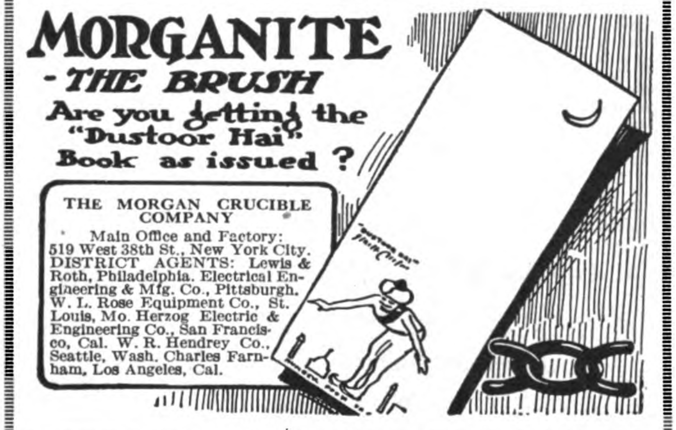
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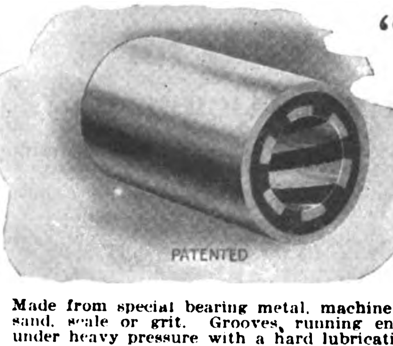

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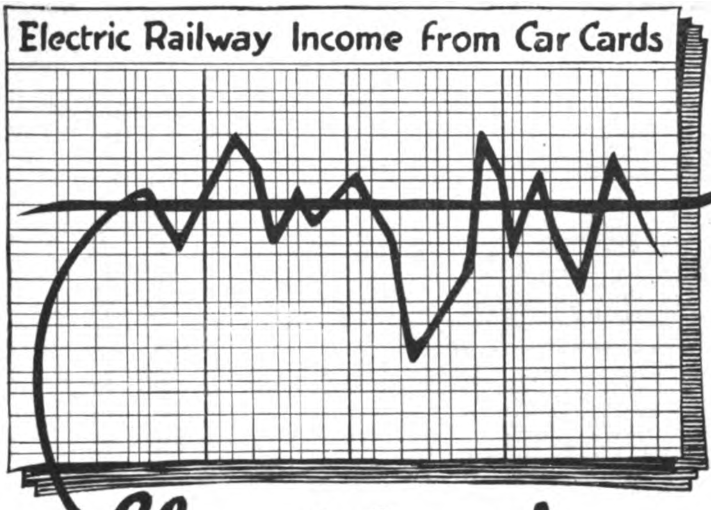
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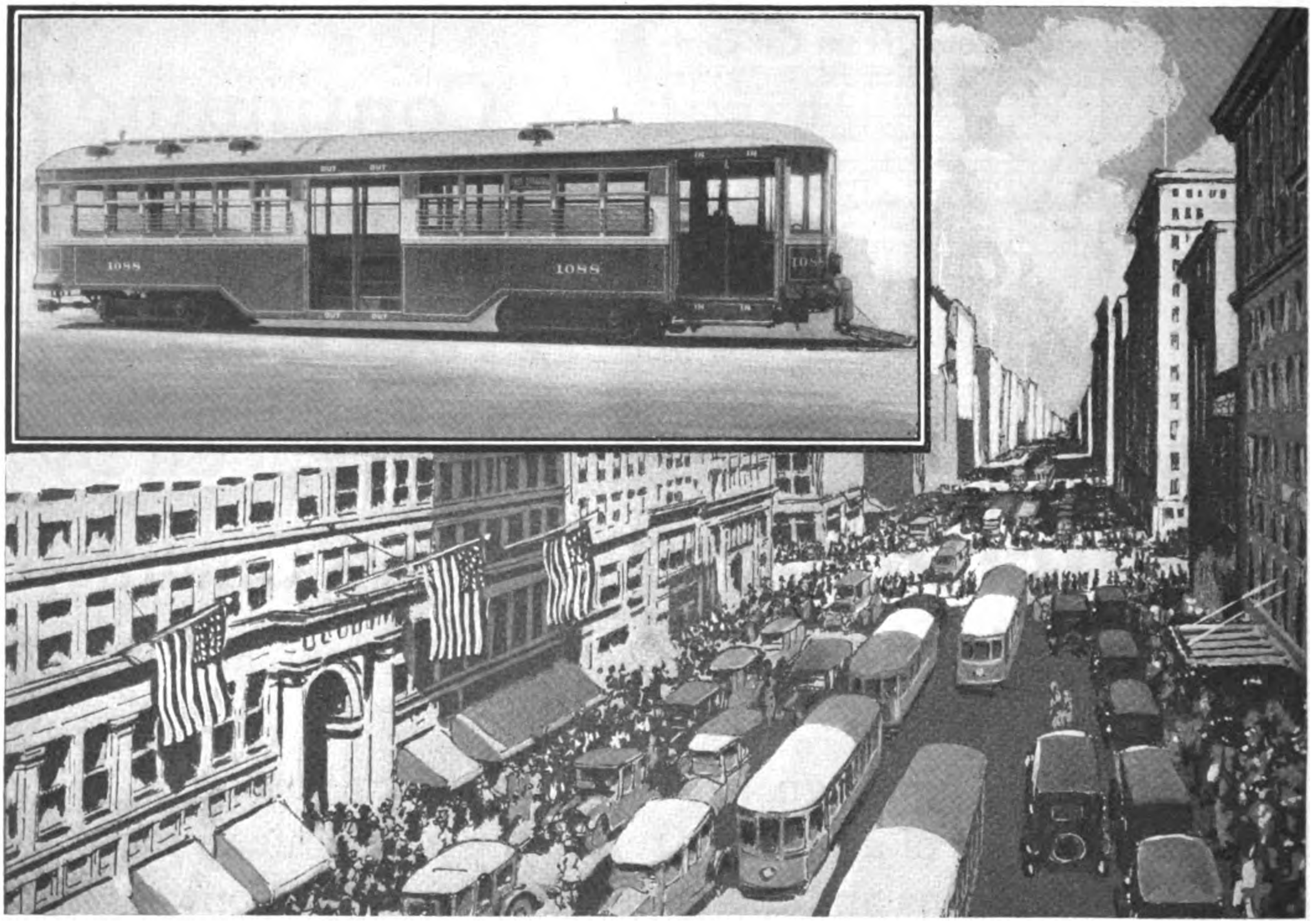

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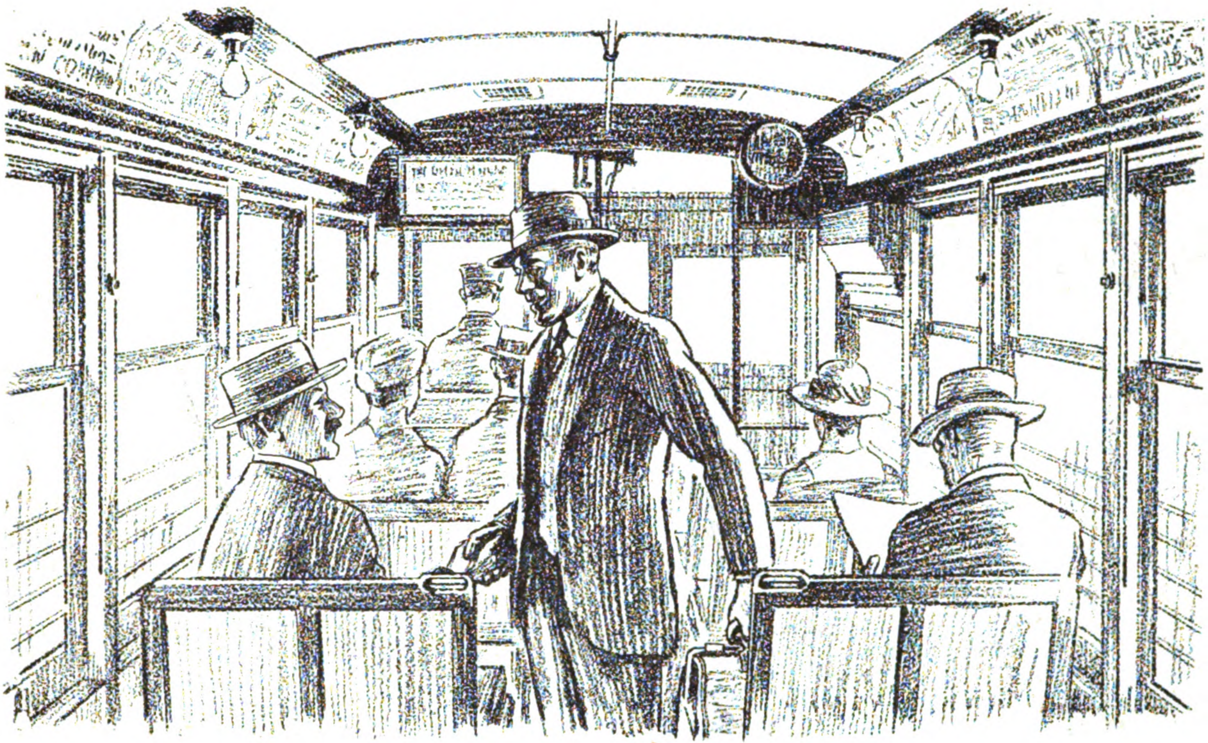
SPRINGFIELD, MASS.



"Hello, Jones, welcome home! You see our city has acquired Birney Safety Cars since you left."
"Yes, and it's a real acquisition! My trip took me to a good many places where these cars are used and I want to tell you that every one of those cities was prosperous and progressive and had a good reputation with the traveling men I met. I believe that good transportation has a lot to do with prosperity."

HOW many more calls would business men make if they knew they could get cars when they wanted them?

How many more shopping trips would women make if they hadn't recollections of long waits for cars?

How many more walkers and automobile users would be railway passengers if they hadn't been irritated by a series of car-waiting experiences?

How many more people would go to ball games, parks, movies and other amusements if they were fairly sure their enjoyment wouldn't be marred by standing and waiting for cars?

Frequent and quick car service is the biggest kind of an incentive to increased activity of the entire population of a city.

More business is done. More money is circulated. Everything speeds up and takes on a healthier tone.

The Birney Safety Car gives exactly the service that every city needs.

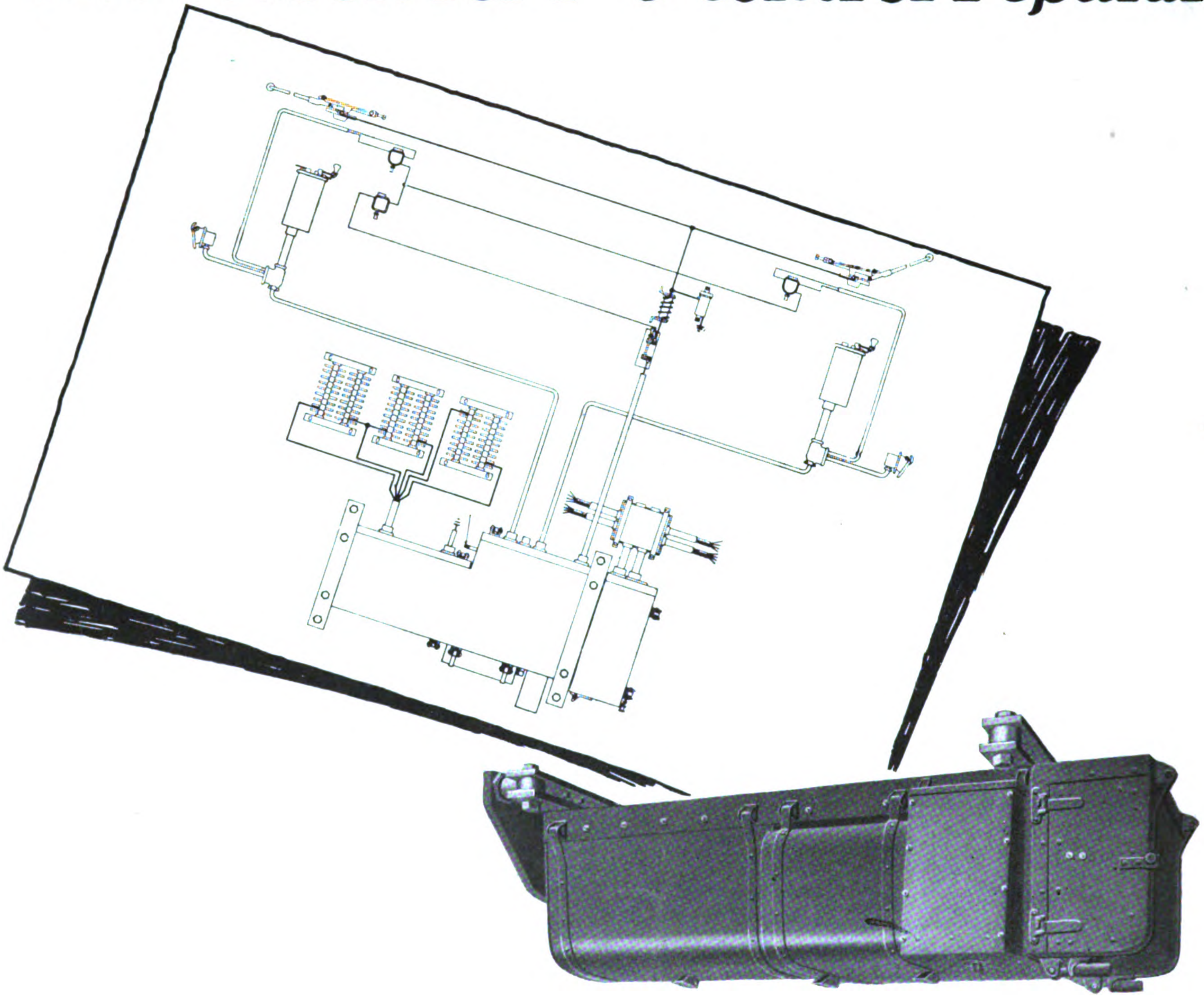
THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR COMPANY
ST. LOUIS, MO.
G.C.KUHLMAN CAR COMPANY
CLEVELAND, OHIO
WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

BIRNEY
TRADE MARK
SAFETY
CAR

Birney Safety Car Service produces the good-will that puts a railway company in the best position to obtain a higher rate of fare.

BRILL

Simplicity
One reason for P C Control Popularity



Inspect this wiring diagram—*note* the simplicity.

That is the complete diagram of the now famous Sprague-General Electric Type PC for remote control.

PC Automatic Control can be set to accelerate, notch by notch, at the rate best suited to traffic, motors and comfort of passengers.

25-49

GENERAL ELECTRIC COMPANY

General Office, Schenectady, N.Y.

Sales Offices in all large cities